UTILIZATION OF INFORMATION TECHNOLOGY BY LOCAL GOVERNMENTS: THE IMPACTS OF POLITICAL AND THE BUREAUCRATIC BEHAVIOURS

a case study of six municipalities

by

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ABSTRACT

Utilization of Information Technology (IT) to support goal achievement, has been reported to be a critical concern of Information Systems (IS) executives in large organizations. In the past decade, it has become one of the major areas of interest for the MIS community. Research in the area of IS in the public sector suggests that political and bureaucratic interests strongly influence IT utilization in local governments. However, no comprehensive work has been done to investigate how organizational behaviours associated with the political and bureaucratic nature of local governments influence the extent to which those organizations utilize IT to support their goals.

This study proposes a framework to define how IT can be utilized to support four major goals of local governments: efficient administration, delivery of high quality services, objective and comprehensive decision making, and support of the democratic process. There are many factors which influence how local governments use IT to support their goals. Many of them are similar to factors which influence strategic use of IT in the private sector, and others are external to the organization. However, the literature suggests two internal factors that are qualitatively unique to governmental organizations and which are often mentioned as reasons why government actions do not follow normative expectations. These factors are commonly referred to as **"politics"** and **"bureaucracy"**. This study postulates a model which explains IT utilization in local government as a function of seven behavioral patterns which stem from these two factors. In this model, "political leadership", "political involvement in IS development", and "authority structure" are variables that depict behaviours of the political level. "Corporate management approach", "fragmentation", "incrementalism", and "dominant orientation" are variables that delineate bureaucratic behaviours. A measurement tool was developed and tested for each of these variables, as well as for four variables which depict utilization of IT to support the goals of local governments.

A multiple case study was conducted using six municipal governments; two with high utilization of IT, two with moderate utilization of IT, and two with low utilization of

IT. Each pair consisted of a large and a medium size city. Data analysis was conducted at three levels. First, a within case analysis describes the situation found in each city, rates the city on each of the variables, and explains why it uses IT as it does. Second, at the model level, the analysis focuses on the relationships between the political and bureaucratic behaviour variables and IT utilization, and the soundness of the model's predictions. Third, between-cases analysis uncovers common trends in IT utilization among the six cities studied, and provides insights as to **how** politicians and bureaucrats influence it.

The findings support the proposed model. In the study's sample, the political behaviour variable that has the strongest influence on the ability of the cities to use IT to support organizational goals was the existence of a unified authority structure at the political and administrative levels. It appears, however, that the influence of the political level on utilization of IT is only indirect and secondary to the influence of the bureaucracy. It was found that the politicians in the cities studied, in general, were not interested, or motivated, to develop and implement a vision regarding the role of IT in local governments. It therefore, seems unrealistic to expect the political level to initiate and champion IT utilization. At the bureaucracy level, a corporate management approach and a proactive, result focused, dominant orientation appear to be necessary conditions for the emergence of IS that supports organizational goals. Incrementalism and fragmentation of organizational power and decision making process seem to be strong impediments for utilization of IT to support organizational goals. On the more practical level, the findings from the six cases suggest that centralized approach to IS planning and development, standardization within and between cities, as well as with other levels of governments, nomination of executive level IS manager, and reliance on packaged solutions, may increase the ability of local governments to utilize IT effectively. The findings also suggest that IS development should be regarded as capital investment and implemented rapidly rather than in incremental steps. The measurement tools developed in this study can help practitioners plan, and evaluate themselves and provide a good starting point for researchers to embark on a large sample study.

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CHAPTER 1

INTRODUCTION

1.1 The motivation for the study

Governments in modern democracies are by far the largest organizations in most countries according to criteria such as the number of employees, size of operational budgets, and capital expenditures. Their decisions and daily operations affect all businesses and private individuals in those countries. Governments traverse all spheres of public life and have profound impacts on the future of our societies. Governments are also the biggest employers and the single most influential players in their national markets. For example, Plumptre (1988, p.2) estimates that more than 43% of the Canadian market is directly or indirectly controlled by Canadian governmental agencies. In 1992, the expenditures of the Canadian federal and provincial governments amounted to 24% of the nation's GDP[1]. In 1994, these governments employed more than two million persons, almost 16 percent of the total labour force in the country[2].

In the last thirty years, a major effort has been made to modernize the administration of governmental organizations by many Western countries at federal, state, and local levels. The introduction of sophisticated information technology (IT)[3] was seen as one way to improve public administration and to enhance its ability to achieve its goals (Lenk 1973, Danziger 1982, Donk & Snellen 1989, Lenk 1990, Caudle et al. 1991, Gore 1993). The

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[1] From the "National Incomes and Expenditures Accounts: annual estimates", Statistics-Canada, 13-201, 1994

[2] From the "Labour Force - August 1994", Statistics-Canada, catalogue no. 71.001.

[3] This study refers to Information Technology (IT) as the computer hardware (including communication) and software available to the organization. Information Systems (IS) is a holistic construct referring to the specific IT a certain organization uses, as well as, to the sociotechnical and organizational aspects of using IT.

results, however, were only partially successful and often failed to fulfil the expectations (e.g. Downs & Larkey 1986, Caudle 1988, Hamelink 1988). Nevertheless, the process of modernization did not slow down. Today more and more IT is being introduced at all levels of government and in most areas of operation (Kraemer 1989, Northrop et al. 1990, Taylor & Williams 1991, OECD's report 1993).

Failures of some governmental programs to achieve expected results, in modernization as well as in addressing social needs, are often attributed to two factors, **politics** and **bureaucracy**. Gore (1993), the vice president of the USA, wrote in the introduction to yet one more US administrative reform plan:

> *The problem is that governments are filled with organizations designed for an environment that no longer exists - bureaucracies so big and wasteful they can no longer serve the people... Bureaucracies in which tasks were broken into simple parts, each the responsibility of a different layer of employees, each defined by specific rules and regulations. With their rigid preoccupation with standard operating procedure, their vertical chains of command, and their standardized services, these bureaucracies were steady - but slow and cumbersome. ... In today's world of rapid changes, lightning-quick information technology, tough global competition, and demanding customers, large, top-down bureaucracies don't work very well ... Politics intensifies the problem. In Washington's highly politicized world, the greater risk is not that programs will perform poorly, but that a scandal will erupt. Hence control system after control system is piled up ... the emphasis on process steals resources from the real job: serving the customer.* (p.3)

In regard to utilization of IT, Laudon (1974) states: "*the extent to which information technology will be used to help meet those broader social needs is a political, not a technological, question*" (p. 311).

When thinking of governments, there is a general tendency to dismiss the routine activities of local governments as less critical than dramatic actions of highly visible federal agencies and officials. However, despite the glamour, and the obvious importance of national

and provincial governments, the actions of thousands[4] of local governments may affect the daily lives of the public in no less important ways[5]. In the local government arena, improving the planning, management, and delivery of public services is an old problem. As early as 1910 reformers were concerned with transforming local governments into "businesslike" organizations in which services could be effectively provided without favouritism. One manifestation for this reform movement was the rejection of the "party boss" system in many North-American cities, in favour of the council-city manager structure (Banfied & Wilson 1967)[6]. Advocates of the reform argued that it separates politics from administration and promotes professionalism and efficiency in city management (Stillman 1974, Svara 1989a/1989b, Nalbandian 1991). Thus, in line with the reformers' advocacy for more "scientific" management, introduction of IT to local governments was seen as a way to:

> *Develop technologies which would enhance productivity [of local government] in much the same way that the development of mass-production techniques revolutionized productivity in private manufacturing sector* (Kraemer 1981, p. 5).

Expectations, however, were soon trimmed down. La Porte and Metlay (1975) observed that while technological reforms were at first met with relatively unalloyed enthusiasm in and out of governments, the public soon became wary. Also, an increasing number of authors have pointed out the limitations of technological reforms (Nelson 1974, Rettig & Wirt 1976), and

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[4] There are more than 4,500 local governments in Canada and approximately 83,000 ones in the U.S. (Diamant & Pike 1994).

[5] To illustrate, Dutton & Kraemer (1980) claim that the expenditures of American local governments account for more than half of all domestic governmental expenditures in the US.

[6] In Western Europe and Canada the tradition and values of the professional civil service were established before the 20th century, and usually cities have narrower jurisdiction (Diamant & Pike 1994). Thus, the reform movement's impact was less dramatic since in many cases non-partisan election, and professional, politically non-affiliated, civil service were the norm.

several studies suggest that where IT based systems were implemented to support management-science techniques, they often failed to produce perceptible change in the quality of governments' decisions and services (Shick 1971, Lee 1973). Highlighting the familiar causes of policy failures in local governments, Ingram and Mann (1980) list *"**political** fragmentation and multiple veto points that often result in deadlock ... **bureaucratic** impediments to action ... agency infighting, and lack of coordination" (emphasis mine, p. 17),* as major ingredients.

Among other reasons why IT may not be utilized to its full capacity in local governments, Perry and Kraemer (1979), Danziger et al. (1982), Dutton and Kraemer (1985), Kraemer et al. (1987), and others suggest that **po litical** and **bureaucratic** motivations, rather than a rational management approach, often determine the need for IS, how it will be developed, and which purposes it will serve. Dutton et al. (1980) write: *"In general, policy makers do not want critical information that might illuminate policy failures"* (p.176). Northrop et al. (1990), summarizing a longitudinal study of the payoffs realized from computerization in local governments, state:

> *More sophisticated applications such as those which set and measure goals ... appear to be long way away from delivery of major payoffs if, in fact, the **political nature** of these application tasks will ever allow them to be dramatically affected by computerization* (emphasis mine).

Currently, IT is widely used in most local governments, for a variety of purposes, and with a varying degree of success. However, little attention was given to the question why some local governments make more extensive use of IT to support important goals, than the others, and what enables them to do so. This study aims to fill that gap.

The literature reviewed in Chapter 2, shows that political and bureaucratic motivations

are among the most important factors influencing IT utilization in local governments. However, even though there is a vast literature on political and bureaucratic behaviours, to our knowledge, no comprehensive study has been conducted to investigate how **behavioral patterns** associated with political and bureaucratic motivations influence the extent to which local governments utilize IT to support achievement of their goals, and to what extent differences in political and bureaucratic behaviours explain differences in IT utilization.

Focusing on behavioral patterns, rather than on motivations, allows this study to investigate factors that are relatively easy to observe, and thus, easier to control and change than values and motivations. It also facilitates, to some extent, to separate the influences of the political level on IT utilization, from those of the bureaucratic level, and to study the relative importance of each behavioral pattern as enabler, or impediment, for utilization of IT to support achievement of local governments' goals.

The terms *goals*, *organizational goals*, or *goals of local governments*, are used throughout this study to denote what Kraemer et al. (1989) labelled *organizational interests* which they defined as: "further the goals of top management, such as increasing the internal efficiency of service delivery, maximizing revenues and their collection, and maximizing service delivery to the community" (p. 191).

1.2 The objectives of the study

The specific objectives of this study are to:

1. Develop a comprehensive framework of how IT can be used to support major goals of local governments.
2. Identify factors associated with political and bureaucratic behavioral patterns which may

enhance or impede local governments' ability to utilize IT to support these goals.

3. Develop a model which relates political and bureaucratic behavioral patterns to IT utilization.

4. Define and develop measures of how local governments **actually** use IT to support their goals.

5. Define and develop measures of the existence and strength of political and bureaucratic behaviours associated with the ability of local governments to utilize IT to support their goals.

6. Describe how several local governments are using IT to support their goals, and how the level of IT utilization in these organizations is influenced by political and bureaucratic behaviours.

7. Compare the empirical data with the model to determine the validity of the model, the relationships between the behaviours of the politicians and the bureaucrats, and the impacts of these behaviours on IT utilization.

1.3 The research process

The first stage of this study focused on how IT utilization can support major goals of local governments. This was based on the literature on IS in local governments, which indicated important, and common, areas of activity for which IT utilization was found beneficial (e.g. Downs 1967b, Laudon 1974, Danziger et al. 1982, Dutton & Kraemer 1985, Kraemer et al. 1989).

The second stage of this study identified factors associated with the political and bureaucratic nature of local governments which may enhance or impede utilization of IT. These factors emerged from the literature on IS in local governments. In addition, the vast

literature analyzing the management and actions of governments in Western democracies was used to identify organizational behaviours which often characterize political and bureaucratic organizations (e.g. Allison 1971, Niskanen 1971, Breton & Wintrobe 1979, Bower 1984, Wildavsky 1984, Downs & Larkey 1986, Zussman & Jabes 1989, Osborne & Gaebler 1992). The literature on strategic IS (e.g. Hufnagel 1987, Porter & Millar 1985, Earl 1989, Harrington 1991, Tapscott & Caston 1993) was used to identify organizational behaviours perceived as instrumental, or most helpful, to the emergence of IS that support organizational goals. The integration of these three bodies of literature allowed the development of hypotheses regarding which factors, associated with political and bureaucratic behaviours, may have significant influence on the ability of local governments to utilize IT to support their goals. These first two stages provided the framework for studying why some local governments are more successful in using IT to support common organizational goals than others.

The next stage of the study operationalized the factors identified in the previous stages. This resulted in three variables which describe political behaviours, four variables which describe the behaviours of the bureaucracy, and four variables which depict utilization of IT to support the goals of those organizations. For each of these variables, a measurement tool and a three-level scale on which to rate each of the organizations studied was developed.

Equipped with these measures, and following a case study methodology, data was collected from six different municipalities. The data was first analyzed on a case by case basis. In a detailed case write-up, findings were described and conclusions presented as to how behaviours at the political and bureaucracy levels in the city explained the extent to which that city used IT to support the goals of local government. Secondly, data from all six

cases was combined and used to ascertain the reliability and validity of the measures developed for each of the variables. Lastly, between-cases analysis was performed to draw more general conclusions, as a base for recommendations for practitioners, and to identify areas which require further study.

The thesis is organized in ten chapters. This chapter discusses the motivation, objectives, and research process for this study. Chapter 2 reviews the relevant literature on IS in local governments. Chapter 3 sets the framework for the empirical study. Chapter 4 addresses the research methodology, describes the development of the measurement tools, and reports on the procedures followed during data collection. The fifth and sixth chapters are each a full-text case write-up. Each of these two chapters portrays the situation in a specific city, explains how findings led to the ratings of the city on each of the variables, and presents conclusions about what determines the extent to which the city uses IT to support its goals. To avoid exhausting the reader, the other four full-text case write-ups are presented as appendices A-D. Chapter 7 provides only a brief summary of the situation in each of these four cities along with conclusions about what determines the way they use IT. Chapter 8 is dedicated to the questions of the reliability and validity of the findings. It uses the data from all the cases to investigate the properties of each measure. It examines the sample chosen and addresses the possibilities of confounding factors. Chapter 9 presents the results of the between cases analysis. It compares findings to the predictions of the model. It describes general trends in IT utilization in local governments, highlights common behaviours of politicians and bureaucrats in these organizations, and explains how these behaviours

influence utilization of IT. Lastly, Chapter 10 concludes with practical suggestions, addresses the limitations of this study, and identifies areas for further research.

CHAPTER 2

LITERATURE REVIEW

2.1 IT in local governments - early studies

Research on computing in governments began in the mid 60's. At that early stage, the research was mainly focused on discovering how governments, at the national, state, or local level, were using computers, and how information systems, aimed to automate a large volume of data handling, should be developed, operated, and managed in governmental organizations. Thus, most of this research was focused on procurement policies, organization of data processing capabilities, management of data processing activities, and the financial aspects of computing[1].

In general, however, knowledge was scarce and inconclusive. Researchers felt that there was much to be gained from organizing the data handling activities of the various departments to satisfy most government-wide information needs by sharing data among departments (Hearly & Mason 1963, Mitchel 1967, Kraemer 1969, Kraemer, Mitchel, Weiner & Dial 1972), but how to do it successfully, the magnitude of the benefits and costs associated with computerization, and what other impacts computerization might have, were not clear.

Among the issues unique to local governments, **size** was recognized as a key factor in determining both the need for computerization, and the choice between in-house and outside computing (Luing 1969). The existence of departments, such as police, with

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[1] In 1973, the US National Science Foundation sponsored the EPRIS project (Evaluation of Policy-Related Research in Municipal Information Systems) which produced a comprehensive analysis of the research on IS with a special focus on local government. The findings of this research project are reported in Computer and Local Government (Kraemer & King 1977).

distinctive data processing needs was recognized. Decentralization of task specific applications to users' departments was suggested (Colton 1972), but in light of the prohibitive costs it was usually deemed unrealistic (Kraemer & King 1977). Also, Hoos (1961) and Faunce et al. (1962) found that the social relationships within governmental organizations were sometimes different from those in private businesses due to transferability, grading schemes, and job classifications. Diesen (1971), however, found no appreciable differences between governmental and private organizations, in terms of the behaviours of employees influenced by computerization.

In general, during the 60's and early 70's researchers gave little attention to the unique characteristics of governmental organizations with respect to IT usage and its management (Bozeman & Bretschneider 1986). A strong indication to this is the fact that in Kraemer and King's (1977) comprehensive review of the state of the knowledge on computers in local governments, an overwhelming majority of the citations were taken from research done in the private sector. Table 2.1 presents a sample of early empirical research on computing in local governments.

Table 2.1, Early empirical research on IS in local governments

TITLE	AUTHOR/DATE	METHOD	MAJOR CONTRIBUTION
Police and computers	Colton (1972)	survey and interviews in 498 police departments	The technology is being successfully used to aid police work but it requires changes in some jobs, skills, and practices. Most difficulties are behavioral not technological particularly between users and providers of computer services.
A survey of municipal automated data processing	Watlington (1970)	mail survey of 472 cities	Use of EDP by municipalities is increasing with most applications routine in nature. A shift in locating EDP from finance departments to independent EDP departments is observed.
Automation and the bureaucratic structure	Meyer (1968)	field study of 253 cities, states, and counties	EDP departments have different structure and job requirements than non-EDP departments. The bureaucratic structure has implications for administration of EDP.
Automated data processing in municipal government: a survey	Kraemer & Howe (1968)	mail survey of 419 cities	Municipal usage of EDP is increasing. Larger cities own their own installations while smaller ones use service bureaus. EDP is located in the finance department.
Automation and the middle manager	American Foundation on Automation and Employment (1966)	field study in 22 private, public, and academic organizations	Middle managers are not fully utilizing capabilities of computers because of their resistance. With computerization, middle managers' job will change and so will the organizational structure and hiring practices.
The status of EDP in city government	Willis (1965)	mail survey of 231 cities	Most cities are in their infancy in computer utilization with large cities predominating. Most applications are routine. Hardware and personnel cost are nearly equal.

2.2 Contemporary studies[2]

Since the mid 70's, research on IS in local governments has acquired a more distinctive identity. It has also diversified into four main areas of research: 1) the understanding of computerization and innovation in local governments, 2) the impacts of computerization, 3) the differences between the public and the private sector with respect to IT utilization, and 4) IS management in local governments. The following sections review the state of the knowledge in each of these areas.

2.2.1. Understanding computerization and innovation in local governments:

Most of the early literature on computing in local governments reflects a rational perspective. Implicitly, it regards computers as an apolitical technology, and its use as an attempt to improve the rationality of decision making and the efficiency of operations (Danziger et al. 1982). However, researchers in the field of IS in the public sector soon realized that this rational perspective did not provide a good explanation to the phenomenon of computerization in governments. Laudon (1974), in a series of case studies of state, region, and county information systems, found that the impact of computers has been "*at best, to increase the efficiency of line personnel acting within the context of traditional public policies*" (p. 302). He suggests that the failure to achieve more benefits from computerization results, among other reasons, from the fact that the technology is being used to further the interests of dominant groups in the organization who are often driven by political and bureaucratic forces. Similar conclusions have been reached by Hoffmann (1973, 1977) who studied the role of computers in the Soviet Union, and by Downs (1967) and Winner (1977)

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[2] A summary table of empirical research in the area of IS in local governments is presented in Appendix E.

in the USA. The same conclusion is reflected in Perry & Kraemer's (1979) explanation of the negative correlation between "climate favourableness" and IT's innovation scope[3].

Based on the findings of those studies, Danziger et al. (1982) focused on: 1) who controls decisions regarding computers, 2) the dominant mode of decision making (rational, technical, pulling and hauling, political), and 3) whose dominant interests are served, and formalized four perspectives on the politics of computing. Propositions developed from these four perspectives (managerial rationalism, technocratic elitism, organizational pluralism, and reinforcement politics) were then tested using data collected in a survey of more than 500 US counties and cities. Danziger et al. (1982) concluded that computerization in local governments is a very complex process. No single local government interest (managerial, political, or technological) unilaterally controls this process, and none of the interest groups is always served by it. In general, however, they found that computerization is shaped by those who directly control it to serve the interests of those who dominate the prevailing structure of influence within the local government. As such, Danziger's findings agree with those of previous studies (Laudon 1974, Hoffmann 1977, Winner 1977) that IT use tends to reinforce not only the prevailing control structure within local governments[4], but also the prevailing political and organizational biases of those organizations.

Two additional studies (Dutton & Kraemer 1985, Kraemer et al. 1987) also support

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[3] "Climate favourableness" was defined as the level of support of politicians and senior bureaucrats. The negative relationship was tentatively explained as the result of the tendency of elected officials to allocate resources for data processing differentially to organizational subunits in accordance with their perceptions of political advantage or need (Perry & Kraemer 1979, p. 91).

[4] They did not differentiate between political and bureaucratic control structure.

this perspective. These studies utilized a case study methodology[5], which allowed them to better understand the intricate political process involved in development and use of modelling applications. In local governments, they conclude, successful modelling is a process in which powerful interest groups negotiate for consensus that maintains and even reinforces the existing structure of power. At the federal level, since each agency is almost an independent entity, there is much less need for internal negotiation, but modelling often serves as a powerful political tool with which to win arguments in the inter-agency rivalry, or in the political debate between the Congress and the executive branch (Kraemer et al. 1987). As such, the need for modelling often stems from inter-agency competition and political motivations, rather than from technical-rational needs for the data. These studies also found that external interest groups (developers, vendors, and community groups in cities; and industries, contractors, regional lobbies in the federal arena) play a central role in the modelling process. Lastly, these two studies claim that at the conceptual level the forces that shape computerization are very similar across levels of government (Dutton & Kraemer 1985 p. 211, Kraemer et al. 1987 p. 18). The modelling process, the players, their interests, and their relative influences, however, vary significantly according to the size of the organization and the specific domain being modeled.

A related stream of research focused on adoption of computer innovations by local governments (Perry & Kraemer 1979, Danziger & Dutton 1977), the adoptability of innovations - the probability that an innovation will be incorporated by an organization - (Perry & Danziger 1980), and organizational change with respect to computerization

[5] Dutton & Kraemer (1985) studied the process of developing a Fiscal Impact Computerized Model in five US cities. Kraemer et al. (1987) studied the use of computerized modelling systems in federal agencies.

(Kraemer et al. 1989). It found that factors related to the external environment within which the organization operates, such as financial assistance, supportive professional infrastructure, reporting relationships, and proximity of supplies, influence adoption. Research also found that size, slack resources, the complexity of the problems that the organization faces, and the technical and functional properties of the innovation strongly influence governments' decision either to adopt or not to adopt an IT innovation.

Moving beyond these broad observations, and clearly embracing the "reinforcement politics" perspective, which posits that "*in every system of decisional control and allocation computing will reinforce the power and influence of those actors and groups who already have the most resources and power in the organization*" (Danziger et al. 1982 p. 18), Danziger and Dutton (1977) write:

> *If the values and interests primarily served by the innovation are relatively dominant in the political system, the probability of adoption increases. (p. 41)*

They found that higher IT innovation is associated with professional management and reform values[6], measured as the existence of council-city manager structure, use of management-science practices, corporate control over computer resource allocation, and nonpartisan elections. Complementing these findings, Danziger & Dutton (1977) found that when elected officials have greater control over decisions regarding computers, IT innovation decreases. Perry and Kraemer (1979) found negative relationships between the scope of innovation and "climate favourableness". They interpret this finding as the tendency of politicians and bureaucrats to allocate computer resources based on internal political considerations. Similar finding were reported by other studies of IS in local governments (Kraemer et al. 1989,

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[6] Reform values refer to the administrative reform movement which seeks to separate politics from administration, introduce management science practices to city government, and promote professionalism among the civil service agencies.

Dutton & Kraemer 1985, Danziger et al. 1982, Kraemer et al. 1981).

Focusing on inter-organization factors, Perry and Danziger (1980) found that complex systems which benefit a broader range of internal actors have a higher probability of being adopted. High risk usually does not deter adoption, since adopting complex systems (perceived as high risk) usually means that failures will not be easily identified (Perry & Danziger 1980). Also, in a fragmented organization, need, risk, and the relevance of the innovation to the organizational context, are less influential since the adopting departments can cover up a possible failure (Feller 1977). With respect to the need for computerized system, Perry and Danziger (1980) write:

> *Adoptability, is a positive function of [objective] need only at the lower range of the need value ... beyond that level other factors [usually political] are more critical" (p. 474).*

Dutton and Kraemer (1985) and Kraemer et al. (1987) also suggest that the political motivations influence the perceived organizational need for modelling system more than the rational managerial need for the information. Lastly, research highlights the positive link between top management[7] support and adoption of IT innovations (Danziger & Dutton 1977, Perry & Kraemer 1979, Danziger et al. 1982, Kraemer 1989). Furthermore, Kraemer et al. (1989) maintains that management actions intervene to shape the influence of the environment. They claim that the key factors to understanding changes in computing in local governments are the actions of managers which are the manifestation of the control structure, and the managers' orientation towards management and computing.

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[7] In general, no distinction is made between political and bureaucratic management support.

2.2.2. The impacts of computerization

As already noted, early research on the impacts of computerization in local governments started with high expectations (from IT), and ended with disappointments (Downs 1967, Hoffmann 1973, 1977, Winner 1977). The research reviewed in the previous section was, in part, an attempt to understand those disappointing results. It concluded that IT is a malleable technology (Kraemer & King 1986) which can be shaped to serve the interests of whomever controls the organization. In many cases, research also found that the state of the technology in the 70's and its cost were major constraints for realizing more benefits from computerization (Danziger & Kraemer 1986, Northrop 1990). While not as significant as was expected, researchers do show that some benefits have been realized, and claim that much more can be expected (Laudon 1974, Kraemer et al. 1981, Danziger et al. 1982, Dutton & Kraemer 1985, Kraemer et al. 1989, Northrop et al. 1990). For example, King and Kraemer (1985) report that 63% of the cities in their sample experienced moderate to high benefits with respect to speed of operation, 92% of the cities enjoyed more accurate data, and 85% reported increased service delivery due to computerization[8]. However, 69% of the cities reported little or no savings on staff, and 80% did not experience cost savings due to computerization.

Measuring the impacts of computers on administration and service delivery in terms of efficiency and effectiveness is extremely difficult, especially in the public sector where there are no clear bottom-line financial results with which organizational performance can be assessed. Furthermore, computers can support activities which are even harder to assess in terms of efficiency and effectiveness, such as planning, managerial decision making, and

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[8] The corresponding numbers reported in Europe are 82%, 74%, and 70% (OECD 1974, 1978).

interaction with the public. Nevertheless, 78% of the cities in King and Kraemer's (1985) empirical study reported that computers are useful for identifying cities' problems, 50% reported that computers are useful in determining solutions to the problems, and more than 55% said that computers help them in planning[9]. Similarly, Northrop et al. (1990) found that computers significantly improved the ability of city governments to interact with the public. Kraemer et al. (1993) report that computer-based information is important to most public managers, and some of them are even extremely dependent upon it. In actuality, Northrop et al. (1990) hypothesized, that the benefits from computerization are much greater than those reported since they allow municipalities to do more with the same amount of resources and to maintain the level of services during a period of severe financial constraints. Lastly, King and Kraemer (1985) found significant variance in benefits realized across cities. They found that large cities reported more benefits than smaller ones, and that external environmental factors were only weakly related to the outcomes of computerization. Overall, however, those external factors explained only a small portion of the variance in IT utilization. The authors suggested that internal factors may explain better why some cities use computers more extensively than others.

2.2.3. The differences between the public and the private sector

Some researchers have focused on the differences between the private sector and the public one with respect to IT utilization and management. Mansour and Watson (1980) found that a model that successfully predicted MIS performance in the private sector was inadequate

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[9] In comparison, data collected in 1976 among the same cities indicate that only 16% of top management (mayor, city manager, department heads) found computers useful or very useful for identifying city problem, and 11% fount them useful for determining solutions to city problems (Dutton et al. 1980).

in the public sector. They wrote: "*Government organizations function in an environment that is much different from that faced by private business organizations*" (p. 525). Bretschneider and Wittmer (1993) found that adoption of microcomputers in public organizations is higher than in comparable private organizations. They attribute this finding to the information intensity of governmental tasks, and the bureaucratic tendency to use technology as a side payment in lieu of salary. It was observed that in governments the need for IT often stems from the overriding political power of computer generated information (Kraemer et al. 1987), prestige and the need to be highly visible (Perry & Danziger 1980), and to justify budget expansion and increments in personnel (Bozeman & Bretschneider 1986). On the other hand, governmental organization face more red-tape, procedural delays, external review, and are accountable for much more than just generating revenue (Bozeman & Bretschneider 1986, Bretschneider 1990, Caudle et al. 1991). Caudle et al. (1991) relate these differences to public IS managers' concerns indicating that they are more concerned (than their private counterparts) over comprehensive and integrative IS planning, maintaining IS direction through changing political regimes, linking IS plans to budget, and facilitating data sharing and technology transfer. In addition, examining differences between levels of governments, Caudle et al. (1991) found that managers in local governments place more importance on mainframe systems and efficient transaction processing while those in the federal government place more importance on distributed data processing and flexible IS. Also, IS managers of local governments tend to be less concerned with red tape, and more concerned with technology transfer and data discontinuity between political regimes, than IS managers at the state and federal levels.

2.2.4 Managing the IS function in local governments

While the literature on IS in local governments is mainly descriptive, some address the question how local governments manage computing (e.g. Kraemer & King 1977, Kraemer et al. 1981, Danziger et al. 1982, King 1983, Kresslein 1984, Bozeman & Bretschneider 1986, Brown 1987, Kraemer et al. 1989). The results, however, are diverse, often incomparable, and with respect to some issues in contradiction with each other. Furthermore, there is a lack of consistency in terminology, and often recommendations are given with respect to a specific application without clarifying whether they should be applied to other types of applications as well. For example, Kraemer et al. (1989) developed a theoretical model of computing changes in local governments in which the actions of top management are portrayed as the single most influential factor in affecting changes. Who is included in this top management group is not exactly clear. Danziger et al. (1982), King and Kraemer (1985), and others argue that computers are used to serve the interests of the prevailing political coalition, and differentiate between political, managerial, and technocratic interests, but do not differentiate between "bureaucratic politics" (Allison 1971, Dutton et al. 1980) and "council members' politics". In general, there is an agreement that top level support is important for computerization (Kraemer & King 1977, Kraemer et al. 1981, Danziger et al. 1982, Dutton & Kraemer 1985, Miewald et al. 1987, Caudle et al. 1991). However, this factor was found only weakly associated with adoption and extent of IT utilization (Perry & Kraemer 1979). Also, it is not clear who should be considered top management. Some argue that the politicians should be considered as part of top management, and thus involved in IS development (Dutton & Kraemer 1985, Miewald 1987, Caudle 1990), while others suggest that computerization will fare better if politicians are not involved in decision making

regarding computers (Perry & Danziger 1980, Bozeman & Bretschneider 1986). Mirroring the controversy in the general IS literature, the literature on IS in local government is also not conclusive on the issues of centralization vs. decentralization, comprehensiveness vs. incremental development, user involvement, the structure and location of the IS function, the status of the IS manager, and the level of integration vs. stand-alone task specific systems (King 1983, Kresslein 1984, Kraemer et al. 1989, Danziger et al. 1993, Kraemer et al. 1994).

At a less specific level, however, the literature does provide some clues to IS management. Most studies found that in cities where rational management and reform values are dominant, there is a tendency to use IT more extensively and more technically advanced applications (Kraemer et al. 1981, Danziger et al. 1982, King & Kraemer 1985, Kraemer et al. 1989). Those cities are using technology to improve services (Danziger et al. 1982), are developing and using decision support systems (Dutton & Kraemer 1985), and report higher benefits from computerization (Kraemer et al. 1981, Kraemer et al. 1989). The dominance of the managerial and reform values, however, were measured by structural factors, such as the existence of senior executive, formal adoption of management-science practices, and non-partisan elections. Thus, research does not provide answers to **how organizational behaviours** influence utilization of IT, and which are more influential than the others. Lastly, Kraemer et al. (1989) identify nine states of computing in local government, ranging from the "skill" state which is controlled by IS professionals and focuses on technical issues, to the "strategic" state which is controlled by top management and focuses on managerial issues. They further argue that it is the role of management to decide which state is most appropriate to the city, and provide in very broad terms some indicators of how the IS function is

managed in each state.

2.3. Where this study departs from the approach taken by previous studies

This research does not challenge the reinforcement politics perspective adopted by most previous studies, or their findings. In fact, as Table 2.2 shows, it builds on top of the existing knowledge to shed light to yet one more aspect of the phenomenon of IT utilization by local governments. There are, however, five main points where this study departs from the approach taken by most previous researchers, and a few more minor ones.

First, most of the previous research which focuses on understanding computing in local governments is descriptive in nature. It observes the patterns of computerization in the cities and tries to see which conceptual perspective best fits the prevailing process. As such, they seem to follow the "emergent perspective" (Markus & Robey 1988), which "*attribute outcomes to an unpredictable interaction of technological features and actors' intentions*" (p. 589). Since most of these studies are concerned with explaining how outcomes (computerization) develop over time, they also tend to follow the "process theory" approach which holds that "*Causation consists of necessary conditions in sequence, chance and random events play a role, outcomes may not occur even when conditions are present*" (Markus & Robey 1988, p. 590). This study's underlying perspective, is closer to the "organizational imperative" perspective (Pfeffer 1982, Markus & Robey 1988), which "*Attributes the consequences of information technology to the choices and behaviours of managers*" (p. 589)[10]. Furthermore, this study is interested in exploring levels of outcome and how they

[10] Laudon's (1985) concepts of "environmental" and "institutional" models also see adoption and use of computers as predictable, but the environmental models see computerization mainly as a function of needs and opportunities created by the external environment, and the institutional models see computerization mainly as a function of values and interests wildly shared within the organization, rather than "objective" environmental pressures.

relate to levels of predictor variables. Thus, as Markus and Robey (1988) suggest, the "variance theory" approach is more appropriate. Hence, this research chooses, based on the existing literature, a number of organizational behaviours which seem to have strong impact on computerization and explores whether, how, and to what extent, those behaviours correspond with different levels of utilization of IT in support of an a-priori set of organizational goals.

Second, previous research links motivations (interests) to outcomes (patterns of computerization). Organizational behaviours, which intervene between motivations and outcomes, were often left unidentified. Dutton et al. (1982) write: *"At a general level, computing in most local governments is governed by the pulling and hauling among various participants"*. This research aims to explore the link between the organizational behaviours and IT utilization.

Third, while previous research identifies the important role politicians and bureaucrats play in determining how, to what extent, and to which end computers will be used in the organization, it often does not clearly differentiate between those two groups of players. Similarly, motives which stem from the political competition for votes and influence are not separated from those which stem from what Allison (1971) and Dutton et al. (1980) called "bureaucratic politics". This research aims to go one step further by focusing on the behaviours of each group **separately** in order to see how, and to what extent, each influences utilization of IT to support the goals of the organization.

Fourth, previous research is mainly concerned about understanding computing in local governments as a sector. It recognizes the variance between cities but pays little systematic attention to the question what makes one city use IT more extensively than the other in

supporting a set of common organizational goals. Using a multiple case study approach, this research looks at similar cities within similar external environments to investigate which political and bureaucratic behavioral patterns allow one city to use IT more extensively to support its major goals than the other.

Fifth, early works (e.g. Downs 1967, Laudon 1974, Perry & Kraemer 1979) had an underlying normative approach. Danziger et al. (1982) write:

> *Broadly, we are disturbed by the tendency for computing to be used to reinforce the dominant political coalition ... it is inherently undemocratic, many legitimate interest are excluded ... It has led to computing's application for internal administrative support and for increasing bureaucratic and social control rather than for service delivery to citizens ... we are disturbed because the dominant political coalitions have failed to utilize computing to serve citizens in new ways that utilize the technology's potential.* (p. 222)

Later, research tends to adopt a more neutral position, describing what cities are doing and fitting it into a conceptual framework, without taking a normative stand (e.g. Dutton & Kraemer 1985, King & Kraemer 1985). Kraemer et al. (1989) specifically claim that cities should not necessarily pursue more computerization, or move to the strategic state where computers support managerial concerns and the goals of the organization, as long as they decide which state they wish to be in and structure their IS accordingly. Recently there is once again a more normative flavour to many studies (e.g. Bozeman & Bretschneider 1986, Frantzich 1987, Miewald 1987, Caudle et al. 1991). This study follows these more recent works and measures to what extent IT is utilized to support common goals of local governments.

It is important to note also a number of less crucial differences. The previous studies which take a comprehensive look at IT utilization, as opposed to focusing on a specific

application, do so by counting the number of low level Information Processing Tasks (IPT)[11] implemented in each city (Perry & Kraemer 1979, Perry & Danziger 1980, Kraemer et al. 1981), investment in IT, and sophistication index of selective applications (Danziger & Dutton 1977, Danziger et al. 1982), or by asking IS managers to check each application the organization employs from a list of generic applications (Northrop et al. 1990). There are many advantages to this approach especially when a survey is used, but as Kraemer et al. (1981) write "*application can exist in name only*". Thus, this study focuses on the level of support existing systems extend to city officials and the public for achieving major goals of local governments. Similarly, in the literature management values are measured by looking at three formal arrangements (existence of chief executive, nonpartisan elections, and management-science practices). This study aims to go one step further from measuring formal structures to developing and utilizing measurement instruments which address actual behaviours, as well as measures of the use of IT to support major goals of local governments. This seems important since such measures do not exist in the literature.

Lastly, much of the data on which the above mentioned studies are based was collected in 1976, 1984, and to a lesser extent in 1987. Since then, the technology has changed dramatically and probably also has the awareness of managers and politicians. Also, all the data was collected in the USA. While we do not expect major differences (in the process of computerization and factors which influence it), Canadian cities with their different political and social environment may present a slightly different picture.

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[11] An IPT is a basic information processing task such as adding a record, printing a report, searching for a record, etc. In the Urban Information System Project (URBIS) research design, from which the data for many of those studies was taken, there are more than 350 different IPT listed (Danziger et al 1982, Chapter 8).

In Table 2.2, the left column summarizes the main findings of previous research on IS in local governments, the right column shows how each of these findings relates to this study.

Table 2.2, a summary of findings of previous research and how they relate to this study

RESEARCH AREA	MAIN CONTRIBUTIONS	IMPLICATIONS FOR THIS RESEARCH
Understanding computerization and innovation in local governments	Politicians and bureaucrats have strong influence on computerization.	Justifies the focus on politics and bureaucracy.
	The influence of politicians and bureaucrats is not always consistent with the goals of the organization.	Suggests that variance in IT utilization to support a-priori goals may be explained by different political and bureaucratic behaviours.
	Factors external to the city government, such as technology, environment, size, socio-economics, etc. are influential in determining computerization.	Need to control or incorporate these factors.
	Existence of systems does not necessarily imply that the goals of the organization are supported.	Requires focus on the extent to which systems support goals rather than on the existence of systems, investment in IS, or technical characteristics.
	Computerization is driven and controlled by a complex web of direct and indirect forces whose motivations, interest, and relative influences vary by issue, technology, personality, and time.	In light of the complexity a case study methodology seems the appropriate research method.
	Conceptually, the factors that influence utilization of IT are similar in local, state, and federal governments.	Supports reliance on general principles of politics and bureaucracy, and possible generalization of the study's findings.
	Cities are acting in response to needs which are politically-based as much, or even more, than they are mission-based.	Self-reported needs may not be sufficient criteria for assessing IT support of the goals of the organization.
	Bureaucratic motivations influence adoption of IT innovations.	Supports focus on bureaucratic behaviours.
	The actions of managers strongly influence the state of computerization. Dominant rational management orientation leads to higher utilization of computers.	Suggests the need to focus on actions and behaviours.

The impact of computerization	Computers are malleable technology which can support whatever structure and interest those who control them desire.	It is an open question why some cities realize more benefits from computing than others.
	IT utilization can be beneficial for: 1) improving administrative functions, 2) improving service delivery, 3) improving decision making, and 4) improving the democratic process by better interaction with the public. Most studies suggest that more can, and should, be done in all four domains.	Suggests that IT utilization should be assessed with respect to all four domains.
The differences between the public and the private sector.	IS management and usage in public organizations differ from that in private ones.	Justifies special focus on IS in the public sector.
	The differences between the sectors stem from the political and bureaucratic nature of governments.	Suggests that a focus on political and bureaucratic behaviours may provide useful insights.
	There are differences between levels of governments but usually they are perceived as differences in magnitude rather than in principles.	Tentative generalizations may be drawn from findings in local governments to higher levels of government.
Managing the IS function in local governments.	Little attention was given to the effects of behavioral factors (as opposed to structural and motivational) on computerization	Studying behavioral factors may explain how motivations influence IT utilization, as well as provides more practical recommendations.
	Rational management and reform values tend to be associated with more extensive computerization and more benefits from computerization.	Can serve as a basis for expectations with respect to how behaviours influence IT utilization.

CHAPTER 3

THEORETICAL FRAMEWORK

3.1 Utilization of IT to support the organizational goals of local governments

A major objective of this study is to develop comprehensive measures of how cities are using IT to support organizational goals. As already mentioned, previous studies which aim to measure IT utilization in a comprehensive way often focused on specific, relatively low level, computerized tasks which they labelled Information Processing Tasks (IPT) (Kraemer et al. 1981, Danziger et al. 1982, Northrop et al. 1990). IPT is a term used to signify an activity which has a specific objective, explicitly involves information processing and could be automated (Kraemer et al. 1981). For example, payroll processing, traffic-ticket processing, customer utility inquiry, balancing supplier accounts, can be designated an IPT. IPT is a useful unit of analysis, because it permits more objective and quantifiable observations of IT utilization. However, Danziger et al. (1982) identified more than 300 such IPT's, covering the full range of services provided by most city governments, and Northrop et al. (1990) reported that a new field study in 1985 led to expansion of the list of IPT's to 450. Another problem with the use of IPT as the basic unit of IT utilization is that it does not measure directly the extent to which IT is utilized to support major functions of local governments. For example, efficient and effective inventory management is one aspect on which cities can be evaluated. However, the IPT measure, since it focuses on specific data processing tasks, would not reveal the comprehensiveness of IT support for this function such as, whether or not the inventory management system provides automated linkages to other related functions (such as accounting, maintenance management, purchasing), or whether or

not it allows users on-line generation of orders. Similarly, issuing permits and licences is a service provided by all cities. While the IPT measure can detect the existence of automated systems for record keeping, record search, printing, etc., it would not show if those automated systems are integrated with other internal systems to provide eligibility checks, facilitate inter-departmental tracking of applications, or allow customers on-line filling of applications. Lastly, a large number of the IPT's identified in previous studies can be expected to be automated these days in most cities of more than 50,000 people (Kraemer et al. 1989). Since this study aims to explain variance in IT utilization across cities, a measure that focuses on areas where variance is expected is needed.

We are not aware of a study which has developed a comprehensive framework, or criteria, with which to judge the extent to which IT is used to support goals of local governments. We are also not aware of the existence of a commonly accepted framework of this type. However, studies have shown that IT can support, and generate significant benefits, when applied to four broad areas of activity which all cities, and probably most citizens, are interested in and concerned with: efficient administration, service delivery, decision making, and the democratic process[1].

IT utilization was found beneficial in improving the efficiency of the administrative processes. For example, Kraemer et al. (1981) write "*Automation of budget reporting and monitoring does result in more effective budget control ... further, it results in greater cost efficiency." (p. 255).* Norris (1986) found that the effects of microcomputers were mainly positive, and the two most significant positive effects of microcomputers on work in local governments were time savings and the ability to do work that was not feasible previously.

[1] Further elaboration of these four areas of activity will be provided in the next chapter.

Northrop et al. (1990) found that computerization is perceived as useful in supporting cost control and job costing functions, and somewhat useful in providing support for personnel management. Furthermore, while we do not have empirical evidence on the benefits of computerization in areas such as office automation, record management, inventory management, and payroll, there is no reason to assume that local governments differ from other large organizations in benefiting from these types of systems.

IT utilization was found beneficial in increasing efficiency of service delivery, improving the quality of the services, and facilitating new services. For example, King and Kraemer (1985) found strong positive correlation between service delivery effectiveness and degree of automation, computer usage, and measures of the sophistication of the systems used. Investigating computerization in police departments Kraemer et al. (1981) write: *"Automation of traffic ticket processing does result in more effective and efficient operations, and allows agencies to provide new services"* (p. 102). They further claim, *"Our findings support the early development of extensive police automation if one's goal is to improve the payoffs of computer technology for the police"* (p. 154). Similar findings were reported with respect to a variety of other services provided by local government (Norris 1986). Danziger et al. (1982) write

> *Computing [can] serve the public interest directly ... [by] facilitating the provision of public goods and services that were impossible or less feasible without the technology, and indirectly, by improving the performance of public organizations through improvement of quality, quantity, and manipulation of information for operations and for decisions.* (p. 223)

In general, IT utilization was also beneficial in supporting managerial decision making. In that respect, however, empirical findings are less conclusive. While computers are perceived by top management as useful and valuable for some management decision making

(e.g. budgeting, scheduling, planning), they are perceived as having less value for others (e.g. personnel, monitoring and controlling operations) (Kraemer et al. 1981, Northrop et al. 1990, Kraemer et al. 1993). Also, the extent to which IT utilization supports more objective and comprehensive decision making is not clear (Dutton and Kraemer 1980). For example, Dutton and Kraemer (1985) found that the ability of IT to provide more information, better quality information, and easier access to information is recognized and appreciated. But analytic decision support systems, such as computerized models and simulation, often retain the biases of those who control or have the dominant influence on their development. They, however, claim that the negotiation process which best describes modelling tends to focus the discussions on the underlying assumptions embedded in those types of systems, and thus contributes to a more analytic decision making process. Other studies, while recognizing the mediating influence of political and bureaucratic motivations, did find that decision support systems promote more, objectively accurate, forecasting and better quality decisions (Norris 1986, Griffith 1987, Brown 1987, Bretschneider & Schroeder 1988, Bretschneider & Wilpen 1992). King and Kraemer (1985) write,

> *The benefits of computing for management and planning activities have not been as great as the benefits found for efficiency and service delivery activities. We believe this is primarily because computing has been less extensively applied to these tasks.* (p. 87)

Lastly, a number of studies point to the potential of IT to *"Enhance citizen participation in government, to inform citizens of their rights (e.g. entitlements and allowances under existing laws) and duties, and to provide new information services to citizens"* (Dutton et al. 1982 p. 222). There is, however, very little empirical data about the usage of computers towards these goals. The one empirical study of local governments which touches on this area concludes that IT utilization significantly improves interaction with the

public (Northrop et al. 1990). This area of activity, which is common to all cities and commonly perceived as one of the goals of local governments, is labelled in this study as IT support for the democratic process.

In summary, Gore (1993) envisions IT being used by governments to: improve the quality of services provided; support result-oriented management and decision making processes; improve the internal administrative processes; and provide citizens with better access to governmental information. Empirical evidences show that utilization of IT to support each of these four goals is feasible and beneficial in the context of local governments. Thus, this study follows these four categories[2], and the extent to which a local government is using IT to support them forms the **dependent variables** of this study[3].

3.2 Factors that influence utilization of IT in local governments

What makes an organization use IT more, or less, extensively has been studied by many researchers interested in the diffusion of innovations and in factors that influence how an organization will use the technology (e.g. Rogers 1971, Downs & Mohr 1976, Perry & Danziger 1980). In very broad terms, research differentiates between environmental factors, and factors which are internal to the organization. The environmental factors comprise of three groups of variables that are outside of the organization and on which the organization has little control: the *societal or external environment*, the *technology environment*, and the *immediate environment* that depicts characteristics of the industry and market within which the organization operates. The internal factors comprise of variables such as, values and

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[2] In addition, computers are generally seen as having positive effects on the quality of the work life of city's employees (Kraemer et al. 1986). This aspect of computing however is only indirectly related to this study since it is not one of the major goals of local governments.

[3] The following chapters define more rigorously which functions within each domain will be looked at, and how IT's support to those system is measured.

attitudes, linkage between IS and business personnel, IS planning methodology, implementation policies, and the IS function structure. (e.g. Hofstede 1978, McFarlan 1984, Porter & Millar 1985, Sager 1988, Hamelink 1988, Harrington 1991, Chan & Huff 1992, Davenport 1993).

3.2.1 Environmental factors

More specifically, in terms relevant to local governments, the *external environment* within which the organization operates refers to: the local government charter, the reporting relationships with other levels of government, financial and technical assistance for computerization from other levels of government, professional communication, and legislation which regulates local government operations (Danziger & Dutton 1977, Perry & Kraemer 1979, Perry & Danziger 1980, Danziger et al. 1982, Kraemer et al. 1989).

The *technology environment* refers to attributes of the available technologies such as cost, availability, maturity, compatibility, and communicability, as well as to the extent to which the technology is relevant to the tasks performed by local governments (Danziger & Dutton 1977, Perry & Kraemer 1978, Perry & Danziger 1980, Dutton & Kraemer 1985).

The *community environment*, often referred to as the *immediate environment* (King & Kraemer 1985), refers to the size of the city, its wealth or the slack resources available to its local government, population growth, social complexity, socio-economics characteristics of the city's population, and the availability in the community of expertise in the use of the technology (Kraemer et al. 1989). This last group of variables subsumes two different sources of influence on the extent of IT utilization. Size, wealth, population growth, and to a lesser extent the other factors influence IT utilization by affecting the "objective" needs for computerization, and the ability to invest in IT (Kraemer & King 1977, Danziger et al. 1982).

The *community environment* factors, however, denote also the citizens' preferences with respect to what the city government should do. Thus, the community influences IT utilization by defining for its government the priorities of resource allocation, through its elected representatives, direct or indirect influence of interest groups, or a combination of these two.

All the above mentioned environmental factors may influence IT utilization in local governments. However, as Kraemer et al. (1989) write,

> *When considered in a broader perspective that treated environment as one of several competing explanations, the links between environment and computing conditions appeared uniformly weak.* (p. 255)

Kraemer et al. (1989), summarizing almost twenty years of URBIS's[4] research on IS in local governments tentatively conclude,

> *Management action supersedes environmental influence as the dominant driver of change in computing, both over time and across organizations. We found no instances in which environmental factors could be identified as critical factors affecting computing development, although many were found to have played important roles in shaping computing adoption and use. ... Even major environmental perturbations, such as changing economic fortunes, do not exert a uniform, predictable influence on computing.* (p. 257-8)

It is beyond the scope of a single study to address all possible factors which influence IT utilization. Also, the focus of this study is on the influence of political and bureaucratic behaviours on IT utilization, which means that the above mentioned environmental factors are less relevant to the questions asked by this study. Thus, to the extent possible, the sampling strategy adopted in this study (explained in the next chapter) seeks to control for these environmental factors.

3.2.2 Internal factors

The group of internal factors which explain how and to what extent IT is used in local

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[4] Urban and Regional Information Systems Association.

governments is most often called *intra-organizational environment* (Perry & Kraemer 1979, Kraemer et al. 1989). Studies which focus on intra-organizational factors usually differentiate between two levels of factors: the level of values and motivations, and the level of IS management policies. The first level includes factors such as, dominant values, interests, disposition toward IT, and managerial orientation, and the second level includes factors such as computing policy, centralization vs. decentralization of the IS, hardware and software environments, the structure of the IS function, user involvement, and executive support. For example, Danziger et al. (1982), and Dutton and Kraemer (1985) focus almost exclusively on the first group of factors, explaining variance in factors that belong to the second group as well as in computing outcomes, as the result of differences in the values and motivations of those who have dominant power in the organization. Laudon (1977) also focused on the first group of factors when he wrote, "*The growth of public government use of computers ... was ultimately defeated by a number of governmental groups unwilling to make the transition to a managerial democracy*" (p. 24). Others have focused on factors which belong to the second level. For example, King (1983) focuses on the question of centralization vs. decentralization of computing, Danziger et al. (1993) focus on the structural arrangement of the IS function and the orientation of computer specialists, and Kraemer et al. (1989) focus on computing policies. It is clear, and commonly accepted, that factors belonging to the first level are driving the second one, and while there certainly is a feedback mechanism with which the outcomes influence values, interests, and motivations, in the short term factors related to values and motivations determine how computing will be managed and how IT will be utilized (Kraemer et al. 1989).

Values, interests, and motivations are hidden constructs which can be assumed or

inferred but rarely observed. Also, as Danziger et al. (1982) demonstrate, there is no one set of values, interests, and motivations which controls computerization in a local government. Behaviours, however, are manifestations of the individuals' values and interests and those of important others (Ajzen & Fishbein 1980). Thus, organizational behaviours reflect the dominant values, interests, and motivations in the organization. They are also relatively easy to observe, and easier to control and change than values and motivations. A principal conclusion of Laudon (1974), Danziger et al. (1982), Dutton and Kraemer (1985), and others, is that computerization in local governments is primarily shaped by political and bureaucratic forces. Thus, this study aims to explore how and to what extent organizational behaviours which stem from the political and bureaucratic nature of local governments, influence the utilization of IT to support their goals. The next sections discusses in more detail some of the roots of these behaviours.

3.3 Organizational behaviours associated with politics and bureaucracy

Politics and **bureaucracy** are two factors quantitatively unique to governmental organizations[5]. They are often mentioned as the reasons government actions do not, and some argue cannot and should not, follow the prescriptions of the rational agent model. The uniqueness of these two factors stems from the fact that they constitute an alternative (to the rational perspective) set of assumptions regarding what motivates governments and how power is distributed within them (Allison 1971, Elmore 1978). Thus, organizational behaviours in governments may be explained not only as actions taken in an attempt to

[5] Politics and bureaucracy exist in all organizations. Their influence, however, is much stronger in governmental organizations because of the lack of bottom-line criteria, multiple and conflicting goals, lack of linkage between outputs and revenues, and many other factors.

maximize goal achievement, but also as the result of factions within governments which have competing, and sometimes contradictory goals and the power to pursue those goals.

Many studies have noted that some patterns of behaviour associated with politics and bureaucracy may impede governments from following the prescriptions of the rational management model. Some focus on the reasons for the existence of these behaviourial patterns and why they are so powerful (e.g. Downs 1967, Arrow 1974, Hofstede 1978, Bower 1984, Wolf 1988). Others look at the impacts of these behaviours on economic indicators, internal processes within governments, norms and values among public servants, responsiveness to public needs, and many other aspects of social life (e.g. Niskanen 1971, Wildavsky 1984, Zussman & Jabes 1989, Stanbury 1991, Blais & Dions 1991). Allison (1971), Kirby (1980a/b), Downs & Larkey (1986), and Dunleavy (1991) among others, use these patterns of behaviours as analytic frameworks with which to explain governmental actions and the constraints within which they operate. Yet others adopt a prescriptive approach and suggest ways to minimize the undesired impacts of these behaviours (e.g. Eddy 1981, Plumptre 1988, Ross 1988, Boseman & Stroussman 1990, VanDoren 1991, Rainey 1991).

These studies, however, share some common perspectives about political and bureaucratic behaviours:

a) The behaviours which may stem from a political and bureaucratic environment inherently and inevitably follow democracy as the governing method. They are attributed to the need of politicians to be reelected and to the size and complexity of governmental organizations and tasks they deal with.

b) These behaviours sometimes impair the ability of governments to follow the prescriptions

of the rational agent model.

c) Many authors believe that the extent to which these behaviours influence the actions of governments varies significantly among governments, levels of governments, and issues.

There are no clear demarcation lines between political motivations and bureaucratic ones, or between political and bureaucratic behaviours. Banfield and Wilson (1967) note that while the two roles of local governments, providing services (the bureaucracy role) and managing conflicts in matters of public importance (the political level role), can be analytically separated, they are often indistinguishable in a concrete way. Wildavsky (1984), Kelman (1987), Nalbandian (1991), Svara (1994), and others, argue that senior bureaucrats' values and actions extract significant influence over political choices, and that politicians' values, expectations, and actions, motivate and often directly shape the behaviours of bureaucrats. Furthermore, the term politics, which is commonly used to describe grappling for power and influence, is often used indiscriminately to describe both the democratic process through which elected representatives agree on public policies, and the internal struggle for power within an organization which has more to do with individuals' aspirations than with settling conflicting public interests (Ingram & Mann 1980). A politician may be motivated simultaneously by these two aspects of politics, and a senior bureaucrat may be motivated by external or internal politics as well as by the bureaucratic work environment of local governments (Wilson 1989, Perry & Keller 1991). This study, however, is not concerned with what motivates a politician or a bureaucrat in a certain city. Rather, it focuses on how the behaviours of the elected officials as a group, labelled **political behaviours**, and those of the senior bureaucrats, labelled **bureaucratic behaviours**, influence utilization of IT to support goals of local governments.

3.4 Political behaviours

It is useful to visualize the political process as a complex set of interrelationships among members of three groups: voters, politicians, and bureaucrats. Like consumers in the market, voters use their electoral support, money, and other political resources to express demands for legislation and other governmental actions. Like business entrepreneurs, politicians are suppliers who design and shape legislation and government policies. Finally, just as managers and employers are assigned the details of the production process in private firms, bureaucrats perform this task in governments.

Politicians, however, like all people, may be motivated also by self-interest. The self-interest axiom means that politicians, like others, are motivated by personal benefits and costs, and will pursue such rewards as satisfaction of an intrinsic need to actively pursue values they believe in, as well as personal wealth, power, and prestige (Gwartney & Wagner 1988, VanDoren 1991, Dunleavy 1991). Regardless of an ultimate motivation, however, the ability of a politician to achieve his/her objectives depends upon the ability to get elected and reelected, and subsequently power to determine policies once elected (Gwartney & Wagner 1988, Stanbury 1991). Thus, the individual politician is seen as a competitor in two interrelated markets: the external market for votes, and the internal market for power and influence among his/her fellow politicians.

Fesler (1980), Gwartney & Wagner (1988), and others postulate that pursuit of votes is the primary stimulus shaping the behaviour of politicians. They recognize also that in Western democracies, the ability of governments to formulate and implement policies hinges on the ability of the executive branch (the cabinet) to reach agreement among its members and, then, to get the approval of the legislative body (the parliament/congress) (Wildavsky

1984, VanDoren 1991). In turn, passing a resolution in the legislative body also requires the formation of a coalition that represents the majority of the members of the parliament[6]. However, members of the coalition represent different ideologies. They depend for their reelection on different groups in society, are primarily concerned with different issues, are tied in a complex web of loyalties to other members and to various interest groups, and may nurture different personal ambitions. This is, in part, because it is impossible for politicians to become experts on issues they are asked to decide upon and there are no clear-cut criteria or easy trade-offs with which politicians can choose among various policies and objectives[7]. Also, since governments usually operate in areas of high uncertainty, decisions are necessarily judgmental in nature and heavily influenced by the values, aspirations, and perceptions of the decision makers (Wildavsky 1984, Bower 1984). In situations like these, especially since in the competitive game the gains of one are often the losses of the other, bargaining, negotiation and consensus become the basis for collective decision making (Hofstede 1978, Bower 1984, Plumptre 1988). Politicians, in order to advance their goals, must master the arts of negotiation and persuasion, learn to make concessions, create networks of favours and debts, and shift decision making process from the explicit and analytic nature of a conference room to the "pulling and hauling" of the back offices.

Most of the literature on political behaviours focuses on the national level. However,

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[6] In a proportional representation system, the parliament (or congress) is usually dominated by a coalition of parties. Nevertheless, parties have a limited control over the vote of each of their members. In a direct representatives system, parties usually have a weaker hold on members but the executive branch is usually more homogeneous. However, among members of the legislative body itself, the coalition can be dynamic, created only on an ad-hoc basis before voting on an important issue.

[7] One example is the lack of a termination mechanism. If a private business incurs costs in excess of the value of the service it produces, bankruptcy will eventually bring the operation to a halt. There is no parallel external process for controlling inefficiency and halting unsuccessful experiments in the public sector. In fact, a failure to meet objectives often generates pressure for larger appropriations in the public sector, because of self-interest and over-riding importance to avoid what can be perceived as a failure.

there is ample evidence that the same processes may characterize politicians' behaviours at the local government level as they may do in the national level (Banfield and Wilson 1967, Dutton and Kraemer 1985, Nalbandian 1991, Svara 1994). Banfield and Wilson (1976) even state that studying city politics may help understanding national level politics. Rubin (1992) writes that in less reformed cities "*electoral politics play an important part in policy and administrative decisions*" (p. 454). Svara (1994), referring to cities without strong political leadership, writes "*The council is reactive, focuses on short-term problems ... seeks special benefits for constituents ... involved in administrative activities*" (p. 23).

3.4.1 Political behaviour variables

How do these characteristics affect utilization of IT to support goals of local governments? Earl (1990)[8] argues that strategic utilization of IT depends on the ability of an organization to formulate in clear and operationalizable ways its goals, to explicitly define its strategies and priorities, and to derive its IS plans from those higher-level goals and strategies. The political process, however, is often in marked contrast to those requirements. Schultze (1968) states that:

> *The first rule of the successful political process is, don't force a specification of goals or ends. Debate over objectives should be minimized partly because ends and means are inseparable. More important, the necessary agreement on particular policies can often be secured among individuals or groups who hold quite divergent ends*" (p. 47).

Thus, the extent to which IT is utilized to support organizational goals may depend on the extent to which the political level provides well defined goals, objectives, and strategic directions to the administration, demand result-oriented corporate management approach, is

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[8] Earl (1989/1990) referred primarily to organizations in the private sector, but it seems that the argument is relevant also to other types of organizations.

actively involved in strategic planning, and, on an on-going, comprehensive basis closely supervises the city's plans and operations. In other words, IT utilization may be a function of the **leadership** provided by the political level.

Earl (1989) referring to the private and Gore (1993) to the public sector, also argue that strategic utilization of IT requires organization-wide standardization, recognition of IT as a strategic resource, and unification of the authorities with the mandate to make strategic decisions, especially with respect to IS development. It also requires, in most cases, an integration of separate systems and a merging of the various authorities that handle IT into one unit at the corporate headquarters level. Earl (1989) argues that these steps will make it easier for an organization to manage IT as an important corporate resource, and as a function in its own right, he writes:

> *[IT should be managed]... as a function in its own right -- a function that is planned, organized, and controlled just as those functions such as finance or personnel, which are responsible for other principal resources* (p. 37).

These requirements may also be incongruent with the political process. For example, the complexity and diversity of the issues the political level must attend to, and the need to bargain and make concessions in order to create a working coalition, often lead to fragmentation of the authority structure at the political level (Banfield & Wilson 1967, Wildavsky 1984). In these cases, different political bodies have decision making authority in regard to utilization of IT. Similarly, politicians may divide an authority structure at the administration level to strengthen their hold over the bureaucracy or as a political necessity to share power bases (Frissen & Snellen 1990, Svara 1994). This may pose serious obstacles in the path of system integration, standardization, and the creation of a coherent IS strategy for the organization as a whole. Thus, the extent to which IT is utilized to support

organizational goals may depend on the extent to which the political level provides a coherent and unified **authority structure** to the local government organization.

Lastly, since the development of IS is a long and expensive process - far longer than the election cycle - and its products are often not visible to the public, politicians may not be interested nor supportive of this domain. Thus, the political level may not be actively involved in IS planning, and hence deprive the administration of top level championship and support which are important to successful implementation of IS that support organizational goals. Thus, IT utilization may also be a function of the extent to which the political level articulates a vision regarding the role of IT in the city, and is **involved** in IS planning and implementation.

These three behavioral patterns of the political level which seem to have strong influence on the ability of local government to utilize IT to support its organizational goals are the first of two groups of **independent variables** in this study. They are **political leadership, political involvement in IS development**, and **authority structure**. Each of these variables will be discussed in detail in Chapter 4.

3.5 Bureaucratic behaviours

The importance of the bureaucracy (senior civil service officers and their staff) in determining government policies and how they are translated to actions, is hard to overstate. As professional managers, with extensive experience and in-depth acquaintance with the operation of the governmental machinery, they are expected to initiate programs, advise on policies, investigate alternative solutions, and supervise the implementation of the elected body's policies (Allison 1971, Wildavsky 1984, Bower 1984, Rainey 1991). While, usually,

politicians occupy the seat of power for a short time only, the bureaucrats maintain continuity and carry the organizational knowledge and memory from one political regime to another. As such, their actions and motivations are especially important to the issue of IT utilization, since:

1) IT plans and the implementation of IS are often perceived by the political level as operational issues and left exclusively to the discretion of the administration;

2) often a prerequisite for utilization of IT to support organizational goals is the development of extensive infrastructure, which may take much longer than one election cycle; and

3) in most cases, the bureaucrats are the only ones in governments with sufficient managerial expertise and subject knowledge to develop a vision about how IT can be used to support the organizational goals, and the ability to translate this vision into plans and actions.

Certain bureaucratic motivations and behaviours, however, may not be conducive to the accomplishment of the goals of the government as a whole[9]. Sometimes, as Niskanen (1971) and Blais & Dions (1991) propose, "budget maximizing" and "discretion maximizing" can become the main motivations which govern bureaucrats' choices and actions. They argue that *"if bureaucrats are pretty much like the rest of us, it is useful as a first approximation to view them as seeking to maximize the size of their bureau's budget"* (Gwartney & Wagner 1988, p. 11). Budget maximization, they postulate, is a logical extension of the self-interest principle, since a larger budget enhances the opportunities and resources available to administrators at all levels. As a bureau's budget increases, the power, prestige, salary, and

[9] It is important to note that the following discussion explains the roots for some bureaucratic behaviours, but while these behaviours may characterize some bureaucracies they are not necessarily the dominant pattern in all of them.

other benefits which accrue to it will generally increase as well[10].

Other writers, while supporting the same conceptualization of governments as a collection of semi-independent departments and bureaus, each with its own attitudes, priorities, and traditions, choose to explain adverse bureaucratic behaviours as the inevitable result of the unique conditions under which governments operate (e.g. Allison 1971, Wildavsky 1984, Ross 1988, Wolf 1988, Rainey 1991). These authors do not ascribe selfish motivations to government employees, but focus on the inherent difficulties in implementing policies derived from the model of government as a rational agent. The negative sides of a bureaucracy, according to this approach, is the inevitable consequences of a lack of bottom-lines, an ineffective incentive structure, the size and complexity of the governmental organization, the disjunction between costs and revenues, the diversity of goals and the complex trade-offs between them, and the political environment. Ironically, Rainey (1991) notes:

> *These factors are both pushing bureaucrats to seek segregation, rely on internal evaluation criteria[11], develop narrow perceptions of their tasks, and choose strategies that aim to increase their independence and resources, while at the same time constraining the ability of the government leaders to enforce uniformity and to effectively control the actions of the bureaucracy.*

From a different point of view, that of organizational behaviour and psychology, the possible adverse bureaucratic behaviours (e.g. pursuit of parochial goals, alienated

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[10] At the middle and lower levels of employment, a larger budget offers additional job security, more opportunities for promotions, funds for office space, furniture, travels, and other resources which improve the work environment of the bureaucrats.

[11] The lack of measurable output and the disjunction between results and revenue bring governmental agencies to develop evaluation criteria that are not related to the efficiency or effectiveness of the operations but to internal factors such as status, connections, and power. In the terminology of the non-market failure theory (Wolf 1988) those evaluation criteria are called "internalities" and are paralleled conceptually to "externalities" in the market failure theory.

behaviours) is explained as the result of the work environment in which senior civil service officials operate. The diversity of the operations, fuzziness and abstract nature of goals, remoteness of political decision makers, and the frequent shifts in priorities, may present bureaucrats with an environment too ambiguous and complex to relate to (Hubbell 1992). Thus, some bureaucrats may scale down their perspective to a "narrow vision" of their responsibilities, identify with their unit instead of with the government as a whole, and ascribe their immediate tasks importance and urgency as if they were the missions or goals of the whole government rather than only the means (Plumptre 1988, Zussman & Jabes 1989). Similarly, they sometimes tend to ignore problems that are not directly related to their own narrow domains, and may engage in territorialism and "turf-wars", since they define their roles in the context of the specific task or project they are responsible for, rather than as members of the managerial group of the organization. Bower (1984), Plumptre (1988), and Zussman & Jabes (1989) found that governmental managers are less inclined to initiate or support innovations, and are often actively motivated to ward off new ideas. Although these motivations can partly be explained as a result of lack of rewards for, and recognition of, innovativeness, they may also be a reaction to the already too complex, unstable and inconsistent environments that managers face. While mainly aimed to promote accountability, equity, and managerial control, the proliferation of regulations, due process, and red-tape is also attributed, in part, to the inherently unmanageable work environment these bureaucrats encounter (Bozeman et al. 1992). Thus, in order to reduce the complexity of the work environment and the equivocality of the issues governments' managers must face, they may be motivated to rigidly classify problems and subjects into familiar patterns, devise pre-arranged procedures and regulations with which to address all problems, and insist upon due

process and conformity to regulations (Allison 1971).

Like the literature on politics, bureaucratic behaviours have been studied mainly at the national level. However, there is evidence that those behaviours may prevail also in some local governments' bureaucracies. Banfield and Wilson (1967) in their study of city politics, write:

> *Frequently [the bureaucrats] have three strategic aims in their search for autonomy: 1) to establish a taboo against "political interference" - a taboo under cover of which they would be free from supervision [of the elected level], 2) to achieve a maximum and assured role in policy formulation in order to protect their group values and settled traditions ..., 3) to control the procedures under which [they] monopolize the formulation of, or modification of, the procedures under which [they] work, so there will be as little disturbance of work routine as possible. ... The leader of the cities' bureaucracies are a conservative force in the cities' politics. (p. 213)*

3.5.1 Bureaucratic behaviour variables

How do these characteristics affect utilization of IT to support goals of local governments? "Bureaucratic politics" is referred to as one of the major forces which shape computerization in local governments (Laudon 1974, Kraemer et al. 1981, Dutton & Kraemer 1985, Kraemer et al. 1989). Danziger et al. (1982) write,

> *Local governments are not unitary and hierarchical, and the fragmentation of formal authority is apparent in most decision making processes ... The reality of bureaucratic politics seems to mitigate the overall effect [of using IT]"* (p. 163, 229).

Initiating and successfully implementing IS to support organizational goals requires strong, visionary, and proactive corporate leadership (Earl 1989, Tapscott and Caston 1993). It often requires a restructuring of the organization (Harrington 1991, Tapscott and Caston 1993), and a significant shift in resource allocation (Tapscott and Caston 1993). For the organization to move toward utilization of IT to support its major goals, it also should be result-oriented, dynamic, open to its environment and to innovations, and guided by long term strategic plans

(Earl 1990). The bureaucracy, however, may be engaged in budget-maximizing activities (Niskanen 1971), it may adopt a narrow, operational perspective of its tasks, and it may be oriented internally rather than externally. If that is the case, the city may lack the type of corporate leadership needed to initiate and implement the needed IS, and IT will be used primarily to improve intermediate processes rather than goals attainment. The bureaucracy may also be territorial and empire-building, concerned with "bureau-shaping" (Dunleavy 1991), which may result in fragmented organizational power and decision making processes. This, in turn, might impede integration and standardization, which are prerequisites for the utilization of IT to support the goals of the organization as a whole. The bureaucracy may cherish the status quo, resist changes, and foster incrementalism (Wildavsky 1984), either in the way things are done or in the allocation of resources. Hence, effective utilization of IT which often necessitates changes in the way things are done may not take place.

Four behavioral patterns which may explain variance in IT utilization across cities emerge from this discussion. The extent to which IT is used to support organizational goals may depend on the existence of visionary, mission-driven, strategic **corporate management** approach. It may inversely depend on the extent to which organizational power and decision making processes are **fragmented**. Successful utilization of IT to support organizational goals may be an inverse function of the extent to which a local government is **incremental** in its resource allocation and implementation of changes. And, IT utilization may depend on the extent to which the **dominant orientation** in the organization is proactive, customer-centred, and innovative. Clearly, these four dimensions of bureaucratic behaviours are not independent of one another, however, for simplicity, this study regards each of them as a separate variable and only at the analysis stage addresses the interactions between them.

These four behavioral patterns of the bureaucracy which this study suspects may influence utilization of IT to support organizational goals, comprise the second group of **independent variables** in this study. They are **corporate management**, **fragmentation**, **incrementalism**, and **dominant orientation**. Each of these variables will be discussed in detail in Chapter 4.

3.6 The model of IT utilization used in this study

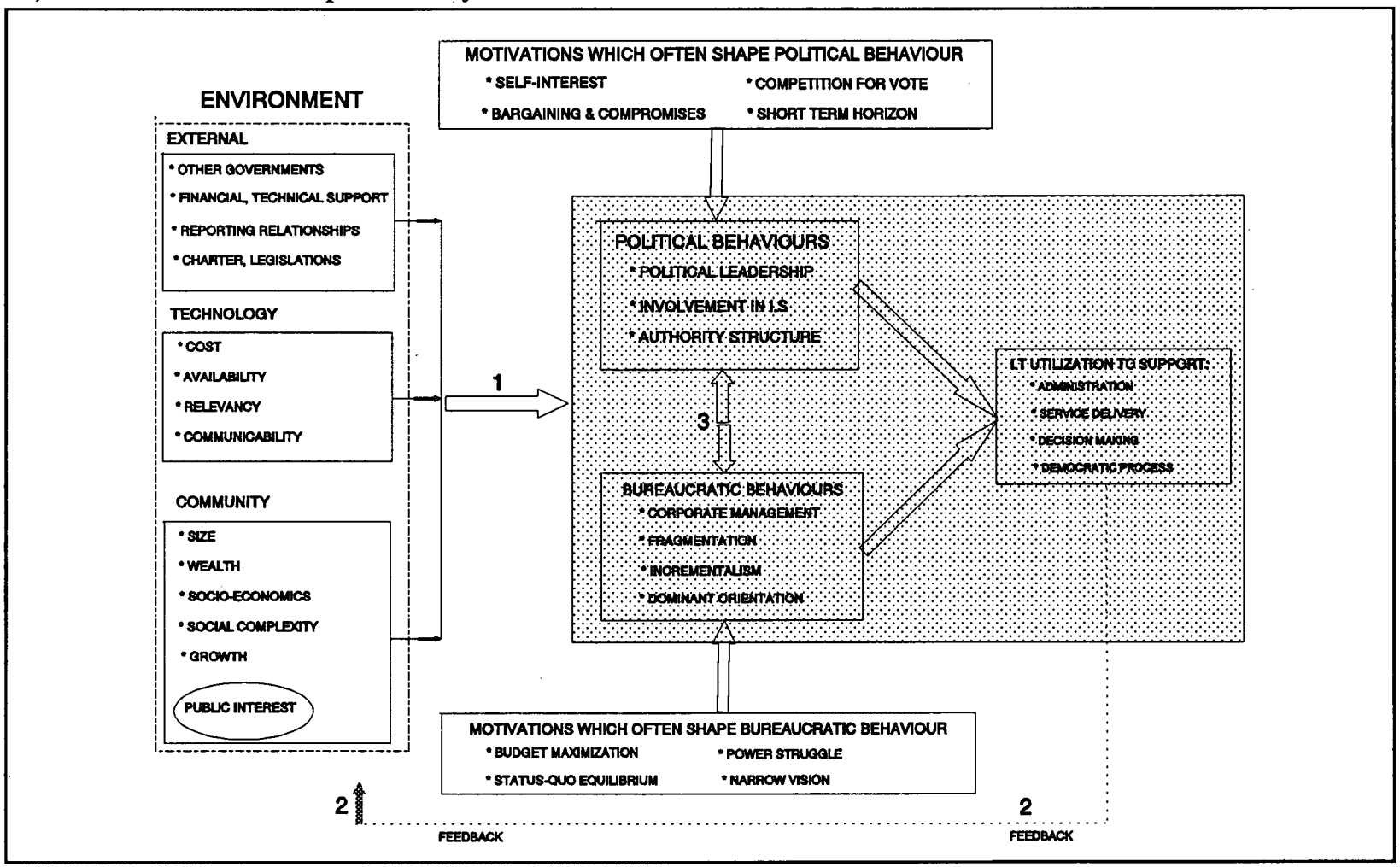
Chapter 2 and the previous sections of this chapter review the theoretical foundation for the empirical study. First, the literature on IS in local government was reviewed, four areas in which IT utilization can significantly support local governments' goals were identified, and the factors which influence IT utilization discussed. This body of literature suggests that political and bureaucratic motivations have strong, and sometimes dominant, influence on how, to what extent, and for which ends IT is utilized in local governments.

Second, the literature on political and bureaucratic behaviours, and on developing and implementing IS to support organizational goals was consulted. This suggests a set of organizational behaviours, associated with the political and bureaucratic nature of local governments, which might strongly influence the ability of a local government to use IT to support its goals. Thus, two sets of potential independent variables were defined.

Figure 1 summarizes the framework discussed above in a schematic model. For simplicity, and since this study focuses only on the three constructs within the shaded box, the influences of the environmental factors are represented as a single arrow (arrow number 1). In reality, some environmental factors may influence IT utilization directly, while others may effect it indirectly by influencing the behaviours of the political or bureaucratic levels

or the motivations from which these behaviours stem. Similar, the feedback arrow (arrow number 2) is added only to complete the model and its nature is not discussed in this study. Lastly, section 3.3 discusses briefly the relationships between the two independent variables of this study, represented in the model by arrow number 3. No predictions are made by the model with respect to the nature of these relationships, but to the extent the limited sample of this study allows, they are explored empirically.

Figure 1, Framework for the empirical study[12].



[12] The empirical study will investigate only the constructs within the shaded box. "Public interest" is specifically marked to indicate that it is an important factor not measured and not directly controlled.

It is important to make explicit five points essential to the understanding of the context of this study, its limitations, and the meanings of its findings.

First, the lists of motivations and behaviours which appear in the model, and on which this study focused are by no means exhaustive. They include only those behaviours judged by the author to be most relevant to the subject under study[13]. The behaviours and motivations mentioned are also not necessarily shared, or practiced, by all levels, units, and officials of a specific local government to the same extent. What this study assesses is only the dominant patterns of behaviour in each local government studied.

Second, patterns of behaviour associated with politics and bureaucracy may not be consistent across all domains and issues. Thus, for example, in a specific organization, the political level may provide a strong, visionary, and proactive leadership in regard to issues related to urban development or social legislation. However, the politicians may not provide leadership in regard to the operations and management of the organization, which is the kind of leadership needed for utilization of IT.

Third, although some patterns of behaviours, associated with politics and bureaucracy and described rather negatively above may impede use of IT, they may be positive and important from other perspectives. For example, Wildavsky (1984) argues that incrementalism is a positive attribute of the budgetary process in governments, since it serves as a mechanism to reduce the uncertainties involved in many governmental decisions.

Fourth, this study is based on previous studies that found utilization of IT to support

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[13] The basis for this judgment appeares in sections 3.4.1 and 3.5.1. We choose to focuse on political and bureaucratic behaviours which, according to the available literature, prevail in most public organizations and contrast with the recommendations of the literature with respect to favorable conditions for extensive utilization of IT. This choice is not supported by previous studies since to our knowledge no previous study address the influence of political and bureaucratic behaviors on IT utilization.

the four goals of local governments mentioned earlier feasible and beneficial from the public-interest perspective. A strong support for these conclusions can only be achieved through measuring the effectiveness of local governments, which is outside the scope of this study. Instead, this study can only indicate whether or not utilization of IT to support these goals is perceived as desirable by local government officials.

Fifth, high or low utilization of IT, does not necessarily reflect on the overall quality of a local government. While we believe that high utilization of IT can improve the performance of all local governments, it is possible that a city which does not make extensive use of IT could perform better than one which is highly supported by IT. It is also beyond the scope of this study to address other issues which can be affected by IT, such as the issue of privacy, citizen participation, quality of the work life of municipal employees, etc.

CHAPTER 4

METHODOLOGY, MEASUREMENT, AND DATA COLLECTION

4.1 The research method

The question this research addresses is **how** behavioral patterns associated with the political and bureaucratic environment of local governments affect utilization of IT to support four a-priori chosen goals. To answer this question three intermediate questions must first be answered: 1) to what extent are local governments using IT to support the four goals discussed in Chapter 3? 2) what are the dominant patterns of behaviours of the political level? and, 3) what are the dominant patterns of behaviours of the bureaucracy? Given the nature of the research question a field study method is the appropriate one.

Initially, we intended to collect data regarding the three preliminary questions through a survey of a large sample of local governments and then to use statistical analyses to reveal relationships between the extent of IT utilization and the behaviours of politicians and bureaucrats. However, a comprehensive review of the literature on IS in local governments, bureaucracy, and politics did not yield a well articulated framework with which to link these three areas. Also, commonly used and validated measurement instruments to use in a survey are unavailable. Finally, a pilot study in a municipal government, which employed questionnaires as well as semi-structured interviews, convincingly proved that the research question is too complex to lend itself to this line of investigation. As a consequence, case study methodology was chosen, because, according to Bonoma (1985), Strauss & Corbin (1990), and Miles & Huberman (1994), it is the most appropriate method when there is little theoretical knowledge in the area of study, the interactions between the variables are complex

and multi-dimensional, and the unit of study is inherently a very complex organization.

Yin (1989, 1991) suggests that a convincing way to show the effects of various factors on the phenomenon under study is to design the research as a multiple-case study. According to Miles & Huberman (1994):

> *"Multiple-case sampling adds confidence to findings. By looking at a range of similar and contrasting cases, we can understand a single-case findings, grounding it by specifying how and where and, if possible, why it carries on as it does. We can strengthen the precision, the validity, and the stability of the findings ... If a finding holds in one setting and, given its profile, also holds in a comparable setting but does not in a contrasting case, the finding is more robust". (p. 29)*

This multiple-case strategy allows "literal replication" within a group of cases which possess similar attributes, and "theoretical replication" when findings from cases with contrasting attributes are matched to an underlying theory (Strauss & Corbin 1990, Yin 1991)[1]. This study is designed to allow for both types of replication.

4.2 The unit of analysis

To situate the scope of the research, it was imperative to choose a unit of analysis which would be holistic. Relinquishing a holistic view of local government in favour of research on domain-specific departments and operational units would result in increasing difficulties relating utilization of IT to the achievement of the goals on which this study focuses. This is because in most cases the achievement of these goals depends on the combined efforts of a number of departments and units. The impacts of politics and bureaucracy are also less detectible at lower levels of local governments hierarchy. Usually politicians are not involved in the daily operations of the city, and the unique characteristics

[1] In this case the underlying theory is the model which appears in page 52.

of bureaucracies are less influential as units become more task specific with definable and measurable outputs (Wolf 1988). Thus, in light of the research question, the research adopts a holistic approach and chooses a local government as a whole as the unit of study.

4.3 The sample

In order to achieve literal and theoretical replication, at least two pairs of local governments (municipalities) are needed. The municipalities should be as similar as possible, with respect to the dependent or independent variables within each pair, and as dissimilar as possible between the pairs. A survey of the literature and data collected while preparing for this study made evident that even if the domain from which to sample cases was limited to Canadian municipalities, it would be almost impossible to find organizations which are similar enough in respect to the independent variables to allow literal replication. Cities differ in their organizational structure, environments, political institutions, etc. Just to find two or three cases which are similar enough in these respects would have required an in-depth study of many municipalities. An easier task was to choose the cases based on the dependent variables, namely, the extent to which they use IT to support their goals.

To explore the influence of political and bureaucratic behaviours on IT utilization it is important also to control for the environmental factors identified by previous studies as influential with respect to IT utilization. Two of these factors, the external environment in which the local government operates and the attributes of the information technology available to it, were relatively easy to control. Limiting the choice to cities in Western Canada ensures to a reasonable extent that all cities face the same legal restrictions, have similar mandate and reporting relationships with higher levels of governments, operate within comparable external

political and social culture, and enjoy the same financial and technical support for IS development[2]. It also ensures that the cities chosen for this study were facing the same technological environment.

Controlling for differences between the communities was a more demanding task. As previous studies show, the size of the city dictates to a large extent the needs for advanced IS, and how IT is being used and managed (e.g. Kraemer & King 1977, Kraemer et al. 1981, Danziger et al. 1982, Caudle et al. 1991). The size of a local government was also associated with the extent to which differences in political and bureaucratic behaviours influence its actions (Banfield 1965, Banfield & Wilson 1967). Socio-economic characteristics of the population, the wealth of the city, and the slack resources available to it were also identified as important determinants of IT utilization (Kraemer et al. 1981, Danziger et al. 1982, King & Kraemer 1985). Since, at the short and medium terms, political and bureaucratic behaviours have only marginal influence on the size of the city or its wealth, these two factors were not included as independent variables. As such, this study attempts, to the extent possible, to control for them through case selection and analytical means. This further complicated the task of selecting cases, as this control drastically reduced the number of municipalities from which to choose.

Thus, the sampling strategy adopted in this study was to choose two sets of municipalities. For each set, three municipalities which represent three points on the continuum of IT utilization -- high, moderate, and low -- were chosen, based on preliminary inquiries and convenience. One set is comprised of three large cities, each with about 500,000

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[2] Financial and technical support for IS development is the same because it is an external factor (i.e. it comes from the province equally to all cities). The need to choose cities of the same size, explained in the next paragraph, forced us to study cities from two neighbouring provinces. However, except for a small difference in the local government's charter, cities in both provinces face similar external environment.

residents, the other set is comprised of three medium size cities of around 100,000 residents[3]. The wealth factor was controlled, after the selection of the cases, by ascertaining that the cities have similar average annual per capita income, more or less the same municipal budget per resident (standard deviation of $60), and that differences in wealth do not correspond to differences in IT utilization. This sampling strategy controls for the effects of size and wealth within each set of cities. Thus, theoretical replication within each set was achieved by comparison of the two extreme cases, where the variance in extent of IT utilization is maximized. The three point sampling strategy permitted clearer insights about how the independent variables affect the dependent variables as one moves from cities with low, through medium, to high utilization of IT.

If the size of the organization was found to be a non-influential factor, with respect to the phenomenon under study, the sampling strategy adopted makes it also possible to achieve literal replication by showing the similarity in findings among the three pairs of cities. The first pair comprises of the large and the medium size cities which make high utilization of IT. The second pair comprises of the two cities which use IT only to a moderate extent, and the third pair comprises of the cities which make low utilization of IT.

Following this sampling strategy, cities A, E, and F were designated as the set of large cities, and cities B, C, and D were designated as the set of medium size cities. All the cities are located in the Western-most provinces of Canada. In Chapter 8 (Table 8.1) demographic, financial, and organizational data pertaining to each of the cities is presented.

One factor which is external to the local government organization and which this study

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[3] The choice of these categories of size was driven by the need to find three cities for each size group, and the desire to focus on cities large enough for political and bureaucratic behaviours to be easily detected.

was not able to control is "public interest". This factor denotes the preferences of the city's residents with respect to what their local government should do, as perceived by the city's politicians and bureaucrats. Theoretically, the public interest should dictate to the city government how much to invest in IT, how to use the technology, and whether to allocate resources to IS development or to other city's programs. Thus, differences in IT utilization may be explained by differences in public interest across cities. Obviously, public interest cannot be measured directly. Few studies which incorporate variables which may indicate differences in public interest, such as poverty, heterogeneity of population, education, and unemployment, did not find significant associations between these variables and the extent of computing (Perry & Kraemer 1979, Kraemer et al. 1981). Nevertheless, Kraemer et al. (1989) argue that differences in IT utilization across cities can be explained, among other reasons, by differences in preferences of the city government (comprising the political and the bureaucracy levels). Whether the authors believe that those differences in preferences reflect different public interest or only different political and managerial interests, is not clear. Based on the proximity of the cities (four of them belong to the same metropolitan area) and apparent similarities in socio-economic and demographic characteristics, this study assumes that the public in the cities studied have more or less the same preferences with respect to what its government should do[4]. The study substantiates this assumption by asking city officials whether they perceive high utilization of IT to support the city's goals to be congruent with the public interest and beneficial, and whether they sense public demands or objections for such use of IT.

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[4] Laudon (1985) found that environmental pressures, which can be interpreted also as pressure from the public, strongly influence adoption but not utilization. Thus, even if there are differences in public interest among the cities they may not have significant influence on utilization of IT.

4.4 The time dimension

Information systems take considerable time to plan, develop, and implement. Variables associated with the behaviour of the political level, when measured at present, may not explain the actual utilization of IT, since recent changes may not have had enough time to impact the actual usage of IT. Similarly, but to a lesser degree, changes in variables associated with bureaucracy may not yet influence how the municipality actually uses IT, since considerable time must pass for changes in the organizational orientation to register in actual behaviour.

In order to take this time lag into account when measuring the extent to which IT is used to support organizational goals, this study also considers systems which are in the planning or implementation stages, as long as the organization is committed to them by way of formal decisions and allocation of resources. In these cases, the study explicitly identifies how the municipality was using IT at the time of data collection, how utilization of IT is expected to change in the near future, and on what evidence these expectations are based. Similarly, this study measures variables associated with the behaviours of the political level and that of the bureaucracy not only as they are at the time of data collection, but also as they were in the last five years, a time frame that is sufficient to be reflected in current usage. In this way, the study compensates for the fortuitous point in time in which the municipalities were studied.

If recent changes occurred in those variables but have not yet influenced actual IT utilization, or not yet resulted in approved and budgeted development plans, such developments are mentioned but are not considered in the rating of these variables. For example, in a given city, the political level may have recently become much more involved

in IS development or may have embarked on a comprehensive strategic planning exercise aimed to provide visionary leadership. If these activities represent changes from the patterns of behaviour that characterized the political level in that city until then, but have not yet resulted in formally approved plans, commitment of resources, or significant organizational changes, the behaviours of the political level in that city are rated as they were rather than as they are currently.

4.5 Operationalization of the variables -- overview

The phenomenon this study aims to explain is why some local governments use more, and others use less, IT to support four a-priori chosen goals. Thus, the dependent variables are the existence and the quality of IT based systems which contribute to the attainment of efficient administrative processes, provision of high quality services, objective and analytic decision making, and democratic process.

This study focuses on organizational behaviours associated with the political and bureaucratic environments of local governments as possible explanations of variance in IT utilization across cities. As such, the independent variables are the behaviours of the politicians and the bureaucrats in the organization, and the principal proposition is that differences in the independent variables may explain why some local governments make more use of IT to support their goals than others[5]. Since the unit of study is a municipal government, the variables are operationalized in terms that are meaningful to that context.

As in most case studies, this study began with only a partial list of indicators for each

[5] There are, of course, many other factors that could impede IT utilization to support goals, such as lack of know-how, resources, and environmental factors. However, this study either controls for them, or (as in the case of know-how) considers them to be the outcomes of one or both of the factors under study.

of the dependent and independent variables. During data collection, new aspects of the variables which influence IT utilization were discovered and incorporated into the study, and other aspects which emerged as irrelevant were discarded. The variables and the lists of indicators used to measure them presented in this chapter are those used in the final data analysis.

4.6 Operationalizing the dependent variables: IT utilization in municipalities

It can be argued that any IT based system may, directly or indirectly, contribute to the achievement of one or more of the goals of municipalities. Even systems that are mainly administrative in nature, such as payroll, inventory management, accounting, and office automation systems, may be considered beneficial from the public interest point of view, since they make it possible for municipal governments to attain their goals with limited resources and to comply with rules and regulations imposed by higher levels of government. Similarly, systems that support decision making may be considered beneficial since, when resources are scarce, it is of utmost importance to decide correctly how to allocate them in order to maximize goal attainment. It can also be argued that IT based systems which support administrative processes, or decision making, may generate more payoffs to the city than those which directly support service delivery or the democratic process, or vice versa. Thus, this study considers IT utilization to support organizational goals as four separate, and equally important dependent variables, operationalized as the existence of IT based systems with a direct bearing on the following goals: a) provision of high quality services to the public, b) support of the democratic process, c) support of analytic, objective, and comprehensive

decision making, and d) support of the efficient administration of municipal activities[6]. Since there are no theoretical reasons to assume that utilization of IT must follow the same pattern for each of these goals, IT support for each goal is considered separately.

It is clear that the value of a system -- the extent to which a specific system contributes to the achievement of organization's goals -- should be measured on a continuum. A direct measure of the value of IT utilization should be based on the actual contribution of IT based systems to the attainment of the organizational goals. This, however, is very difficult to measure in a governmental setting, especially when one follows a holistic approach rather than focusing on a specific goal or service. It requires measuring the quality and quantity of the outputs of municipal governments, as well as the ability to separate the unique contribution each system makes to these outputs. An alternative approach, in which the value of IT is assessed only by asking for the subjective opinions of governmental officials, may not be valid since it is not clear to what extent informants can use objective, and comparable across cities scale, or whether they use public interest as their criteria. In addition, politicians and senior civil servants may have an interest in presenting a favourable evaluation of the situation. Instead, in this study, the utilization of IT to support local government goals is assessed by looking at the extent to which existing IT based systems support specific functions judged as important to the achievement of local government goals[7]. The existence of a

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[6] The goal of providing high quality services is directly derived from the missions to enhance the wealth (maximize the welfare) of the residents and to maintain order. The goal of supporting the democratic process is directly derived from the mission to safeguard the principles of democracy. Analytic, objective, and comprehensive decision making, and efficient administrative processes are goals which stem from the need to maximize the payoffs of the municipal operations and minimize their costs.

[7] The term functions is used in the sense of what a city does to fulfill its goals. Thus, the study focuses on functions such as: inventory management, cost control, issuing of permits and licences, traffic control, using information for decision making, publication of council minute, general election, etc. While somewhat similar, the terms activities and processes are less appropriate since they refer more to how these functions are executed.

system is only a binary measure while the value of a system should be measured on a continuum. Thus, the level of sophistication of each existing system is considered. Systems which provide on-line support, allow integration with related functions, facilitate changes via flexible design, and offer comprehensive support for the tasks for which they are used, have the potential to contribute more to the attainment of the goals of the organization, and are thus considered more valuable than less advanced systems. The existence of systems, and the level of support they may provide do not necessary imply that they are fully utilized. Furthermore, sometimes excessive sophistication may decrease the level of usage. In that sense, measuring the existence and sophistication of systems instead of their usage and the extent of support they actually provide, is a limitation. However, since it is very difficult to measure usage and level of support objectively, and since as described later in this work, we found that almost all existing systems are routinely used, we believe that it is a valid and objective surrogate measure of the dependent variables.

Thus, for each of the four goals identified above, a list of functions which are: a) salient to the achievement of the goals, b) common to all municipalities, and c) can be significantly supported by IT, was constructed[8]. For each one of these functions a generic description of IT based systems which could support the function to a high, moderate, or low degree, is offered as a measure of the potential value of the system to the organization. In general, following the theoretical discussion in Chapter 3:

a) high IT utilization is assigned to systems which fully automate the functions they support, or to systems which provide comprehensive, real-time, task specific support, and allow

[8] The functions were chosen based on the literature on the roles of local governments and the services they provide. However, to facilitate comparison and increase the variance, functions supported to the same extent across all the cities in this study's sample (such as criminal identification) or functions which are not performed by all cities (such as transportation and electricity) were eliminated.

integration with most related functions;

b) moderate IT utilization is assigned to systems which do not facilitate integration with most related functions, or to systems which provide only partial support, or where the support is not in real-time, and not customized to the specific instance of the task they support; and

c) low IT utilization is assigned in cases where there are no IT based systems to support the functions, or where the systems are only stand-alone applications capable of record keeping only.

As the study proceeded, these rating scales were fine-tuned to better express the differences between the systems found in the study sample. The rating of high utilization, for example, was often scaled down to reflect the characteristics of the best system found. This allowed for more sensitive measurement tools, but it precluded the measurements from being universal. The resulting measurement instruments, which assess the extent to which each municipality uses IT to support its goals, are presented in the following tables.

Table 4.1 presents the measurement instrument used to assess support for the administrative functions. Table 4.2 presents the measurement instrument used to assess IT support for provision of quality services. Table 4.3 presents the measurement instrument used to assess IT support for decision making. Table 4.4 presents the measurement instrument used to assess IT support for the democratic process. The study does not assume that all functions used to assess a variable in a specific municipality would be supported to the same extent. Thus, the overall assessment of the state of each city with respect to each variable, is the overall impression of the author based on the level of IT support to all functions pertaining to this variable.

Table 4.1: IT support of the administrative processes

Functions	High utilization	Moderate utilization	Low utilization
Inventory management	on-line and comprehensive support; integrated with purchasing, accounting, maintenance systems; automatic replenishing & user generated purchasing orders; tracking, reporting & analysis tools.	on-line and comprehensive but not fully integrated with accounting, purchasing and maintenance; no automatic replenishing; no on-line generation of purchasing orders; no analysis & reporting tools.	not on-line, or not covering all types of inventory, integrated only with accounting, no managerial functions, only record keeping.
Financial management	on-line, comprehensive accounting system; fully integrated with all functions which generate financial transactions; electronic transfer; bank reconciliation; cost allocation; point of sale data entry; budget preparation; financial analysis & reporting tools.	on-line accounting system but not capable of handling all types of accounts or transactions, or not fully integrated with associated systems, or no budget preparation, no financial analysis and no reporting tools.	accounting system which do not cover all transactions, not integrated with associated functions, redundant data entry, no budget preparation, analysis, electronic transfer, bank reconciliation & reporting tools.
Payroll	on-line, parametric system; handling all workers; automatic time capture or one time data entry; integrated with maintenance, personnel, & accounting; electronic deposit, check writing; annual reports (T4)[9].	capable of handling all workers; electronic transfer, check writing, & annual reports. But, non-parametric; redundancy in time card data entry; not fully integrated with other system or not on-line.	stand alone, non-parametric & not on-line system, and/or not capable of handling all workers, no electronic transfer, no annual reports.
Personnel	on-line, central personnel records; employment history, positions, job descriptions, training and qualifications, performance appraisal; integrated with payroll & time card; analysis & report tools.	on-line, central personnel records but only current status & no performance appraisal, analysis or reporting tools, or not fully integrated with other systems and not on-line.	stand alone, record keeping database, no employment history, qualifications, training; no managerial functions.
Consistency in references	all data, in all systems, which refer to the same entity share a common key; no redundancy in data storage; on-line linkages between record regarding the same entity; electronic link to external assessment authorities; dynamic views.	central repository database of addresses and properties which is linked on-line only with some of the systems that use that kind of information.	stand alone database; each system holds its own addresses and properties records; or none.

[9] T4, given as an example, is an annual report needed to complete the income tax forms.

Office automation	city-wide network which offers an integrated and standardized office suite, including: word processor, spreadsheet, communication, telephone, graphics, e-mail, file transfer, scheduling.	only between 50%-80% of the employees are provided with PC, or are connected to the network, or office automation tools are not standardized; some tools are not provided; no enveloping system to integrate the various tools.	less than 50% of office workers have PC or are connected to a network, or office automation tools are not standardized, and, most tools are not provided nor integrated.
Cost control, job costing	on-line systems, fully integrated with accounting, inventory, personnel, & payroll; semi automatic generation and costing of work orders; allocation of costs to programs, projects, equipments and work orders; analysis and reporting tools.	the same as the high cell, but not covering all types of the city's operations, or not fully integrated with the related systems, and/or no analysis and reporting tools.	batch based system which records work orders and posts costs to appropriate accounts.
Record management	city wide, on-line, standardized, magnetic media storage of all records; full text search and retrieval capabilities.	a city-wide computerized record indexing system, or number of separate, non-compatible, record management systems, or record management system that stores only part of the city's records.	small stand alone databases, or departmental computerized indexing systems, or none.

Table 4.2: IT support for provision of services

Functions	High utilization	Moderate utilization	Low utilization
Response to emergency calls (police, fire, ambulance)	on-line, computer aided dispatch system which covers all three services; real-time optimization of whom to alert, routing, and call-ups for reinforcement; on-line presentation of all relevant, call-specific data available in the city's systems.	the same as in the high cell, but only for some of the services; or on-line computer aided dispatch system which presents only static (not call specific) data; no automatic optimization of routing, alerts, & reinforcement.	records calls and maintains log of activities; stand-alone database of some relevant information; no automatic functions; or none.
Provision of data to emergency field crews	mobile data terminals in most vehicles; communication links which allow field crews to interrogate all city's systems; remote data entry and verification.	same as in the high cell but only in few of the vehicles, or radio links with operator who can access all city's systems on-line.	radio links with operator who does not have on-line access to most systems, or none.
Traffic control	full coverage; automatic traffic-load sensing and scheduling of traffic lights; responsive system.	full coverage; automatic traffic lights control system but without real-time components.	partial coverage; static traffic lights control system, or none.
Water, sewage, storm-water control	full coverage; real-time monitoring of pumps and valves; automatic detection of faults; remote control.	partial coverage, or real time monitoring but no remote control capabilities.	none.
Bill and fine collection	ATM; and/or: one-stop service station integrated with other city's systems; on-line data entry, query, printing of bills and receipts; flexible forms of payments (banks, instalments, automatic debiting, credit cards, checks, cash); bar code scanning.	one-stop computerized cash register not integrated with the city's systems, or a number of different systems each one capable of handling one type of payment, or system does not allow flexible form of payments.	computerized cash registers for each type of payment, not integrated with other systems, no on-line data entry, query, and printing of bills and receipts, no flexible form of payments, or none.
Issuing of permits and licences	on-line filing of applications; automatic fill-in data fields and eligibility checks; presents customers with case-specific information; inter-departmental inquiry and tracking system integrated with bill collection system.	one-stop service counter; inter-departmental inquiry and tracking system.	departmental record keeping. or none.
Public library	on-line, multi-branches, circulation system; computerized catalogues; public terminals; self search, inquiry, and booking; automatic notification; remote access.	on-line but branch specific circulation system; computerized catalogues; search only public terminals; no self booking, status inquiry, or remote access.	computerized catalogues, or none.

Managing public requests and complains	on-line, city-wide system which records, channels, and tracks all types of requests and complains; generates confirmation notices and final responses; integrated with all other relevant systems.	on-line, city-wide but type-specific system; records & tracks requests for specific services, and/or does not generate responses; not integrated with other systems.	off-line record keeping, or none.
Provision of information, registration services	on-line registration/booking system for all city's sponsored events, classes, facilities; available at most public service counters, integrated with other systems to allow on-the-spot payment and issuing of receipts /tickets /confirmation.	on-line but event or departmental specific systems; presents information and allows registration / booking only to those activities controlled by one department; not integrated with other systems.	system support for registration / booking are for local activities only, or none.
Remote access	direct access through dial-in modems or terminals in central locations to: registration services, taxes/fines/bills inquiries, permits & licences applications, and requests for services.	direct access through dial-in modems or terminals in central locations to a partial list of the services mentioned in the left cell.	none.
Customizationvalue -added services	notices and bills in language of choice; offering a range of options regarding format of bills and their informative content.	some of the items described in the high cell but not all.	none.

Table 4.3: IT support for decision making.

Functions	High utilization	Moderate utilization	Low utilization
Sharing of information	all corporate data is available on-line, systems and users can easily share information stored anywhere in the city, easy to use interfaces allow easy access and manipulation of data.	not all corporate data is readily available on-line; sharing information among systems often requires professional involvement; no easy-to-use data manipulation tools.	data is not managed as corporate resource; most systems are not compatible; very little data is available on-line.
Breadth and depth of information	corporate data is broad and deep; includes environmental data as well as internally generated data in great detail; historical data is maintained and available on-line.	only limited environmental data is available through the IS; historical data is not maintained on-line.	no environmental data is available; there is no historical data in the system; internally generated data is kept at a relatively high level of aggregation.
External linkages	on-line, dial-in linkages to many external networks and databases are available to most city's officials.	few linkages to external sources of information; no on-line, dial-in capabilities, and/or only few officials have on-line connection with external networks/databases.	only operational-level, routine and standardized file transfers, or none.
Flexible & easy to use reporting, executive summaries, exceptional reporting	flexible and easy to use report generators which allow integration of data across systems; most systems provide executive-level summaries, exceptional reporting, and graphical presentation.	most systems provide menu driven report generator, usually restricted to the data stored in each system alone; no executive-level summaries; no exceptional reporting; no graphical presentation.	only routine, standardized print-outs of data; most system do not support user generated reporting.
Performance monitoring & performance evaluation	system support for monitoring use of resources and many parameters regarding the city's outputs; on-going, standardized, and city-wide calculation of performance measurements.	system support for monitoring use of resources and limited outputs' indicators; some city-wide performance measurements criteria are routinely calculated.	systems' support for monitoring use of resources only; no performance measurements at the corporate level, or none.
Analysis tools (modelling, forecasting, statistics)	many analysis tools are available on-line at the corporate level; tools are well integrated with the city's data; available tools cover many aspects of the city's activities.	few, task-specific, analysis tools are available at the corporate level; analysis tools are not integrated with the other systems.	none.

Table 4.4: IT support for the democratic process.

Functions	High utilization	Moderate utilization	Low utilization
General election	automated voting system.	calculation and reporting of the results.	voters list, or none.
Publication of council minutes, decisions, legislations	on line, search and retrieval capable system, electronically accessible to the public.	database of council minutes, bylaws, policies.	computerized indexing system, or none.
Communication between the public and its representatives	system capable of recording, channelling, and tracking constituents' concerns.	system that records constituents' concerns, or a messaging system.	telephone, or none.
Council's oversight of the administration (monitoring city's expenditures, operations, administration behaviours)	on-line, EIS[10] type of system for aldermen.	on-line, menu driven query system and report generator.	on-line connection to all city's systems, or none.
Disclosure of municipality's data (budget, plans, programs, expenditures, etc.)	on line, search and retrieval capable archive, electronically accessible to the public.	magnetic media archive.	computerized indexing system, or none.
Involvement of the public in decisions	computerized survey/poll system that actively seeks and analyze public opinion, or interactive televised council meetings.	bulletin board which carries council agendas, and/or system that record public opinion regarding issues on the agenda.	televised council meetings, or none.
Reducing asymmetry of information (collection and distribution of social, commercial, and environmental data and statistics)	on line, search and retrieval capable system, electronically accessible to the public.	database.	computerized catalog, or none.

[10] Executive Information System, a system which provides executive-level managers, with no extensive knowledge of IT, the ability to perform without professionals' help ad-hoc queries, what-if analyses, and search for information at various levels of detail.

4.7 Operationalizing the independent variables: the behaviours of the political level

An observer might not expect (normatively) that the political level, e.g. the city council, would be deeply involved in the details of how a city uses computerized systems. However, as the literature reviewed in Chapter 2 suggests, decisions and actions of politicians may have significant effects on how a city utilizes IT. This study hypothesizes that the political level may influence IT utilization to support organizational goals through its decisions and actions in three dimensions.

First, Ingram and Mann (1980) write: "*[politicians in local governments] tend to be reactive, deviating from incremental shifts in policy primarily when pressures from the political system's environment are too strong to be ignored*" (p. 170). Banfield and Wilson (1967), and Ingram and Mann (1980) argue that politicians often do not set specific goals and objectives, they devote sporadic rather than sustained attention to policy implementation, and they shy away from committing themselves to a course of action. Svara (1994) found that cities where the politicians provide strong political leadership perform better. Thus, this study hypothesizes that the political level can affect utilization of IT by the extent to which politicians provide well defined goals, objectives, and strategic directions to the administration, demand result-oriented corporate management approach, are actively involved in strategic planning, are willing to commit resources to long term plans, and, on an on-going, comprehensive basis closely supervise the city's plans and operations. This dimension is labelled as **political leadership**.

Second, many studies found that IT is being used more successfully, and to a larger extent in local governments, when senior officials are supportive of IS development and are actively involved in IS planning (e.g. Kraemer et al. 1981, Dutton and Kraemer 1985, King

and Kraemer 1985, Kraemer et al. 1989). Bugler and Bretschneider (1993), citing others, write,

> *The most important variable in determining the success of computing implementation is the agency's commitment to advanced technology. Such a commitment would show itself by the level of importance an agency places on data processing and by top management's involvement in the coordination of MIS* (p. 281).

On the other hand, some researches who studied public administration though not specifically at the local government level, argue that IS should not be managed by the top of the executive structure, since, "*Political executives' understandable concern with political cycles and quick results can undermine the long term managerial objectives of PMIS*[11]" (Bozeman & Bretschneider 1986, p. 484). Thus, this study hypothesizes that the political level can affect IT utilization by the extent to which politicians support IS development, are directly involved in IS planning, oversee the IS function, and articulate a vision or policies regarding the role of IT in the city. This dimension is labelled as **political involvement in IS**. It can be argued that involvement in IS development should be considered as a component of political leadership. However, in light of the importance ascribed to the involvement of top level management, and the fact that there is no basis to assume that politicians recognize IT as a strategic resource, political involvement in IS is treated as a separate variable.

Third, Banfield and Wilson (1967), Kraemer et al. (1981), Kelman (1987), Nalbandian (1991), and Svara (1994) show that institutional design, the way the formal and informal authority relationships are structured, strongly influence the performance of the city. Thus, this study hypothesizes that the political level can affect IT utilization by the extent to which politicians create a coherent and unified authority structure at the political level, give the

[11] Public Management Information Systems.

city's management team authority to direct all the operational units in the municipality, and centralize authority over all matters relating to IT utilization in the hands of one political body. This dimension is labelled as **authority structure**.

The behaviours of the political level with respect to each of these three dimensions are hypothesized to have strong impacts on the extent to which the city is able to use IT to support its goals. However, there are no theoretical reasons to assume that politicians will be consistent in the extent to which their actions and decisions are conducive to the development of IS across the three dimensions. Thus, each one of the dimensions is treated as a separate independent variable. The behaviours of the politicians, with respect to each of the dimensions can be highly conducive to IT utilization, moderately so, or low and even somewhat obstructive. To measure the three variables related to political behaviours, we developed, for each variable, a set of indicators, that capture different aspects of the variable. For each of these indicators, three generic political behaviours are identified and assigned a rating of high, moderate, or low, to indicate how conducive (hypothetically) they are to the development of IS that support the city's goals[12]. This resulted in a table (Table 4.5) which serves as a measurement instrument.

[12] As already noted this study does not make any claim with respect to how conducive these behaviours are for other aspects of local governments, or for their overall performance.

Table 4.5: Variables and indicators of political behaviours.

variable / indicator	High	Moderate	Low
Political leadership provision and commitment to well defined goals & strategic directions in all areas of operation	on-going, formal processes in which council formulates and reviews the city's plans and operations, in a comprehensive way.	institutionalized, one-shot process in which council set its objectives for the term/year.	no formal process in which council set goals priorities, and directions.
	council is interested & actively involved in goal setting & strategic planning.	council supports & encourages but is not involved in goal setting & strategic planning.	council does not support nor get involved in goal setting & strategic planning.
	top-down, comprehensive budgeting process in which council provides result-oriented guidelines.	bottom-up but comprehensive budgeting process; council does not provide guidelines.	bottom-up, fragmented budgeting process.
	existence of mission-driven, updated strategic plans, officially endorsed by the political level.	strategic plan/s exist but not officially endorsed by the political level, or, are not comprehensive.	there are no long-term strategic plans.
	resources are committed to long-term strategic plans.	there is a long term capital investment plan but there is no direct commitment of resources to the strategic plan.	there is no long-term commitment of funds, only ad-hoc, yearly allocation of resources.
	council is perceived as leading in all areas by politicians & bureaucrats alike.	council is perceived as leading only in some areas by politicians & bureaucrats.	council is not perceived as the leader in most areas by politicians & bureaucrats.

Political involvement in IS interest and active participation of politicians in IS development	council is interested and actively involved in directing IT usage.	council is interested and supportive but not involved in directing the development of the IS.	council is not interested, not involved, and even somewhat opposes the development of the IS.
	council develops formal vision and policies regarding the role of IT.	informally, there is a shared vision regarding the role of IT among council members.	council does not have a vision regarding the role of IT in the city.
	council, in its goals and objectives, explicitly refers to the development of IT based systems.	council initiates few IS projects on an ad-hoc basis.	council does not initiate any IT based projects.
	a political body directly oversees the IS function.	no special body oversees the IS function but council receives reports and presentations from the IS manager.	council does not directly oversee the IS function nor ask for reports or presentations.
	council formally discusses and endorses a comprehensive IS plan and commits to the plan as a whole.	council is aware of the IS plan but discusses and funds each project separately.	council is not aware nor interested in the IS plan/s.
Authority structure unified authority at the political and operational levels	there is a coherent and unified authority structure for all aspects of the city's operations.	few aspects of the city's operations are not directly controlled by the central, political, authority.	there are a number of political bodies, each with the authority over a part of the city's operations.
	authority over all matters relating to IT utilization resides in only one political body.	there is a central authority, at the political level, that controls most IT related matters.	IT related matters are controlled, at the political level, by a number of different bodies.
	council gives the senior manager authority to direct all the executive branches of the city.	council gives the senior manager only limited authority over the operation of the departments.	there is no central authority below the council level, each department directly reports to some political body.

4.8 Operationalizing the independent variables: the behaviours of the bureaucracy

The literature suggests that in bureaucratic organizations, departments and bureaus may engage in territorial turf-wars, adopt empire-building strategies, and develop rigid procedures, norms, and traditions. Governmental organizations are often seen (rightly or wrongly) as conglomerates of parochial and imperialist sub-organizations that operate in an uncoordinated ways. Each unit operates according to its own agenda, strives to maintain independent status, attempts to increase its share of the governmental resources, and seeks to have discretion on what and how to operate (Allison 1971, Dunleavy 1991, Rainey 1991). This may lead to a lack of shared, long-term corporate vision of what the organization seeks to achieve and its priorities, which may result in the organization being managed from a local, short-term, operational perspective rather than a mission-driven, strategic, corporate one. Where there is no visionary, proactive, corporate management approach, there may not be organization-wide strategic plans. Each sub-unit may be focused on its local needs, programs, and intermediate processes for which it is responsible, and neglect the 'big picture' or goals which are not directly assigned to it. Corporate management refers to how the organization seeks to achieve its goals and set its priorities. The managerial practices and attitudes described above are seen in this study as one dimension of bureaucratic behavior and is labelled as **corporate management**.

To illustrate, in terms of IT utilization toward supporting organizational goals, a low level of corporate management may lead to the following results: a) The development of the IT infrastructure is neglected, since there is no clear vision where the organization is heading and what will be needed, b) Utilization of IT for communication with the public may not be pursued because it does not fall within the responsibility of any one department, c) IT is used

to process transactions but not to deliver the results to other units or systems, which need the information, since the systems are designed to address local needs rather than those of the organization as a whole, d) IT is used to store and analyze information, but the systems are not designed to allow efficient distribution of the products, since its development was not part of a comprehensive IS plan, and e) Proliferation of non-integrated stand-alone systems, each serving a specific process, resulting from a lack of shared understanding of the goals and strategies of the organization.

Often the size of a bureaucracy, the diverse nature of its operations, and the lack of a common denominator with which to compare the results of the various sub-units lead to fragmentation of organizational power and the formation of small "empires" within an organization. This, in turn, may lead to lack of coordination and cooperation, inconsistencies, lack of focus in the organizational decision making process, and inefficient use of resources; all of which may seriously impede the development of IS which can significantly support the goals of the organization. This dimension is labelled as **fragmentation**. To be consistent with the way all other variables are rated, this variable is rated as "high" when the municipality is not fragmented[13]. Thus, high rating delineates bureaucratic behaviour which is conducive to the development of IS that support the organizational goals, e.g. unified strategic decision making, and low when the municipality is fragmented.

To illustrate, with respect to the development of IS, the lack of integration and unification of organizational power and strategic decision making (low fragmentation) may lead to the following: a) Each department develops its own IS and employs its own IS

[13] Fragmentation is a commonly used term in the public sector literature, that is why we choose not to replace it by another term such as integration.

professionals, b) Each department develops different software and hardware standards, and strives to maintain its independence, and c) Each department views information generated or collected by it as its own, and is reluctant to share it.

Utilization of IT to support organizational goals, in many cases, means drastic departure from existing routines, work processes, and current organizational structure. In the absence of such changes, IT instead of significantly enhancing goal achievement, may have only a marginal impact on operations. Utilization of IT in ways that support organizational goals, also depends on a certain level of IT infrastructure being in place before significant benefits can be realized. Bureaucratic behaviour characterized by internal competition over organizational resources, may result in strong emphasis on status-quo as a state of equilibrium, and incrementalism in implementing changes. Bureaucracies have the reputation of risk avoidance, often are reactive rather than proactive, and may prefer a slow and gradual approach to changes rather than a dynamic and drastic approach. Thus, the ability of an organization to achieve high level of IT utilization may be in stark contrast with a bureaucracy which tends to move forward in small increments. This dimension is labelled as **incrementalism**. To be consistent with the way all other variables are rated, this variable is rated as "high" when the municipality is <u>not incremental</u> in its approach to changes and resource allocation (i.e. bureaucrats' behaviour is conducive to the development of strategic IS), and "low" when it is incremental.

The literature is inconclusive with respect to the impacts of incrementalism on IT utilization. Some argue that the frequent shifts in political emphasis, the dour consequences of failure, and goal ambiguity, warrant an incremental approach to IS development (e.g. Bozeman & Bretschneider 1986). Others argue that the time is ripe for a more comprehensive

and rapid IS development (e.g. Kresslein 1984, Miewald et al. 1987, Caudle 1990)[14], and yet others believe that IS development policies should be contingent on the specific application being discussed (e.g. Kraemer et al. 1981, King & Kraemer 1985, Kraemer et al. 1989).

This study, based on the literature on strategic IS, tentatively assumes that a local government that is characterized as highly incremental would achieve lower IT utilization (as defined in Tables 4.1 - 4.4). It reasons that with respect to the development of IS that supports the organization-as-a-whole goals, an incremental approach, which may stem from internal competition, a wish to maintain equality of resources allocated to different functions, or caution and frugality, may result in the following:

a) Resources are allocated to departments according to fixed proportions, which leaves none of them with enough to pursue advanced and comprehensive applications, b) Investment in IT that is seen as supporting primarily one department, is "balanced" by investments in systems that support other departments, although they may not have the same value to the organization, c) Resources are spread across all needs, which impairs the ability of the organization to focus its efforts on development of IS that can significantly improve goal attainment, and d) Large IS projects are broken into small yearly increments which are usually attached to existing systems. In the long run this practice inhibits the development of totally new systems which can improve significantly the organizational operations.

Utilization of IT to support the organizational goals is often associated with a shift in the dominant orientation of the organization from internal efficiency and control over use of

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[14] Business Process Re-engineering (BPR) proponents are usually strong believers in drastic changes and rapid implementation. In many cases they argue against incrementalism in IS development. To our knowledge, BPR in the public sector was not studied, but our impression is that the principles of BPR are gaining hold among public administrators. This supports our choice of incrementalism as an important variable and our assumption that it impedes IT utilization.

resources and processes, to customer service, performance measurement, and proactive and innovative strategy rather than defensive strategy (Gore 1993, Tapscott and Caston 1994). Kraemer et al. (1981) report that on average cities where the reform values are dominant tend to use IT more extensively. Because of lack of competitive pressure and easily measured bottom lines, and of the political downside of failures, bureaucracies may adopt a "don't rock the boat" approach and focus on short-term efficiency. Bureaucracies may be oriented more towards "governing" than "serving", and "doing" rather than "steering" (Osborne & Gaebler 1992). Bureaucrats may be less responsive to their environment, and focused on the narrow, measurable aspects of their tasks and traditional ways of achieving them rather than on organizational missions and visionary methods to attain them. This dimension is labelled as **dominant orientation**.

To illustrate, with respect to the development of IS that support the city's goals, a dominant orientation rated as unfavourable (low) may result in the following: a) Municipalities may focus on operational applications that aim to improve the efficiency of processes and neglect managerial applications, which could dramatically increase effectiveness, b) Municipalities may display a tendency to reject innovative approaches, since there are no incentives to take risks, and c) Municipalities may demand that all developments be based on demonstrable cost savings, or that changes and new equipment or positions will be balanced by cuts in other places.

Unlike the three dimensions of political behaviour, which are to a large extent independent of one another, the four dimensions of bureaucratic behaviour are closely

interrelated[15]. Each of them can be seen either as the result of a combination of the others, or a major cause of them. For example, fragmentation can cause incrementalism (Wildavsky 1984) or, when incrementalism is a conscious and intentional managerial philosophy, it can strengthen tendencies towards fragmentation because, when there are no radical changes, power and decision-making authority can be delegated to sub-units. Similarly, it is hard to think of an organization which follows a strong corporate management approach and is highly fragmented. Proactiveness, innovativeness, and customer orientation usually do not go hand in hand with incrementalism. Strategic corporate management is almost an antithesis to a traditional, defensive, process-focused dominant orientation.

These inter-dependencies suggest that there are deeper reasons which govern and explain why a certain bureaucracy follows certain approaches with respect to incrementalism, fragmentation, dominant orientation, and corporate management. However, addressing the question of why a bureaucracy behaves as it does, while certainly an interesting topic, does not serve the purpose of this study. Since there is no well developed theoretical base which links utilization of IT with bureaucratic behaviours, it is hard to know which motivation-level factors should be considered. Moreover, from a practical point of view, the four variables chosen are observable and measurable, even if only qualitatively, while the deeper factors may be treated only conceptually (are there things such as organizational motivations?). Also, recommendations regarding the variables chosen, if such emerge from the study, can be directly translated into actions cities may follow. That is not the case if more abstract concepts, such as values and motivations, are used. For example, the lack of evaluation

[15] The overlap between the dimensions of the bureaucratic behaviors is clearly one of the limitations of this study, but at present it cannot be avoided. In Chapter 9 we discuss some aspects of the interplay between the variables.

criteria and competition, the complexity and diversity of the organization, and the difficulties of relating to an abstract mission, are all deeper-level reasons often mentioned as underlying bureaucratic behaviours. These factors, however, are much harder to measure, they do not vary much between organizations, and it is harder to translate findings associated with these concepts into practical recommendations. Thus, this study seeks to establish what the behavioral patterns of the bureaucracy in each city are, and associates them with the extent to which IT is used to support organizational goals. Why these behaviours exist is not a part of this study.

Another concern that should be addressed is that the patterns of behaviour of the bureaucracy may change from one issue to another. Focusing only on the four variables (corporate management, fragmentation, incrementalism, and orientation) as they relate to the IS department may bring to light the superficial reasons why a municipality succeeds, or fails, to develop beneficial IS, but it will not illuminate the more fundamental reasons. For example, in a certain municipal government, the IS function itself may be very centralized, or the nature of IS development may be rapid and radical. If, however, this municipality fails to use IT extensively, the reason may be the lack of corporate management approach, which in turn, deprives the IS planners of a strategic business plan. Alternatively, it may be because a fragmented strategic decision making process causes each application to be developed in isolation. Failure to use IT in ways that support organizational goals may even result from a traditional, process-focused orientation used to define the needs according to which the systems were design. Hence, while it makes sense to assume a consistency between general behaviours and those specifically related to IT utilization (and to the IS department), this is not necessarily accurate.

Thus, for each of the four variables, a list of indicators was constructed which incorporates general behaviour patterns (e.g. the budgetary process, variance in allocation of resources, adoption of contemporary approaches to public administration), and IS specific indicators (e.g. the position of the IS manager, existence and content of strategic IS plan, standardization and integration of systems). For each of these indicators generic description of the behaviours conceived as highly conducive to the development of IS that support the city's goals, moderately so, or not conducive and even obstructive are offered in Table 4.6. This is the measurement instrument used to assess the behavioral patterns of the bureaucracy in each of the municipalities studied.

Table 4.6: Variables and indicators of bureaucratic behaviours

	High	Moderate	Low
Corporate management	city management is a source of vision, manifests coherent and proactive approach to management, initiates policies and lobbies for their approval.	city management has a coherent approach to management but tends not to be visionary and to react to the political level rather than to influence it.	city management does not demonstrate visionary and coherent managerial approach, tends to see the implementation of council's policies as its only role.
	city management, as a group, champions and is actively involved in strategic planning.	city management, as a group, supports and often initiates strategic planning but is not championing it nor directly involved.	city management, as a group, is not very interested nor involved in strategic planning.
	top-down, goal-driven budgetary process, tightly connected with the strategic plan.	only capital budget is driven by an a-priory defined goals and strategic plans.	bottom-up budgetary process, disconnected from long-term plans.
	institutionalized process in which management reviews departmental plans and operations on a periodical basis.	management reviews departmental plans and operations on an ad-hoc basis when there are problems.	usually departments' plans and operations are not reviewed by city management.
	city-wide standardization of processes and managerial practices.	some processes are standardized city-wide but it is not comprehensive nor strongly stressed by management.	no standardization of processes and managerial practices.
	approved, long term, and comprehensive strategic plan for the city as a whole.	some domain-specific (not departmental) strategic plans but not a comprehensive plan for the city.	no strategic planning at the corporate level, only at the departmental level.
	IS manager is a member of the city's management group.	IS manager is one level below city management level.	IS manager is 2-3 levels below city management level.
	IS is perceived as a strategic, corporate resource.	IS is perceived as a corporate resource but mostly used to support the operational level.	IS is perceived as a supportive tool for the departments.
	IS steering committee consists of top level executives and operates at the strategic level.	IS steering committee consists of middle level managers and operates at the tactical level.	There is no IS steering committee, or, it is not active or not influential.
	IS development is directly controlled by city management and driven by the city's strategic plan.	IS development is corporately prioritized but driven by operational, problem solving perspective.	IS development is controlled by the departments each separately driven by its own operational needs.

Fragmentation (reverse scale)	the city is managed as one integrative entity.	departments are to a large extent independent in their operation but well coordinated at the strategic and operational levels.	the city operates as a holding company with very limited inter-departmental dependencies.
	no significant signs of territorialism, turf-wars, and frictions between departments.	moderate level of authority related frictions, turf-wars, and territorialism.	many evidences of territorial behaviour, turf-wars, and disputes regarding decision making authority.
	strategic planning is comprehensive, done at the corporate level, tends not to regarding departmental boundaries as a constraint.	strategic planning is done by inter-departmental task forces but for each domain separately.	strategic planning is done by departments in isolation, or not at all.
	innovations are implemented regardless of departmental boundaries, conscious effort to break those boundaries.	only few innovations and changes bridge departmental boundaries, there is no stress on breaking up departmental boundaries.	changes and innovations tend to be confined to specific departments.
	there is a central IS function, all IT related budget and development are controlled and guided by the IS function.	the IS function is a central support unit, budget and development are managed by the IS but guided by departmental needs.	departments have their own IS units, IT related budget is controlled and prioritized by departments.
	city-wide standards for hardware and software.	partial standardization of hardware and software.	no city-wide standards for hardware and software.
	all data is perceived and managed as a corporate resource.	administrative related data is managed corporately, otherwise, each department manages and owns its data.	most data is owned by the departments.
	most systems are integrated city-wide.	administrative systems tend to be integrated but operational systems are not.	most systems are departmental, low level of system integration across departments.
Incrementalism (reverse scale)	relatively high variance in allocation of resources over the years (avg > 1%).	moderate variance in allocation of resources over the years (avg = 0.5 - 1%).	very stable allocation of resources over the years (avg < 0.5%).
	relatively large portion of the city operations are contracted out.	moderate extent of contracting out.	almost all city operations are carried out by city employees.
	in the past few years the city has implemented many drastic changes in its priorities and operations.	few significant changes in priorities and modus of operation implemented over the last few years.	no significant changes in priorities and operations took place in the last few years.

	IT is used as a change agent to significantly alter the way the city does business.	IT is not used as a change agent but some systems significantly change the way the city operates.	IT is used mostly to mechanize existing processes.
	managers believe that drastic changes are both necessary and feasible.	managers believe that drastic changes are needed but can, and should, be achieved only incrementally.	managers do not believe that drastic changes are needed or can be achieved in the context of municipal government.
	relatively high percentage (40-30%) of IS resources are dedicated to new development.	moderate percentage of IS resources (30-20%) are dedicated to new development.	only small percentage of IS resources (under 20%) are used for new development.
	there is a sense, shared by managers, that "things are moving rapidly" in the municipality.	there is a sense, shared by managers, that the municipality is moving ahead but at a moderate rate.	there is a sense, shared among managers, that "nothing is moving" in the municipality.
Dominant orientation	criteria used to justify new initiatives are: vision, quality of services, and long-term productivity.	criteria used to justify new initiatives related to efficient delivery of services and operational needs.	criteria used to justify new initiatives are: short-term cost saving, control over resources used, and efficiency of existing processes.
	high emphasis on staff training.	moderate level of importance to staff training.	low importance to staff training.
	dominant strategy is proactive and innovative -- seeks improvements through investment in technology and organizational changes.	dominant strategy is effective utilization of existing resources -- seeks improvements through maximization of resource utilization.	dominant strategy is defensive -- seeks to maintain the level of operation through cost reductions.
	the city implements many contemporary, innovative ideas regarding public administration.	only a few of the contemporary innovations in public administration are implemented.	the city does not implement contemporary, innovative approaches to public administration.
	the city makes an extensive use of external consultants, and is open to its environment.	the city uses external consultants only for technical issues.	the city hardly uses external consultants, and is relatively unresponsive to its environment.

4.9 Data collection

Data was collected between April 1993 and August 1994. First, various municipalities were approached. Through telephone interviews, usually with the manager of the IS function, and other preliminary inquiries the extent to which the city was using IT was roughly assessed. Then, demographic and economic data from the Canadian government statistics agency (Statistics-Canada) was utilized to choose the six municipalities which best fit the sampling strategy adopted in this study. Once six cities were chosen, official permission from the city management to include the city in the study was sought and obtained.

Next, each city was asked to provide as much material as possible regarding its organizational structure, budget, and demographics. Also, each was asked to provide its long term goals, priorities, and strategic business plans, if available in writing. Documentation of all existing IT based systems, the IS function's structure, budget, and hierarchical position, and if available, the IS strategic plans, was also collected. While all six cities willingly cooperated, the amount of data collected in this stage varied from several large volumes of printed material received from one city, to a few pages which were the only readily available, written material from another.

Based on the data collected and the experience gained from a reiated but not similar small study, done late in 1992, several data collection tools were developed: a detailed and quite lengthy, open-ended interview guide; a list of quantitative data to be collected; and a short, close-ended questionnaire. The questionnaire requested the respondents to directly assess, on a three point scale, each of the independent variables under investigation[16].

[16] We measure all variables by three-point scales to facilitate easy distinction between points on the scales. We believe that the lack of established measures, and the complexity and abstract nature of the variables justify this approach. To be consistent with the other measures used, the written questionnaire used three-point scale as well.

Equipped with these guides, questionnaires, and lists, the author spent between one and three weeks in each city, conducting semi-structured interviews with at least one politician, two or three top level bureaucrats (including the senior administrator[17]) and five or six managers at the department or division level[18]. Overall, between seven and ten officials in each city were interviewed, for a total of 54 interviews. On average, interviews took between one and two hours. Each of the interviews was taped, with the explicit consent of the interviewee, and later transcribed.

The dependent variables, namely, the extent to which the city utilizes IT to support its goals, were measured by asking managers at the departmental and division levels to describe the systems they work with, and to match them to the generic descriptions in the tables (Tables 4.1 to 4.4). Where possible, system documentations were also used and when needed interviewees demonstrated the systems they use. Interviewees were also asked about systems in development. Responses were compared against, and supplemented with, information from the IS development plans and the IS budget provided by each city. To gain deeper understanding, higher level officials were asked for their assessments of the level of support IT provides for each of the four domains, about any major shortcomings of the IS, and why the IS in the city developed as it did.

Data regarding the independent variables, namely, the three variables which relate to the behaviours of the political level and the four which relate to those of the bureaucracy, were collected mainly through interviews with the politicians and senior management in each

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[17] Only in City E the author was unable to interview the city manager, since the city manager argued that the IS manager's opinions fully reflected his own and stated that there is no reason to repeat them.

[18] We try to be as consistent as possible with respect to which positions we interviewed in each city. Where we had a choice (i.e. which council member or which department head to interview) it was made based on availability, willingness to be interviewed, and their knowledge of the IS domain.

city. Since this type of data is more perceptual and open to subjective interpretation, information was gathered from at least three different people regarding each of the variables. In addition, during the interviews, a short, close-ended questionnaire was administered. It directly asked the interviewee to rate the city in regard to each of the independent variables. To supplement the data collected through the interviews, the author searched through four to five years' of official council minutes and policies for any discussion or decision related to IT utilization. In addition, the structure of the city's budget, the budgetary process, and the allocation of resources during the last five years was studied, as well as each city's council, management, and departmental long term plans, where they existed.

In some cases, when the last interviews happened to be conducted after it was possible to review associated data already collected, the author presented the interviewees with some compilations regarding that city's ratings on each of the variables and some explanations as to why. Interviewees were then asked to confirm or revise these ratings. To the extent that it helped verify how the city uses IT or how its politicians or bureaucrats behave with respect to each of the indicators, it was very useful. However, it was only partially helpful in determining the overall picture. This was due to the fact that several interviewees, usually those at the middle management levels, ascribed different meanings to the highly abstract concepts used in the study, or did not see the distinctions between them. For example, some did not understand concepts such as "political leadership", "incrementalism", or "corporate management" in the same way they have been defined in the study. Often interviewees were unable to refer to these concepts in the context of the organization as a whole, as opposed to their specific areas of work. Even more often, they were able to recount what was happening in the city on an issue by issue basis, but not at a more abstract level, and they were unable

to rate the city as a whole because they lacked reference points. Nevertheless, since informants did not have problems with understanding and relating to questions regarding the indicators, we are confident that there are no problems with the validity of the answers received. Table 4.7 summarizes the data sources for this study.

Table 4.7: Summary of information sources

	CITY A	CITY B	CITY C	CITY D	CITY E	CITY F
Political level	councillor	mayor councillor	mayor councillor	mayor	councillor	councillor
Top management	city manager deputy city manager city engineer	city manager director of administration	city administrator director of IS (X2)[19]	chief administrator director of finance	IS manager	commissioner director EDP director planning
Departmental/ division managers	IS manager deputy IS manager (X2) manager budget and research deputy manager finance training officer	IS manager (X2) manager in budget studies training officer supervisor GIS project manager personnel	manager in budget and research manager in permit and licences manager in city clerk supervisor GIS[20] project supervisor MMS[21] project	IS manager (X2) system coordinator training officer manager engineering operation chair IS committee	IS system coordinator manager in city clerk manager GBIS[22] project manager budget & corporate study supervisor in personnel	manager IS applications div. manager IS communication div. manager budget & corporate study supervisor city clerk manager engineering services
Documents	proposed IS plan summary current systems budget books training study & plan council minutes	IS strategic plan budget books council minutes	IS strategic plan budget books city's annual reports city's strategic plan policy manual council minutes & objectives	IS plan budget books council minutes city "strategic plan"	strategic IS plan budget books council minutes auditor reports departmental IS plans	IS architecture plans budget books council minutes departmental IS plans council's plans commissioner's plans

[19] X2 represents two separate interviews with the same official.

[20] Geographic Information System.

[21] Maintenance Management System.

[22] Geographic Based Information System.

4.10 Data analysis

Data analysis was performed at two levels. First, each case was summarized separately as to how that city utilizes IT, and the behavioral characteristics of its political level and its bureaucracy. Each case write-up is very detailed, presents the city with all its complexities, and incorporates many quotations and examples. The case descriptions are organized according to the three main concepts used in this study (IT utilization, political behaviours, bureaucratic behaviours), and at the end of each section a table is presented, displaying the rating of each of the indicators used to assess the variables and the overall ratings of the city on each of the variables. In the interest of giving the reader a feeling regarding the data collected, its comprehensiveness, reliability, validity, and how it was used to rate each city, Chapters 5 and 6 are full case write-ups of two cities. In order not to overwhelm the reader, Chapter 7 presents the summaries of the other four cases. The full case write-ups of these four cases are attached as appendices A-D.

At the within-case level of analysis, little emphasis was given to the rating of the highly aggregated variables. Instead, a narrative description attempts to give the reader a comprehensive understanding of what is going on in each city in regard to IT utilization, and why. The goal is to provide a reliable, easily checked and validated, picture of the city from which it will be easy to understand its overall ratings. At the end of the descriptive sections, a discussion of how the behaviours of the city's political level and its bureaucracy affect utilization of IT in that city is provided.

The second level of the analysis was performed at the "between cases level", in three stages. The first stage focuses on the reliability and validity of the study's findings. At this stage, data is first analyzed in regard to the two controlled variables (size and wealth) to ascertain that these factors do not contaminate the between cases analysis. Then the results

within each set are analyzed to confirm the existence of three distinct data points, on the continuum of utilization of IT to support the organizational goals, which allow for theoretical replication. The results within each pair of cities are also analyzed to test the validity of using literal replication. Lastly, the data from all the cases is used to analyze the reliability and validity of the measurement instruments developed in the study. Detailed discussion of how each of the analyses was performed is presented in Chapters 8 and 9.

In the second stage of the between cases analysis, the predictions of the model are compared to the empirical data collected, based on the ratings each city achieved on each of the variables. The goal of this analysis is to test whether or not the relationships between the dependent and the independent variables support the hypotheses of this study, to analyze the direction of those relationships, and to assess their relative strength.

The last stage of data analysis is also at the level of between cases analysis. However, at this stage, instead of focusing on the static model, there is an attempt to uncover processes that explain the relationships between the variables. Thus, at this stage, the data is reviewed across the cities for common processes which may explain **how** and **why** the independent variables influence the dependent variables. Based on this level of analysis recommendations for practitioners and further research are provided.

CHAPTER 5

THE CASE OF CITY D

5.1 General

City D is a medium size municipality in Western Canada composed of three urban residential areas and a relatively large rural area sparsely dotted by farms. Following the completion of a number of infrastructure projects which connected the city with the nearby metropolitan centres in the early 60's, major development projects took place in the city which opened up new land for industrial development and generated growth in commerce and residential areas. City D, however, still maintains extensive tracts of prime land used for agriculture and other rural purposes, and in the last couple of years emphasis has shifted from large-scale to fill-in developments. In the 1992 census, the population of the city was 90,171. The next year, the municipality had a budget of around 92 million dollars, and employed 635 full-time employees.

5.1.1 The IS function in the municipality of City D

The IS function in City D was developed relatively late. Early in the 80's, a small IS group was formed in the Finance Department and an accounting system was purchased. However, the city moved into a more extensive use of IT only in 1987. That year, an IBM system 38 was installed, and the city purchased a comprehensive financial package from the Graphic Response Service Inc. (GRSI). At the same time, the city upgraded its IS group to the status of a division and promoted its supervisor to the rank of a manager. During the following three years, a number of additional financial management applications were bought

from GRSI, and various small, task-specific applications were developed by the IS division for other departments. In addition, while the IS division remained officially the only authority in the area of IS development and the owner of all the systems, various departments independently purchased stand-alone systems and installed them, sometimes even without the knowledge of the IS division.

The purchase of all this equipment may give a misleading impression. In reality, IS development was given a very low priority and fell outside of the focus of top management. Without either a long term plan or organizational-wide consensus regarding the role and authority of the IS function, the development of IS in City D suffered many setbacks. The financial package the city bought was outdated even when it was purchased and, because the city did not have a maintenance agreement with the vendor, it was not updated. As a result, *"most of its components are badly out of date"*, said the System Coordinator, one of the senior members in the IS division. Furthermore, since no comprehensive needs analysis was done prior to purchasing these systems, and *"users did not know what they wanted nor understood the implications of introducing IT"*, some applications did not live-up to the users' expectations and today they are only partially used or not used at all. As the IS Manager said,

> *The systems that were bought have some difficulties in their implementation as a result of both sides not understanding what was involved and not recognizing that a package is a package and not a custom-build system. So, there was a lot of dissatisfaction with some of the purchased packages and we did not go on a maintenance contract, [systems] have fallen out of maintenance and been sort of patched internally. We also, in the past, built poorly some systems, again as a result of users not understanding their commitment to the building process.*

Probably due to the same reasons, a number of in-house developed systems such as, a service requests system and a utility billing system, failed. In addition, perhaps because of these problems, within four short years, two IS managers were hired and subsequently left the

corporation, and the IS division operated without a manager for most of 1991. It is not surprising that in 1991 the IS function in City D was badly demoralized. It struggled, in many cases unsuccessfully, just to survive its daily tasks, and users' confidence dropped so severely that requests for IS support virtually ceased. This caused more departments to independently contact vendors for computerized solutions, and small, stand-alone systems appeared in a number of departments. This, however, was not accompanied by decentralization of the IS function. The IS division remained the only unit staffed by IS professionals and thus it was expected to take responsibility over all operation and maintenance of the city's computerized systems, even those which were bought without the IS involvement or knowledge. As a result, the IS workload increased and users' satisfaction decreased, since often the systems they had bought failed to fulfil expectations yet the IS division was unable to help.

In 1991, recognizing the need for change, the Director of Finance initiated a review of the computerized systems in the city, and contracted a consulting group to prepare a long term plan for the development of IS. The review culminated in a report called "Strategic IS Plan for City D" which was submitted to the city late in 1991. The report reviewed the strengths and weaknesses of the IS function in the city, and identified three major IS projects as most important: Geographic Information System (GIS), Maintenance Management System (MMS) and the total renewal of the financial systems. The plan, however, was very superficial, did not perform a comprehensive top-down analysis of the information requirements of the city, did not evaluate the existing systems, did not prepare city-wide data models, and did not propose an IT architecture on which the city should base its IS. Furthermore, even in regard to the three major projects, the plan did not go beyond naming them. There were no recommendations about what exactly should be developed, financial

analysis of the implications, or a time table for implementation. The major part of the report (nine of eleven recommendations) referred to organizational aspects of IS management.

City management received, but never officially endorsed or presented the report to the City council. Only two recommendations were acted upon: in 1992 one of the consultants who prepared the report was lent to the city[1] to become the new IS manager and, a steering committee was formed to further develop the report's suggestions into an implementation plan. The committee was empowered to preside over all future developments of the IS. Since then, not much has happened. The IS steering committee produced a number of working papers reaffirming the need for central control over IS development and purchase of software and hardware. It developed an acquisition policy and a process for prioritization of departments' requests for IS resources. It failed, however, in its main mission; there is still no plan, strategic or otherwise, for the development of IS in the city. Top-level management in City D is still not involved in the development of the IS, and capital investment in IS remains at the same (low) level as in 1987. As the current Chair of the Steering Committee explained,

> *The only department head [in the committee] is the Director of Finance, since IS is in Finance. She is very aware of the implications so there is a tendency not to think big ... We do not have a corporate vision and there is no strong management backing to help us push it forward ... IS is so small, and there is no willingness to invest in it, so people do not believe that big changes will ever be approved and are not thinking big ... I was requested to report if the Committee is worth having and I am thinking to report that it is not doing anything.*

The hiring of the consultant as IS manager also failed to spark a renewed thrust in IS development. As she saw it, her managerial mandate was primarily to manage the IS group, to rebuild it and to restore users' confidence: *"I was not hired at a very senior level, by*

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[1] She was lent to the city by her consulting firm, and later hired on a permanent basis.

council, to take over Information Technology", she said. She reported that since 1992, *"more than 90% of [her] time is actually reacting and doing"*. New to the municipal domain, she felt underinformed about users' needs and the capabilities of her IS group. She felt it would be premature to take a leadership role, or to embark on any of the projects identified in the report. As she explained:

> *My initial look at what went on here was "I cannot go anywhere until I straighten things internally" ... staff was unhappy every minute of the day and fighting among themselves ... they had to feel that they had something to grow towards, a career here and a reason to do the job ... until then, "do not give me other jobs to do!" ... now, I would say, we are mostly there ... Also, there was not an understanding at the top management level of what was involved to make it happen.*

In terms of these goals, she was successful. In 1993, she was able to fill two positions in the IS division that had been vacant for more than a year. The daily operation of the computer rose to good standards, user confidence in IS was regained, and a new and healthier atmosphere spread in the IS division. Also, the IS manager believed that top management finally *"recognizes the value of strategic planning and understand its meaning"*, and users understood that *"they have to be actively involved and not just throw me a half baked list of requirements"*.

At the time of data collection, however, these changes had not yet been translated into actions. The IS function in City D was still only a small supportive unit, rather than a major organizational resource. With only eleven IS professionals and an annual capital budget which had remained constant ($270,000) for more than seven years, the IS division was not engaged in any new developments nor was there a concrete plan for future projects. While officially all IT related budgets are controlled by the IS division and all IS projects had to be approved by the Steering Committee and supervised by the IS division, the reality is very different. The IS manager was reluctant to take any more responsibility than she already had, and was also

wary of repeating the mistakes of the past, where the IS division led projects and then was left alone to hold them. Consequently, the only two new IS projects currently underway in City D (GIS and Vehicle Management) have been moved to the Engineering Department. The IS manager explained why, referring to the GIS project:

> *I do not know exactly what they want, I mean they do not know what they want, so there is no way I will know ... What happens here is that if I take any kind of leadership role I will own it [the project] and they will never do a thing ... I mean that is the history, they [users] just wait until it is delivered and say: well, that is not what I wanted ... So, when GIS started I said, "You'd do better to find someone in your department who understands what you require and start working with the vendor.*

The Vehicle Management project offers an even better example of the reality of the IS function in City D. Because the Engineering department was tired of waiting for a comprehensive Maintenance System to be developed by the IS function, they requested a budget for a smaller and much less ambitious system to manage their fleet of vehicle. The budget was approved and administratively included in the IS capital budget, but earmarked for Engineering. Furthermore, at the request of the IS manager, the budget was approved subject to an understanding that *"the project will not put additional load on the IS division"*. Thus, as the manager of Operation in Engineering said, *"We are directly working with the vendor. It is going to be a stand alone system interfacing with the General Ledger system at the file transfer level only"*.

Lastly, while not very common, departments (especially Police and Engineering) completely bypass the procedures and use their own budgets to purchase hardware or small software packages without even notifying the IS division. The Police even trained their own IS professional who, over the last couple of years, developed numerous small programs independently from the IS division.

5.1.2 Utilization of IT in City D

In City D, IT utilization is plagued by a lack of resources and a foreboding sense that none are forthcoming. So the city is being, to a large extent, constrained by the technology it already has. The city has one small IBM mainframe, a UNIX RISC minicomputer, 80 PCs, a LAN[2] server which links 40 of the PCs, and a small number of stand-alone workstations on which task-specific programs are run. In terms of software, City D has a large but badly outdated financial package, a number of small task-specific packages, and a few in-house developed applications. Lastly, there are twelve[3] IS professionals in the city. They are tied to operation and maintenance and can allocate only 15% of their time to new development.

The management group in City D, in general, does not have a vision regarding the role of IT and is suspicious of large investments in IT. When asked about his vision regarding utilization of IT in the city, the Chief Administrator remarked on the *"dominance of the financial system"* in the context of municipal government. He then referred to the need to integrate this system with a GIS, and to *"have an information system committee ... and then try to set corporate wide objectives"*. Explaining this somewhat restricted vision, he said:

> *Others spent huge sums of money ... and did not have much to show for it. So part of my vision is to say: let us spend less money, let us move a little bit more slowly, but let us hopefully make better use of the equipment we already have.*

Thus, utilization of IT in City D is to a large extent determined by what the old GRSI package can provide, since users as well as the IS manager no longer believe that a large scale investment, or an ambitious project stand a chance to get management support, let alone

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[2] Police and Fire also have LANs but they are not connected to the city-hall network.

[3] Including the one in the Police department.

approval of the council[4]. The old Financial package can almost be called **the** IS in the city, since ten out of the eighteen large applications are in fact sub-systems of it and five more applications use it as their core. The system, however, is neither based a on modern DBMS concept nor parametric in nature, which means that it is very inflexible, and even simple changes consume a lot of IS resources. Furthermore, some of the functions within that package have never matched the way the city does business and others are no longer adequate. Thus, relatively simple functions, such as payroll and cash management, have to be supplemented by manual manipulation of data since the system cannot be changed to fit the requirements.

Utilization of IT in City D is constrained also by the fact that the GRSI system was originally designed as a financial control tool. While it includes many sub-systems[5], the design of each of those applications focuses primarily on their financial aspects. Hence, they provide very limited support to administrative processes not directly related to accounting.

This emphasis on financial control also extends to what little the IS division was, and is, able to do in terms of in-house development and small enhancements. While the Director of Finance, to whom the IS division reports, is aware of the needs of the other departments, she feels that the needs of the Finance department should in most cases take precedence. *"Even writing off small balances in the taxes never got done"*, she said. *"For years we have been writing balances manually, so, before turning to others [other departments] we should get our own house in order"*. The requirements of the Finance department put an especially

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[4] The need to replace the whole GRSI system was recognized by the Director of Finance a few years ago, and a proposal to do so was even presented to council informally. However, since then, it has been taken off the priority list by the administration during budget preparation.

[5] Such as: human resource, inventory, purchasing, payroll, and maintenance management.

heavy load on the IS division since, as already mentioned, the GRSI system is not parametric and every change in tax rates, interests, or format of reports necessitates programming. Also, in City D expenditures are distributed to a number of different funds to allow each residential area to pay for only those expenditures from which it benefits. This creates the need for a number of parallel accounting systems which the GRSI system can hardly manage, which means a lot of manual interventions. Thus, as the Director of Finance said,

> *I told the [IS] committee, "You can set all the priorities you like, when it comes to me having to make changes, to collect taxes or whatever, I am going to be number one whether you like it or not" ... I think I am fairly open in those things and try to go with the flow of [the IS committee] except when I have to override them ... We also have problems with setting corporate priorities because people circumvent the committee, including me at times.*

The result is that the development of IS in City D lacks direction. Whatever resources are available at any given time were used for fire fighting rather than according to a plan. As the IS manager said, the workplan of the division *"follows the squeaky wheel"* principle: the urgent takes precedence over the important. She added that people are assigned to work on specific systems often because "*some users are so persistent in their demands that I prefer to accommodate them*", and the capital budget is often allocated to *"the director with the most clout"*. What new IS development took place in City D at the time of data collection, was the purchasing of small stand-alone applications usually by the departments, and small changes and add-on enhancements to the existing financial system done by the IS personnel. Referring to the compilation of the latest list of IT related projects required by the departments, the Director of Finance said, *"I took it from what I did in 1989 and just added a few more things on the end because nothing got done"*.

Utilization of IT in City D is also limited by conservatism and excess concern with possible failures and liabilities. The Chief Administrator mentioned the possible pitfalls of

computerization as one reason for the city's cautious approach to system development. He was nervous that a more visionary use of IT might expose the city to liabilities, and was concern about possible misuses of computerized systems. This often resulted in underuse of the systems the city did have. For example, even though the payroll system allows on-line data entry, it is not used, according to the System Coordinator since, *"[management] want to scrutinize the time cards, [they have] this need for control in a lot of areas, particulary payroll"*. While for a short time city employees were given dial-in access to the mainframe from their homes *"[management] were concerned about security so they thought it best to terminate it"*, he added. Explaining the conservative approach to IS development, the IS manager stated:

> *We are not even going to be next in line ... we are going to wait and see who also does it, how much it cost them and how it works, whether the public liked it, whether all of those people got re-elected, and then we will see about doing it here. That is what I mean about being conservative.*

To summarize, utilization of IT in City D is in a poor state. As the IS manager said referring to the development of the IS in the city:

> *I think the Steering Committee is wondering why we had a strategic plan with no action plan and with no goals, with no timetables, with no resources committed. They now recognize that we could not possibly succeed in utilizing the technology because management did not even know why we should do it, how important those things are, or understood what it takes ... So, that is why we did not get [the IS plans] done.*

5.2 Assessing utilization of IT to support organizational goals in City D

The assessment of IT utilization in City D was judged based only on the existing systems. While for several functions the city had identified a need to develop more advanced systems, none of these intentions was ever translated into an implementation workplan. Existing capital budget was far too small to allow any significant development, and the author

felt that there was not even an understanding of what exactly is needed in terms of IS development. Furthermore, in the domains of "decision support" and "supporting the democratic process" there was very little awareness as to the potential of the technology. Although during interviews, managers granted that usage of IT to support these domains could be beneficial, it appeared so remote from their realities that they usually did not even think in those terms, let alone plan for such usage or demand it from the IS division.

5.2.1 IT support for administrative processes

The IS in City D provides very little support for the major administrative processes in the city. Since the GRSI was designed as a comprehensive accounting package for local governments, its strength is in its ability to track and record all forms of financial transactions and integrate them into the corporate general ledger. Its weakness is that it does not support the processes which generate or manage those transactions. Thus, for example, the inventory sub-system keeps records of what exists in the city's stores and updates the general ledger when a purchasing order is issued. It does not support the processes of generating purchasing orders, inventory management, cost analysis or automatic replenishing of inventory. It also does not link processes of planning and executing maintenance tasks, which use inventory, and inventory records. Another example is the personnel sub-system, which keeps records of positions, pay grades, vacation time, and sick leaves, which are needed to calculate pay checks. It does not support recording of employment history, training and qualifications, and job requirements, or provides managers with tools for trend analysis and performance appraisal. The third example is the cost control and job costing sub-systems which record all work orders and automatically allocate expenditures to the appropriate accounts, but do not

link them to a maintenance history database, or provide a break down of the costs according to type of jobs, equipments, or field crews used. As the manager of Engineering Operations said:

> *[The system Engineering use] is almost a sub-system of finance that aims to capture expenditures from operation into the accounting system ... there is no capability to create work orders and I cannot use it to do costing or managerial functions such as scheduling, planning of work load or analysis.*

Even processes that are carried out by the finance department are not well supported by the city's IS. Financial management functions such as budgeting, capital funds debt control, and financial analysis are not available at all. The payroll system does not facilitate electronic transfer of money, *"it calculates gross salary but does not break it down to basics, deductions, and fringe benefits. That is done later manually"*, described the System Coordinator. It also does not allow *"magnetic media reporting for T4 and superannuation data"*[6].

In areas which are not related to finance, system support is even less developed. There is no central reference system to maintain consistency in referencing properties, mailing addresses, geographical locations, and business or private entities. In fact, there are hardly any IT based systems which support processes which use this kind of information, and those which exist are not inter-connected; each maintains its own records and identification keys. Similarly, there is no corporate record management system. Documents cannot be transferred electronically between departments, and the City Clerk's department, which keeps all the official records, does not use a comprehensive computerized indexing system for the city's archive.

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[6] Incomes and tax deductions that have to be reported to Revenue Canada and other governmental agencies.

Finally, there is the matter of the IT infrastructure. Recently the municipality moved to a new town-hall which is wired for networking, but only 40 of the city's close to 100 PC's are inter-connected through a LAN. None of the other locations the city occupies are tied with the network, including the city police which, even though it is right next door, has its own LAN. At the time of data collection, there was no gateway between the PC network and the city's mainframe. Also, only about 40% of office workers in City D had PCs on their desks, only those who have access to a mainframe terminal had e-mail (about 30 people), and many office automation tools such as graphics, file transfer applications, and fax were not available through the network server.

All of these characteristics are summarized in Table 5.1, which is the reproduction of the measurement instrument (see Chapter 4) with modifications pertaining to City D. Overall, the author rates the level of IT support for administrative functions in City D as **low**.

Table 5.1: Summary of IT support for the administrative functions in City D
(underlined = characteristics of existing system; shaded cells = system as rated)

	High utilization	**Moderate utilization**	**Low utilization**
Inventory management	on-line and comprehensive support, integrated with purchasing, accounting, and maintenance systems, automatic replenishing & user generated purchasing orders, tracking, reporting & analysis tools.	on-line and comprehensive but not fully integrated with accounting, purchasing and maintenance, no automatic replenishing, on-line generation of purchasing orders, or analysis & reporting tools.	not on-line, or does not cover all types of inventory, integrated only with accounting, no managerial support functions, only record keeping.
Financial management	on-line comprehensive accounting system, fully integrated with all functions which generate financial transactions, electronic transfer, bank reconciliation, cost allocation, point of sale data entry, budget preparation, financial analysis & reporting tools.	on-line accounting system but not capable of handling all types of accounts or transactions, or not fully integrated with associated systems, or no budget preparation, no financial analysis and no reporting tools.	accounting system which does not cover all transactions, not integrated with associated functions, redundant data entry, no budget preparation, analysis, electronic transfer, bank reconciliation & reporting tools.

Payroll	on-line parametric system handling all workers, automatic time capture or one time data entry, integrated with maintenance, personnel, & accounting, electronic deposit, check writing, annual reports (T4).	capable of handling all workers, electronic transfer, check writing, & annual reports, but non- parametric, redundancy in time card data entry, not fully integrated with other system, or not on-line.	stand alone non-parametric & not on-line system, and/or not capable of handling all workers, no electronic transfer and annual reports.
Personnel	on-line, central personnel records; employment history, positions, job descriptions, training and qualifications, performance appraisal, integrated with payroll & time card, analysis & report tools.	on-line, central personnel records but only current status & no performance appraisal, analysis or reporting tools, or not integrated with other systems and not on-line.	stand alone record keeping database, no employment history, qualifications, training, no managerial functions.
Consistency in references	all data, in all systems, which refer to the same entity share a common key, no redundancy in data storage, on-line linkages between record regarding the same entity; electronic link to B.C assessment authorities, dynamic views.	central repository database of addresses and properties which is linked on-line only with some of the systems that use that kind of information.	stand alone database, each system holds its own addresses and properties records, or none.
Office automation	city-wide network which offers an integrated and standardized office suite, including word processor, spreadsheet, communication, telephone, graphics, e-mail, file transfer, scheduling.	only between 50%-80% of the employees are provided with PC, or are connected to the network, or office automation tools are not standardized, some tools are not provided, no enveloping system to integrate the various tools.	less than 50% of office workers have PC, or are connected to a network, or office automation tools are not standardized, and most tools are not provided nor integrated.
Cost control, job costing	on-line systems, fully integrated with accounting, inventory, personnel, & payroll; semi automatic generation and costing of work orders; allocation of costs to programs, projects, equipments and work orders; analysis and reporting tools.	the same as the high cell, but, not covering all types of the city's operations, or not fully integrated with the related systems, and/or no analysis and reporting tools.	batch based system which records work orders and posts costs to appropriate accounts.
Record management	city wide, on-line, standardized, magnetic media storage of all records, full text search and retrieval capabilities.	a city-wide computerized record indexing system; or: number of separate, non-compatible, record management systems, or record management system that stores only part of the city's records.	small stand alone databases, or departmental computerized indexing systems, or none.

5.2.2 IT support for provision of high quality services

The criterion used to assess the value of IT based systems for provision of services is the extent to which customers directly benefit from the systems, rather than indirectly through improvements in administrative processes.

A survey of the IT based systems that have a direct bearing on the quality of services provided by the city reveals an even bleaker picture than the survey of those supporting the administrative processes. While in the domain of administrative processes IT is used at least at the record keeping level, nearly half of the assessed functions for service provision (five out of eleven) show no support from IT based systems at all. Of the rest, two are only marginally supported, two are moderately supported, and only two are highly supported. Furthermore, of the two services which are highly supported, one (Public Library) is not managed by the city and the other (the water and sewage control system) is a stand-alone system purchased by the Engineering Department without even the knowledge of the IS division.

There are two examples of functions in this domain for which IT support is rated as moderate. First, the Bills and Fine collection system presents customers with one-stop station in which all payments can be processed, and it uses bar codes and scanners to expedite the service. However, while the system can query customers' accounts, it is not capable of providing customers with receipts in real-time. Payments can be done through banks but there is no automatic debiting of customers' bank accounts, and no provision for monthly instalments. Furthermore, since the cash registers update only the general ledger, fees for services (such as licences, permits, connection to gas and water) are paid at the front desk but then the customer must take the receipt to the appropriate department in order to collect

the permit or licence. Second, the CLASS registration system, purchased by the Park and Recreation department, only barely qualifies for the moderate rating. It is installed in only five of the eight community centres and it does not provide information and registration services for all events sponsored by the city, but only for those facilities and classes managed by that department. It cannot be accessed from the customers homes.

Two other functions, traffic control and managing public requests and complaints, are supported to some extent by IT based systems. However, as illustrated here, they provide only low level support. A small database application was developed in-house to support the managing of service requests. The system, however, is used only by the operation branch of Engineering. It allows the front desk to record service requests, but since it is not linked with any of the other systems, it cannot provide confirmations or status reports to customers. Requests that do not concern the operations branch or which involve other departments are not recorded or tracked, and there are no managerial tools such as scheduling, prioritization, or trends and re-occurrences analysis[7]. Also, most traffic lights in City D are still not controlled by a computerized system. The system which controls some of the lights does not have real-time sensors and is not capable of adjusting the lights according to the traffic load.

All of these characteristics are summarized in Table 5.2, which is the reproduction of the measurement instrument (see Chapter 4) with modifications pertaining to City D. Overall, IT utilization for provision of quality services in City D is rated as **low**.

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[7] Incidently, the system was developed a few years ago in response to request from the operations branch of the Engineering department, but then *"the users changed their minds"* and only recently, a new version, which seems to satisfy the users' needs, was developed.

Table 5.2: Summary of IT support for provision of services in City D
(underlined = characteristics of existing system, shaded cells = system as rated)

	High utilization	Moderate utilization	Low utilization
Response to emergency calls (police, fire, ambulance).	on-line computer aided dispatch system which covers all three services, real-time optimization of whom to alert, routing, and call-ups for reinforcement, on-line presentation of all relevant, call-specific data available in the city's systems.	the same as in the high cell, but only for some of the services, or on-line computer aided dispatch system which presents only static (not call specific) data, no automatic optimization of routing, alerts, & reenforcement.	records calls and maintains log of activities, stand-alone database of some relevant information, no automatic functions, or none.
Provision of data to emergency field crews	mobile data terminals in most vehicles, communication links which allow field crews to interrogate all city's systems, remote data entry and verification.	same as in the left cell but only in few of the vehicles, or radio links with operator who can access all city's systems on-line.	radio links with operator who does not have on-line access to most systems, or none.
Traffic control	full coverage, automatic traffic-load sensing and scheduling of traffic lights, responsive system.	full coverage, automatic traffic lights control system but without real-time components.	partial coverage, static traffic lights control system, or none.
Water, sewage, storm-water control	full coverage, real-time monitoring of pumps and valves, automatic detection of faults, remote control.	partial coverage, or real time monitoring but no remote control capabilities.	none.
Bill and fine collection	ATM, and/or one-stop service station integrated with other city's systems, on-line data entry, query, printing of bills and receipts, flexible forms of payments (banks, instalments, automatic debiting, credit cards, checks, cash), bar code scanning.	one-stop computerized cash register not integrated with the city's systems, or a number of different systems each one capable of handling one type of payment, or system does not allow flexible form of payments.	computerized cash registers for each type of payment, not integrated with other systems, no on-line data entry, query, and printing of bills and receipts, no flexible form of payments, or none.
Issuing of permits and licences	on-line filing of applications, automatic fill-in data fields and eligibility checks, presents customers with case-specific information, inter-departmental inquiry and tracking system integrated with bill collection system.	one-stop service counter, inter-departmental inquiry and tracking system.	departmental record keeping, or none.

Public library	on-line, multi-branches circulation system, computerized catalogues, public terminals, self search, inquiry, and booking, automatic notification, remote access.	on-line but branch specific circulation system, computerized catalogues, search only public terminals, no self booking, status inquiry, or remote access.	computerized catalogues, or none.
Managing public requests and complains	on-line city-wide system which records, channels, and tracks all types of requests and complaints, generates confirmation notices and final responses, integrated with all other relevant systems.	on-line, city-wide but type-specific system, records & tracks requests for specific services, and/or does not generate responses, not integrated with other systems.	off-line record keeping, or none.
Provision of information, registration services	on-line registration/booking system for all city's sponsored events, classes, facilities, available at most public service counters, integrated with other systems to allow on-the-spot payment and issuing of receipts /tickets /confirmation.	on-line but event or departmental specific systems, presents information and allows registration / booking only to those activities controlled by one department, not integrated with other systems.	system support for registration / booking are for local activities only, or none.
Remote access	direct access through dial-in modems or terminals in central locations to: registration services, taxes/fines/bills inquiries, permits & licences applications, and requests for services.	direct access through dial-in modems or terminals in central locations to a partial list of the services mentioned in the left cell.	none.
Customization , value-added services	notices and bills in language of choice, offering a range of options regarding format of bills and their informative content.	some items described in the high cell but not all.	none.

5.2.3 IT support for decision making

The three criteria used to assess the extent to which IT is utilized to support decision making in City D are: a) availability of data, b) breadth and depth of data, and c) existence of tools to manipulate and present the information in ways useful to decision makers at the city management level.

In City D, except for a financial report distributed to all senior management monthly,

none of the other systems provides management with routine reports and none can be easily interrogated by the users themselves. The only report generator available is an IBM tool which, as the System Coordinator stated, *"is useless to those who are not professionals"* since it is not integrated with the systems. Consequently, as the IS manager said, *"of the senior directors, less than half use the computers on their desks"*. Senior managers, with no exceptions, reported that they are forced to manually extract data from the financial reports and plug it into a spreadsheet in order to do even the simplest analysis. As the manager of Operation in the Engineering Department summarized:

> *No, our systems do not support decision making, [managers] only get routine financial reports, too detailed and too late to be of use in decisions, only for the records ... There is very little data in the systems, no history, no connections between different aspects, no details on properties, infrastructure, or costs ... the systems do not collect these kinds of data ... So, I work alone with a spreadsheet to manipulate the data, produce graphs.*

The only area in the domain of supporting decision making on which the IS in City D is not rated as low, is the availability and sharing of corporate data. Since most major systems reside on the mainframe, whatever information is stored in those systems can theoretically be shared city-wide. This, however, is often not the case since there are no easy-to-use report generators, the PC network is not connected to the mainframe, and there are no common keys to facilitate integration of data across systems. Thus, many times the kind of information needed to support decision making is not readily available.

In all other areas, utilization of IT for decision making support in City D is low. The information stored in the city's IS is relatively narrow in its coverage. There are no environmental data, statistics, property databases, economics indicators, or census data. The depth of the information is rather shallow, since none of the systems maintain historical data on-line. City D does not provide its managers with electronic linkages to external networks

or databases. The existing systems do not monitor parameters of outputs, and the data stored is not organized in a way that facilitates performance measurements, or any exceptional reporting. Lastly, while departments are probably using some modelling and analysis tools locally, the IS manager is not aware of such usage and there are no such tools in use at the corporate level. Even in Engineering, where such tools are frequently found, the Manager of the Operations branch reported that "*we have only a CAD system for planning, all the rest is done manually*". The following quote represents the opinion of a number of senior managers regarding the extent to which the city's IS supports decision making:

> *I do say it is still very weak ... We do not even have a good accounts payable system so what right do I have to say I want tracking systems ... There is nothing like executive information system or anything of that level that we could use ... Much of the information is simply not there, and what we have cannot be pulled easily, the systems do not have the capability to do it, so I doubt that many managers are using it ... Even to know how much debt we owe, I can look up the total but for more details I must go through a manual search.*

Table 5.3, which summarizes these characteristics, is the reproduction of the measurement instrument (see Chapter 4) with modifications pertaining to City D. Overall the utilization of IT to support decision making at the corporate level in City D is rated as **low**.

Table 5.3: Summary of IT support for decision making in City D
(underlined = characteristics of existing system, shaded cells = system as rated)

	High utilization	**Moderate utilization**	**Low utilization**
Sharing of information	all corporate data is available on-line, systems & users can easily share information stored anywhere in the city, easy-to-use interfaces allow easy access and manipulation of data.	not all corporate data is readily available on-line, sharing information among systems often requires professional involvement, no easy-to-use data manipulation tools.	data is not managed as corporate resource, most systems are not compatible, very little data is available on-line.

Breadth and depth of information	corporate data is broad and deep, includes environmental data as well as internally generated data in great detail, historical data is maintained and available on-line.	only limited environmental data is available through the IS, historical data is not maintained on-line.	no environmental data is available, there is no historical data in the system, internally generated data is kept at a relatively high level of aggregation.
External linkages	on-line, dial-in linkages to many external networks and databases are available to most city's officials.	few linkages to external sources of information, no on-line, dial-in capabilities, and/or only few officials have on-line connection with external networks/databases.	only operational-level, routine and standardized file transfers, or none.
Flexible & easy to use reporting, executive summaries, exceptional reporting	flexible and easy to use report generators which allow integration of data across systems, most systems provide executive-level summaries, exceptional reporting, and graphical presentation.	most systems provide menu driven report generator, usually restricted to the data stored in each system alone, no executive-level summaries, exceptional reporting, or graphical presentation.	only routine, standardized print-outs of data, most system do not support user generated reporting.
Performance monitoring & performance evaluation	systems support for monitoring use of resources and many parameters regarding the city's outputs, on-going, standardized, and city-wide calculation of performance measurements.	systems support for monitoring use of resources and limited outputs' indicators, some city-wide performance measurements criteria are routinely calculated.	systems support for monitoring use of resources only, no performance measurements at the corporate level, or none.
Analysis tools (modelling, forecasting, statistics)	many analysis tools are available on-line at the corporate level, tools are well integrated with the city's data, available tools cover many aspects of the city's activities.	few task-specific, analysis tools are available at the corporate level, analysis tools are not integrated with the other systems.	none.

5.2.4 Support for the democratic process

Last year, following the initiative of two neighbouring cities, City D joined negotiations with a vendor and subsequently purchased a computerized voting machine. Apart from that, however, none of the functions chosen as indicators for the level of support IT provides to the democratic process are supported to any extent by IT based systems. Even when a voice mail system was installed in the new city-hall, the opportunity to provide

councillors with electronic mail boxes was not taken advantage of, probably because the councillors did not ask for it. This exemplifies two research observations: first, the need for system support for the democratic process, even if recognized by the administration in City D, is far from being a priority; second, neither the politicians nor the public are asking for such systems. As the IS manager explained:

> *The public is not really interested in any of those things ... nobody has asked me to provide that kind of support and certainly if it cost more to do, then any demand would go away, that is my feeling ... There could be quite a number of those things that could be worthwhile, but I cannot really drive it myself, my list is long enough.*

Table 5.4, summarizes the study's findings with respect to IT support for the democratic process in City D. It is the reproduction of the measurement instrument (see Chapter 4) with modifications pertaining to City D. Overall, the IT support for the democratic process in City D is rated as **low**.

Table 5.4: Summary of IT support for the democratic process in City D
(underlined = characteristics of existing system; shaded cells = system as rated)

	High utilization	**Moderate utilization**	**Low utilization**
General election	automated voting system.	calculation and reporting of results.	voters list, or none.
Publication of council minutes, decisions, legislations	on line, search and retrieval capable system, electronically accessible to the public.	database of council minutes, bylaws, policies.	computerized indexing system, or none.
Communication between the public and its representatives	system capable of recording, channelling, and tracking constituents' concerns.	system that records constituents' concerns, or a messaging system.	telephone, or none.
Council's oversight of the administration (monitoring city's expenditures, operations, administration behaviours)	on-line, EIS type of system for aldermen.	on-line, menu driven query system and report generator.	on-line connection to all city's systems, or none.

Disclosure of municipality's data (budget, plans, programs, expenditures, etc.)	on line, search and retrieval capable archive, electronically accessible to the public.	magnetic media archive.	computerized indexing system, or none.
Involvement of the public in decisions	computerized survey/poll system that actively seeks and analyze public opinion, or interactive televised council meetings.	bulletin board which carries council agendas, and/or system that record public opinion regarding issues on the agenda.	televised council meetings, or none.
Reducing asymmetry of information (collection and distribution of social, commercial, and environmental data and statistics)	on line, search and retrieval capable system, electronically accessible to the public.	database.	computerized catalog, or none.

5.3 Political behaviours in City D

5.3.1 General description

The political level in City D consists of the city council, with six councillors, and the Mayor, who is elected by the public at large. Subordinated to the city council in matters that relate to budget but otherwise independent of the council and the administration, there is the Police Board, which consists of councillors and public figures. In City D, the Public Library and the Health authority, two functions which usually are under the jurisdiction of a city's council, are managed instead by a regional organization that is totally independent of the political structure of the city. Unlike many other cities, the council in City D does not work through sub-committees. Instead, councillors often participate in meetings of administrative committees as liaison persons, as observers rather than chairs or in other official roles. Thus, senior managers always work directly with the council at large and council does not delegate decision making authority to sub-groups or special committees.

Since by definition the notion of using IT to support organizational goals views

technology as the means to an end rather than an end in itself, it is not (normatively) expected that the political level will be deeply involved in the details of how City D is using computerized systems. However, decisions and actions of the politicians may have significant impacts on how the city uses IT. The following three sections assesses the extent to which the political behaviours in City D provide well defined goals, objectives, and strategic directions, support IS development and are directly involved in its planning, and create a uniform authority structure. Each of these three political behaviours is hypothesized to have a strong impact on the extent to which the city is able to use IT to support its goals.

5.3.2 Political leadership

In City D, the council is the driving force which not only sets city-wide policies and goals, but also directly manages many aspects of the operation of the city's departments. Once a year, in a planning session with senior management, council in City D reviews the three year "Council Goals and Objectives" plan and updates the list of projects expected from each department. This plan, which is called "The Three Year Strategic Plan For City D", is in fact a list of specific projects, sometimes even at the operational level, with no articulated, city-wide vision or other linkage to higher level goals or missions, and with no apparent commonalities between them. It defines what each department should do in terms of projects and new programs but does not set goals for the city as a whole. Furthermore, probably due to the operational level of the objectives set by the council, the plan does not provide the administration with guidelines and long term directions regarding how it is expected to pursue the objectives assigned to it. For example, in the 1992-1994 plan the Park and Recreation Department was assigned objectives such as *"conclude the dedication [of a certain park],*

achieve substantial completion of recreational centres [specifically identified], and open an information centre [in a certain location]". In the same plan, the Engineering Department was asked to *"upgrade a number of [specifically identified] segments of roads, review the reallocation of a [certain] pump station, and upgrade the fire-fighting communication system"*. Even when the plan instructs departments to prepare plans for future development, the mandate is always narrowly defined to a particular area and no policy-level directions are given to guide the planning. For example, the Planning department was asked to *"plan for expansion of the Operation Building, prepare plan for industrial lands, and find alternative access to the HWY [from a specific neighbourhood]"*. Thus, although it is not a long term mission-driven plan, in the area of urban development, council provides the administration with well defined operationalized objectives. The council, however, is much less specific in areas which relate to provision of routine services and the administrative process. Out of the 45 objectives identified in the 1992-1994 plan, only 10 referred to administration and routine services. All of them are requests for action with no well specified goals or strategies. For example, the council asked the administration to *"initiate a long term financial plan, implement an improved development approval process, and review the structure of information services"*.

Thus, in terms of providing the administration with clear policies, strategic direction, and well defined objectives, the political level in City D tends to focus only on the last. The politicians tend to adopt a tactical approach, separately identifying objectives that have to be met within a relatively short time. They do not first articulate a grand vision and strategy for the city as a whole, or consolidate separate objectives into a coherent and long term plan. As a result, when it comes to integrating the separate objectives into a realistic workplan, the

administration often finds that it lack political leadership. As the Director of Finance said:

> *I think that we need more. Once we put it all into a comprehensive plan and consider the reality of the budget constraints, I am not sure that we get a clear direction from council as to what directions we are supposed to be heading in here.*

The council's minutes of the last four years confirms this perception. In the four large volumes which record all council decisions, there were many case-specific decisions, and discussions of specific projects. The council deliberations even went into details such as scheduling and personnel assignments. Even the temporary reassignments of middle-ranking officials are usually brought before the council. On the other hand, there was not even one session which discussed in a comprehensive way how all the separate projects should fit into a higher level plan. Nor did the council return to its "Goals and Objectives Plan" to revise and prioritize it after the staff had the time to study and respond to the projects identified at a retreat. In fact, none of the council's "Goals and Objectives Plans" were ever approved officially in their entirety by the council.

The budgetary process in city D reflects this same approach. In City D, the council does not set goals and strategic directions prior to the preparation of the budget, except for informally set tax-levels, and the budget is not discussed in a comprehensive way. Rather, each department presents its needs separately, the council goes through each program, sometimes even item by item, and, in a number of iterations between the council and the department heads, the budget is trimmed down to what the council perceives as acceptable. This process involves the political level at an almost operational decision making tier. It loads the politicians with details which they often do not have the time, expertise, or inclination to evaluate methodically. Thus, during the process of integrating all budgeting requests, the focus tends to be lost and resources are spread across programs rather than concentrated.

Furthermore, in that they control the budgeting process not at the policy level but at the operational level. Since the political level in city D focuses on short term, specific, and highly visible projects, long term strategic goals tend to be postponed, especially when they concern areas which are administrative in nature or not visible to the public. Thus, as the Chief Administrator said,

> *The council tends to get down to the nitty gritty, not only to set policy, and then direction is lost because they do not have the time, training ... They have not been here for the on-going process ... Thus, decisions do not fit the long-term plans and inevitably, in those cases, [the plan] goes nowhere.*

The Director of Finance said:

> *Since council also directs priorities at the operational level, not only policies, matters that are considered administrative are being pushed aside because they are less politically attractive ... As soon as we reach the city boundaries [from the yearly strategic planning session] we are back to putting out fires.*

The results are that, many objectives identified in the strategic plan were not achieved, since the council at budget time did not commit resources to them. A typical example is the case of the IS strategic plan described by the Director of Finance,

> *I told council, at the retreat, that we need to take a look at [the development of the IS] from the top, and that it should be put into the plan at a very high priority. ... It actually got into the strategic plan. But when I got to do my budget and say "Now where the money is going to come from?" they say, "You cannot do it right now because we do not have the money."*

Both the Chief Administrator and the Director of Finance stated that the council in City D is *"involved and interested in strategic planning"*. The author opinion, however, is different. By taking tactical control only, the council seems to focus on operational level issues. Especially in the areas of administration and the routine provision of services, the council does not provide the administration with policies, clear goals, and strategic directions. Furthermore, in those cases where such goals are identified, the council does not follow up

by asking management to develop them into a comprehensive executable plan, and when such plans are prepared, they are often left unrealized because no resources are committed to them. Frustrated by her failure to pass the IS strategic plan, the Director of Finance said, *"It is the squeaky wheel, politicians are responding to those who squeak from the outside and I am squeaking from the inside".*

5.3.3 The involvement of the political level in the development of the IS

Except for a reference to the need for a strategic IS plan in City's D most recent "Goals and Objectives Plan", there are no other references in council minutes to a comprehensive discussion regarding the role of IT in the city or the development of its IS. Furthermore, while individual members may have a good grasp of the concept of IS as a corporate resource and some of them are quite knowledgable in the area of IT, as a group, the council in City D does not share a vision regarding the role of IT in the city, nor understand what is involved in developing an IS to support the city's goals. As the Chief Administrator said:

> *As politicians, they have to appear knowledgable ... Quite often councillors talk about mind-boggling visions, but I think that it is motivated more by their desire to look good to out-vision the other ... when I come back and say, "Okay, you want complete file master, up-to-date financial system, advanced GIS, it is going to cost you five million", they will say, "Jeez, we cannot do that" ... So we have 25,000 dollars for the GIS next year.*

Also, the council seems not very interested in the area of IT. For example, when it came to name a councillor to be the liaison person with the IS Steering Committee, the council said *"We do not have any one left",* recalled the Director of Finance. And, in the year and a half the IS manager has been in her position, she has never been asked to report to council, nor engage in other types of direct contact.

On the other hand, the council does not leave the development of the city's IS to the

administration. Because of the way City D is managed in all areas, every project has to be separately approved by the council. Moreover, the council in City D has directly initiated a number of IT based systems. This, however, was not always beneficial. Lacking vision, disclined towards lengthy and methodical planning process, and unwilling to invest in a comprehensive and integrated IT infrastructure, the council has vaguely requested specific applications to be developed. Later, these have developed into yet more stand alone systems with limited value which often altogether fail to meet users' needs. For example, in 1990, the council initiated the development of the service request system which failed to meet users' needs. In the past few years, the council legislated changes in the tax structure without providing the resources to update the financial system to accommodate those changes, which has had grave consequences on the usefulness of the system. Also, by not following a master plan for the development of the city, the council often wastes scarce IS resources by initiating a system, only to shelve it when a new council is elected. As the Chief Administrator recalled,

> *Some years ago council was concerned with the road system and asked for some quantitative program to help in budgeting deliberations ... So we started the process of implementing a road maintenance system and by and large that council went out of office and it was not possible for us to proceed because [the new] council did not champion it and did not give us resources ... and I can repeat that example time and time again.*

In essence, thus, the political level in City D does not have a clear vision regarding the role of IT, and is not involved nor very interested in the development of the city's IS. This, however, has not stopped council from initiating, on an occasional and ad-hoc basis, IT projects which have often been counter-productive from the point of view of developing a comprehensive IS to support the organization's goals.

5.3.4 Authority structure

In City D all political authority, except for matters that relate to the operation of the Police department, is vested in the council as a whole. Furthermore, de-jure and de-facto, the Chief Administrator's role is more of a *"go-between between council and the department heads"* than a source of vision, strategic direction, and authority. This further pushes decision making up to the political level. *"In a sense I am the boss"*, said the Chief Administrator, but, *"I do not rule by decree ... I try to give people as much scope and freedom they want and let them run with the thing ... I try to be a cheerleader"*. In reality, the Administrator's role is less dominant. While all reports from the departments to the council go through the Administrator, he is usually not involved in their preparation and he is not authorized to decide upon them. While he is usually informed of departmental initiatives he *"is not leading, he does not give backing nor put his weight, it is not his style"*, said a senior manager. Thus, in practice, decision making authority in City D rests almost entirely on the council as a whole, even in matters which are operational in nature. As the Director of Finance said, referring to the City Manager's role, *"we have a different system here. [the Chief Administrator] does not make a lot of decisions without going to council first"*.

The council, however, does not have the time or the inclination to spend a lot of time on administration or routine matters and, without an authoritative head to the administration, authority in those areas rest, to a large extent, in the hands of the department heads. Thus, at least in these matters, there is no centralized authority structure to guide the daily operations of the departments; within limits, each is free to pursue its own goals and objectives. This phenomenon is especially true, and even more accentuated, in the area of IT. As already mentioned, while the IS Committee has formal authority over all IT related issues,

it is often bypassed, and even the IS manager herself gladly surrenders her authority to centrally control all IS matters. As she explained,

> *You have to work within the culture of your organization ... The culture of this organization is that there are a number of very strong senior directors and regardless of what is your formal position, those are the people that really run the show, together, and each in his area.*

Thus, because the council is not very interested in IS and there is no unified authority below council level, and because the IS division itself is reluctant to fight to maintain central control, departments are to some extent free to independently pursue computerized solutions to their needs.

Table 5.5, a reproduction of the measurement instrument (see Chapter 4) modified to reflect the situation in City D, summarizes the research findings with respect to the extent to which the political level in City D provides political leadership through well defined goals, objectives, and strategic directions; supports IS development and become directly involved in its planning; and, creates a uniform authority structure.

Table 5.5: A summary of the rating of variables and indicators of political behaviours in City D
(shaded cells = current practice/situation; thick lines = factors as rated)

	High	Moderate	Low
Political leadership provision and commitment to well defined goals & strategic directions in all areas of operation.	on-going, formal processes in which council formulates and reviews the city's plans and operations, in a comprehensive way.	institutionalized, one-shot process in which council set its objectives for the term/year.	no formal process in which council set goals priorities, and directions.
	council is interested & actively involved in goal setting & strategic planning.	council supports & encourages but is not involved in goal setting & strategic planning.	council does not support nor get involved in goal setting & strategic planning.
	top-down, comprehensive budgeting process in which council provides result-oriented guidelines.	bottom-up but comprehensive budgeting process; council does not provide guidelines.	bottom-up, fragmented budgeting process.
	existence of mission-driven, updated strategic plans, officially endorsed by the political level.	strategic plan/s exist but not officially endorsed by the political level, or, are not comprehensive.	there are no long-term strategic plans.
	resources are committed to long-term strategic plans.	there is a long term capital investment plan but there is no direct commitment of resources to the strategic plan.	there is no long-term commitment of funds, only ad-hoc, yearly allocation of resources.
	council is perceived as leading in all areas by politicians & bureaucrats alike.	council is perceived as leading only in some areas by politicians & bureaucrats.	council is not perceived as the leader in most areas by politicians & bureaucrats.
Political involvement in IS interest and active participation of politicians in IS development.	council is interested and actively involved in directing IT usage.	council is interested and supportive but not involved in directing the development of the IS.	council is not interested, not involved, and even somewhat opposes the development of the IS.
	council develops formal vision and policies regarding the role of IT.	informally there is a shared vision regarding the role of IT among council members.	council does not have a vision regarding the role of IT in the city.
	council, in its goals and objectives, explicitly refers to the development of IT based systems.	council initiates few IS projects on an ad-hoc basis.	council does not initiate any IT based projects.
	a political body directly oversees the IS function.	there is no special body that oversees the IS function but council receives reports and presentations from the IS manager.	council does not directly oversee the IS function nor ask for reports or presentations.

	council formally discusses and endorses a comprehensive IS plan and commits to the plan as a whole.	council is aware of the IS plan but discusses and funds each project separately.	council is not aware nor interested in the IS plan/s.
Authority structure unified authority at the political and operational levels.	there is a coherent and unified authority structure for all aspects of the city's operations.	few aspects of the city's operations are not directly controlled by the central, political, authority.	there are a number of political bodies, each with the authority over a part of the city's operations.
	authority over all matters relating to IT utilization resides in only one political body.	there is a central authority, at the political level, that controls most IT related matters.	IT related matters are controlled, at the political level, by a number of different bodies.
	council gives the senior manager authority to direct all the executive branches of the city.	council gives the senior manager only limited authority over the operation of the departments.	there is no central authority below the council level, each department directly reports to some political body.

Overall, the extent to which the political level in City D provides political leadership, demand a results oriented corporate management approach, and closely supervise the bureaucracy is rated as **low**. On the scale of being champions of IS, actively involved and highly instrumental in its development to low involvement or even somewhat obstructive, the political level in City D is rated as **low**. On paper, there is a unified authority structure in City D. De-facto, the council, which is the only central decision making authority, does not exercise its authority in matters which are administrative and routine in nature. Thus, the authority structure in City D is somewhat fragmented. Therefore, authority structure in City D is rated as only **moderately** unified.

5.3.5 The impact of political behaviours on IT utilization in City D

The fact that City D makes only low usage of IT to support its goals can be attributed partly to the city politicians' general approach to their roles. They do not provide vision, long term goals, or a comprehensive strategic plan for the city as a whole, especially in areas which relate to administration and the provision of routine services. To make matters worse, council does not delegate authority in these areas to a central position within the administration, and does not demand from the administration a city-wide approach for planning and implementation. Rather, city council tends to keep executive-level authority in its hands and become directly involved in decision making at the operational level. This tends to discourage the bureaucracy from developing a corporate management approach and as a result IS development in the city tends to be driven by local and operational needs. Furthermore, the lack of a comprehensive long term plan makes it harder to justify large scale IS projects, and the city council's focus on immediate and operational problem solving

discourage management from even thinking of comprehensive city-wide systems.

The council's approach to IS, also constitutes an impediment to effective utilization of IT. It seems that in City D council is more interested in areas which are visible to the public, short term projects, and low taxes, and tends to de-emphasize administrative needs. As a result, even when the council recognizes the need for IT based systems to support administrative processes, it tries to minimize spending on those areas. Thus, often allocations suffice only to address local or narrowly defined needs. Council, in City D is also unaware of the nonlinear nature of IT benefits, it tends to consider each project in isolation and only within the context of a specific need. This results in allocation of resources to small, stand-alone projects. Thus, investments in comprehensive and integrative IT infrastructure, which is a crucial condition for the emergence of effective IS, is deferred to better times which never come.

Lastly, naturally the council in City D is driven by the desire to satisfy the majority of the voters. It believes that the public wants traditional services, provided more or less in the same ways they were in the past, and certainly not in ways which will significantly increase taxes. The council, does not have the vision, or the inclination to educate the public in regard to possible innovative services or to spear-headed efforts of re-inventing governments. Thus, especially in areas which require considerable initial investment, (such as IT based systems to support the democratic process, new approaches to delivery of services, or even decision support systems) the council not only refrains from championing those types of innovations, but to some extent opposes them. In City D, this impact of political behaviour on IT utilization is especially pronounced, since the council is so central in the decision making process and is not counter balanced or guided, by a strong,

professional, and visionary city manager (or management team).

5.4 The bureaucracy in City D

As identified in Chapter 4, four behavioral patterns commonly associated with bureaucracy constitute factors that may impede or negatively influence the development and use of IS to support organizational goals: a lack of coherent corporate management, a high degree of incrementalism, a high level of fragmentation, and a dominant orientation which is internal focused, emphasizes control, and strives to maintain the status-quo.

In the following sections, findings about these four factors are described and assessed for City D. This involves investigating general patterns of behaviour such as the budget process, buy or build policies, and allocation of resources, as well as issues directly related to the IS function (e.g. the IS planning process, and structure and status of the IS unit). It does not serve the purpose of this study to speculate on reasons for these behaviours. Rather, this study seeks to establish what the behavioral patterns of the administration in City D are.

5.4.1 Corporate management approach

As already mentioned, the only city-wide plan that exists in City D is the council's "Goals and Objectives Plan" which is a middle-range, tactical plan. It was not developed through a top-down, methodical process, and the city's senior managers were not involved, as a group, in its conception. In fact, although the Chief Administrator sees himself as a *"team leader"* there is very little evidence of a corporate approach to management in City D. *"We have never sat down as a management team to discuss and reconcile what our priorities are"*, admitted the Director of Finance. *"Corporate leadership and direction, what there is*

of it, is basically provided by council". Thus, in City D, departmental long-term plans are neither discussed nor approved by the department heads as a team. Matters which involve more than one department are resolved, in an ad-hoc fashion, in meetings of the interested parties, sometimes through the arbitration of the Chief Administrator, but not by the corporate management as a whole. What one department is doing is perceived by other senior managers as very much between that department and the council. The Chief Administrator's approach to his role demonstrates this:

> *I try to give each department as much latitude as possible ... They are responsible for what they are doing and how they are carrying out council directions ... I do not have the time, that is not my role to go there and tell them what to do ... I should only help and affirm that they are doing the right thing.*

City D's management, as a group, does not provide a source of corporate vision or a strong advocate for city-wide, long-term, strategic planning. At the time of data collection, none of the areas in which the city operated was guided by a mission-driven long term plan, prepared as a corporate endeavour by the management team. Even in those areas where council asked for long term plans, it was left for individual departments to prepare and present them to the council. Thus, the forum of department heads in City D is more of a coordination mechanism than a corporate management team. As the Director of Finance explained:

> *Directions are set more within each department and less by the department heads as a group ... Each department presents to council, and council comes back with decisions ... We meet for about 3/4 of an hour each week, the morning after the council meeting, and the administrator goes over what happened the night before and whose responsibility it is to look after it.*

The lack of strong corporate approach is manifested in many ways in City D. While the supremacy of the IS Steering Committee was officially recognized in its terms of reference, no serious attempt was made to enforce it. While directors and managers know of the council's "Goals and Objectives Plan" and the "Strategic IS Plan", they usually are not very

familiar with their content except where it directly relates to their department. Also, in City D there is no corporate-wide approach to performance appraisal, no emphasis on standardization of processes across departments, and no established process in which departments' plans and operations are reviewed by all other department heads.

Allocation of resources in City D also reflects a lack of corporate perspective. Prior to the city's yearly budget process, the Finance department circulates guidelines regarding technical issues[8] and, at times, the Director of Finance and the Chief Administrator sit down together with an individual department head to help finalize budget proposals. There is, however, no reconciliation and prioritization of departmental requests at the management group level prior to presentation to the council. Ultimately, each department is responsible for what it presents to the council. Even for capital investments and new initiatives (areas in which a budget is less stable and less self-explanatory), each department separately submits to council its requests through standardized program changes forms, and fights for approval. Sometimes, this indirectly blocks other departments' initiatives. As the Director of Finance explained,

> *The individual departments prepare their budget and go with it to council ... I wanted to get to the level where department heads sit together and look at it [before it goes to council] but we have not got to that ... I can make recommendations and so can the Administrator but the council is where all is prioritized.*

In the area of IT, the central IS division promotes, and to some extent succeeds, in creating city-wide standards of hardware and software. There is, however, no corporate approach to system development in the city. The IS Steering Committee consists of middle-

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[8] These include how to organize the documents, how to account for various expenditures, standard costs of certain items, and recommendations regarding the level of increase (discount) the departments are expected to incorporate into their budget requests.

level managers who tend to react to departmental level needs. Thus, planning is bottom-up and operational rather than top-down and goal-oriented. Also, the resources available to the IS division are so limited that no corporate level projects can realistically be considered. Furthermore, there is no top-level management involvement to provide the development of the IS with goals and corporate priorities. The Chief Administrator explained why he is not involved in directing the development of the IS: *"I set up the IS Committee and tried, as much as possible, to step back from it ... I do not want to sort of distort the priorities"*. He further explained that other senior managers also remain uninvolved, as they are too occupied anyway and *"because the [IS] budget is so limited, they know it is almost impossible to do a really big thing"*. So, the development of the IS is left to *"the people who really are using the system"*, he said. Accordingly, IS in the city is perceived as a supportive tool for the operation of the departments rather than as a major corporate resource. As a result, as the Director of Finance reported,

> *The IS plan is not a corporate strategic plan ... It is not really connected with the strategic plan of the city nor with council objectives ... I am not even sure the vision is out there [among the city management group]. We certainly did not talk about it corporately.*

5.4.2 Assessing the level of fragmentation

Very little long term thinking and planning are currently taking place in City D as, below the political level, there is no strong centralized authority. In addition, for a long time, no substantial change has occurred in the way the city is structured and operates, no re-structuring or innovative re-engineering initiatives are currently on the city's agenda, and none is believed possible. As the Chief Administrator explained, *"for years, departments have been trying just to survive, very rarely do they ever get any additional program, initiative,*

or new priority through the budget". Furthermore, many of the senior directors have already been in their positions for eight or more years. As a result, routines have settled in and there is little need to coordinate between departments. Thus, to a large extent, each department operates as an independent sub-unit. Since major changes are perceived as unrealistic, strategic thinking and planning is very limited and is confined to the departmental level. Even the council, which is the only centralized authority, tends to direct its requests and designate each of its objectives as the responsibility of a specific department, rather than to address them to the city management as a whole. It is no surprise that both the Chief Administrator and the Director of Finance, the two most influential managers in the city, chose the option of a *"holding company of loosely connected, more or less independent, sub-units"* as the one that best describes how the city is managed. The Administrator added, *"We are trying to move towards a more controlled decentralized management, but I do not think that we have arrived"*.

Manifestations of this fragmentation of power and decision making authority at the bureaucratic level abound. They include first, the fact that within certain rules, departments in City D are independent in their use of their budget. Second, each department independently appeals for council's approval for new initiatives. Third, managers know very little of what the other departments are planning even in areas directly related to their operations. fourth, many processes which, in essence, are common to a number of departments[9] are either duplicated or arbitrarily split to fit the division of responsibility among departments.

Although it is hard to tell whether it is a result of the less-than-unified authority

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[9] These include fleet and inventory management, application processing for permits and licenses, and document management. In the case of response to emergency calls, however, the Police and Fire dispatch are integrated with each other but not with the ambulance services.

structure or a consequence of personal preferences, top management is not involved in, or a champion of, efforts to articulate and pursue an integrated vision for the city. There is no corporate effort to re-think the city's structure or its divisions of responsibility. Referring to the way the city is managed, a senior manager expressed the opinion that:

> *There is a need for stronger management to push the city forwards ... Currently each department tends to see only its narrow interest ... There is no strong corporate body that can force hard decisions.*

Many other managers agreed with this statement. Some of them even expressed frustration that the municipality seemed in stagnation, and voiced hopes that the forthcoming personnel changes in top management would bring about long needed changes.

In the area of IT, fragmentation in City D is not structural but nevertheless clearly apparent. The centralized IS function is not guided by a city-wide, shared vision. The IS committee is often bypassed by departments. There is no top-down planning process or real backing by, and involvement of, senior management. The IS Manager is not a corporate level executive. Therefore, as the Chair of the IS committee stated,

> *Members [of the IS committee] tend to represent the narrow interest of their departments, [and since] what can be done is very limited, people instead of developing a comprehensive approach to IT are satisfied if they can get a limited departmental solution.*

In addition, in line with the general approach to new initiatives, budgets for new IS projects are approved on a project by project basis, and each project must be requested by a user department. Thus, when a budget is approved and given to the IS division, it is tagged for a specific department and the IS manager can influence the decision how to use it only to a limited extent. As a consequence, while the central IS function should be able to ensure compatibility and integration with other systems, it can only do so in a minority of cases. Even more significant is the fact that the IS manager cannot prioritize IS development

according to a corporate perspective, or use the resources to build a corporate-wide IT infrastructure.

5.4.3 Assessing incrementalism in City D

Effective utilization of IT, in many cases, means drastic departure from existing routines, work-processes, and organizational structure. In the absence of such revolutionary changes, any technology, instead of significantly enhancing goal achievement, may have only a marginal impact on operations. Effective utilization of IT also presupposes a certain level of IT infrastructure before significant benefits can be realized. Thus, this study hypothesizes that the ability of a local government to achieve payoffs from IT utilization may be hampered by the bureaucratic tendency to move forward in small increments.

Several managers were asked to characterize the new initiatives that the city had implemented in the last five years. One of them, representing the sentiments of most of the others, said,

> *There were no drastic changes ... Very few projects were new and innovative ... Most of what we were able to do was small, add-on, improvements which did not really change the way things were done before.*

This is evident by the fact that in City D the average change in the allocation of the annual budget among the departments, over the last five years, was only 0.36% of the total budget. The largest increase (decrease) in the budget share one department received, over two consecutive years, was 1.49%. More significantly, during that time (1989-1993), the total IT related budget remained virtually constant at 1.5% of the total municipal budget, and capital investment in IT even dropped slightly from 0.37% of total budget, in 1989, to 0.28% in 1993.

One way in which municipalities make their resources more flexible and thus facilitate shifting emphasis among different areas is to contract out as much of their operations as possible. From this perspective, City D was initially in a relatively good position. The city employed a relatively small permanent work force of one worker per 142 residents[10], and had for a long time contracted out garbage collection, recycling, and most of the large construction projects. However, in the last couple of years, city D has not been able to pursue that approach, probably due to the dominance of the council and its hesitation to antagonize unions, as well as the lack of a strong management group to advocate this course of action. As the Chief Administrator explained,

> *There is no specific policy regarding in-house or contracting out ... If there is something that we see that can be contracted out we go to council and say, "Would you like to consider this possibility?". Every time they consider that, they have immediate reactions from the unions, so they will come back and say, "Well, if we do this, what is the downside for us?" ... In any given year in the last five years, at least, we probably looked at three or four different items that we could contract out and very few of them got to be contracted because of the political and union pressure.*

So, instead of contracting out more and more of the city's operations, the Police is managed directly by the city, parks and recreational facilities are run by city workers, and most significantly, almost all small and medium scale construction projects and all infrastructure maintenance tasks are carried out by permanent city employees.

The budget process in city D also contributes to an incremental approach to allocation of resources. Because budgets are prepared from the bottom-up unguided by a corporate strategic focus, the council, unable or unwilling to re-structure them, tends to spread any available resources across all domains of operation rather than take a harder decision to

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[10] This is a higher (better) rate than the average among the 22 largest municipalities in the province. In 1993, this average was one city worker for every 134 residents.

temporarily risk a set-back in one area in order to significantly advance another.

Incrementalism is also a cornerstone of the Administrator's management philosophy. While many interviewed managers expressed interest in some drastic changes in the municipality, the Administrator saw things differently. When asked why he does not try to focus resources on a few areas rather than spread them across all domains, he said,

> *My nature, my personality, and my management style have been to keep all the horses going ... I have tried to resist [focusing resources on some areas and shut down others] because I think the nature of the municipal government is that you try to do a lot of different things with a very little bit of money, in that sense a large change in priorities, I think, is really counterproductive.*

In terms of developing the city's IS, incrementalism results not only from top management's general approach to resource allocation, but also from their lack of understanding about the requirements of IS. Management in city D seems not to understand that in order to use IT effectively, they must first invest in creating a comprehensive and integrated infrastructure. As a consequence, they have proceeded with small and local improvements, believing that somehow it will all fit together in the future. For example, networking is proceeding very slowly, but management seems not to understand that if a network is not implemented within a relatively short time and integrated with most applications, it will end up not being used. Management has approved projects which should be city-wide and integrative (such as GIS, Fleet Management, and Service Requests) on a local scale, without first defining the long term goals and scope of these projects, or how they should fit in with the other systems. This lack of understanding lures management to see each of these projects in isolation, and thus, to perceive incrementalism as a viable approach.

Risk avoidance is also a major consideration. Because City D's management lacks a clear understanding of what it wants from the technology, is weary of the dramatic changes

in IT, feels unqualified to judge where technology is going, and because management is very conscious of stories of how others have been burned, City D's management prefers to sit on the fence rather than to dare invest in the technology in a big way. As the Chief Administrator explained,

> *The technology is changing so dramatically, how do I know that the piece I bought six months ago is going to be as good as the piece I can buy today? ... I cannot go to council and say this six million dollars we are investing today is going to turn to be providential, worthwhile, and correct three years down the road in terms of our strategic plan ... So, we wait, and you are right, there is a generation gap in the use of the technology between us and the private sector, but we cannot risk failures.*

As a result, for more than five years, there were almost no new developments in IS. What was accomplished involved essentially only small, local applications, which usually stemmed from the need to fix failures in existing systems, or new legislation, or urgent operational needs, rather than from a comprehensive and visionary IS development plan.

5.4.4 The dominant orientation of the bureaucracy

> *You can come back to the arguments about re-inventing government and say that we need to re-organize the whole place ... I suppose it is a possibility but at this point in time we literally are not able to keep up with the roads, water, and every other program ... We are just trying, we are fighting desperately to stay alive ... I am well aware of the literature and the theory about how you run an organization, and I know that the literature would say, "All you are doing is presiding over the demise of an organization", I would prefer to say that I am presiding over trying to keep an organization afloat.* (Chief Administrator).

Financial difficulties, shared by all municipalities in the country, did not promote in City D a fresh look at its organization and how it pursues its goals, or precipitate a search for new strategies or innovative technologies. Instead, City D adopted a defensive orientation, due to the politicians' pressure to cut costs, their focus on visible service deliveries in-lieu of fundamental, long-term solutions, and lack of a strong and professional management

equipped to advocate and lobby for investments in strategic development. Both the Chief Administrator and the Director of Finance agreed that the main orientation of the city's administration is, "*to maintain the level of service by improving the existing processes and by cost saving*". Paradoxically, this defensive strategy tends to worsen a situation over the long term. A managerial approach which is too frugal leads to an organization which is so lean that there are no resources to spare for evaluation of what is being done, it severely limits the capacity to "think ahead", and retains neither resources nor tolerance for experimentation and development. To some extent City D is in that situation, as the Director of Finance explained,

> *Those things [organizational development, re-organization] are not seen by the public, so the politicians are not interested in them ... They always think I can perform miracles ... but we are too occupied in putting out fires. We have not had the time to look at what we are doing ... I wanted to do some program evaluation, but we just did not, ever, have the resources to get down to that level.*

Thus, in City D, none of the new approaches to management, such as quality control, performance measurement, and joint ventures with the private sector have been implemented. In the last five years, capital investments directly related to improvements in the working of the municipality never exceeded 6% of the total municipal budget[11]. This sum hardly covers replacement of equipment and small enhancements. Similarly, while exact figures about the level of investment in human resources are not available, extrapolating from the budget for corporate training, and using the most favourable premise[12], city records indicate that City

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[11] This number does not include major construction projects, such as new recreational facilities, bridges, or roads. In City D, those types of projects are funded by special funds collected from the residents of the neighbourhood in which the project is to be built.

[12] This calculation is based on the assumption that corporate training constitutes only 15% of the total resources allocated to staff training. In reality, judging from all the other municipalities studied, the number is closer to, or exceeds, 30%.

D is spending only 0.14% of its budget on training, this is almost half of what was spent in the other municipalities studied.

In terms of the development of the IS, short term thinking, cost saving, and supporting the existing processes characterize management's orientation. According to the IS manager, IT related projects are likely to be approved only if there are hard dollars to be saved or earned. As she said,

> *There is nothing that can justify a million dollar investment in IT right now ... So, we are not introducing drastic changes ... [management] only want everyone to be more efficient with what we are already got.*

An example of the short term, cost saving approach of City D's management to system development is the case of planning the GIS pilot project. As the IS manager stated, even though her division does not have the time or the expertise to do an information requirement study, system analysis, and market study for the GIS, *"There is not going to be a lot of contracting out of those functions, [management] are saying, You have got eleven people so why can't you do it yourself"*. This has a cumulative effect, *"because being able to spare only 15% of our time to new development, all I can do is the tip of the iceberg"*. In other words, nothing of organizational-wide significance can be accomplished. The Chief Administrator, as much as admitted that innovative projects, which may have significant impacts on goal achievement, are second in priority, he stated that role number one of IT in the city is to support *"financial control, accountability, and cost saving"*.

While many senior managers cited customer service as key to the city's orientation, most were quick to add that not much has actually been done in that area in regard to IT utilization. One explanation which summarizes the short term, inward looking, and cost saving orientation was provided by the Chief Administrator:

The most customer-friendly thing I can do is try to control taxes ... The taxpayer, unfortunately, does not know about all these new answers [IT] and they are not very sympathetic when I go to them and say, "I am sorry, you are going to have a 10% tax increase this year but I can guarantee you that because of all the new technology you get better information".

Table 5.6, a reproduction of the measurement instrument (see Chapter 4) modified to reflect the situation in City D, summarizes findings as regards the behavioral patterns of the bureaucracy in City D in four areas: a) corporate and strategic, vs. local and operational management; b) unification vs. fragmentation of power and strategic decision making authority; c) incremental and slow vs. rapid and drastic changes; and, d) defensive and status-quo vs. proactive and innovative orientation.

To summarize, the extent to which the administration in City D follows a corporate approach to managing the city is rated as **low**. Organizational power and decision making authority, at the administration level, resides mostly within separate departments. Strategic thinking or planning also tends to be fragmented and is done mostly at the departmental level rather than at the corporate level. Structurally, the area of IT utilization is less fragmented but there also, decision making tends to focus on local problem solving rather than being driven by a city-wide vision, and IS resource allocation is dictated by user departments rather than by corporate priorities. On the scale of integration vs. fragmentation City D is rated as **low**. Overall, City D appears on the scale between dynamic to incremental and status-quo as **highly incremental**. Overall, the dominant orientation of management in City D is characterized as defensive, inward looking, and fighting just to maintain its level of operation, with very little emphasis on long-term, visionary, and innovative approaches to management, or provision of services. This orientation is also rated as **low** from the point of view of how conducive it is to the development of effective IS.

Table 5.6: Summary of the ratings of variables and indicators of bureaucratic behaviours in City D
(shaded cells = current practice/situation; thick lines = factors as rated)

	HIGH	MODERATE	LOW
Corporate management	city management is a source of vision, manifests coherent and proactive approach to management, initiates policies and lobbies for their approval.	city management has a coherent approach to management but tends not to be visionary and to react to the political level rather than to influence it.	city management does not demonstrate visionary and coherent managerial approach, tends to see the implementation of council's policies as its only role.
	city management, as a group, champions and is actively involved in strategic planning.	city management, as a group, supports and often initiates strategic planning but is not championing it nor directly involved.	city management, as a group, is not very interested nor involved in strategic planning.
	top-down, goal-driven budgetary process, tightly connected with the strategic plan.	only capital budget is driven by a-priory defined goals and strategic plans.	bottom-up budgetary process, disconnected from long-term plans.
	institutionalized process in which management reviews departmental plans and operations on a periodical basis.	management reviews departmental plans and operations on an ad-hoc basis when there are problems.	usually departments' plans and operations are not reviewed by city management.
	city-wide standardization of processes and managerial practices.	some processes are standardized city-wide but it is not comprehensive nor strongly stressed by management.	no standardization of processes and managerial practices.
	there is an approved, long term, and comprehensive strategic plan for the city as a whole.	there are some domain-specific (not departmental) strategic plans but not a comprehensive plan for the city.	no strategic planning at the corporate level, only at the departmental level.
	IS manager is a member of the city's management group.	IS manager is one level below city management level.	IS manager is 2-3 levels below city management level.
	IS is perceived as a strategic, corporate resource.	IS is perceived as a corporate resource but mostly used to support the operational level.	IS is perceived as a supportive tool for the departments.
	IS steering committee consists of top level executives and operates at the strategic level.	IS steering committee consists of middle level managers and operates at the tactical level.	There is no IS steering committee, or, it is not active or not influential.

	IS development is directly controlled by city management and driven by the city's strategic plan.	IS development is corporately prioritized but driven by operational, problem solving perspective.	IS development is controlled by the departments each separately driven by its own operational needs.
Fragmentation (reverse scale)	the city is managed as one integrative entity.	departments are to a large extent independent in their operation but well coordinated at the strategic and operational levels.	city operates as a holding company with very limited inter-departmental dependencies.
	no significant signs of territorialism, turf-wars, and frictions between departments.	moderate level of authority related frictions, turf-wars, and territorialism.	much evidences of territorial behaviours, turf-wars, and disputes regarding decision making authority.
	strategic planning is comprehensive, done at the corporate level, tends not to regarding departmental boundaries as a constraint.	strategic planning is done by inter-departmental task forces but for each domain separately.	strategic planning is done by departments in isolation, or no strategic planning at all.
	innovations are implemented regardless of departmental boundaries, there is a conscious effort to break those boundaries.	only few innovations and changes bridge departmental boundaries, no stress on breaking up departmental boundaries.	changes and innovations tend to be confined to specific departments.
	there is a central IS function, all IT related budget and development controlled and guided by the IS function.	the IS function is a central support unit, budget and development are managed by the IS but guided by departmental needs.	departments have their own IS units, IT related budget is controlled and prioritized by departments.
	city-wide standards for hardware and software.	partial standardization of hardware and software.	no city-wide standards for hardware and software.
	all data is perceived and managed as a corporate resource.	administrative related data is managed corporately, otherwise, each department manage and own its data.	most data is owned by the departments.
	most systems are integrated city-wide.	administrative systems tend to be integrated but operational systems are not.	most systems are departmental, low level of system integration across departments.

Incrementa-lism (reverse scale)	relatively high variance in allocation of resources over the years (avg > 1%). relatively large portion of the city operations are contracted out.	moderate variance in allocation of resources over the years (0.5% < avg < 1%). moderate extent of contracting out.	very stable allocation of resources over the years (avg < 0.5%). almost all city operations carried out by city employees.
	in the past few years the city has implemented many drastic changes in priorities and operations.	few significant changes in priorities and modus of operation implemented over the last few years.	no significant changes in priorities and operations in the last few years.
	IT is used as a change agent to significantly alter the way the city does business.	IT is not used as a change agent but some systems significantly change the way the city operates.	IT is used mostly to mechanize existing processes.
	managers believe that drastic changes are both necessary and feasible.	managers believe that drastic changes are needed but can, and should, be achieved only incrementally.	managers do not believe that drastic changes are needed or can be achieved in the context of municipal government.
	relatively high percentage (40-30%) of IS resources are dedicated to new development.	moderate percentage of IS resources (30-20%) are dedicated to new development.	only small percentage of IS resources (under 20%) are used for new development.
	there is a sense, shared by managers, that "things are moving rapidly" in the municipality.	there is a sense, shared by managers, that the municipality is moving ahead but at a moderate rate.	there is a sense, shared among managers, that "nothing is moving" in the municipality.
Orientation	criteria used to justify new initiatives are: vision, quality of services, and long-term productivity.	criteria used to justify new initiatives related to efficient delivery of services and operational needs.	criteria used to justify new initiatives are: short-term cost saving, control over resources used, and efficiency of existing processes.
	high emphasis on staff training.	moderate level of importance to staff training.	low importance to staff training.
	dominant strategy is proactive and innovative -- seeks improvements through investment in technology and organizational changes.	dominant strategy is effective utilization of existing resources -- seeks improvements through maximization of resource utilization.	dominant strategy is defensive -- seeks to maintain the level of operation through cost reductions.

	the city implements many contemporary, innovative ideas regarding public administration.	only a few of the contemporary innovations in public administration are implemented.	the city does not implement contemporary, innovative approaches to public administration.
	the city makes an extensive use of external consultants, and is open to its environment.	the city uses external consultants only for technical issues.	the city hardly uses external consultants, and is relatively closed to its environment.

5.4.5 The impact of bureaucratic behaviours on IT utilization in City D

In all four domains of operation, City D is making only marginal use of IT. On all four bureaucratic patterns of behaviour, City D rated low. This fits the predictions made in Chapter 4, regarding the relationships between these variables, and thus, support the model used in this study.

None of the managers interviewed regarded what this study considers as high utilization of IT as unnecessary or un-beneficial. However, often managers viewed such usage of technology as too far from their reality to contemplate, or expressed doubt as to whether the public would consider the benefits from those systems worth their costs. These opinions about what the research considers effective use of IT may be interpreted in two ways. It might be a true reflection of the public interest in City D, which means that supporting the four goals of local government by extensive use of IT is not a priority of the public in City D. On the other hand, it might also means that the public is interested in improvements in these four areas of activities, but is not aware of the potential benefits of the technology, or not very interested in how its local government achieve those improvements. Based on the fact that managers in City D report that they sense neither demands for more extensive computerization nor objections to it from the public, and that most of them believe that the public is not overly concerned about how its local government operates as long as it provides quality services efficiently, the author tends to believe in the second explanation. As such, it is up to the council and senior management to educate and lead the public toward more visionary use of the technology.

While all variables which relate to the bureaucracy are inter-related, it seems that the major impediment to the development of effective IS in City D is the lack of corporate

management. This is apparent not only at the structural level, but also at the deeper level of understanding about what a corporate strategy is in regard to IT and what is needed to make it work. As the IS manager state,

> *What is constraining [IS development] is the understanding of what a vision and a strategic plan and an action plan are ... it is not a council problem or that senior management do not want it.*

Contributing to this lack of understanding is the position of the IS manager who is too low in the hierarchy to effectively influence, or educate, top management and council. Also, her own perception of her role as more technical than strategic, hampers her effectiveness.

Since there is no strong, visionary management in City D, the city bureaucracy seems to react to the financial pressure by adopting a defensive, short term, cost saving orientation, which severely inhibits the development of IS. On the one hand, it forces IS planning and development to focus on supporting existing processes and limits its horizon to small, local applications. On the other hand, it conveys a message that long term planning, from which a better understanding of the role of IT in supporting the goals of the city may emerge, is futile and a waste of time. It also tends to reduce slack resources to the point where people do not have the time to step back from their daily chores in order to re-evaluate what and how they are doing, or to pursue innovative ideas.

Incrementalism, especially when combined with lack of corporate management and a long term strategic plan, is another deadly ingredient in the combination of factors which explains the lack of effective use of IT in City D. Able to move only in very small steps, and judged after each one, the IS function cannot afford the patient development of a comprehensive infrastructure. Furthermore, since each increment has to be justified separately, and development is not guided by a long term master plan, it is very likely that

at the end no comprehensive and integrative IS plan will have formed. This may seriously constrain the value of the technology, and postpone its realization.

Lastly, organizational power and decision making in City D is quite fragmented. However, fragmentation does not have a severe adverse effect on the current use of IS in the city. Primarily because the major part of it is still the financial package which was purchased as a comprehensive, well integrated, corporate system, but also due to the central IS function, which was able to ensure some standardization and compatibility. Fragmentation, however, may become a more serious impediment for realizing payoffs from IT in the near future. There are signs that the IS function is gradually letting go of its central control over IS development, and since development, even when controlled by the IS function, is governed by the needs of a specific user's department rather than by a master plan for the development of the IS for the city as a whole. This process already endangers city-wide standardization in some areas and jeopardizes the integrative nature of the IS, and in the future it may restrict the value the city may enjoy from new developments.

CHAPTER 6

THE CASE OF CITY E

6.1 General

City E is a large, geographically isolated urban centre which experiences an exceptionally harsh winter climate. The city originated in the late 18th century as a fur trade outpost and later became that trade's western centre. The gold rush and the agricultural settlement that followed it during the 19th century further transformed the city into a prosperous cultural and commercial centre for the whole region. The discovery of oil in the 1950's brought about an intense but brief period of economic prosperity and growth during which many national and international business establishments set their offices in the city. In the last ten years, two of the key economic sections in City E (energy resource industries, and agriculture and its related food industry) have suffered severe recessions. As a result, the average annual growth rate of the city dropped in the last decade to 1.4%, and its residents' average income in 1992 was the lowest among the cities in this study's sample. In 1992, the population of City E was 618,195. The municipal budget (not including utilities[1]) was around 694 million dollars in 1993. Currently, the municipality employs more than 9,500 people, of which 6,823 are employed in functions which correspond to those covered by the other cities in the sample, and the rest in the utilities.

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[1] City E owns and directly manages many revenue based functions, such as telephone, power, waste treatment facilities, water, transportation, and municipal airport. Utilization of IT to support those functions, which are grouped under the label "utilities", is not included in this study to allow comparison with other cities.

6.1.1 The IS function in the municipality of City E

Like many cities of its size, computerization in City E started during the second half of the 60's. However, due to the fact that the city owns and operates its own telephone, power generation, power distribution and transportation systems, its needs and resources were on a much larger scale than others in this study. While in the other cities computerization tended to be restricted to the area of financial control, City E utilized computers almost from its earliest systems for broader tasks. As early as 1971, it recognized IS as an independent domain and created the Computing Resource Department (CRD) to centrally manage all its computer related operations.

As CRD supported functions which are technology-oriented by nature, such as telephone and power, and enjoyed their revenues, it expanded rapidly. In 1972, disenchanted with its IBM mainframe, the City purchased one of the biggest UNIVAC mainframes available at the time, and redeveloped its whole IS on the UNISYS operating system, utilizing what then was considered the state-of-the-art approach to computerization. Among other systems, an on-line utility billing system was developed in 1973 which CRD manager rated as *"lightyears ahead of everyone's else"*. In 1974, CRD developed a database management system to integrate data from the financial, utility billing, purchasing, payroll, and inventory systems. And, as early as 1978, City E launched a project to digitize its maps and to use computers to support urban planning.

During the 60's and 70's, CRD remained the only IS unit in the city. Except for the computerized mapping application, which was developed on an InterGraph platform, all systems resided on the UNISYS mainframe and most were developed in-house, since at that time there were hardly any packaged applications available on the market. The General

Manager of CRD stated,

> *The department had both control and an execution mandate. There was very little computing done by the departments themselves. CRD controlled all IT related operations and budgets, and the systems were mostly aimed to support corporate-level information needs.*

In the late 70's, a number of processes combined to decentralize the IS function in the city. During the period of rapid economic growth in the city, between 1978 and 1982, most city departments established a high funding level to meet urgent requirements. In the years immediately following, the budgeting process allowed these funds to be retained by the departments. Concurrently, line departments realized that the existing corporate systems seldom met their business requirements, but due to staff limitations, the CRD was forced to turn down many departmental requests for new applications. At the same time, relatively cheap computerized solutions became available on the market, and spearheaded by the strong utility units, the departments manoeuvred to decentralize the municipal organizational structure. In 1983, the City Council officially changed the role of the CRD to be one of service rather than control. Under the new organizational structure, the costs of all CRD operations were to be recovered through a chargeback system. Investments in new IS projects were to be determined and funded by each department rather than be decided by a corporate body. The Manager of the CRD described what followed this organizational change:

> *Over a short period of time most of the larger departments established their own data processing, went out and bought machines, usually incompatible and inconsistent, and we saw a fragmentation of computing ... There were no mechanisms put in place that would make sure that chaos did not occur ... Within about 12 months we had 11 different word processing packages in use. We had one of every computer ever invented, network was an absolute disaster because everybody did their own data communication network ... Everyone wanted to do its own thing and uniqueness was almost a virtue.*

A number of factors mitigated the adverse effects of the fragmentation of the IS. The

central IS function was not disbanded or significantly downsized. Rather, the establishment of departmental IS groups came about, in most cases as a supplement to the large body of IS professionals who worked in CRD. This allowed CRD to keep the large corporate systems, now sponsored by the administrative departments, up to date and even allowed it to develop new systems. Line departments, once they had control, were willing to spend more money on IT and often found it to their advantage to hand over applications development to CRD as internal contracts. This allowed some level of consistency in planning and development to be maintained, as well as fuelled an intense period of departmental system development. Also, the chargeback system imposed on all CRD's services, created an incentive for the departments to integrate their systems with the corporate ones in order to reduce the chargeback cost of re-entering data. Lastly, CRD's manager remained a member of the corporate management team, and thus, was in a position to add a corporate perspective on the otherwise fragmented IS development.

In 1985, the Executive Committee[2] made an attempt to regain central control over IS development. Following the recommendation of the CRD Manager and City Manager, it requested that "*a five year strategic plan for data processing and office automation for the city be prepared*". In November 1986, a management consulting group that had been engaged to assist CRD in this task presented the city with a plan that stated,

> *Although the city has many good systems, the present computing environment has some major shortcomings which have resulted in: lack of required information; duplication of systems and data; inconsistencies; redundant efforts; inefficient use of technology; and, expensive maintenance and system development.*

The plan's overall recommendations met strong resistance for two main reasons. First, it

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[2] A sub-committee of the city council which supervises CRD.

called for a one-time capital investment of $10 million over and above what the departments were willing to pay for CRD services, to restructure the IT infrastructure and re-engineer the central systems. Second, the plan implicitly reinstated the control mandate of the CRD in strict contrast to the drift of the line departments towards autonomy.

In the preface to the revised Corporate Computer Plan which was approved three years later, in March 1989, the Manager of the CRD wrote,

> *The need for new corporate direction is even more pronounced today ... Because major activities were delayed, pending approval of the Corporate Computer Plan directions, we were not able to satisfy much of the present demand, let alone prepare for the future. The effect has been a further deterioration in performance, response times, and a build up in the application development backlog. This has resulted in a proliferation of small departmental systems which tended to further distance us from our envisioned computing environment.*

This revised plan, which the city has been following since, was neither a detailed implementation plan nor one that referred specifically to any of the 144 applications (requiring over $25,000 in original development cost) which existed in the city. Rather, it addressed the city's IS shortcomings and future information needs at three levels. At the organizational level, it called for strengthening central control over IS development, for establishing a corporate prioritization process, and for improving coordination between the departmental and the central IS functions. It further directed CRD to: *"establish and ensure compliance with standards for equipment, data communication, office automation, software, and the planning and control of computer projects"*. At the IT infrastructure level, the plan recommended a gradual move towards client-server architecture in which the role of the mainframes would be the central repository of corporate data rather than the main production tool. The plan specifically directed CRD to: *"implement a city wide communication system that will allow any terminal in the city to access data and systems on any computer"*. At the

more practical level, CRD was directed to prepare a five year implementation plan with budget requirements, timetables, and detailed list of projects. The plan also instructed CRD to *"acquire products and expertise to improve the productivity of computing staff"*, specifically referring to CASE tools, project management tools and techniques, fourth generation programming languages, and relational databases.

In September 1989, a detailed implementation plan called the System Replacement Plan (SRP) was presented to the council and approved early in 1990. This plan, which entailed a $18 million investment over five years, was executed in three stages. First, since the old UNISYS mainframe could not support the new IT architecture, an IBM mainframe was purchased in December 1990. During 1991-1992, hardware and software for a high capacity, city-wide, communication network was installed. Second, all computer applications in the city were reviewed and CRD began migrating them to the new environment by re-writing those which still met business needs and totally redesigning those which no longer did. Those two stages were funded as a corporate project, and CRD had the overall responsibility for their completion. In the third stage, information needs which were not met by existing systems were identified. Applications which fell within this category were not included in the initial $18 million capital investment, and it was not the responsibility of CRD to justify them. Rather, the sponsoring department had to submit a business case for each of those applications through the annual capital budgeting process. To comply, most departments embarked on a planning process aimed to produce a departmental strategic IS plan congruent with the corporate IS plan, but focused on their business goals. These planning exercises, which involved senior managers in each department, were supported and guided by CRD analysts.

Two steps were taken to strengthen the corporate control over IS development and to ensure that future development at the departmental level would be coordinated and integrative. First, a Corporate Computer Advisory Committee, chaired by the City Manager and consisting of six department heads, was created. Its principal tasks were to prioritize all new IT related initiatives from a corporate perspective, and to review the strategic direction of computing in the city. Second, an Architectural Steering Committee was formed in 1991 with representatives from all departments, *"to coordinate the establishment of corporate standards"*. These steps seems effective. In 1992, a firm corporate guideline which directed all departments to favour a packaged solutions based on an open-system standards was issued, and detailed corporate standards for computers were published. Furthermore, the Architectural Steering Committee, chaired by the Manager of CRD, evolved over the years into a tactical steering committee which reviewed departmental plans, discussed proposed computerized solutions, and reviewed choices of technology and vendors. More importantly, it has become a forum where ideas, knowledge, and needs are exchanged and shared among departments, and joint ventures are coordinated. The Manager of the IS group in the Planning Department mirrored the feelings of many IS managers interviewed when she said,

> *There is much more awareness of what each of the departments is doing ... In the technical steering committee we exchange information regularly with other departments and we all try to work together ... Currently many departments are using our systems and usually before embarking on a major project, we interview people from other departments and try to get them involved.*

A brief review of the resources allocated to the IS function and their distribution (see following table) demonstrates how heavily the city was, and still is, committed to IS. The numbers also clearly reflect the organizational change that is currently taking place in which the CRD is being transformed from a service centre to a corporate headquarters function.

year[3]	annual expenditure on computing [4]	CRD's share of computing budget	% of computing $ dedicated to development	No. of IS professionals in CRD	No. of IS professionals in the departments
1986	$32.5 million	50%	31%	210	90
1989	$42.5 million	39%	28%	235	120
1994	$50 million	30%	25%	181	148

As the SRP approaches completion, major utility units (telephone, power) are being separated from the municipality to become independent subsidiaries, and the decentralization trend among the line departments has been gaining strength. Computing power and control over applications and IS resources are being transferred to the user departments[5]. At the same time, IS remains a high profile domain in the city. Top management is more aware of the need for integration and connectivity, is more involved in IS, and is interested in strengthening corporate control over IS development. This is exemplified by CRD's proposal, currently under consideration,

> *Recognize that the corporate mainframe computer, its databases, and the corporate office automation application and communication network need to be treated as corporate assets and funded accordingly rather than through the current method of cost recovery.*

Summarizing the expected role of the central IS unit in the city, the CRD Manager said,

> *Most of the resources used to provide services to the departments are being transferred to them ... In two years' time we will have a staff of about 90. About a third will still be in production, servicing small departments and the central systems. A third in corporate network, databases, and technical support, and a third in research, new directions, standards, planning, and technology architecture. In my*

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[3] From City E's Corporate Computer Plan (1986,1989). 1994 figures drawn from the city's budget books and estimates prepared by the manager of CRD.

[4] The numbers presented in this table include all the city's expenditures on computing because numbers which relate only to the tax-supported functions are not available.

[5] The Manager of CRD projected that in 1996, CRD will be staffed by only 90 people and that its annual budget will be nine million dollars.

opinion, we will see the control mandate stay in place, but it's going to be a softer sort of control, more of a cooperative approach than the sort of control one traditionally associates with central agency.

6.1.2 Utilization of IT by City E

City E is making intensive and extremely diverse use of IT. In 1989 there were 350 different application systems running on five mainframe computers, 28 mini-computers, and more than 250 micro-computers. In addition, there were 16 departmental communication networks. As the Manager of CRD stated,

We were probably more automated in terms of systems, than anywhere else in North America as a municipality ... In the mid 80's, before the budget dried up, no one in this organization could think of anything else they wanted to computerize ... If you shut down our operations the city would grind to a halt. There are systems in use which if they were out for more than few days we would never be able to recover.

City E utilizes IT at two layers: the central corporate systems (mostly of the 70's vintage) and the departmental systems. The two differ in the goals for which the technology is being used, the intensity of IT usage, and the level of sophistication. The first group consists of a few, very large administrative systems which reside on the UNISYS mainframe. They are quite sophisticated and comprehensive, but were developed in times when the technology did not facilitate much flexibility. These systems were designed to automate large volumes of repetitive clerical processes, and aimed to provide central control over use of resources. When the city reorganized its administrative departments as service centres, and the line departments became almost independent business entities, resources for those systems dried up. Where the efficiency of the administrative processes was concerned, the systems were regularly updated because they provided economies of scale. The line departments, however, were neither too interested in investing large amounts of money to transform the

corporate systems to a decision support tools, nor to finance major infrastructure projects needed to facilitate sharing of information. As a result, utilization of IT to support corporate level decision making, sharing of data, and objectives which do not correspond with departmental business goals fell behind. For example, in 1983, CRD developed a sophisticated central payroll system which, taking advantage of economies of scale, significantly reduced the cost of this administrative service by allowing on-line data entry, electronic transfers of money, and fully automated posting of data into the accounting system. A corporate Human Resource system was meant to be the second phase of the project. However, as the development of the IS became more and more directed by the business needs of the line departments, the Personnel Department as a service centre with hardly any independent resources was not able to fund the project which was never completed. Rather, many stand alone systems appeared, which satisfied departmental needs, but not those of the corporation as a whole. A similar example was provided by the Manager of the System Integration branch of CRD:

> *The corporate financial information system (FIS) is a very large, complex, and relatively sophisticated system. It maintains thousands of accounts and is integrated with all other corporate-level systems. It was built in 1975. Departments, however, need to look at their businesses in a different way than what the corporate financial people do. So what happened was that just about every department built a lower level, much more detailed information system, typically on minicomputers, on which they did their financial management and budgeting ... There is seldom a direct connection between the two layers, they are usually not even on a compatible machines. There is, however, a summary process where data, aggregated to the level needed by the corporate people, is extracted and transferred as a file or tape to the other system. The same happens in the other direction.*

This second layer of information systems in City E is where many of the city's IS strengths and weaknesses reside. On the one hand, departmental systems are usually of the 80's and 90's vintage, utilize more advanced technology, are more flexible, and have more

intelligence built into them. Thus, in many cases[6], utilization of IT at the departmental level reaches far beyond computerization of routine processes or operational problem solving. Often it is used to re-engineer the way a department is doing business and, in most cases, these systems include sophisticated managerial support modules. Furthermore, in City E, departments are managed as cost-centres. They are frequently evaluated by external and internal auditors and are compared to alternative service providers. This has led to a strong results-oriented management style within each department. Since departments control and pay for their systems, they tend to make sure that they fit their business goals and are driven by them. It also has led to active involvement of department heads in IS development and the emergence of long term vision regarding the role of the technology among many of the senior managers.

The second layer of IS in City E is very fragmented. While some of the fragments are very advanced, utilization of IT varies greatly across departments and often does not address needs at the corporate level. Moreover, in the past, departments were unwilling to pay the cost of integration, to spend money on corporate-wide infrastructure, or to finance systems which support goals not specifically assigned to them.

A main thrust of the SRP is to address those shortcomings. The Plan, however, does not attempt to bring back central control over applications development. In fact, while senior IS managers agree that *"there are certain benefits to a more controlled and centrally directed IS development"*, they do not believe it can be achieved within the context of the *"fierce*

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[6] For example, the Transit Department's Bus Routing System, the Planning Department's Social Economic Land Use System (SELUS), and the Mobile Equipment Division's model for vehicle maintenance.

autonomous and competitive environment" which exists in the municipality of City E. Instead, the SRP is a corporate initiative to re-design the IT infrastructure of the city, and thus, to a large extent, fill the holes left untended. As the Manager of the CRD stated,

> *IS has been reactive in this corporation to a large extent, changes were not imposed by IS we only facilitates them ... But, we knew that to provide better strategic support we should be more integrative, we knew that we are going to be moving massive volumes of data around and that people will want to share it ... So, we are creating an environment that can accommodate those directions and, when the users decide to move, we will be in a position to facilitate it ... And, we try to create an infrastructure that offers the maximum flexibility to the corporation.*

Thus, central systems are being migrated to a network environment and rewritten in a relational database language which allows much more flexibility and connectivity. A city-wide network, to which more than 75% of the users are now connected, was installed, and a fourth generation structured query language and report generator were provided throughout the network servers. Furthermore, rather than coercing the departments into using one word-processor, e-mail, and communication software, CRD followed an alternative approach in which small gateways and interfacing applications were provided to facilitate integration between departmental systems.

The case of the Geographic Based Information System (GBIS) provides an example of how, more and more, IT based systems are being developed and used in City E. It also shows how, through common interest and business-like transactions, city-wide standards and integration are being achieved. GBIS started as a digitized mapping project funded by the "rich" utility departments to facilitate computer-aided mapping and planning. At some time in the 80's, GBIS became a corporate project since it was recognized that it had a much broader potential usage. Nevertheless, it remained in, and was owned by, the Public Works Department. The manager of the project, wearing both a corporate and a departmental hat,

had a clear vision of GBIS as the backbone of many applications, but he did not ask for, or receive, any corporate funding. Instead, he persuaded business units in the city to finance the project by showing them that, with a relatively small investment in converting their data to the GBIS standards, they would get much more in return. As the Manager of the GBIS project described,

> *With each new member to the GBIS community, it became easier to convince others and the database expanded. We even have members from outside the city. From 9 members in 1985, we grew to 60 ... If I were to put a plan together and say we are going to spend $10 million over the next five years implementing this project they [council/departments] would have said no. But we did, and none of that was funded as a corporate project, it all came from the users ... It is all decentralized. They [business units] are collecting the data, building applications to use it, and spending the money. I am merely making sure that all can share it, coordinating, and guiding ... It is cooperation, standardization, and integration through vested interest.*

6.2 Assessing IT support for organizational goals in City E

Consistent with the utilization of IT assessment in other cities, this study bases the evaluation of City E on the existing systems together with those included in its System Replacement Plan and its approved Capital Priority Plan. By thus taking into account those systems whose replacement or development have already been approved and budgeted, this study compensates for the particular point in time City E was surveyed.

6.2.1 IT support for the administrative processes

Because of the size of City E's municipality, its decentralized managerial approach, and the autonomous nature of the line departments, administrative processes are usually managed at both the corporate and the departmental level. Thus, complementing the corporate administrative functions, departments have administrative groups which manage finance,

payroll, inventory, and cost control at the departmental level. Accordingly, in City E there are few very large IT based systems that support the administrative processes at the corporate level and a multitude of smaller systems which supplement them at the departmental level. Since the development of the departmental systems were governed by the departments themselves, they vary significantly in their level of sophistication. Each tends to be unique in its design rather than a customized module of a common generic system. For example, the Transit department, the Mechanics yards, and the Public Works department each has a different Maintenance Management System which captures data regarding work orders, time-cards, departmental inventory, and maintenance costs[7].

At the time of data collection, most departmental systems were still not linked to the larger corporate systems. Data exchange between the two layers of systems was done through file transfer or exchange of magnetic tapes. In cases where departments did not have separate computerized systems, data was fed directly and on-line by the departmental administrative officer into the corporate systems. With the migration of the corporate systems to a relational database and a network environment, due to be completed in 1995, on-line exchange of information between the two layers will be facilitated. The departmental systems, however, are not being replaced. Each will remain a separate entity, integrated with the corporate system only to the extent needed to efficiently exchange highly aggregated data. As the Manager of the System Integration branch in CRD explained:

> *To begin with, we are replacing all corporate systems and integrating them on-line. The departmental systems will remain in place because departments have grown to like them and they fill their needs. It will take a hearts and mind exercise to wean them off it and migrate them to a more integrative solution. It is certainly CRD's goal, but*

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[7] In fact, the Public Works department has two separate and different systems, one for the Water Division and one for the Civic Building Division.

to a large extent it depends on the departments themselves.

Departmental resistance to change is not the key reason for not pursuing more integrative solutions. Underlying it is a fundamental management approach which views each department as an autonomous business unit directly responsible for managing its own administrative processes. Thus, for example, most departments have a financial management system which maintain much more detailed break-downs of corporate accounts and on which they perform financial analysis and budgeting. Departments do not want to, and are not expected to, share these operations with the corporate functions.

This structure of IS does not limit its value in supporting the administrative processes in City E. Since administrative processes are routine and predictable by nature, it was possible for the departments to develop fully automated systems, customized to their specific needs, and still sufficiently compatible and integrative with the corporate ones to avoid redundant data entry, manual manipulation of data, and inconsistent data. As the Manager of the GBIS project explained,

> *[fragmentation] resulted in the fact that in many areas we have redundant systems ... part of it is due to the fact that each department wanted direct control and part is because each was developed at a different time using a different technology ... Administrative systems, however, are very structured and it was relatively easy to integrate them to the extent needed at each level ... Thus, data is usually consistent across systems, and while [the administrative systems] are not connected as well as they should be, they do their work ... I am not sure if it is good or bad, because you may spend more time, effort, and money trying to eliminate the redundancy than the redundancy costs you.*

For example, in the area of consistency in reference, the GBIS serves as a master reference to all departmental systems which use addresses and geographical coordinates. Each department, however, developed its own applications to manipulate this data, and many tend to maintain a duplicate of the master database in their systems.

In other areas, however, such as office automation, the fragmentation of the IS and the lack of city-wide standards do restrict the extent to which the technology support administrative processes. In City E there are close to 5000 PC's or mainframe terminals, almost one for each office worker. All of them are connected to departmental LAN's which offer a full set of office tools, and all will shortly be interconnected through a city-wide WAN. However, even though there is a growing realization that the city needs to standardize its office automation tools, city management was not able to agree on standards. As the Manager of CRD explained,

> *We discussed the concept of one package and the committee could not agree because everybody said, "I do not mind if we go to one but it better be the one I am using because the cost to my department of changing at this time is too significant, I can not afford it in terms of business disruption".*

Thus, currently, departments are using WordPerfect, Lotus Notes, or Microsoft Word office packages. Similarly, some departments opted to purchase a sophisticated voice mail system and an advanced telephone system while others are still operating without those features. Consistent with their approach to provide infrastructure to facilitate connectivity, CRD are currently building gateways which will allow transparent connectivity across e-mail systems. Adopting this approach to more complex applications (such as scheduling, graphics, and spreadsheets) is much more difficult, and CRD is still looking for a solution.

Lastly, two new systems, Records Management and Human Resource (HR) Management, are scheduled to be implemented within the next two years. The HR system is being developed as an integrated part of the redesigned financial and payroll systems, accessible throughout the city's network and comprehensive. However, while it will facilitate performance appraisal and reporting, no city-wide standards in these areas have been set. Instead, each department will decide how to use those features. Supporting the Records

Management function, City E already has an on-line system called UNITERM which is a computerized indexing system used independently by most departments. The new Records Management project is directed by the City Clerk's office and intended primarily as a full text, on-line, search and retrieval system for council minutes and other official documents stored in the Clerk's office. While CRD managers hope that this system will eventually encompass all the departments and all city records, such expansion is not yet budgeted, and it is uncertain whether the current organizational culture will allow it.

Table 6.1, summarizes findings in regard to IT support of the administrative processes in City E. Overall, City E is rated as **high** with respect to utilization of IT in support of the administrative processes.

Table 6.1: Summary of IT support for the administrative functions in City E
(underlined = characteristics of existing system; shaded cells = system as rated; double lined cells = current system being upgraded)

	High utilization	**Moderate utilization**	**Low utilization**
Inventory management	on-line and comprehensive support, integrated with purchasing, accounting, maintenance systems, automatic replenishing & user generated purchasing orders, tracking, reporting & analysis tools.	on-line and comprehensive but not fully integrated with accounting, purchasing and maintenance, no automatic replenishing, no on-line generation of purchasing orders, no analysis & reporting tools.	not on-line, or not covering all types of inventory, integrated only with accounting, no managerial functions, only record keeping.
Financial management	on-line, comprehensive accounting system, fully integrated with all functions which generate financial transactions, electronic transfer, bank reconciliation, cost allocation, point of sale data entry, budget preparation, financial analysis & reporting tools.	on-line accounting system but not capable of handling all types of accounts or transactions, or not fully integrated with associated systems, or no budget preparation & no financial analysis and no reporting tools.	accounting system which do not cover all transactions, not integrated with associated functions, redundant data entry, no budget preparation, analysis, electronic transfer, bank reconciliation & reporting tools.

Payroll	on-line parametric system, handling all workers, automatic time capture or one time data entry, integrated with maintenance, personnel, & accounting; electronic deposit, check writing; annual reports (T4).	capable of handling all workers, electronic transfer, check writing, & annual reports, but non-parametric, redundancy in time card data entry, not fully integrated with other system or not on-line.	stand alone, non-parametric & not on-line system, and/or not capable of handling all workers, no electronic transfer, no annual reports.
Personnel	on-line central personnel records, employment history, positions, job descriptions, training and qualifications, performance appraisal, integrated with payroll & time card, analysis & report tools.	on-line, central personnel records but only current status & no performance appraisal, analysis or reporting tools, or not integrated with other systems and not on-line.	stand alone, record keeping database, no employment history, qualifications, training, no managerial functions.
Consistency in references	all data, in all systems, which refer to the same entity share a common key, no redundancy in data storage, on-line linkages between record regarding the same entity, electronic link to external assessment authorities, dynamic views.	central repository database of addresses and properties which is linked on-line only with some of the systems that use that kind of information.	stand alone database, each system holds its own addresses and properties records, or none.
Office automation	city-wide network which offers an integrated and standardized office suite, including word processor, spreadsheet, communication, telephone, graphics, e-mail, file transfer, scheduling.	only between 50%-80% of the employees are provided with PC, or are connected to the network, or office automation tools are not standardized, some tools are not provided, no enveloping system to integrate the various tools.	less than 50% of office workers have PC, or are connected to a network, or office automation tools are not standardized and most tools are not provided nor integrated.
Cost control, job costing	on-line systems, fully integrated with accounting, inventory, personnel, & payroll, semi automatic generation and costing of work orders, allocation of costs to programs, projects, equipments and work orders, analysis and reporting tools.	the same as the high cell, but, not covering all types of the city's operations, or not fully integrated with the related systems, and/or no analysis and reporting tools.	batch based system which records work orders and posts costs to appropriate accounts.
Record management	city wide, on-line, standardized, magnetic media storage of all records; full text search and retrieval capabilities.	a city-wide computerized record indexing system, or number of separate, non-compatible, record management systems, or record management system that store only part of the city's records.	small stand alone databases, or departmental computerized indexing systems, or none.

6.2.2 IT support for provision of high quality services

In assessing the value of IT based systems used in the area of provision of services, the extent of customers' direct benefit from the systems is studied, rather than the indirect benefits of improvements in administrative processes.

Most of the line departments in City E are using IT extensively to support their operations. Systems currently in use at the departmental level are often in their third generation. In many departments, long term IS plans to further develop their systems exist and are driven by senior management. To some extent, this is the result of the early start in computerization and the fact that during the 70's and 80's, when there was plenty of money to invest, line departments rather than the administrative departments controlled IS resources. As the Manager of the IS group in the Planning Department explained,

> *We started to use the technology very early ... so, people have gotten used to thinking in those terms ... Once they had been using computers, people gained knowledge and a sense for what they can do for them, so they are not quite as reluctant ... Senior management has recognized the importance of IT. Many developed a very clear vision of where they want IS to go and have been willing to fight to get projects through.*

Until recently, however, IS development was not well coordinated between departments. For example, Police, Fire, and Ambulance Services each purchased their own computer-aided dispatch systems. Many departments independently developed computerized systems to record and track public requests. There were even separate systems for each type of permit or license issued by the Planning Department. From the customers' point of view, this often meant that bills could not be settled at one location. Complaints or requests could not be tracked across departments, and getting a permit or a license required customers to visit a number of offices. It also meant that areas which do not fall within the jurisdiction of one specific department were significantly less supported. This state of affairs is slowly being

changed as the Computer Advisory Committee tends to consolidate departmental initiatives, and the forum of the departmental IS managers fosters coordination and cooperation.

Three examples demonstrate that move: First, the dispatch functions of Fire and Ambulance Services have been merged and their systems are being replaced by the very sophisticated system used by the Police[8]. This will allow better coordination of all services which respond to emergency calls. Second, the Planning Department is currently re-engineering its permit system. The new system, due to be operational in 1995, will add to the already quite impressive features the current one offers[9]. It will add the ability to receive applications electronically from real estate developers' CAD systems, circulate and track these applications across departments, and integrate data from hand-held computers used by inspectors. Third, the Transit, Park & Recreation, and the Library, each uses a different system to provide information and facilitate remote registration. The City's FreeNet, a joint project of the City, the University's library, and the Association for Continuing Education, is scheduled to become on-line late this year. This will allow the public access to all those systems from one point. FreeNet will also facilitate electronic access to information regarding all city sponsored events, courses offered by educational institutes, and a bulletin board on which information can be posted and discussed. It will also enable the public to apply on-line to career and employment centres.

To a limited extent, City E is even starting to use IT to support remote access and

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[8] The system automatically identifies the location of the caller, presents call-specific maps and data retrieved from other systems, optimizes alert notifications and routing, and supports field crews with remote monitors. Lately, the combined project team is considering use of Satellite Positioning technology to automatically keep track of the location of the emergency vehicles.

[9] The system already facilitates on-line filing of application, eligibility checks, and real-time retrieval of case-specific data. It is integrated with the finance systems and the inspectors' scheduling and reporting system.

customization of services. The new corporate utility billing system will offer customers a range of options regarding the format and the information content of their bills. While still on the drawing board, the city is considering the placement of ATM-type information kiosks from which the public will be able to automatically access some of the more routine services, such as garage sale and fishing permits, and renewal of dog licenses.

The move to more integrative and city-wide computerized solutions has not yet reached all areas of services. Offices which are engaged in the collection of bills, fines, and fees, are all fully computerized, but the systems are usually departmental or even function-specific rather than a one-stop service counter. Similarly, requests for service or complaints regarding all aspects of the city's activities can be logged, recorded, and easily tracked by computerized systems, but only from within the department that is responsible to each service.

Table 6.2 summarizes the findings in regard to IT support of provision of services. Overall, even though in some areas IS support is still hindered by fragmentation, the extent to which IT is utilized to provide quality services in City E is rated as **high**.

Table 6.2: Summary of IT support for provision of services in City E.
(underlined = characteristics of existing system, shaded cells = system as rated, double lined cells = current system being upgraded)

	High utilization	**Moderate utilization**	**Low utilization**
Response to emergency calls (police, fire, ambulance).	on-line computer aided despatch system which covers all three services, real-time optimization of whom to alert, routing, and call-ups for reinforcement, on-line presentation of all relevant, call-specific data available in the city's systems.	the same as in the high cell, but only for some of the services, or on-line computer aided dispatch system which presents only static (not call specific) data, no automatic optimization of routing, alerts, & reenforcement.	records calls and maintains log of activities, stand-alone database of some relevant information, no automatic functions, or none.

Provision of data to emergency field crews	mobile data terminals in most vehicles, communication links which allow field crews to interrogate all city's systems, remote data entry and verification.	same as in the high cell but only in few of the vehicles, or radio links with operator who can access all city's systems on-line.	radio links with operator who does not have on-line access to most systems, or none.
Traffic control	full coverage, automatic traffic-load sensing and scheduling of traffic lights, responsive system.	full coverage, automatic traffic lights control system but without real-time components.	partial coverage, static traffic lights control system, or none.
Water, sewage, storm-water control	full coverage, real-time monitoring of pumps and valves, automatic detection of faults, remote control.	partial coverage, or real time monitoring but no remote control capabilities.	none.
Bill and fine collection	ATM, and/or one-stop service station integrated with other city's systems, on-line data entry, query, printing of bills and receipts, flexible forms of payments (banks, instalments, automatic debiting, credit cards, checks, cash), bar code scanning.	one-stop computerized cash register not integrated with the city's systems, or a number of different systems each one capable of handling one type of payment, or system does not allow flexible form of payments.	computerized cash registers for each type of payment, not integrated with other systems, no on-line data entry, query, and printing of bills and receipts, no flexible form of payments, or none.
Issuing of permits and licences	on-line filing of applications, automatic fill-in data fields and eligibility checks, presents customers with case-specific information, inter-departmental inquiry and tracking system integrated with bill collection system.	one-stop service counter, inter-departmental inquiry and tracking system.	departmental record keeping, or none.
Public library	on-line, multi-branches, circulation system; computerized catalogues; public terminals; self search, inquiry, and booking; automatic notification; remote access.	on-line but branch specific circulation system, computerized catalogues, search only public terminals, no self booking, status inquiry, or remote access.	computerized catalogues, or none.
Managing public requests and complains	on-line, city-wide system which records, channels, and tracks all types of requests and complaints, generates confirmation notices and final responses, integrated with all other relevant systems.	on-line city-wide but type-specific system, records & tracks requests for specific services, and/or does not generate responses, not integrated with other systems.	off-line record keeping, or none.

Provision of information, registration services	on-line registration/booking system for all city's sponsored events, classes, facilities, available at most public service counters, integrated with other systems to allow on-the-spot payment and issuing of receipts /tickets /confirmation.	on-line but event or departmental specific systems, presents information and allows registration/booking only to those activities controlled by one department, not integrated with other systems.	system support for registration / booking are for local activities only, or none.
Remote access	direct access through dial-in modems or terminals in central locations to registration services, taxes, fines, bills inquiries, permits & licences applications, and requests for services.	direct access through dial-in modems or terminals in central locations to a partial list of the services mentioned in the left cell.	none.
Customization, value-added services	notices and bills in language of choice; offering a range of options regarding format of bills and their informative content.	some items described in the high cell but not all.	none.

6.2.3 IT support for decision making

The assessment of the extent to which IT is utilized to support decision making, focuses on three areas: a) availability of data, b) breadth and depth of data, and c) existence of tools to manipulate and present the information in ways useful to decision makers at the city management level.

Referring to the extent to which the current systems support decision makers, the CRD Manager said,

> *I would say that the biggest single weakness of our IS is the lack of sufficient support for decision making at the corporate level ... A major thrust of the plan we are putting in place is to provide better information, because today the typical report they get is an inch thick and they have no capability to ask the "what-if" type of questions.*

The author's assessment of the level of support IT provides decision makers in City E is more favourable, especially considering the improvements currently under way.

Following the System Replacement Plan, all corporate systems are being implemented on relational databases with easy to use report generators. Historical data, which was previously archived, is now being brought on-line, and all corporate systems have been given the capability to provide executive summaries, exception reports, and graphic presentations. The integration of the corporate systems with the departmental ones, however, is only superficial. Thus, there is only a limited ability to "drill-down" for data from the corporate level into the departmental, let alone combine data from a number of departmental systems. Data is still considered the property of the departments rather than a corporate resource. There are still considerable organizational barriers to on-line sharing of information. Increasingly, however, departments are sharing their systems and data. In these cases, sharing usually necessitates intervention of an IS specialist.

The following incident demonstrates the breadth and depth of the data stored in City E as well as the difficulties in sharing it. Recently, the Fire department was challenged that it does not provide equal service to all neighbourhoods in terms of response time. The Fire department had all its operational data, but no tools to analyze it nor neighbourhood data or mapping capabilities. Cooperation of two other departments and help from IS experts were needed. Once help and cooperation was secured, operational data from the Fire's dispatch system, neighbourhood and environmental data from the Planning department's SELUS system, and maps from the GBIS was combined to produce geographical analysis of response time and a computerized model which optimizes the location of fire halls.

City E subscribes to a number of local, provincial, and international communication networks, which further broadens the scope and variety of the data available to decision

makers[10]. Connection to networks, however, is not open to all employees, but determined by each department according to its evaluation of the needs versus costs.

The following example demonstrates the impressive capabilities as well as the limitations of these systems. The manager of GBIS noted that to produce a map of the best route he should take from work to home if he wishes to purchase some specific items on the way, *"I will have to phone the property and tax assessment people for permission and access, and get access to the network with the Chamber of Commerce which people in the city have but I do not"*. Other than that, and the need to use IS experts to bring all the data into the module which integrates and analyzes geographical data, *"I can do it all from here in one day"*.

In general, City E has a multitude of computerized analysis tools and models which are routinely used at the departmental level to provide forecasts and statistical reports, but are not as easily applicable to support decision making at the corporate level. Also, IT is used extensively to monitor and calculate various performance measurements, but since methods and criteria are not standardized, this does not allow comparison between departments.

One development well worth mentioning because it is way ahead of what this study defines as high utilization, is a system developed especially for the council chamber in the new City Hall. This system is an on-line group decision support system which at the moment supports the structuring of the political debate, setting of the agenda, and voting. In the future, this system will be connected on-line to the council minutes database and other corporate systems to allow councillors to consult city information in real time.

Table 6.3 summarizes findings in regard to IT support for decision making at the

[10] One of them, the WinterCity network, was even initiated, built, and run by the city.

corporate level. Overall, City E has a broad and deep information base and many tools to use the information to support decision making. Sharing this information and tools across departments and systems is not always easy. Also, performance monitoring and evaluation are usually not standardized city-wide. Nevertheless, in general, decision making at the corporate level is **highly** supported by IT.

Table 6.3: Summary of IT support for decision making in City E (underlined = characteristics of existing system, shaded cells = system as rated, double lined cells = current system being upgraded)

	High utilization	Moderate utilization	Low utilization
Sharing of information	all corporate data is available on-line, systems & users can easily share information stored anywhere in the city, easy to use interfaces allow easy access and manipulation of data.	not all corporate data is readily available on-line, sharing information among systems often requires professional involvement, no easy-to-use data manipulation tools.	data is not managed as corporate resource, most systems are not compatible, very little data is available on-line.
Breadth and depth of information	corporate data is broad and deep, includes environmental data as well as internally generated data in great detail, historical data is maintained and available on-line.	only limited environmental data is available through the IS, historical data is not maintained on-line.	no environmental data is available, there is no historical data in the system, internally generated data is kept at a relatively high level of aggregation.
External linkages	on-line, dial-in linkages to many external networks and databases are available to most city's officials.	few linkages to external sources of information, no on-line dial-in capabilities, and/or only few officials have on-line connection with external networks/databases.	only operational-level, routine and standardized file transfers, or none.
Flexible & easy to use reporting, executive summaries, exceptional reporting	flexible and easy to use report generators which allow integration of data across systems, most systems provide executive-level summaries, exceptional reporting, and graphical presentation.	most systems provide menu driven report generator, usually restricted to the data stored in each system alone, no executive-level summaries, no exceptional reporting, no graphical presentation.	only routine, standardized print-outs of data, most system do not support user generated reporting.

Performance monitoring & performance evaluation	system support for monitoring use of resources and many parameters regarding the city's outputs, on-going, standardized, and city-wide calculation of performance measurements.	system support for monitoring use of resources and limited outputs' indicators, some city-wide performance measurements criteria are routinely calculated.	system support for monitoring use of resources only, no performance measurements at the corporate level, or none.
Analysis tools (modelling, forecasting, statistics)	many analysis tools are available on-line at the corporate level, tools are well integrated with the city's data, available tools cover many aspects of the city's activities.	few task-specific, analysis tools are available at the corporate level, analysis tools are not integrated with the other systems.	none.

6.2.4 Support for the democratic process

Probably because no line department is directly responsible for it, utilization of IT to support democratic processes is not formally recognized as a separate area. However, there is an awareness of the needs and of the ability of IT to support it. This awareness is manifested, to some extent, in the design of some of the current systems.

City E has an automated voting system, electronically connected to the written media. Council minutes and policies are stored on a computerized database which, while not directly accessible to the public, can be used to search and retrieve information. Councillors have a voice message system and each has a computer connected to all corporate systems (but there is no easy-to-use interface to allow them independent search for information). Also, there is a Citizen Action Centre, supported by a small, stand-alone system that records public concerns and tracks how they were handled. In one case, when a proposal to legislate cat-licences evoked a spirited public debate, this system was used to produce a public opinion poll report to the council. In the near future, the city's FreeNet network will provide residents with a dial-in access to some of the city's information, a communication channel to their representatives, and an outlet for information regarding social, commercial, and

environmental data and statistics.

At the moment, City E does not have a formal and comprehensive plan regarding how it intends to use IT to support this domain, and there are no concrete plans or budgetary commitments for systems which directly aim to support the democratic process. Nevertheless, there are a number of impressive, innovative and visionary ideas which are being circulated. Three are particulary noteworthy. First, the manager of the GBIS project recalled a recent informal meeting with some of the councillors, in which two-way TV technology was discussed, including how it could be integrated with the new council-chamber system. Second, more pragmatically, parallel to the development of the records management system, a sub-committee of councillors and administrators, called the Access To Information Committee, was convened to look into the question of giving the public direct access to the system. Finally, a senior manager in CRD mentioned a rather subtle point in terms of public access to information. He said,

> *The mayor is very much aware of the disadvantage of the individual citizen [in regard to access to information as compared to organized interest groups] and tries hard to balance the power of competing interests. ... We are aware of the need but we do not yet have the automated mechanism to supply that information to whoever might need it.*

Table 6.4 summarizes findings in regard to IT support for the democratic processes in City E. Overall, IT support for this domain in City E is rated as **moderate**.

Table 6.4, summary of IT support for the democratic process in City E.
(underlined = characteristics of existing system; shaded cells = system as rated; double lined cells = current system being upgraded)

	High utilization	**Moderate utilization**	**Low utilization**
General election	automated voting system.	calculation and reporting of results.	voters list, or none.

Publication of council minutes, decisions, legislations	on line, search and retrieval capable system, electronically accessible to the public.	database of council minutes, bylaws, policies.	computerized indexing system, or none.
Communication between the public and its representatives	system capable of recording, channelling, and tracking constituents' concerns.	system that records constituents' concerns, or a messaging system.	telephone, or none.
Council's oversight of the administration (monitoring city's expenditures, operations, administration behaviours)	on-line, EIS type of system for aldermen.	on-line, menu driven query system and report generator.	on-line connection to all city's systems, or none.
Disclosure of municipality's data (budget, plans, programs, expenditures, etc.)	on line, search and retrieval capable archive, electronically accessible to the public.	magnetic media archive.	computerized indexing system, or none.
Involvement of the public in decisions	computerized survey/poll system that actively seeks and analyze public opinion, or interactive televised council meetings.	bulletin board which carries council agendas, and/or system that record public opinion regarding issues on the agenda.	televised council meetings, or none.
Reducing asymmetry of information (collection and distribution of social, commercial, and environmental data and statistics)	on line, search and retrieval capable system, electronically accessible to the public.	database.	computerized catalog, or none.

6.3 Political behaviours in City E

6.3.1 General description

The political level in City E is the city council, which consists of two representatives from each of the six wards in the city, and the mayor, who is elected by the public at large. The council is divided to three sub-committees. Each is responsible for certain aspects of the city's operations and oversees the municipal departments which operate in those areas. These sub-committees are authorized to make final decisions regarding the operation of the departments. This allows specialization among council members, facilitates better oversight of each department, and frees council as a whole to focus on city-wide policy matters. The

council serves also as the board of directors for the power and telephone authorities and various other bodies such as the taxi, convention centre, and economic development commissions. It also holds a controlling vote in the public library board. These authorities, commissions, and boards are kept at arms length from the municipal corporation. Each is managed as a separate financial entity which reports directly to council rather than through the city manager.

There is no expectation that a political level will be deeply involved in the details of how a city is using computerized systems. However, decisions and actions of the political level may significantly impact how a city uses IT. In the following three sections the researcher assesses the extent to which the politicians in City E: a) provide well defined goals, objectives, and strategic directions, b) support IS development and became directly involved in its planning, and c) create a uniform authority structure. Each of these three dimensions of political behaviour is hypothesized to strongly impact the extent to which the city uses IT to support its goals.

6.3.2 Political leadership

Probably because in City E there is no party politics[11], council did not bring to its term at the city's helm a well articulated and shared vision of the direction it wants the city to go. Also, there is no effort to reach a comprehensive consensus in regard to the city's goals, priorities, and targets. On the contrary, the council in City E tends not to devote much time to articulate its vision or to present the administration with a well integrated list of long-

[11] Party politics refers to a system where representatives are affiliated with a political party and are elected to follow its platform. No party politics means that candidates are nominated and elected to represent a ward without affiliation to a political party or other, external to the ward, organizations with political goals. In the case of no party politics, a new council often does not share a well articulated vision of the direction it wants the city to go.

term goals. As the Manager of the GBIS project explained,

> *We have the vision of 13 people sitting there independently ... They are not accustomed, nor very interested, in dealing academically with the need to create a co-vision, particularly with vision that does not directly help the public ... They do not have an easy mechanism for doing it and it's difficult for them to get their heads around this, to commit time to looking at that ... because they are dealing with thousands of more pressing issues.*

On the other hand, there is a long tradition of expecting, and even demanding from the departments and the city manager, a results oriented approach to management. The political level in City E encourage strategic management, council tends to ask for specific targets to be set and met, expects long term planning, and is willing to commit resources to them. The council also expects to be presented with performance measurements and criteria, and rigorously monitors them. As the GBIS Manager further explained,

> *They expect [the administration] to have the long term vision, to make recommendations based on it, and to make that vision explicit to them when a specific issue is discussed.*

The politicians in City E, however, are seldom personally involved in any of those activities. They tend to expect city management to sort out its priorities and come up with crystallised plans and recommended targets for their approval, rather than get involved in the planning process.

Three examples demonstrate this form of political leadership. First, prior to the annual budget process, the council and senior management develop guidelines for the next year's budget. These guidelines state the tax rate target and, in a very general terms, indicate those areas in which services should be enhanced, maintained, or where a decreased level of service could be tolerated. Apart from that, the political level is not involved in the budgetary process until a detailed, comprehensive, and integrative budget proposal is brought before the council. It is expected that a systematic prioritizing process, and a long term plan will be followed,

but the politicians are not involved in setting the process nor in examining the plans on which it is based. Second, each department is expected to precede its part of the budget with a mission statement and well defined business goals. Where applicable, departments are expected to indicate measurable performance criteria and quantitatively justify new programs they want to initiate. The council usually discusses those parts of the budget book and formally endorses them, but it does not participate in their formulation. Requests for capital investments are usually presented within the context of the long-term strategic plans of the departments that ask for them. The council tends to address those plans in their entirety and commits to long term capital investment plans, but it is seldom involved in the planning process itself. Third, in City E, in addition to the usual financial auditing function and the internal budget office which routinely monitors compliance with the budget, there is also the office of the General Auditor. This office is external to the administration. It reports directly to council and its main concern is with operational auditing. Each year, the General Auditor office performs a number of in-depth studies. It starts with the stated missions, goals, and operational targets of the unit under study and compares them to what actually happens. Where possible, it also compares the performance of the departments with those of other cities or comparable organizations. As such, it is a control mechanism for the council. The audit function is to identify weaknesses and inefficiencies, but not to investigate what should be done or how. Those questions are given to the administration to resolve.

The council in City E, however, is not always content with simply reacting to the administration or closely monitoring and overseeing its operations. Sometimes, especially in areas which directly relate to services to the public, the council is the source of the initiatives. For example, it initiated a program to provide transportation to disabled citizens as well as

a number of studies to investigate the feasibility of contracting out major operations of the city. Also, the original directive to separate the telephone company from the municipal organization came from the council, as well as the initiative to combine all utility bills and to develop the WinterCity network. Those directions, however, tend to be far apart and on an ad-hoc basis rather than the result of a systematic planning process. Congruent with the opinions of many other managers, CRD's Manager said,

> *In some areas council provides explicit leadership, especially in terms of services to the citizens they are very specific ... often they will dictate an exact level of service, even to the extent of how many garbage bags are needed ... In other situations, those which are less direct and immediate, they tend to react to the administration and to remain at the mission level in their deliberations.*

6.3.3 The involvement of the political level in the development of the IS

As in other areas, the council in City E does not have a shared vision regarding the role of IT in the city. One senior manager said,

> *I do not blame them, we have not given them that vision ... What they expect, I assume, is that we better have that vision and whether we share it with them is not important as long as we know what we are doing and they have the final decision.*

There is also a great disparity among council members in levels of understanding of technology, interest in it, and attitude towards it. This disparity has not been addressed, and probably will not be, since the council in City E does not have the time or the inclination to undertake that kind of educational process and is content with passing decisions on what the administration puts before it. As the Manager of the CRD explained,

> *Some members of council have a clear vision, some are interested in technology, some have no interest, and some are actually afraid of it a little bit ... There are probably only four of the thirteen people on council who were there when the big plans were approved. Those four have a fairly good understanding of what we were trying to achieve, the history of getting from where we are to where we want to be, some of the others have no idea ... As a whole they do not provide leadership in the area of IS*

and they do not see it as their job.

Nevertheless, the political level in City E, in general, has been very supportive of IS development. At times, even without clear understanding, the council was willing to support, and even ask for, very visionary and innovative IS projects. For example, when the plans for the new City Hall were discussed, one of the clear directives that came from the council was that they wanted it to be *"one of the most automated city halls that exist"*. One of the oldest members on council is quoted to say:

> *We should put in all the modern technology that we can, because I know I will not be around and I probably would not understand it but my successors are going to require it.*

Furthermore, while the council does not provide leadership in the area of how to use the technology and does not get involved in IS planning, as the CRD Manager stated, *"Quite often, council realizes that if we are to implement a certain service or program, it is likely going to involve an IS solution and they support it"*. Sometimes the council in City E has even directly initiated IS projects. In those instances, however, the council has not directly requested a specific system. Rather, it has directed the administration to achieve some business goal and suggested that the way to achieve it would be through an automated system. For example, when the council decided to allow individuals to pay their bills through the banks, it simultaneously gave the green light to initiate a project to connect the banks on-line with the city's financial systems. Similarly, a proposal to make the waste management unit (garbage collection) a revenue based organization, is currently being discussed. Referring to this proposal the manager of CRD recalled, *"So, council made the connection and asked that if we do that, a system should be developed to recover the cost through our utility bills"*.

At the organizational level, as already mentioned, CRD is supervised by the council's

executive committee, which according to CRD Manager, *"Is considered the most senior committee since the mayor chairs it"*. While committee members were not personally involved in IS planning, both the Corporate Computer Plan and the System Replacement Plan were thoroughly discussed in that committee. Both were approved and committed to by the council at large. Furthermore, the political level in City E did not settle for a one-time discussion of the IS plans. Since 1991, more than 30 items in council minutes refer to IS development, and in the wake of some doubts regarding CRD's ability to carry out the plan, the Manager of CRD was told, *"The executive committee demanded that you come in here every three months telling us where you are in terms of the five year plan"*.

6.3.4 Authority structure

City E owns and directly controls many functions which in other cities are outside the responsibility of the local government. Those functions (except for transportation) are managed separately from the municipality, and are directly controlled by the city council. This means that at the political level there is only one elected body who bears responsibility for all aspects of the city's operations. To some extent, the fact that the council's sub-committees have decision making authority may be perceived as fragmentation of the authority structure. In City E, however, the author found no evidence of a power struggle between committees nor inconsistencies or overlaps in their decisions. Among other reasons, this is probably because areas of responsibility and decision making processes are clearly delineated. For example, except for the chair, all committee members rotate each year, a committee's authority is limited to on-going operational issues, and usually if there is strong discord at the committee level, the matter is moved to the council as a whole.

Authority structure at the professional management level is also quite unified[12]. The Manager of the CRD explained the formal status of the City Manager:

> *Formally, the Mayor is the CEO of the corporation. [the city manager] regards himself as the chief administrative officer (CAO) and tries to avoid forcing decisions on the departments. But all reports must go through his office before being submitted to council. Major decisions have to have his approval, and ultimately he would say, "I think that is more important to do", and that is what will go to council.*

In City E, the political level gives the City Manager full authority over all functions included in this study[13]. As one of the councillors said, *"We directly nominate four officials, the rest, including direct responsibility for the departments, goes through the Manager"*. De-facto, until five years ago, the City Manager and his senior management team did not understand the importance of central control over IS development and standards. They did not exercise their authority and left the IS domain to the discretion of each department. This led to the fragmentation of the IS which still prevails to some extent. The creation of the Computer Advisory Committee, the issuing of corporate IS standards, and the change in the capital budgeting process[14] are indicators that, more and more, city management is practising its authority over IS development.

The author concludes that the political level in City E provides strong leadership on how the city should be managed and also closely monitors compliance. It is less explicit on what exactly should be done and to what ends, and it is seldom directly involved in the process of researching and formulating the strategic directions available to the city. While

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[12] The authorities, commissions, and boards are not under the authority of City Manager. However, those bodies were excluded from the study to enable comparison with other cities.

[13] The only exception is the Public Library which is operated under a separate board, not under the authority of the city management.

[14] According to the new process, established in 1990, all IS projects are separated from the rest of the departmental requests and prioritized by the City Manager and his Computer Advisory Committee separately from all other capital projects.

there are indicators of both a high and medium level of political leadership, the overall rating is closer to **high**.

Overall, on the scale measuring the council's involvement in IS (e.g. champions of IS projects, actively involved, and highly instrumental in its development, to low involvement or even somewhat obstructive) the involvement of the political level in IS development in City E is rated as **moderate**.

Overall, at the political level itself, and in terms of how the political level structures authority at the administration level, the authority structure in City E is rated as **highly** unified.

Table 6.5 summarises findings in regard to the extent to which the political level in City E, provides political leadership through well defined goals, objectives, and strategic directions; supports IS development and is directly involved in its planning; and, creates a uniform authority structure.

Table 6.5: Summary of the ratings of variables and indicators of political behaviours in City E
(shaded cells = current practice/situation; thick lines = factors as rated)

	High	Moderate	Low
Political leadership provision and commitment to well defined goals & strategic directions in all areas of operation	on-going, formal processes in which council formulates and reviews the city's plans and operations, in a comprehensive way.	institutionalized, one-shot process in which council set its objectives for the term/year.	no formal process in which council set goals priorities, and directions.
	council is interested & actively involved in goal setting & strategic planning.	council supports & encourages but is not involved in goal setting & strategic planning.	council does not support nor get involved in goal setting & strategic planning.
	top-down, comprehensive budgeting process in which council provides result-oriented guidelines.	bottom-up but comprehensive budgeting process; council does not provide guidelines.	bottom-up, fragmented budgeting process.
	existence of mission-driven, updated strategic plans, officially endorsed by the political level.	strategic plan/s exist but not officially endorsed by the political level, or, are not comprehensive.	there are no long-term strategic plans.
	resources are committed to long-term strategic plans.	there is a long term capital investment plan but there is no direct commitment of resources to the strategic plan.	there is no long-term commitment of funds, only ad-hoc, yearly allocation of resources.
	council is perceived as leading in all areas by politicians & bureaucrats alike.	council is perceived as leading only in some areas by politicians & bureaucrats.	council is not perceived as the leader in most areas by politicians & bureaucrats.
Political involvement in IS interest and active participation of politicians in IS development	council is interested and actively involved in directing IT usage.	council is interested and supportive but not involved in directing the development of the IS.	council is not interested, not involved, and even somewhat opposes the development of the IS.
	council develops formal vision and policies regarding the role of IT.	informally there is a shared vision regarding the role of IT among council members.	council does not have a vision regarding the role of IT in the city.
	council, in its goals and objectives, explicitly refers to the development of IT based systems.	council initiates few IS projects on an ad-hoc basis.	council does not initiate any IT based projects.

	there is a political body that directly oversees the IS function.	no special body that oversees the IS function but council receives reports and presentations from the IS manager.	council does not directly oversee the IS function nor ask for reports or presentations.
	council formally discusses and endorses a comprehensive IS plan and commits to the plan as a whole.	council is aware of the IS plan but discusses and funds each project separately.	council is not aware nor interested in the IS plan/s.
Authority structure unified authority at the political and operational level	there is a coherent and unified authority structure for all aspects of the city's operations.	few aspects of the city's operations are not directly controlled by the central, political, authority.	there are a number of political bodies, each with the authority over a part of the city's operations.
	authority over all matters relating to IT utilization resides in only one political body.	there is a central authority, at the political level, that controls most IT related matters.	IT related matters are controlled, at the political level, by a number of different bodies.
	council gives the senior manager authority to direct all the executive branches of the city.	council gives the senior manager only limited authority over the operation of the departments.	there is no central authority below the council level, each department directly reports to some political body.

6.3.5 The impact of political behaviour on utilization of IT to support organizational goals

In general, the success of City E in utilizing IT to support its goals cannot be directly attributed to the political level. The politicians were not the ones with the vision, they did not champion IS projects or plan them, and they were not involved in carrying out the plans to completion. However, they did set the stage for the administration to pursue effective IS, and as the city's history showed, demanded it when the administration failed in the 80's.

Two factors, which relate to politics, seem to contribute to the way IT is used in City E. The first relates to political leadership. The competitive, results-oriented management style appears to have encouraged innovations, and maybe more importantly, discouraged the natural tendency of a large organization in a non-competitive environment to settle in its ways. Associated with the same factor is the fact that the council in City E expected and even demanded long term strategic plans and was willing to commit resources to them. The second factor relates to the authority structure. The current structure in City E means that the administration has a single political master, which in turn grants to the City Manager a unified authority over all city operations.

The case of City E demonstrates that direct involvement of politicians in the planning and developing of a city's IS is not a necessary condition for the development of effective IS. It seems however, that it is important to involve the political level not to gain its input to the process but to create an opportunity to educate the politicians. Thus, with long exposure to IS related issues, there is a better chance that politicians will develop a vision, will better understand what it take to build IS that strongly support the city's goals, and will be more willing to allocate resources to it.

6.4 The bureaucracy in City E

As identified in Chapter 4, four behavioral patterns commonly associated with bureaucracy constitute factors that may impede or negatively influence the ability of a local government to develop IS that significantly support its goals: a lack of coherent corporate management, a high degree of incrementalism, a high level of fragmentation, and a dominant orientation which is internal focused, emphasizes control, and strives to maintain the status-quo.

In the following sections, findings about these four factors are described and assessed for City E. This involves investigating general patterns of behaviour such as the budget process, buy or build policies, and allocation of resources, as well as issues directly related to the IS function (e.g. the IS planning process, and structure and status of the IS unit). It does not serve the purpose of this study to speculate on reasons for these behaviours. Rather, this study seeks to establish what the behavioral patterns of the administration in City E are.

5.4.1 Corporate management approach

The formation of the dominant managerial approach in City E was strongly influenced by the city's remoteness from other large urban centres and its harsh winter weather. Because of its isolation and distance, it was deemed unprofitable for provincial or national service providers for telephone, transportation, power, and water to extend their coverage to City E. The harsh winter conditions demanded many exceptional and expensive solutions which were not obtainable at a reasonable cost from the private sector. Therefore, the city was forced to develop its own services and the organizations to support them. Over the years, these conditions changed and the city found itself in competition with other service providers. This

forced the city to restructure many of its utility departments as competitive revenue centres, to develop an elaborate internal accounting system, and to redefine divisions of responsibility according to economic considerations, such as economies of scale and specialization. This competitive environment in which the utility units operate bred proactiveness, innovativeness, independence, strong emphasis on performance measurement, and a bottom-line, results-oriented approach to management. Over time, this managerial approach has spread across to the more traditional municipal functions by osmosis and movement of people. Undoubtedly, the size of City E's municipality, which with the utility units included is almost twice that of comparable cities, also contributes to the fact that departments in City E are given a lot of discretion in managing their businesses. As the Manager of the CRD stated, *"[the] corporate management style [of this city] is that of a holding company. Departments tend to be very powerful and largely autonomous in their operations.*

The autonomy given to the departments is not the result of a weak central authority. Rather, it is a conscious managerial approach deeply embedded in the culture of the organization. According to this approach, the role of corporate management is to define business for each unit, to structure the municipality in the most effective way, and to oversee the operation of the departments by monitoring their achievements. How each department operates is left exclusively to the department itself. Inter-relationships or dependencies, rather than being explicitly addressed by the management team, are managed either by restructuring to facilitate specialization, or by setting up a market mechanism where one department sells its services to the other. Priorities between departments and major functions are set by the corporate management team, but specific programs or services are prioritized by the departments themselves. Thus, in City E there is a mixture of corporate guidance and strong

central control with local autonomy.

Two examples are illustrative of this mixture. First, in City E there is no high level strategic plan for the city as a whole. City management supports and encourages strategic planning, but it is done at the departmental level with no active involvement of the corporate level. Departments are free to choose whether to prepare a long term strategic plan or not, and which methodology to use. There is no institutionalized process in which city management reviews departmental plans. Second, departments are free to adopt work processes and managerial philosophies that best fit their business goals. There is no emphasis on standardizing processes and methodologies on a city-wide basis. Even the budgetary process is not standardized. As one manager in the Budget and Studies office, attached to the City Manager's office, stated,

> *Each department may have a totally different approach to budgeting, which is fine as long as they end up with the required end results. Different departments have different needs and different approaches to costing and budgeting, so from the very bottom level, their budgets look completely different from each other ... what we collect corporately is only a fairly high level of the budget.*

The substance of the budgetary process in City E, however, demonstrates strong corporate management. At the onset, city management as a team sets global budgetary constraints for each department, which differ from one another according to corporate priorities. Those constraints are tighter than the global target set by the political level for the whole organization and thus, a corporate reserve is created. The city's management team however, does not define operational targets or prioritize programs within departments. Rather, each department prepares its budget proposal according to its plans and priorities and submits it to the corporate budget office. At that point department heads, as a group, review the list of services which did not make it into the department budgets and the artificially

created reserve is used to finance those deemed most important from the corporate point of view. Thus, departments are largely independent in how they budget their operations and even in setting service levels, but there is a strong corporate input regarding which domain is more important to the city as a whole. Furthermore, each year the City Manager's office, through the Budget and Studies office, examines in detail the operational budget of two or three units as a measure of control and reevaluates the need for the program or service. Budgeting capital investments reflects a similar approach. New projects are almost always initiated and justified by the departments. Once submitted, however, the projects are ordered by the City Manager's office according to a pre-defined, multi-attributes priority scale, independently of the priority it was given by the department, and then the management team finalizes the list.

Strong corporate management, vision, and proactiveness are reflected also in the frequent restructuring of the municipal functions. For example, in 1991 a major utility function, Environmental Services, was dismantled and its responsibilities were split between two departments because the City Manager believed that some economies of scale could be achieved that way. In 1992, the Fire and Ambulance units were combined by the City Manager, overruling strong internal resistance, because he and the corporate management team thought that the new Emergency Services Department would be more effective. In both cases, the initiative came from the corporate management level. In both cases, after the reorganization, the departments were given free hand to pursue their assigned responsibilities as they saw fit.

Until 1989, very little corporate attention was given to the development of the city's IS. As the Manager of CRD recalled, *"I almost got thrown out of city council for saying that the IS is being hurt by the lack of a city-wide comprehensive long term plan"*. It was widely

accepted that the information needs of each department, or even each sub-unit, were somewhat different, at least from the departments' point of view. Each was allowed to purchase or develop whatever system it wanted and was able to finance. To some extent, especially in regard to applications development, this approach to IS development still prevails, even though many IS managers recognize that a more top-down centralized approach can be more efficient and effective. But that is still debated as the manager of the GBIS project observed,

> *First of all, centralization did not work, they were never able to pull it together ... The bottom line is that we may, on paper, be more effective [corporately determining IS development] but if we are not helping the guys out there in the trenches, we are really not being effective.*

In the last five years, however, a corporate management approach is much more pronounced in the area of IS development. While, at the applications development level departments are still very independent, the IS Manager in the planning department observed, *"the Architecture Steering Committee has now sort of evolved from its standardization and watchdog roles to an informal corporate long-term planning body"*. Also, as already mentioned, there is a movement to recognize some of the major aspects of the CRD operations as corporate resources and a considerable sum of money is being invested, as a corporate project, in the revitalization of the IT infrastructure. Furthermore, realizing that the capital budget prioritization process may result in most IS projects left on the unfunded list[15], city management excludes them from the usual process. Instead, all IS projects are prioritized as one category. Then, resources allocated to this category are allocated to specific

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[15] Because departmental IS projects, considered separately, may not have sufficient weight, infrastructure projects are usually not supported by the line departments. IS projects often do not have the immediate impacts and visibility to make them attractive to the political level.

projects by the Computer Advisory Committee, chaired by the City Manager.

6.4.2 Assessing the level of fragmentation

Often the size of a bureaucracy, the diverse nature of its operations, and the lack of a common denominator with which to compare the results of the various sub-units leads to fragmentation of organizational power and the formation of small empires within the organization. This, in turn, may lead to a lack of coordination and cooperation, inconsistencies, lack of focus in the organizational decision making process, and inefficient use of resources. Each of those factors may seriously impede the development of effective IS.

On the surface, City E's municipal government may look quite fragmented, with its fiercely autonomous units, its lack of corporate strategic planning process, and its reluctance to standardize management practices, performance measurements, work procedures, and planning methodologies. A closer look, however, reveals that there is much more coordination, communication, and sharing of vision and focus among the municipal departments than the formal organizational structure suggests. As the manager of the CRD stated,

> *I would be careful not to understate the amount of contact that exists between departments ... Some of the departments are linked very strongly to one another on a day to day basis ... their ability to attend their respective business goals depends on it.*

Thus, even though as already described, long term planning is done mostly at the departmental level, departments are well coordinated in their strategies and operations. While there is no conscious afford to break down departmental boundaries, innovative ideas and technologies tend to propagate across departments, and there are no significant signs of

territorialism, turf-wars, or frictions between departments. Also, while much of the IS budget is directly controlled by the line departments, there is a considerable amount of coordination, cooperation, and integration in system development. As the Manager of the IS group in the Planning Department stated,

> *I can't think of a major system that we developed in the last few years that has only been for our department ... We rarely do them in isolation, if we think other departments will use them we will get them involved.*

One of the reasons power, strategic decision making, and operational processes are not severely fragmented in City E, even though the city is managed as a holding company, is the strong results oriented approach to management. Since departments are constantly measured and their achievements are scrutinized, they tend to focus on their business goals rather than on internal politics. The internal accounting system in City E also serves to prevent fragmentation. It provides departments with an incentive to cooperate, it makes it worthwhile for departments to make their projects useful for and available to other departments, and it provides an easy mechanism to regulate inter-dependencies.

Two specific instances show how this works in practice. In the first example, the Planning department incorporated, of its own accord, into its ambitious SELUS project[16] many features not of essence to the department, because it allowed the department to recover some of the project's cost from other departments. In the second, several other departments use the Public Works department's MEM System[17], because they find it cheaper to pay a user's fee than to develop their own system.

The City Manager's office and the team of department heads are also instrumental in

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[16] Socio Economic Land Use System

[17] Mobile Equipment Management System

deterring fragmentation, not by decree, but by acting as facilitators. They spread innovative ideas and make new technologies available to other departments. For example, originally, the GIS technology emerged in the Public Works department. In 1985, the City Manager decided that the technology could, and should, be used on a much broader basis. He initiated a workshop to present the technology to all departments. While leaving the project within the Public Works department, he officially made the project a corporate one, to make it easier for other departments to jump on the wagon. A similar type of facilitation occurred when it was discovered, five years ago, that there were nine different master address databases in the city. CRD identified the need to consolidate them into one city-wide corporate system, but none of the departments were willing to pay for the project or give up their own systems. City management financed the new system as a corporate project and then offered all departments a chance to use it on a voluntary basis. Eventually, all switched to the central system.

In the area of IT, especially in the last five years, even more direct steps were taken to ward off fragmentation. As already mentioned, a set of corporate standards for software and hardware were published, a bi-weekly meeting of all IS managers was institutionalized, and procedures to insure tighter central control over applications development were put in place. Furthermore, because of long experience with the technology, the fact that many of the departmental IS managers were at one time or another members of the central function (CRD), and because CRD's explicit efforts, there is now more or less, a common vision across departments regarding the future role of IT. As the Manager of the System Integration Branch said,

> *If vision is made up of many things, there are bits of it that people across the organization hold, and some hold more of the common pieces ... It is not a direct*

match, but I do not think there is a conflict of vision among people ... It is probably that each holds the bit that relates to his area, and in a sense it is a corporate vision in that it is the only vision in that area ... We [CRD] are providing the technical vision and the glue between the separate islands.

City E, however, is still taxed dearly because of fragmentation. Applications development is ultimately governed by the departments and, even though there is a unified authority structure and strong corporate management, management is still quite reluctant (or unable) to force departments to comply with central directives or corporate standards. Thus, there are un-computerized areas, redundancies, large variances between departments, and inefficient use of information at the corporate level. As the Manager of CRD said,

I would like the corporate data directory to be held by this department so we will be in the position to know what is available and on which system ...sort of a data warehouse ... We are not there, we are there in terms of the large systems but we do not know what a programmer in some of the departments did a couple of years ago ... There are systems that may exist that I am not even aware of.

The Manager of the GBIS project summarized,

Nothing can be done until you get the buy-in of the [departments] ... there is that human thing of wanting control, [and] they want to know what's in it for them ... [the departments] are the guys with the money and they call the shots, the role of the system people is more of negotiating ... We need more overall strategic guidance and it is starting to happen ... the whole decentralization thrust is more expensive, but it bought a lot of buy-in for the technology.

6.4.3 Assessing incrementalism in City D

Effective use of IT to support organizational goals, in many cases, means making a drastic departure from existing routines, work-processes, and organizational structure. In the absence of such revolutionary changes, any technology, instead of significantly enhancing goal achievement, may have only marginal impact on operations. Effective utilization of IT also presupposes a certain level of IT infrastructure before significant benefits can be realized.

Thus, the ability of an organization to achieve high level of IT utilization may be severely hampered by bureaucratic tendency to move forward in small increments.

Asked to characterize the nature of the IS projects currently under development, CRD's Manager said,

> *The selection of packages to replace our major systems is done on the basis of business re-engineering rather than the way we do business now ... We are looking to radically change the way business is done ... incrementalism was never a problem in this corporation, the one thing this corporation has always done is look at the potential economies of scale and improvements that will accrue by changing organizational structure ... We have seen some fairly major changes over the last few years.*

Evidence for the dynamic nature in the municipality is abundant. The average change in allocation of resources among the departments in the last five years was 0.67% of the total municipal budget, which is a relatively high variance in such a big organization. The largest change that occurred between two consecutive years in the share of resources allocated to one department was slightly higher than 6%. In each of the last four years at least four departments experienced a change in their share of the city's resources of more than 1%[18].

As already mentioned, City E started by providing most of its services via an internal work force. In the last ten years, there has been an on-going and quite dramatic move to shrink down the city's payroll and to rely more and more on contracting out. Beginning in the mid 80's, studies were initiated to examine the feasibility and economic merits of contracting out or privatization. Most of those studies concluded that the private sector is more efficient. They further suggested that the municipal units should be allowed to bid against contractors. The result was that over the last eight years 60% of the building

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[18] This may be seen as a minor adjustment, but it represents a change of close to $7 million in the department budget and an increase/cut of between 7% to 25% of the previous year's budget, depending on the size of the department.

maintenance function was contracted out. Water and Sanitation contracted close to 70% of its operation. 80% of Solid Waste (garbage collection and treatment) is contracted and many of the golf courses previously owned and managed by the city were sold to other organizations. This also forced the corresponding departments to become more competitive and results oriented in their management. *"We are constantly modifying our organization"*, reflected one of the managers, *"Recently CRD was even asked to justify its own existence. Someone initiated a study to look at outsourcing all our data processing"*. Today City E employs 6823 permanent workers (excluding utilities) which corresponds to one public service employee per 91 residents. This is a significantly better rate than the average among cities of comparable size. It explains, to some extent, the city's ability to focus resources and be flexible in its emphases because it is less bonded to an inflexible work force.

The changes which are taking place in the organizational aspect of the city's IS demonstrate once again the dynamic nature of City E. Because departments are competitive and results oriented, there is no need to induce changes by using IT as a change agent. Driven by their goals, departments are constantly looking at IT to facilitate changes and re-engineer their work processes. For example, The Records Management System is designed to change the whole process of preparing the council agendas as well as the procedures that govern the flow of data from the departments to the Clerk's office. Similarly, the consolidation of the emergency services was facilitated by IT, but was not induced by it, and the Planning department is developing the new permit system to facilitate one-stop service and to bring the planners to the front desks.

Another measure of the inclination toward changes is the percentage of resources allocated to new development, as opposed to maintenance and operation. In City E, 33% of

CRD's professionals and 28% of its budget are dedicated to development. However, since much of applications development is done in the departments, which are less burdened by maintenance and operation, those numbers are probably significantly higher for the whole city. As the Manager of CRD explained,

> *We have a reputation of being leaders in municipal automation ... There is an understanding and willingness to take advantage of new technologies ... If a project can be justified from the business point of view and is a priority, it usually will be funded ... What constrains us more is the rate in which we are able to assimilate new technologies and the bulk of legacy systems.*

6.4.4 The dominant orientation of the bureaucracy

In his interview, one of the councillors tried to explain, in her own words, the orientation of the city's bureaucracy,

> *Maybe it is the cold weather that forced us to work harder, and maybe it is because we had, and still have, very good people working for us ... [also, council] is very demanding and it is not an easy place to work for, we had a lot of turnover at the top management level ... In this city we never accepted the status-quo, we always were proactive and we tried hard to focus on our role as service providers rather than on the internal mechanism of the bureaucracy.*

Evidence, abounds that the dominant orientation of the bureaucracy in City E is proactive, focused on delivery of services and the long term effectiveness of the organization. Many have already been mentioned in previous sections, including the frequent re-structuring of the organization, utilization of IT to re-engineer work processes and to change the way the city is doing business, employment of an operations auditor, and the bottom-line, results oriented management approach.

Other indicators of the dominant orientation of the bureaucracy in City E also point to the same conclusion. Although the city, like most municipalities in the country, is experiencing a sharp decrease in its resources, investments in staff training has not declined

and the development of the city's human resources has remained a high priority. Thus, in 1993, City E spent on average $488 per employee on training, which is much higher than any other municipality in this study's sample. Rather than reacting to the financial squeeze by adopting a defensive strategy, being less responsive, and relying mainly on internal resources, City E is making an extensive use of external consulting. Almost all strategic IS plans prepared by the departments were done with the help of consulting groups. During the course of implementing the System Replacement Plan, CRD found that it lacked expertise in networking and open systems technology. Experts were then brought in on a contract basis to provide the necessary skills. Similarly, as the Manager of the CRD stated in one of his reports to the council,

> *Lack of experience and expertise in management of large development projects was identified as a problem ... to address it, CRD has placed greater reliance on expertise and resources from the contract market ... through contracting out of some responsibilities and bringing in skilled project managers on a temporary basis.*

Openness and a customer-oriented approach is further exemplified by the fact that members of the public were invited to participate in the steering committee of the new Permit and Licenses system. They are also members in the Access to Information committee which looks at ways to give citizens direct access to the Records Management system being developed. Lastly, as the current endeavour to restructure the city's IT infrastructure and the strategic IS plans attest, vision, long-term productivity, and goals attainment are the major criteria for justification of investments in IT. As the Manager of the IS group in the Planning department stated in regard to justification of IS projects, *"It certainly helps if you can show cost savings, but mainly it is driven by what our long term business goals and needs are".*

To summarize, managers in City E label their corporate management approach as "controlled decentralization". This is a combination of a strong, results oriented central authority which provides corporate strategic vision and directions, with a collection of competitive, proactive, and operationally independent line departments. On a scale of managing from a corporate and strategic perspective to local and issue-driven perspective management in City E is rated as **highly** corporate. A strong corporate management and a market-like approach to regulating inter-departmental dependencies led City E to a high level of coordination and unification at the strategic level. However, in areas other than the administrative processes, the market-like mechanisms often failed to induce coordinated and integrated IS development. Management only recently realized the need for more centralized control over IS development. Therefore, City E is rated on a scale of integration vs. fragmentation as being **moderately** unified. Overall, on the scale between dynamic and changing to incremental and status-quo City E is rated as **highly** dynamic. The bureaucracy in City E is proactive, very much results oriented, and visionary and innovative in its approach to management and provision of services. It focuses on long term productivity and effectiveness. This orientation is **highly** conducive to the development of IS that support the organizational goals.

Table 6.6, summarizes the findings in regard to the behavioral patterns of the bureaucracy in City E in four areas: corporate and strategic vs. local and operational management; unification vs. fragmentation of power and strategic decision making authority; incremental and slow vs. rapid and drastic changes; and defensive and status-quo vs. proactive and innovative orientation.

Table 6.6: Summary of the ratings of variables and indicators of bureaucratic behaviours in City E:
(shaded cells = current practice/situation; thick lines = factors as rated; double lined cells = current practice is changing)

	HIGH	MODERATE	LOW
Corporate management	city management is a source of vision, manifests coherent and proactive approach to management, initiates policies and lobbies for their approval.	city management has a coherent approach to management but tends not to be visionary and to react to the political level rather than to influence it.	city management does not demonstrate visionary and coherent managerial approach, tends to see the implementation of council's policies as its only role.
	city management, as a group, champions and is actively involved in strategic planning.	city management, as a group, supports and often initiates strategic planning but is not championing it nor directly involved.	city management, as a group, is not very interested nor involved in strategic planning.
	top-down, goal-driven budgetary process, tightly connected with the strategic plan.	only capital budget is driven by a-priori defined goals and strategic plans.	bottom-up budgetary process, disconnected from long-term plans.
	institutionalized process in which management reviews departmental plans and operations on a periodical basis.	management reviews departmental plans and operations on an ad-hoc basis when there are problems.	usually departments' plans and operations are not reviewed by city management.
	city-wide standardization of processes and managerial practices.	some processes are standardized city-wide but it is not comprehensive nor strongly stressed by management.	no standardization of processes and managerial practices.
	there is an approved, long term, and comprehensive strategic plan for the city as a whole.	there are some domain-specific (not departmental) strategic plans but not a comprehensive plan for the city.	no strategic planning at the corporate level, only at the departmental level.
	IS manager is a member of the city's management group.	IS manager is one level below city management level.	IS manager is 2-3 levels below city management level.
	IS is perceived as a strategic, corporate resource.	IS is perceived as a corporate resource but mostly used to support the operational levels.	IS is perceived as a supportive tool for the departments.

	IS steering committee consists of top level executives and operates at the strategic level.	IS steering committee consists of middle level managers and operates at the tactical level.	There is no IS steering committee, or, it is not active or not influential.
	IS development is directly controlled by city management and driven by the city's strategic plan.	IS development is corporately prioritized but driven by operational, problem solving perspective.	IS development is controlled by the departments each separately driven by its own operational needs.
Fragmentation (reverse scale)	the city is managed as one integrative entity.	departments are to a large extent independent in their operation but well coordinated at the strategic and operational level.	the city operates as a holding company with very limited inter-departmental dependencies.
	no significant signs of territorialism, turf-wars, and frictions between departments.	moderate level of authority related frictions, turf-wars, and territorialism.	much evidences of territorial behaviour, turf-wars, and disputes regarding decision making authority.
	strategic planning is comprehensive, done at the corporate level, tends not to regarding departmental boundaries as a constraint.	strategic planning is done by inter-departmental task forces but for each domain separately.	strategic planning is done by departments in isolation, or no at all.
	innovations are implemented regardless of departmental boundaries, conscious effort to break those boundaries.	only few innovations and changes bridge departmental boundaries, no stress on breaking up departmental boundaries.	changes and innovations tend to be confined to specific departments.
	central IS function, all IT related budget and development controlled and guided by the IS function.	the IS function is a central support unit, budget and development are managed by the IS but guided by departmental needs.	departments have their own IS units, IT related budget is controlled and prioritized by departments.
	city-wide standards for hardware and software.	partial standardization of hardware and software.	no city-wide standards for hardware and software.
	all data is perceived and managed as a corporate resource.	administrative related data is managed corporately, otherwise, each department manage and own its data.	most data is owned by the departments.

	most systems are integrated city-wide.	administrative systems tend to be integrated but operational systems are not.	most systems are departmental, low level of system integration across departments.
Incrementa-lism (reverse scale)	relatively high variance in allocation of resources over the years (avg > 1%).	moderate variance in allocation of resources over the years (0.5% < avg < 1%).	very stable allocation of resources over the years (avg < 0.5%).
	relatively large portion of the city operations are contracted out.	moderate extent of contracting out.	almost all city operations carried out by city employees.
	in the past few years the city has implemented many drastic changes in priorities and operations.	few significant changes in priorities and modus of operation implemented over the last few years.	no significant changes in priorities and operations in the last few years.
	IT is used as a change agent to significantly alter the way the city does business.	IT is not used as a change agent but some systems significantly change the way the city operates.	IT is used mostly to mechanize existing processes.
	managers believe that drastic changes are both necessary and feasible.	managers believe that drastic changes are needed but can, and should, be achieved only incrementally.	managers do not believe that drastic changes are needed or can be achieved in the context of municipal government.
	relatively high percentage (40-30%) of IS resources are dedicated to new development.	moderate percentage of IS resources (30-20%) are dedicated to new development.	only small percentage of IS resources (under 20%) are used for new development.
	there is a sense, shared by managers, that "things are moving rapidly" in the municipality.	there is a sense, shared by managers, that the municipality is moving ahead but at a moderate rate.	there is a sense, shared among managers, that "nothing is moving" in the municipality.

Dominant orientation	criteria used to justify new initiatives are: vision, quality of services, and long-term productivity. High emphasis on staff training.	criteria used to justify new initiatives relate to efficient delivery of services and operational needs. moderate level of importance to staff training.	criteria used to justify new initiatives are: short-term cost saving, control over resources used, and efficiency of existing processes. low importance to staff training.
	dominant strategy is proactive and innovative -- seeks improvements through investment in technology and organizational changes.	dominant strategy is effective utilization of existing resources -- seeks improvements through maximization of resource utilization.	dominant strategy is defensive -- seeks to maintain the level of operation through cost reductions.
	the city implements many contemporary, innovative ideas regarding public administration.	only a few of the contemporary innovations in public administration are implemented.	the city does not implement contemporary, innovative approaches to public administration.
	the city makes an extensive use of external consultants, and is open to its environment.	the city uses external consultants only for technical issues.	the city hardly uses external consultants, and is relatively closed to its environment.

6.4.5 The impacts of bureaucracy on IT utilisation

In three out of the four domains of operation, City E is making an extensive use of IT, and in the other domain, IT is used to a moderate extent. On three out of the four bureaucratic patterns of behaviour City E is rated as high. This conforms to the predictions of the model used in this study.

Many of the IT based systems that this study defines as highly supportive of local governments goals are either already implemented in City E, mentioned in its plans, or have been included in the vision of senior managers in the city. Furthermore, some of the systems, plans, and visions far exceed what this study rates as high utilization of IT, but they are congruent with the assumption that development of this kind of IS is consistent with the interests of the city's residents. However, managers and politicians alike reported that they sense neither strong demands for computerization nor opposition to it from the public. This, and the fact that City E is perceived as a leader in municipal automation, a state many other would like to follow, suggest that it is not the differences in public interests that explains differences in IT utilization.

All four variables which relate to the bureaucracy are inter-related and the success of City E in utilizing IT to support its goals cannot be attributed to any one of them alone. In the case of City E, however, two additional factors were responsible for the relatively successful development of effective IS. First, the fact that the city owns and directly manages large technology oriented functions is probably the main reason that in City E IT was used outside the financial domain much earlier than in other cities included in this study. This led to an accumulation of knowledge and development of a cadre of professionals. It propagated awareness of the technology throughout other functions in the municipality, and it served as a foundation from which new initiatives originated and on which new systems were built.

Second, the ownership of revenue generating functions provided resources for IS development directly, since the revenue generated by those units allowed the city a larger and more flexible financial base, and indirectly, because systems primarily built to support those functions were upgraded to support also tax-based functions with only small additional funds.

While the availability of financial resources was certainly an important facilitator for the development of IS, City E is not unique in that aspect. In the 70's and early 80's, all three large cities in the study's sample had ample financial resources. What appears to have had a more significant impact on IT utilization were three factors. First was the awareness and early exposure to the technology which stemmed from owning technology oriented units. Second, was the concurrent development of a knowledge base that accumulated within the organization. Third, was the fact that, due to the scope of the IS operations, the city recognized IS as an independent domain as early as 1971, and was moved to designate an executive level manager to head it.

The combination of strong corporate management, fragmented and autonomous departmental IS units, and results oriented, proactive organizational orientation appears to be a successful alternative, to the centralized IS development model. The success of this alternative, however, critically depends on a unique constellation of other factors. First, before the stage of fragmentation of the IS function, there had been a strongly centralized IS, which created a broad foundation for corporate IS. This provided, de-facto standards and an anchor to which to tie subsequent independent applications. Second, departments were relatively large, very much results oriented, competitive, and proactive. Also, the city was willing to back the departments with sufficient resources rather than only incremental funding, as long as a project could be justified on business goals. This allowed departments to consider innovative use of IT rather than only small, less significant development projects. It also

insured that departments had sufficient resources to develop large and sophisticated enough systems to be meaningful from the organization as a whole point of view. Third, internal accounting created incentives to cooperate and to maintain some level of integration. It set a price on IS services and thus facilitated more objective prioritization and minimized, to some extent, duplication and inconsistencies of data and systems. In addition, the coexistence of a strong corporate IS function led by an executive level officer provided some corporate guidance and technological directions.

As regards fragmentation, the author believes that City E is the exception that proves the rule. Fragmentation did not critically impede the development of effective IS in the city, but only because of the existence of the quite unique constellation of factors described above. With these conditions in place, fragmentation of the IS had the effect of bringing IS development closer to the business goals of each department, and thus augmented its value. Direct control over IS resources, which resulted from the fragmentation, also exposed senior managers in each department to IT, and led to their active involvement in its planning and development.

In spite of these advantages and the existence of the mitigating factors, fragmentation is the main reason why in some areas City E does not realize high payoffs from utilization of IT. It is especially pronounced in the areas of supporting corporate decision making processes and functions which are not designated as the responsibility of one specific department. The current move of the municipality to re-centralized control over IS development suggests that city management has recognized fragmentation as a cost and not a benefit, and is taking steps to remedy it.

CHAPTER 7

CASE SUMMARIES OF CITIES A, B, C, AND F

7.1 The case of City A[1]

7.1.1 General description and assessment of the variables

City A is one of the largest cities in Western Canada. During the last 15 years, the city has experienced a rapid growth, primarily due to immigration from the Far East and the rest of Canada. This economic boom has been declining over the last couple of years as available space has become scarcer and more expensive, and new immigrants and investments have turned to surrounding cities. On 1993, the population of City A was around 480,000, the municipality's budget was approximately $520 million, and it employed 6517 permanent employees.

Computerization in City A started in the late 1960's and grew rapidly during the 70's and 80's. However, computerization has never been a high priority in City A. The responsibility for the core IS in the city is in the hands of a Computer Services unit, which is a division in the Finance Department. This unit, which employed 46 people in 1976, was staffed at the time of data collection by 57 IS professionals; an annual growth rate of less than 1% over 16 years. Over the years, Computer Services became unable to support the growing demand for computerized systems. Furthermore, it did not have formal authority over IS development or control over all IT related budgets. Thus, line departments which found the corporate's core applications unsatisfactory, or too restrictive and controlling, sought to develop departmental systems to support their unique needs and allow them the independence

[1] The full-text case write-up is attached as Appendix A.

they desired. This has led to the creation of small, independent IS groups in almost all of the large departments in the municipality. It also led to fragmented IS planning and development, lack of integration, and inability to implement large and comprehensive systems. Currently, there are more than 80 medium to small departmental systems, which are typically decentralized, stand-alone systems which support specific tasks within a particular department or division. While some functions are highly supported by IT based systems, especially those which are the responsibility of one department, in general, utilization of IT to support organizational goals in City A is rated as **moderate to low** across all four domains.

In City A, the council does not provide clear goals, objectives, and priorities for the administration to follow. Council members are usually not involved in long-term planning, do not participate in defining the objectives of the various departments, and do not demand that departments meet performance criteria. In a sense, there is a leadership vacuum at the political level in City A, since the politicians do not provide strategic leadership, demand a results oriented corporate management approach, or closely supervise the bureaucracy. Overall, the political leadership in City A is rated as **low** since the political level does not fulfil the roles expected from leaders.

The politicians in City A are not involved, or interested, in the development of the IS. To some extent they are even somewhat antagonistic towards it. As such, on the scale of political involvement as active champions of IT utilization the political level in City A is rated as **low**.

Overall, on the scale measuring the degree of a unified authority structure City A is rated as **low**. In City A, a number of important functions, such as Park & Recreation, Police, and the Public Library are controlled by political (or semi-political) bodies other than the city

council. Also, as the Deputy City Manager stated,

> *[The office of city manager] tends in terms of charter authority to be more like a post office than in fact a CEO-like office. In 1973 or there about, council took a very explicit decision to increase departmental independence. They felt that too much information to council was being filtered with a strong city manager, and they wanted departments to take a more independent role, in fact fight with one another. There are charter provisions that have department heads reporting directly to the council, not necessary through any central coordinating body.*

City A does not, therefore, have a strong corporate management and, in the area of IT, there is no corporate-level management at all. Therefore corporate management in City A is rated as **low**. In City A, departments are relatively independent from one another and from the City Manager's office, and decision making at the strategic level is extremely decentralized and uncoordinated. On the scale of integration vs. fragmentation City A is rated as **highly fragmented**. The study revealed that City A is unable, or unwilling, to prioritize its operation, to focus its resources, and to undertake projects that demand significant changes in the way it operates. On the scale between dynamic and changing to incremental and status-quo bound City A is rated as **incremental**. City A is input oriented, managed from a short term, cost saving perspective, and focused on existing processes rather than on changes and innovations. This orientation, overall, is rated as **not conducive** to the development of effective IS.

7.1.2 The impacts of political behaviours on utilization of IT in City A

Effective utilization of IT to support organizational goals depends on having clear goals and strategic plans. The politicians in City A do not provide those. However, it seems that management does not expect the council to provide such leadership and its absence does not pose a direct obstacle for developing the city's IS. Since the political level is uninterested

in, and detached from, major parts of the city's daily operations, it allows the professional managers, if they so choose, to fill the leadership vacuum left by the politicians. Indirectly however, the short-term focus and the issue-specific nature of the council deliberations are perceived by many managers as a serious impediment to long-term initiatives, since they divert resources and discourage staff from pursuing an analytic and comprehensive planning and development approach. As the Deputy City Manager described,

> *So, the preoccupation of management becomes minimization of problems, it does not become the development of systems and it does not become the development of quality of services. Because we are responding to what [council] are demanding, we have a strange reinforcement, since if they do not pay attention to [analysis, planning] I might have been wasting my time ... People at the senior management level who spend time in trying to develop long-term plans and systems, do it with certain amount of guilt.*

The politicians in City A do not comprehend IT's potential, and though basically impartial to the city's IS, often express suspicions regarding investments in its development. Long term investments require vision and trust and hard decisions. Because politicians see themselves as guardians of the public purse, *"It is hard to sell it to them. You have to be really good at doing it and very good at making them see your case in order to get approval"*, said the City Manager. Therefore, the council's lack of involvement in the development of IS in City A constitutes an impediment to IT utilization because involvement could increase the politicians' understanding and backing. In other words, being involved in planning and development of IS might help to educate the council on the potential of IT and create the commitment to effective IS which currently lacking in City A.

While the above mentioned factors do create difficulties for the development of a more extensive IS in City A, there is no direct evident that politicians actually block initiatives to use IT to support the organizational goals, or that they oppose long term planning. Moreover, senior managers in City A uniformly expressed the opinion that if they, as the management

team, had strongly recommended a more strategic approach to IT and prioritized it accordingly, the council would have approved it.

Unlike the indirect nature of the two factors mentioned above, the impact of the authority structure in City A on the ability of the city to use IT more effectively is direct and profound. The lack of a uniform authority structure inhibits a comprehensive and integrative approach to IT, since at the political level, IS projects are discussed and decided upon by four different bodies with no mandatory need to coordinate their operations. As a result, the Deputy City Manager explained,

> *Police, of course, have their own computer system because they have a separate board. The Library system of course is independent, and the Park & Recreation Board system to a large degree, minus some interfaces, is independent.*

Lack of a unified authority in the area of IS also prevents information from surfacing as a major resource in the city, and deprives the IS manager from the support of a political sponsor. Since each IS project is discussed separately and seen within the context of the operations (and budget) of a specific department, the potential embedded in IT is not realized, and politicians tend to further regard it as just another administrative tool. Also, the fact is that the authority structure in City A at the political level supports and even encourages the bureaucracy to seek independent, non-coordinated and departmental approaches.

7.1.3 The impacts of the bureaucracy on utilization of IT in City A

All senior managers in City A interviewed believed that the municipality is not using IT as effectively as it should, and that the potential embedded in the technology is far from being realized. The findings in regard to how IT is used to support the four goals of local governments confirm that opinion. There is also a feeling, shared by many of the senior and

middle level managers, of dissatisfaction and even frustration from their inability to affect changes in their IS they believe should take place. To a large extent, it appears that the inability of the municipality to use IT more effectively stems from bureaucratic values and interests manifested in behaviours which are not conducive to the development of IS that support organization-wide goals. As mentioned, City A is rated as low on all four variables that relate to bureaucratic behaviours. How each of these variables, separately and in conjunction with the others, impedes effective utilization of IT is the focus of this section.

A major impediment for the development of effective IS in the municipality of City A is the lack of external pressure to change or improve, and the inward, input-oriented approach of the bureaucracy. The politicians in City A do not press for results or set targets and performance criteria, and there is no direct demand from the public for better services. The Deputy City Manager explained this,

> *We are a monopolist supplier, there is no competitive pressure to provide quality services ... Individual customers may have an interaction with city bureaucracy once a year when they pay their tax, once or twice in their lifetime when they come to get a permit ... so, they say, well, that is government.*

On the other hand, there is a constant pressure from the council and the public to cut costs. As a result, and since city management does not assume the role of the visionary leader, managers are preoccupied with making sure daily operations flow without problems, and are focused on how to do what they always did more efficiently. Thus, there is no incentive or time to plan ahead. There is no urgent need to investigate new technologies, and no compelling reasons for the organization to make the effort to change. Furthermore, since at the corporate level there are no targets or measurements of achievements, there is no reason for managers to adopt analytic and systematic decision making process. As long as the daily operations flow without major break-downs and as long as departments do not spend more

than their budgets, they are in the clear. Thus, when it comes to IT usage, the focus is on how the technology can improve the efficiency of existing processes rather than how to use IT to change the way the organization operates. Similarly, the focus is on how IT can support operational level decision making rather than on how it can support top management. In this environment, even though municipal employees are striving to do their jobs as best they can, the jobs are defined narrowly in operational terms and the systems which support them mirror these definitions. They are developed from the bottom-up and perceived as just another operational tool with which costs can be cut.

The emphasis on the resources used rather than on the required outputs, or the missions, also makes it harder to invest in IT. The City Manager explained this relationship:

> *In a marketplace you are going to spend whatever it takes to be competitive. We do not have that drive. Where else can our customers go? ... For us, [in City A], because we focus on the cost and can't put the same value on quality, the economic rationale [for IS] is a whole lot harder to come by. We have to look at it in terms of reducing costs as opposed to upping the level of service.*

Thus, since politicians are not interested in or rigorously monitoring the achievements of the administration in its daily operations, and the public is remote and indifferent, the only external pressure is that which stems from the growing financial squeeze. The typical reaction to this pressure in City A (in regard to IT usage) is to focus on those applications which promise tangible, short term cost saving. IS rarely meets these criteria, its payoffs are usually intangible and can not be easily expressed in dollars saved[2].

Another major factor that impedes effective utilization of IT in City A is the phenomenon of departmentalization. Due to the lack of corporate management and to the

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[2] Paradoxically, both the City Manager and his Deputy repeatedly expressed the hope that the same financial squeeze that seems to inhibit development will force the city to rethink the way it operates and to adopt a more strategic, long term perspective to IT.

fragmented nature of the municipality, IS projects in City A are initiated by the operational units to support their local and operational needs. Furthermore, resources for IS development are furnished by user departments from their operational budget, rather than as capital investments of the city as a whole. As a result, any of the municipality's goals and tasks which are not directly associated with a specific department do not receive the attention they deserve, and computerized systems that could greatly improve corporate functions are not realized. As a senior IS manager explained:

> *If [a project] is not related to some specific department there is no one that pushes it strong enough. Typically what we lack in the city is champions with interest and energy to take on projects that are corporate-wide. The departments are not typically going to opt to foot the bill for something that is intended to serve the whole city. They are measured on performing their specific tasks. The City Manager's office tends not to champion specific things. He tends to take the approach that if there is a need for it, it will come from the departments.*

A look at the summary tables (Tables A.1-A.4 in Appendix A) demonstrates this point. Administrative functions, which are not within the mandate of a specific department, such as records management and an effective reference system, are only marginally supported. Services for which two or more departments are jointly responsible, such as permits and billing, are significantly less supported than those which are provided fully by one department. Services which are not assigned to departments at all, such as provision of information and tracking public concerns and requests, are not supported at all.

The IT architecture that results from the parochial and fragmented system development approach, and the fact that data is managed as the property of specific departments, have had serious adverse impacts on the extent to which IT based systems in City A can support managerial decision making. Data cannot be easily shared across functions, and data collection and storage are directed by the operational needs of sub-units rather than by

corporate needs.

Internal competition and extreme decentralization are often mentioned as effective measures to combat the bureaucratic tendencies to over-control, create entangling regulations, and suffocate initiatives. It seems that the opposite is true in the area of effective utilization of IT in City A. The lack of a strong, centralized control over IS development is one of the reasons that City A fails to use IT to support its goals. In City A, territorialism, turf-wars, and departmental independency has lead to fragmentation of the IS function and dispersion of its resources. Departments not only control the operation of the applications, but they are also in control of system planning, development, and data storage and formats. This type of behaviour, which some managers see as decentralization, but which the author believes is departmentalization, or dispersion, impedes effective use of IT at three levels.

First, the various departmental systems tend to be issue-specific, not integrated with other systems, and mostly reflect local priorities rather than those of the City as a whole. Furthermore, since large IT based projects are financed by user departments, the centralized IS unit (Computer Services) has a limited ability to direct them and to insure that those projects follow established standards and cater to the greater needs of the municipality. The fact that Computer Services is a division of the Finance Department further aggravates the situation since often it is perceived to be following the Finance Department's agenda rather than acting in a manner sensitive to other departments' needs.

Second, since there is no one agency which controls all IT related resources, the ability to develop and implement large projects within a reasonable time-frame is severely constrained by the ability of a single department to allocate sufficient resources from its own operational budget. Thus, projects are scaled down, often reduced to small add-ons, and

subject to much longer implementation than necessary. This, of course, contributes to the lack of connectivity and integration, and often results in postponing (sometimes indefinitely) the implementation of features which, while not vital, make systems easier to operate. Thus, the value of the systems to the organization is compromised, users are less satisfied and they tend to lose faith in the technology.

Third, within each department, the IS function is small and low in the hierarchy. There is no one at the executive level with the knowledge or the incentive to represent the domain of IT, and no one who sees it as his/her job to advocate investments in IS infrastructures as an enabling basis for future development. Rather, in City A the only infrastructure developments are either those which are an integrated part of a specific application or those which Computer Services can slip into the maintenance budget. The results are that IS infrastructure per-se (such as communication networks, system integration, and a central repository database) is neglected, which diminishes the value of IS in the City. In addition, the top IS professional in City A, the Manager of Computer Services, is shielded from the city management group and from the political level by at least two levels of more senior officials who are not IS professionals. His arguments, when heard at the top, carry less weight than those of department heads. He is less exposed to major strategic decisions and usually is not present when priorities are debated. Thus, he is usually not in the position to offer IT based solutions to problems the city struggles with, nor to judge the relative importance of demands on his unit. Even more important, the IS Manager is not in a position to educate management and the council about the potential embedded in IT.

City A's incremental approach to resource allocation was also found as an impediment to effective use of IT. In City A, resource allocation is based not on the required outputs but

rather on the number of positions approved to each unit and on estimates (based on the previous year) of operational costs. Computer Services is budgeted accordingly and can allocate resources to new developments only from what can be spared from its operational and maintenance needs. Within this constraint, Computer Services must satisfy ever-growing demands from departments only too happy to use others' budgets to advance their needs. A senior manager in Computer Services explained:

> *Thus, for projects that do not need new equipment there is no mechanism that makes departments prioritize their demands from the Computer Services. That is why there are years of backlog. Now we try to encourage departments to give us their priorities, but between departments we still work in some sort of "time sharing" or trying to help each department more or less to the same extent. We would go to the department and say, "Now it's your turn, we can allocate so much time for you, what do you want us to do for you in that time?"*

The results are that even the limited resources Computer Services does control cannot usually be allocated systematically and according to a master plan. Rather, resources are spread around and in many cases allocation decisions have been swayed by those who complained the most and/or had the Manager's ear.

Also, related to the issue of incremental budgeting, is the issue of reliance on internal development rather than on a free market. This bureaucratic tendency impedes utilization of IT at three levels. First, since staffing levels are fairly constant[3], "buy or build" decisions are biased toward internal development[4]. In-house developments, in turn, tie the city to old systems since it cannot afford to constantly update them. Usually, in-house development also

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[3] Since it is almost impossible to lay-off employees, the City is very reluctant to approve new positions. Staffing levels in units with increasing workloads tends to lag years behind the needs. Similarly, in those units where workloads have decreased staffing usually remains higher than needed for a long time.

[4] It is possible that when City A started to look for computerized solutions the market was not able to offer canned packages that answer the city's needs, and the city was forced to develop its systems internally. Today, however, that is no longer true.

means that the systems are less than state-of-the art since the city cannot hope to have the expertise of private companies that specialize in one particular application area. Second, once the city takes that route it is hard to go back. Switching to 'canned' programs or turning to consultants for improvements often requires scraping the old systems entirely, which can be prohibitively expensive. Lastly, in-house development creates a less flexible work force, as capacity is fixed whether it is needed or not, and development is constrained by the available expertise within the IS group.

7.2 The case of City B[5]

7.2.1 General description and assessment of the variables

City B is one of a number of medium size communities that together constitute a large metropolitan area in Western Canada. Starting as a small rural community, it is now one of the fastest growing residential areas in the region with an average annual growth rate in population and number of households of 3.8%. While primarily still a residential community, City B is becoming more and more attractive to industries and commercial firms due to its vast land reserves and its excellent freeway access to other commercial centres in the area. The population of City B is currently around 90,000. City B's 1993 municipal budget was around $95 million, and that year it employed 462 full time workers.

City B acquired its first large scale computerized system in 1984 to support accounting, property tax billing, and payroll, and to maintain data regarding permits, business licences, and voters. As often is the case in early development of IS, the major drive for purchasing the system was the need for financial control. Thus, the Computer Services unit

[5] The full-text case write-up is attached as Appendix B.

was put under the control of the Treasury Department. Staffed with only five IS professionals charged with operating and maintaining applications for which vendor support was terminated, Computer Services was unable to develop new applications or to take on new responsibilities. This had profound impacts on the IS in City B. Computer Services stopped setting directions or supporting departmental initiatives. Requests for funds for IS development became less and less accepted by council because of a lack of clear objectives and cohesive IT strategy. Training was not emphasized, partially because management felt that there was not much reason to train workers in computers that were not readily available and not working properly. The result was a disjointed, fragmented, and underdeveloped municipal IS.

All aspects of the IS function in City B changed drastically from 1991 onwards. Following the uncovering of an embezzlement in the municipality, the City Manager was dismissed together with a number of other senior managers, and a new manager was hired. Among the first initiatives of the new management was a recognition that IT not only was a major strategic resource but also that it could serve as a change agent, with which to affect a drastic change in the culture of the organization. In August 1991, a comprehensive, five year strategic IT plan, prepared by a consulting group, was approved and a very large sum was allocated to its implementation. The IS function was consolidated into an independent department and its budget and staff was tripled. An IS steering committee headed by the City Manager was convened, and the implementation of the IS plan was announced as the first priority of the municipality. At the time of data collection, the implementation of the strategic IS plan was well into its third year, and the successful completion of the project seemed secure. Thus, this study bases the assessment of IT utilization by City B not only on those

systems which were already operational, but also on systems which were scheduled to be implemented in the near future.

In effect, the case of City B provides an opportunity to study a municipal IS which was planned and developed from scratch following a top-down, mission driven, and visionary strategic plan. City B created support for administrative processes not in an insulated manner, but rather integrated as the interlaying levels of applications which support provision of services and managerial functions. In City B, IT has been used as an enabling technology to break down departmental boundaries and to re-engineer work processes. Data is considered as a corporate resource, maintained in central databases, and data management follows city-wide standards. Not surprisingly, because of these characteristics, City B is making, or about to make, **highly** effective use of IT across all four domains.

Coinciding with the change in management, the politicians in City B became more involved in long term planning, setting of goals and objectives, and defining time-frames and performance targets. It is to a large extent a role they have been forced to take by the constant pushing, coaching, and lobbying of the new City Manager. Nevertheless, it has resulted in the existence of comprehensive plans and clear objectives to which the political level is committed. Overall, the political leadership in City B is thus rated as **high** to **moderate**. The political level in City B is not directly involved and not very interested in IS development. Some are suspicious and sceptical, but as a whole, IT is left to the professional administrators and regarded as only one more tool for management to do its job. However, city management continuously insists on involving the political level in IS planning and the council receives periodical reports on the implementation of the IS plan. Overall, on the scale of being champions of IT utilization, actively involved, and highly instrumental in its

development, the political involvement in IS development in City B is rated as **moderate**. The City Council is the only political authority in City B and the City Manager is formally defined as the CEO of the corporation with the authority to direct all operational units. Thus, there is a unified and well defined authority structure, which is rated as **high**.

In City B there is a strong corporate management approach in general, and particularly in the area of IS. Thus, the corporate management is rated as **high**. Decision making in City B at the strategic level is centralized, with a high degree of integration, inter-dependency, and congruence of goals among the departments. On the scale of integration vs. fragmentation, thus City B is rated as **highly integrated**. Overall, City B is rated as **highly dynamic**. City B is results oriented, managed from a long term, customer service perspective, responsive to its environment, and susceptible to changes and innovations. Overall, this orientation is rated as **highly** conducive to the development of effective IS.

7.2.2 The impacts of political behaviours on utilization of IT in City B

Effective utilization of IT depends on having clear goals and strategic plans, top level championship and a uniform and integrative approach to planning and IS development. These three factors can be facilitated and even encouraged by politicians, or they can be inhibited by them. In City B, these three pre-conditions exist, and the city is making giant steps toward extensive use of IT to support its goals. This study did not find, however, any direct influence of political behaviours in City B on how IT is being used. Rather, the only direct influence is that the political level facilitates development of IS by allowing these three factors to exist. Even this can not be wholly attributed to the politicians. Nevertheless, they allow it, and to some extent should be credited, since the politicians were those who changed city

management. Even if reluctant, they participate in long-term goal settings and prioritization of the city's programs, and they agreed to commit resources to long term plans. The political level in City B should also be credited for creating a unified authority structure which insulates the administration from politics and facilitates corporate management.

It is important to note, however, that what happened in City B was the result of a break-down in the administration which forced the council to take a hard look at the way the municipality was run. The City Council assumed a leadership role, in areas that relate to the daily operation of the city, more because the City Manager forced the politicians to do so than because of their own initiative and inclination. The council in City B became committed to the long-term IS plan not because it fitted, or was derived from, a vision regarding the role of IT in local governments, but rather because it was presented (not only by city management but also by an external consultant) as a way out of their problems. Lastly, it is important to note the key role that the external consultant played in convincing the politicians of the need to commit to a long term plan, to invest in IT infrastructure, and to see the requests of the administration not as empire-building but as real needs.

In the researcher's opinion, the fact that currently the politicians in City B facilitate the development of extensive and comprehensive IS does not mean that this will continue in the future. The politicians are, even today, not really keen on strategic planning[6] and the council is still very remote from, and not interested in, how IT is being utilized in the city. Moreover, the council is starting to demand tangible returns on its investments in IT and short-term, cost-saving justifications for future developments as time passes and the scandal

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[6] Last year, for the first time in three years, the City Manager was not able to get the council to go to the retreat in which they discuss goals and priorities, prior to the yearly budget process.

of 1989 fades. As the IS Manager said,

> *Now we are all right, but we could enter a cyclic process where a large sum of money is approved for upgrades, but after that nothing for a long time. We may not get enough to maintain what we have and to move forward, to keep the momentum and not sink backwards ... This would be a result of lack of long term thinking and commitment at the political level, where we wake up only when the system falls apart once again.*

To head off this possibility, and in recognition that political support for long-term development of the IS is not secured, the IS Manager and the Director of Finance are currently studying the prospect of creating a reserve fund to buffer the cyclic allocation of resources.

In summary, the case of City B demonstrates the importance of political leadership, and a uniform authority structure for the development of effective IS. It demonstrates that the involvement of the political level in IS planning and development is not a necessary condition for successful utilization of IT to support organizational goals, as long as they are not actively against it. What happened in City B, however, demonstrates also how fragile the existence of these two necessary conditions, namely political leadership and uniformed authority structure, are in a political organization. It shows that in order for those conditions to exist, city management has to actively push the politicians into the role of leadership. It is not enough for management to adopt the passive role of policy implementor, but rather it has to be an aggressive policy adviser and even policy maker. Lastly, it demonstrates the importance of reliance on external consultants in overcoming the inherent tension between politicians and bureaucrats and in helping the former to commit themselves to long-term plans.

7.2.3 The impacts of the bureaucracy on utilization of IT in City B

The patterns of behaviour of the bureaucracy in City B fit the patterns hypothesized

as fostering and facilitating effective utilization of IT. In all four domains, City B already makes extensive use of IT or is in the process of planning and implementing systems for such use. On all four dimensions of bureaucratic behaviour, the city rates high. Thus, the findings in City B support the model that guides this study. Furthermore, there is a general agreement among the staff of City B, management and users alike, that what is being done in the area of IT is both important and congruent with the city's goals and priorities. There is, in general, a positive attitude toward utilization of IT. Users are highly satisfied with the systems they are using. They feel that their wishes and needs are understood and respected by the IS professionals, and are confident that the IS department will deliver on time those systems which are not yet available. To some extent this supports the research premise that high utilization of IT, as described in chapters 3 and 4, is congruent with local governments goals.

The author believes that the fact that City B successfully uses IT can be directly attributed to the four variables which depict the behaviours and attitudes of the bureaucracy. Using a corporate management approach and a long term, mission driven orientation provided City B with vision, leadership, and strategic direction, all of which are necessary conditions for the development of effective organization-wide IS. It also motivated the municipality to use IT as an enabling technology in order to re-engineer its processes rather than to use the technology merely to support existing processes. This aspect of IT utilization, is especially important since there were no external forces such as public demands or competitive pressure, which forced the municipality to change. Even the council, which in City B recognized the need for change after the scandal, would have been equally satisfied if existing processes were only improved rather than altogether redesigned.

The city-wide, long term, and results oriented approach was coupled with a persistent emphasis on getting the politicians to take an active role in goal setting and strategic planning. This enabled the politicians to adopt the role of leaders with respect to the daily operations of the municipality. It made them more inclined to commit to long term plans and investments, since they were involved in the process of defining the choices, and since they were presented with coherent, strategic options which were closely tied to specific goals, and presented from a city-wide perspective. Thus, while in City B the political level was not involved, or interested in how IT was being used, the fact that IS development was presented as a component of a broader long term plan, and was uniformly supported by management made it easier for the politicians to relate to it.

Within the bureaucracy, a uniform authority structure is probably the major factor that enables standardization and sharing of information. In City B, a strong corporate management and long term, visionary approach to the role of IT, facilitated utilization of IT as a tool to support corporate goals rather than as a departmental, process enhancing tool. The willingness to focus free resources on a few areas rather than to spread them across all domains of operation, and to make drastic, innovative changes rather than incremental adjustments, allowed development of IT infrastructure and functional applications capable of offering significant support to goal achievement. Lastly, the city's reliance on consultants and vendors, played an important role in facilitating the development, and timely completion, of projects big enough in scope and sufficiently advanced in technology to yield strong support to organizational goals.

In City B, the extent to which IT is currently used to support administrative processes, provision of services, decision making, and the democratic process is not uniform. While the

first two areas are highly supported by IT based systems, the area of decision making is only moderately supported and the democratic process is even less so. Based on discussions with many city officials, there appear to be a number of reasons for this:

a) Until recently, the IS in City B was so underdeveloped that the city had to give priority to infrastructure and basic applications before moving on to more advanced utilization of IT.

b) While functional needs and the resulting applications were relatively easy to envision and define, and management was in agreement as to what should be done, systems that support decision making are much harder to define. Managerial philosophy and organizational culture have to be altered before such systems can be successfully used. In addition, the nature of decision support systems is that they help in optimizing choices according to pre-defined criteria. Management in City B, however, perceived very little external pressure (from the public or the council) for optimization of any sort, and there are no clear value functions to the city's products. Hence, there were neither external incentives for those kind of systems, nor internal clarity about which criteria should be optimized or even who should decide it. Thus, the IS in City B facilitates city-wide sharing of information, provides a broad spectrum of information sources, and generates flexible managerial reports, but it does not provide advanced decision support systems with which to monitor performance, calculate criteria, and provide models for analysis. They require more detailed definitions of goals and objectives than currently exist in City B.

c) There is very little demand from the public, or from the council, to improve the democratic process, and thus, supporting it with IT based systems is not a priority. In addition, it seems that this area is not perceived as one of the administration's goals. The administration is oriented toward the more tangible goals of local governments. The

democratic process is addressed more as a constraint that guides the administration work, than as a goal that can and should be advanced by it.

7.3 The case of City C[7]

7.3.1 General description and assessment of the variables

City C is a medium size municipality within a larger metropolitan area in Western Canada. Due to its excellent access to ocean and airports, City C has become very attractive to developers and businesses in the region. Its economy is in the process of diversifying from the traditional base of farming and fishing into light industries, retail centres for the whole region, and a base for provincial and international business establishments. Growth in City C has been particular rapid in the last decade during which employment grew at twice the regional rate and the number of business establishments increased by over 250%. The population of City C was 128,773 in 1992. One year later, at the time of data collection, the municipality had a budget of approximately $137 million, and employed 1007 full time workers.

City C was among the first cities of its size in the region to introduce large scale computerization into its municipality. In 1982, an independent IS department was created and its head, who became a member of the senior city management team, was given authority over all IT related budget and responsibility for the development, maintenance, operation, and support of all the IS in the city. At the same time, a long term IS development plan was prepared, and during the following five years many applications were developed, almost entirely by the staff of the Information Services Department. The accelerated development

[7] A full-text case write-up is attached as Appendix C.

of the IS in City C did not continue for long. After the initial burst of development activity, things settled down to a steady and relatively slow rate of growth. Capital investment in IT was reduced to a yearly allocation unrelated to plans or needs. Over time, the involvement of top level management in the development of the IS in City C decreased. As a result, a huge back-log of outstanding requests developed. There was no more room to add terminals or other peripheral equipment to the mainframe, and response time dropped at times to an unacceptable level. Major applications became a patch-work of small add-on functions and enhancements, which became increasingly harder to maintain, and in some areas, the technology used inhibited changes rather than enabled them.

In 1991, facing a growing demand for services, an aging, loaded-to-capacity central computer, and diminishing resources, the IS Manager, heading a task force composed of second echelon managers, prepared a new computer strategic plan. The plan, however, as can be expected from the composite of the task force, the lack of top management involvement, and the bottom-up planning methodology, was neither mission-driven nor strategic. It was driven by the operational needs of the departments and focused on solving technical problems in the existing systems, rather than the best utilization of IT to attain goals of the municipality. Furthermore, it was never presented to the council or formally approved by the city management team, and no long term commitment of funds was made to finance it. Nevertheless, since 1992, IS development in City C picked up speed and to the extent that the operational and small capital budget of the IS department has allowed, has followed the recommendations of the plan.

Currently, utilization of IT in City C follows the dictate of a central steering committee. Standardization of hardware is controlled through the IS department which

purchases all IT equipment. While there are no city-wide data models or central repository databases, system integration is maintained because of the centralized planning and development processes. Development of IT based systems is coordinated with all potential users and special care is taken to make sure that data is consistent across all systems. On the other hand, the development of the IS in City C stems primarily from operational-level needs of the departments. System development does not follow a top-down analysis of the information requirements of the city, and IT is used mainly to improve the efficiency of existing processes rather than to change the ways the city operates. Furthermore, consistent with the operational, frugal, and problem solving approach that drives the development of the IS, City C often opts to be content with only partial integration between systems and it puts off investments in managerial applications and innovative systems to better times. This often limits the value of the IT based systems used by City C. Across all domains, thus, utilization of IT in City C is rated as **moderate** except for the domain of supporting the democratic process, where it is rated as **low**.

In City C, the political level does not provide the administration with comprehensive and detailed sets of goals, objectives, and priorities, and it is not involved in long term planning. However, each new council in City C articulates its objectives, even if only in very broad outlines, and through relatively close involvement with senior management and the daily operation of the departments, council informally influences what the city does. Overall, therefore, the extent to which the political level in City C provides well defined goals, objectives, and strategic directions is rated as **moderate**. Utilization of IT is not a priority for the politicians in City C. While they are relatively well informed of the IS in the city and the general attitude seems to be positive and supportive, they are not involved and not very

interested in its development. In general, they do not understand the strategic value of IT, and hence, tend to regard IS development as a "nice to have" rather than a "must have". On the scale of being active champions of IS projects the political level in City C is rated as **moderate** to **low**. The council in City C is the only political authority. At the administration level, formal authority is not totally unified under one person, but de-facto, senior management operates as a cohesive and cooperative team. Since there is no evidence of fragmentation of authority, the authority structure in City C is rated as **unified**.

In City C there is a mix between a corporate approach to planning the future development of the city and decentralized approach for planning and managing the operational aspects of the city. The IS function is managed from a corporate perspective but as an operational support function rather than as a major corporate resource. The extent to which City C follows corporate management approach is rated as **moderate**. Overall, decision making in City C at the strategic level in general, and especially in the area of IS, seems to be well coordinated and centralized in the sense that it is done by a central authority and follows the priorities of the city as a whole. However, decision making in City C is fragmented in the sense that each decision tends to address a narrow issue in separation from the broader perspective, inter-dependencies are managed at the operational level, and decision makers tend to focus on local problem solving rather than on a city-wide vision. On the scale of integration vs. fragmentation, therefore, City C is rated as **high** to **moderate**. City C, however, is not dynamic, indeed it is rated as **highly incremental** in its approach to changes. Overall, City C is oriented toward serving its customers but from a pragmatical, operational, and traditional perspective rather than from a visionary, long term strategic one. As such, this major orientation of City C is rated as only **moderately** conducive to the development of

effective IS.

7.3.2 The impacts of political behaviours on utilization of IT in City C

In City C there is not a detectable, direct impact of political behaviours on utilization of IT in the city. While the politicians are not involved in planning and developing the IS, and certainly not in championing IT projects or providing the administration with a vision to implement, it seems that such involvement is neither a necessary condition for the development of the IS nor expected of them by the bureaucracy. It is recognized by both the politicians and the bureaucrats that councillors do not have the knowledge, experience, or time to lead in the area of IT. As long as they are open minded and supportive, as they are in City C, the lack of direct involvement does not constitute an obstacle in the way of developing IS that support organizational goals. As one of the aldermen said,

> *We do not have to have any education, we do not have to be bright business people, we do not have to have a good track record, all we have to do is get elected ... So we are going to depend a lot on the advice from our staff, especially in areas of management and technology ... Computerization is not a high priority for most of us but we do what we feel we can fairly do to support the IS group and get them a reasonable increase, and if what they want is feasible within the budget framework we will give them all the back-up we can.*

The authority structure in City C is also not a serious inhibitor for effective utilization of IT. De-facto, authority in City C is much more unified, especially in the area of IS, than what the formal organizational chart suggests. Since even the semi-autonomous units depend on the central IS function, the lack of formal unified authority does not lead to fragmentation of the IS.

What seems to have the most damaging impact on the development of IS in City C is the type of leadership provided by the political level. On the one hand, council is fairly

involved in the daily operation of the departments and takes an active role in directing their activities. In doing so, the politicians impose their views, priorities, and managerial approach and to some extent prevent the administration from assuming a leadership role. On the other hand, especially in regard to how the city operates, the politicians in City C are quite content. They do not sanction spending many resources on re-thinking the way the municipality works, since at the moment it seems to be doing fine. They are not driven by a long term vision of the missions of governments and the role of IT in achieving them. On the contrary, maybe with the exclusion of major urban development projects, the politicians in City C cater to the average person's expectations of the municipality. As they see it, the average voter tends to take current city services as given. Thus, the politicians only worry about the costs of the services or any serious break down in programs. As one of the alderman explained,

> *The voters do not want to pay taxes, they judge those who run the city based on the yearly property tax and if we can provide reasonable services. Nobody, in 20 years, has ever phoned me to say why do we not use computers in a more sophisticated ways.*

This means that rather than providing the administration with a long term vision, and seeing their job as educators of the public and innovators, the politicians are content with keeping the city running smoothly, and in supporting changes only if they would not "rock the boat". In many cases what is labelled in this study as a high utilization of IT is perceived, in the words of City C's Mayor, as "*a luxury and not a necessity, and people are not into luxury in civic business*". Thus, it seems that the lack of long term visionary leadership on the part of the politicians with a simultaneous blocking of the emergence of a more visionary leadership from the professional managers, is in part responsible for the operational-level, problem-solving approach to IT which in turn inhibits utilization of IT in a more significant role in City C.

In summarizing the impacts of political behaviours on utilization of IT in City C, it is important to note the role of the incentives to address the issue of IT at the political level. As implicitly referred to in the previous paragraphs, the politicians in City C do not sense major problems in the way the city is run. The financial squeeze is not severe enough to force them into considering alternative methods of providing services, or make it imperative to adopt more analytic decision making processes. Thus, computerization has never become a priority and the politicians are content with incremental approach to IS development which, as demonstrated in the case of City C, is an obstacle to effective utilization of IT.

7.3.3 The impacts of the bureaucracy on utilization of IT in City C

In three out of the four areas on which this study focuses, City C is using IT to a moderate extent. On average, the patterns of bureaucratic behaviour which characterize City C are also only moderately conducive, according to the study's hypotheses, to the development of IS that support organizational goals. These findings support the model that guides this study.

While investigating the extent to which City C uses IT to support its goals, the researcher found that almost to a person, interviewees referred to what was defined in this study as high utilization as something, *"we would like to have ... eventually we will reach that point ... we are thinking of that"*. This, to some extent, reflects management and politicians beliefs that IT can and should be used to support the four goals of local governments this study focuses on. However, even though officials in City C do not sense explicit demand, or opposition, to IT utilization from the public, this study cannot categorically state that how City C utilizes IT is not a function of public interest.

Nevertheless, we found no evidence that the choice to use IT only to a moderate extent was based on perceptions about the preferences of the public. Thus, the author believes that managers' values and motivations manifested in their behaviours provide the best explanation to why City C uses IT as it does.

Uncovering the causal relationships between the characteristics of the bureaucracy and the utilization of IT is not simple in City C. Using the technology neither very extensively nor poorly and rating neither high on the variables that relate to bureaucracy nor low, no clear pattern emerges and the explanation is probably in the combination of the factors rather than in each of them separately. Nevertheless, some conclusions can be drawn and the successes and failures of City C to use IT effectively can be traced to some causal relationships.

System integration, sharing of information across systems and functions, and a coherent IT infrastructure are necessary conditions for the emergence of effective IS. In City C, these conditions are met due to the presence of unified authority over all aspects of IT usage, and an executive-level IS manager who communicate the needs of the IS function and guide the development of the IS according to corporate priorities. Hardware and software standardization, imposed by the central IS department, now ensure that data in City C is sharable, and the corporate, centralized approach to IS planning accounts for the integrative nature of the IS in the city. The fact that the IS function is unified and led by a high level executive also contributes to ensure that sufficient emphasis is given to the technical issue of coherent and organizational-wide IT infrastructure, which is the foundation on which to build IS that support organizational goals.

A corporate management perspective and a unified decision making process should

reflect not only the mechanization of managing, but also the content of the decisions and the city manager's managerial philosophy. On these factors, City C rates only moderate. In City C, the content and focus of the unified decision making process, especially in the area of IT, tend to be tactical, local, and operational in nature, rather than visionary and mission-oriented.

The utilization of IT as more of an operational tool than a strategic resource is also the result of the combined influence of the following four factors. First, the political level tends to somewhat micro-manage, councillors see themselves as representing the average person whose expectations reflect short term, conservative outlooks. Second, for a variety of reasons, the Administrator is reluctant to assume a leadership role. Third, as mentioned in City A, there is a disincentive to change as municipalities operate in a non-competitive environment. Finally, the council members, and senior bureaucrats share a feeling that the city is operating reasonably well.

The dominant orientation in City C is thus toward improving existing processes. There are no strong incentives to re-think what and how the city is doing, inclination to pursue drastic and innovative changes, and no willingness on the part of the senior management to champion them. Thus, overly concerned with the here and now, management in City C views IT as an efficiency tool and does not pay enough attention to the potential of the technology to do more than just to enhance the existing processes.

Even where managers do have a vision regarding the strategic role of IT (such as the Administrator's vision of a 'paperless city'), there is no sense of urgency and no desire to personally lobby for it or become its champion. Management in City C tends to assume that in due course, as long as the city keeps moving incrementally in the right direction, effective

utilization of IT will occur. This approach might be true, but it is causing the city to underutilize technology at present, and probably will cause the city to always lag behind in IT utilization. This approach also makes it easier for politicians to follow their tendency to judge each project separately and solely on its short term merits. The political level is not asked to commit to long term comprehensive plans, and is not confronted with strong advocates for more extensive and far-sighted use of the technology.

Lastly, incrementalism which is simultaneously a result and a cause of the operational orientation, dictates a slow development of the IS and a frugal approach to planning and implementation. This frustrates and discourages more visionary aspirations on the part of users and managers. It reduces the benefits actually gained from the systems, which in turn further reduces the willingness of the decision makers to invest in future development of IS. It also forces users and planners to focus only on solving urgent, operational needs, since it is clear that they cannot hope to achieve more in the foreseeable future.

7.4 The case of City F[8]

7.4.1 General description and assessment of the variables

City F is the largest city in this study's sample, and one of the largest in Canada. It was founded as a fort and a trading post in 1875. Due to its location on an important crossroad it soon became the commercial centre for the agricultural settlements in the whole region. The shift to industrial agriculture in the 30's, and the discovery of oil in the city's immediate area in 1947 lured many companies to locate their administrative headquarters in City F. With them came financial institutes and service industries. During the second half of

[8] A full-text case write-up is attached as Appendix D.

the 20th century, the economic base of City F has further diversified. Today there are many manufacturing industries in the city and it has become the home for many research and development facilities. More than two thirds of the province's advanced technology companies are currently located in the city. This lessened the impacts of the slowdown in the oil and agriculture industries and helped City F maintain the highest annual growth rate (2.1%) among the large cities in our sample. During the 60's, the city annexed three outlying towns which made it one of the largest cities in Canada. The population of City F was 717,133 in 1992, one year later, the city had a budget of around $738 million (not including utilities[9]), and employed 7475 permanent employees in functions which correspond to those fulfilled by other cities in this study.

The IS function in City F evolved over a long period of time in a slow, guarded, but continuous process. It first emerged in the mid 60's as a data processing unit within the Finance Department. Ten years later, after acquiring a large IBM mainframe and developing a number of large administrative systems, the IS function was recognized as a separate entity and the Data Processing Services Department (DPSD) was created. DPSD now controls almost all IS resources, all system development initiatives must get its approval and conform to its city-wide IT standards. However, DPSD's role in directing the development of the city's IS is secondary to that of the line departments. In essence, DPSD has remained a service unit responding to its customers. Thus, IS development in City F is to a large extent driven by the operational needs of the departments. It does not follow a top-down, mission-

[9] City F directly owns and operates a few functions which in other cities in the sample are owned by regional or provincial authorities, such as water supply, waste and sewage treatment, and transportation. To allow comparison, IT based systems, budget, and manpower that relate to those functions are not considered in this report.

driven, systematic planning methodology, nor is it driven by a coherent and well articulated vision regarding IT's role in the municipality. Furthermore, there is only limited involvement of top management in IS, and development is usually incremental and conservative. DPSD however, possesses considerable resources and authority. Through formal and informal channels, it gives focus to IS development, especially with respect to technical considerations. Its pivotal role insures that, to a large extent, systems are integrative in nature, data is consistent across applications, and there are only limited cases of redundancies of data or duplication of systems. Also, through the work of the Information System Steering Committee, corporate priorities are kept and new initiatives are disseminated across departments. Recently, DPSD has embarked on a comprehensive, top-down strategic IS plan. The Information System Architecture Plan (ISAP), completed at the time of data collection, identifies eight major technical directions which should guide future IS development in the city. However, at the time of data collection, the ISA plan was not yet formally approved. No specific IS development plans were derived from it, and no budget was allocated to implement its recommendations. Thus, it is not considered in this study assessment.

Utilization of IT in City F is dominated by three characteristics. First, most of the city's IT based systems are still based on old technologies. This is due to the city's cautious and conservative approach to new technologies, the incremental approach to system development, the lack of a long term plan for IS development, and the focus on solving local operational needs without undue disruption to the existing systems. Second, utilization of IT in City F is very pragmatic, frugal, and process oriented rather than visionary and goal oriented. It focuses on the practical and immediate needs of the departments, strongly emphasizes control and security, and is heavily influenced by technical considerations. The

third characteristic of IT utilization in City F is the relatively high level of connectivity and integration between applications, and the centralized approach to data management.

Most of the city's operations are supported by IT based systems. However, as a result of the characteristics mentioned above, most systems are still based on mainframe architecture. Many of them are still written in third generation languages, and most are not based on relational databases. Also, IS is to a large extent perceived as an operational tool rather than a strategic one. Most systems are not based on visionary concepts, their designs lack imagination, and they do not facilitate creativity and innovativeness. Lastly, IT tends to be used to mechanize existing work processes rather enable re-engineering of business processes. For all these reasons, utilization of IT in City F is rated as **moderate** across all domains except for the domain of supporting the democratic processes. Here, the city makes only **low** utilization of IT.

The politicians in City F provide long term vision and goals in respect to the development of the city. The council, however, is mainly reactive and depends on the administration to provide leadership and guidance with respect to how the city routinely operates. Furthermore, the politicians in City F, once they have articulated their main concerns, do not take an active role in working their vision and goals into action plans. Also, they provide only vague guidance in respect to how the city should be managed and they do not closely monitor the departments' operations. Overall, the extent to which the political level in City F provides well defined goals, objectives, and strategic directions is rated as **moderate**.

IT is viewed by the politicians, and in many cases also by senior management, as an administrative and technical domain. None of the issues, goals, or strategies articulated in the

council's strategic plan refers to information technology. As one of the councillors said: *"I cannot recall council ever asking the administration to update us on their information technology"*. On the scale measuring the behaviour of politicians as champions of IS, the political level in City F is rated as **low**.

In City F there are no elected bodies aside from the City Council. At the administration level, the formal authority structure is less unified. However, the commissioners[10] are not individually accountable to the council, they are jointly accountable as the board of commissioners. Since they seem to work as a team rather than in isolation, the authority structure in City F is rated as **unified**.

The managerial approach in City F is in a state of transition. City management is no longer content with assigning responsibilities and controlling the use of resources. Currently the commissioners are trying to advance a corporate vision, and a corporate management approach, and are promoting corporate strategic planning and results oriented management techniques. Those changes are slow and gradual, and as yet, have not had significant impacts on how the city is working in general and specifically on its IS. Furthermore, there are no concrete plans or budget for the implementation of some of the new ideas being discussed. Overall, the extent to which City F follows a corporate management approach is thus rated as **moderate**.

There is no fragmentation of organizational power and strategic decision making authority in City F. Rather, the fragmented issue-base decision making process, which often characterizes City F, is due to the lack of a strong visionary management, and to the incremental approach to implementation. On the scale of integration vs. fragmentation City

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[10] There are four commissioners, and each is responsible for a number of departments.

F is rated as **highly integrated.**

Due to lack of strong visionary corporate management and the perception that the city is doing fine, the basic inclination of City F is towards gradual and incremental changes. In the area of IS development this tendency is even more pronounced. Overall, on the scale measuring dynamic vs. incremental change City F is rated as **highly incremental.**

City F is oriented towards serving its customers but from a pragmatic, conservative, and operational perspective rather than from a visionary, long term strategic one. Thus, this major orientation of City F is rated as **moderate** with respect to providing a conducive environment to the development of effective IS.

7.4.2 The impacts of political behaviours on utilization of IT in City F

On the whole, the political level in City F does not have a direct influence on how the city utilizes IT. The administration does not expect the politicians to take an active role in that domain or try to get them involved. While the political level allows IS development, and even supports it, it neither directly promotes the use of IT, nor indirectly promotes it by demanding a proactive, results oriented, corporate management approach from the bureaucracy. It seems that the council provides the necessary conditions for the development of a comprehensive and effective IS but not the driving forces or the leadership.

Through its strategic plan and the presence of the Mayor in the meetings of the board of commissioners, the council provides the administration with goals and priorities. This is a prerequisite to IT usage that aim to support organizational goals. By channelling all command lines through the board of commissioners, the council creates a professional management group which has a city-wide perspective and the authority to back that

perspective. This allows city management, if it so chooses, to regard the development of IS from the point of view of the city as a whole, and the role of IT from a strategic, long term perspective.

What the political level in City F does not provide the administration with is a proactive, visionary leadership that encourages innovations and changes. It also does not provide the administration with reasons to develop such leadership itself. The council does not demand long term plans, ask for specific quantitative results, or closely monitor the departments' operations. Any of these initiatives may propel the administration to adopt a strategic leadership role. In effect, the political level in City F leaves it to the professional management to set the bureaucracy's orientation, management style, approach to changes, and decision making processes.

In the area of IT utilization, this lack of leadership and involvement is even more apparent. Since IT is seen as an administrative tool, it is outside the council's sphere of interest and to a large extent outside its understanding. Thus, the council does not recognize the importance of regarding IT as a strategic asset and does not ask for comprehensive plans. Indirectly, it sends the message that IT is an operational tool which should be dealt with at the administration level. This, of course, perpetuates itself since, if the politicians are not involved, they understand even less and find it even harder to develop a vision regarding the role of the technology. This, in turn, makes them even more reluctant to get involved and influence IS development.

On the whole, it seems that if the administration had chosen to focus more resources on the development of the IS, or to develop and implement a more visionary long term IS plan, the council would not have stood in its way. Nevertheless, the council in City F

indirectly reinforces, or allows, the natural tendency of most large organizations to maintain the status-quo, to prevail.

7.4.3 The impacts of bureaucracy on utilization of IT in City F

The behavioral patterns of the bureaucracy in City F are neither uniformly conducive, according to the hypotheses of this study, to the development of effective IS nor uniformly non-conducive. On some dimensions of behaviour, the bureaucracy in City F rates high, on some moderate, and on some, it rates low. The extent to which City F uses IT is moderate with respect to three domains and low in the fourth domain. These empirical findings fit the study's predictions, and thus, tend to support the model proposed by it.

While the way City F currently uses IT is not highly supportive of the organizational goals, there is general agreement among all managers interviewed that eventually the city will achieve high utilization of IT as defined by this study. First steps towards this goal have already been proposed by the Information System Architecture Plan put forward by the DPSD. Interestingly, the DPSD used a methodology called "scenario analysis planning" for its long term IS planning, a planning method rarely used for this purpose. Four scenarios were built based on two key drivers, a high/low rate of change in IT and a high/low customer demand. The results of the analysis of the city's needs with respect to IS in the two extreme scenarios fit surprisingly well with the way this study operationalized high and low utilization of IT. The "Flintstone" scenario, which assumes a low rate of change in IT and low customer demand, suggests that the city needs what is described here as low utilization. The "Jetsons" scenario, which assumes a high rate of change in IT and high customer demand suggests that the city needs more or less what is discussed under the high utilization of IT in this study.

This lends validity to how this study has operationalized these two constructs. Since the "Jetsons" scenario was percieved as the most likely one, it also supports the author's belief that high utilization of IT is congruent with the public interest.

One of the strongest points of the IS in City F is the availability and "shareability" of data and the integrative nature of the systems. This can be traced directly to the centralized IS planning and development processes, which resulted from the unified authority structure and the lack of fragmentation of power and decision making authority. In practical terms, it is manifested in a centralized IS function which has a dominant role in all IT related issues.

The weaker points of the IS in City F are the operational, process-oriented nature of the systems and the frugal and incremental approach to their development. There are number of reasons for these weaknesses. First, the lack of strong and visionary corporate management, especially with respect to IT utilization, leaves the role of directing IT utilization to DPSD management. It, in turn, does not have a clearly articulated corporate business strategy from which to derive the IS plan. Also, DPSD management lacks the authority to dictate what should be done in other departments. Thus, quite naturally, DPSD tends to focus on insuring an efficient technical platform and lets its customers define what is needed and what would be the long term goals of systems. Unfortunately, since there is no strong emphasis on results oriented management, no strong directive to break departmental boundaries and to re-think how the city does business, and no urgency about the general perception of how the city is doing, the departments tend to focus on operational, efficiency related needs. To some extent, the ISA plan, which is based on a top-down, mission-driven analysis, identified these problems and suggested some remedies. On the whole, however, even the ISA plan (since it was a DPSD initiative) is oriented more towards creating a

technical platform to satisfy future needs than towards identifying what those needs are.

City F is conservative and pragmatic. In general, politicians and bureaucrats alike feel that this approach serves the city well. As a result they are not inclined to embark on ambitious projects, tend to shy away from risks, and often, as one of the commissioners stated, dismiss visionary thinking as a *"dreamer approach"*. In addition, either as a result of this dominant orientation or as a cause of it, City F is very incremental in its approach to changes and allocation of resources. With respect to IS development, this approach takes the form of financing system development from operational budgets which means that DPSD can usually rely only on the internal resources it can free from routine work for development. As a result, systems are developed in small incremental steps, usually as add-on functions to existing systems. This limits the ability to use IT as an enabler for business processes re-engineering. Even the implementation of the ISA plan's recommendations, which would constitute a revolutionary change from the current way IT is used, is envisioned as a guarded and incremental process. This, in the researcher's view, makes it doubtful whether the city will achieve the strategic goals of the plan. The incremental approach to system development also means that in most cases new systems are based on old technology. System development tends to focus on critical and urgent needs, e.g. usually immediate operational requirements, and delays implementation of more advanced and visionary functions sometimes indefinitely.

City F's reluctance to change its work processes also means that to a large extent the city does not take full advantage of the fact that the market today offers many packaged systems suitable for local governments. In City F there is a strong emphasis on connectivity and system integration, the majority of the systems are still mainframe based, and the inclination is to adapt systems to existing work process rather than to change them. Thus,

packaged systems bought by the city have undergone significant and expensive customization which in the long run often offsets the advantages of buying them.

Lastly, maybe because of its pragmatic orientation, its sense of contentment, or because of its frugal approach to system development, City F tends not to use external resources (such as consultants). Even the ISA plan was done internally. This tends to perpetuate existing problems in the approaches to IT utilization, since people are often held captive by the ways they used to work. They do not have the time and presence of mind to detach themselves from the pressures of the daily operations, and they often do not keep abreast with the latest approaches to IT utilization. Furthermore, outsiders usually do not approach problems from the perspective of a specific unit but tend to address them from the perspective of the organization as a whole. The researcher believes, that if City F had used consultants for the ISA plan, the focus of the plan would have been significantly different.

CHAPTER 8

RELIABILITY AND VALIDITY OF BETWEEN CASES ANALYSIS

By its very nature a case study is rich in details and, done well, may provide a convincing explanation as to **how**, and **why** certain factors influence the phenomenon under study, in this case, utilization of IT to support goals of local governments. From a grounded theory research perspective (Strauss & Corbin 1990), however, a case study of a single unit of analysis, in this case a single municipality, is only one point of data. Inferences regarding theory, relationships between variables, or the validity of the proposed model, are stronger when based on multiple and diverse data points (Yin 1991, Miles & Huberman 1994). Therefore, the first part of this chapter presents demographic, financial, and organizational data pertaining to each of the six cities studied. It examines the study's sample and addresses the questions of control and possible confounding factors. In essence, this part establishes that the between cases analysis conducted is valid both at the theoretical and literal replication levels.

While single case analysis can be carried out based on narrative descriptions of a case, between cases analysis must revert to more aggregated, formally defined, and consistently measured variables. Hence, the second part of this chapter addresses the reliability and validity of the measurement tools developed to measure utilization of IT. It similarly addresses those used to assess the existence and strength of behaviours associated with the political and bureaucratic nature of local governments, which the author hypothesized influenced the extent to which governmental organizations use IT to support their goals.

8.1 Characteristics of the sample

Table 8.1 presents demographic, financial, and organizational data for each of the six cities studied. A number of considerations influenced the choice of cases for this study. To achieve theoretical replication (Yin 1991), a sample which contains cities which make high, moderate, and low strategic utilization of IT is needed. To increase the reliability of the findings and the confidence in the conclusions through literal replication, two or more cases of each state are needed. In addition, the sample had to control for two factors which may influence utilization of IT, but which this research did not intend to study. They are the size and the wealth of a city. The sample is partitioned into two sets, large and medium size cities, to control for the size factor. Within each set, shown in Table 8.1, cities are ordered from left to right (high to low) according to the extent they utilize IT to support their goals. In this way the study achieved theoretical replication by comparing cities within each set. In order to control for the wealth factor, sampling was made, to the extent possible, from cities with similar amounts of resources available to them.

While the study aimed to control for the possible confounding effects of the wealth and size factors, no two cities are exactly the same in regard to these factors. Thus, it has to be established that control was maintained by showing that wealth and size do not have a significant influence on IT utilization within the sample.

In many cases, it was necessary to adjust various data items in order to present the information in a comparable way. Also, it was often necessary to estimate the value of specific data items, since the available data was not complete. These adjustments or estimations are noted at the end of Table 8.1.

Table 8.1: Demographic, financial, and organizational data:[1]

	CITY E[2]	CITY F	CITY A	CITY B[3]	CITY C	CITY D
	SET OF LARGE CITIES			SET OF MEDIUM SIZE CITIES		
Population 1992	618,195	717,133	477,872	87,147	128,773	90,171
Area	700.6 km^2	671.7 km^2	113.1 km^2	123.4 km^2	124.2 km^2	168.5 km^2
Properties/Parcels	N/A	N/A	123,902	27,249	46,379	29,428
Private households total	261,120	262,370	199,535	29,460	44,460	28,825
Average annual growth	1.4%	2.11%	1.55%	3.79%	2.99%	2.32%
Average income per taxfiler 1990	$ 24,901	$ 28,742	$ 27,746	$ 27,554	$ 27,935	$ 29,469
Councillors + Mayor	12+1	14+1	10+1	6+1	8+1	6+1
Political affiliation; F/P time	individuals/F- time	individuals/F- time	prov. parties/P-time	individuals/P- time	prov. parties/P-time	local parties/P-time
Consolidated budget 1993	$ 694,700,000	$ 737,529,000	$ 520,265,000	$ 95,205,497	$ 136,959,900	$ 97,804,062[4]
Average budget 1989-1993[5]	$ 710,050,510	$ 764,198,000	$ 498,544,550	$ 88,169,148	$ 145,545,120	$ 88,552,373[4]
Employees: regular temporary (FTE)	5715+ 1108 police 803	6304+ 1171 police 537	6517+1122 police 1689	462+90 RCMP 282	1007+148 RCMP 157	504+ 131 police 150
IS dept. operational budget 1993	$ 20,190,000	$ 25,415,000	$ 6,002,500 (O+C)	$ 1,300,000	$ 1,551,900	$ 1,096,600
IS dept. capital budget 1993	$ 4,435,000	$ 5,500,000	$ 9,234,615[7]	$ 600,000	$ 750,000	$ 280,000
Total IS related budget 1993	$ 40,000,000[6]	$ 33,000,000[6]		$ 1,900,000	$ 2,301,900	$ 1,376,600

Average IS dept. budget 1989-1993[5]	$ 23,172,000	$ 31,937,000	$ 5,985,223	$ 1,902,802	$ 2,075,912	$ 1,229,600
Yearly spending on IS (avg 89-93)[5]	$ 41,000,000[6]	$ 33,937,000[6]	$ 8,985,223[7]	$ 1, 902,802	$ 2.075,912	$ 1,429,600[6]
IS professionals (+ in dept.)	196 (+135)	334 (+45)	57 (+30)	12 (+4)	19 (+5)	11 (+1)
Training budget 1993	$ 3,325,000	$ 2,442,000	$ 2,940,000	$ 227,248	$ 314,500	$ 135,000[8]
Internal/Contracted:						
Police	city police	city police	city police	RCMP	RCMP	city police
Garbage collection	60-70% contracted	city employees	city employees	contracted	contracted	contracted
Recycling	80% contracted	city employees	city employees	contracted	contracted	contracted
New construction	mostly contracted	mostly contracted	70% contracted	contracted	contracted	70%contracted
Infrastructure maintenance	50% contracted	mostly internal	mostly internal	mostly contracted	mostly internal	all internal
Computer applications	mainly in-house	40% external	85% in-house	80% external	85% internal	60% external
Quantity of data stored	200 Gbit	215 Gbit	40 Gbit	10 Gbit	12 Gbit	7 Gbit
No. of departments	12	21	17	10	15	10[9]

Notes:

1. Sources: British Columbia Municipal Redbook (1993); Census, Stats-Canada (1993); Canadian Markets, Financial Post (1993); budget books and other official documents of each city.
2. Because of the unique mandate of the municipality in City E, information in the city's publications is not comparable to the other cities. To the extent that it was possible, data presented in this column was adjusted to refer only to those functions which are common to all other cities. However, in some cases, such as the number of employees, IS professionals, and operational budget, clear separation was not possible and those numbers are slightly overstated.
3. Comparable financial data was available only for the years 1990 - 1994.
4. A number adjusted to include average expenditures on Public Library and Community Health Authorities.
5. In 1993 dollars, adjusted by the Consumer Price Index (CPI): 1989 = 83.8, 1990 = 88.4, 1991 = 93.0, 1992 = 95.8, 1993 = 100
6. Estimation of total spending on IT, including departmental spending.
7. Total IT related budget was estimated based on the number of permanent IS professionals in the departments.
8. Extrapolation, assuming corporate training budget constitutes 15% of total expenditures on training.
9. Not included are the Public Library and Health Authorities which are managed by the region.

Table 8.2 presents various indicators of the wealth of the cities and their size, and compares them to the dependent variable of this study, namely, the extent to which each city utilizes IT. The data clearly shows that, **within each set, neither the wealth of the city nor its size are associated with the extent to which the cities use IT to support goals.** Thus, both factors were adequately controlled. Eliminating wealth and size as significant factors, in respect to how the cities in the study's sample utilize IT, allows inferences based on theoretical replication within each set. This means that differences between the cities in regard to the dependent variable should be explained mainly by differences in the independent variables. It also means that it is valid to use the empirical data to support or reject the model on which this study was based.

Table 8.2: Size, wealth, and utilization of IT:

CITIES IN ORDER OF IT UTILIZATION		**E**	**F**	**A**	**B**	**C**	**D**
		SET OF LARGE CITIES			**SET OF MEDIUM SIZE CITIES**		
LEVEL OF IT UTILIZATION		HIGH	MODERATE	LOW	HIGH	MODERATE	LOW
WEALTH	**average annual income of taxfiler (+/- of average)**	-8%	+6%	+2%	-3%	-1%	+4%
		average $27,130 (Std Dev. $1,627)			average $28,319 (Std Dev. $828)		
	municipal budget per resident (+/- of average)	+6%	-5%	-4%	-2%	+8%	-6%
		average $1,086 (Std Dev.$45)			average $1,041 (Std Dev. $64)		
	average annual growth 82-92	1.4%	2.1%	1.5%	3.8%	3%	2.3%
SIZE	**Population** (in 000)	618	717	478	87	129	90
	Private households (in 000)	261	262	200	29	44	29

Though the study aimed for a sample with no variance in the wealth factor among

cities, there was some variance in this factor. It appears, however, that wealth does not explain variance in IT utilization among the cities in this study's sample. This is a surprising finding, since it contradicts findings of previous studies, and since most senior managers interviewed stated that if their city had had more money, it would have use IT more extensively. However, this finding may be due to the fact that the variance in wealth, among the cities used in this study, is not large enough to detect the influence of the wealth factor.

The requirements of the literal replication strategy are that two or more cases would have similar dependent or independent variables. In this study, if the same patterns of behaviour of the political and the bureaucracy levels are found in two different cities which make high utilization of IT, it may be considered as a replication of the study and a reinforcement of the validity of the results. To establish strong literal replication, it is not sufficient to compare two cities which make high (or moderate, or low) IT utilization relative to the other cities in their respective sets; if that is the case, replication can only be stated in relative terms. However, if two cities make the same utilization of IT in absolute terms, conclusions can be stated in absolute terms as well.

Table 8.3 presents the scores each city achieved on IT utilization for each of the four domains. The scores were calculated as the sum of points each city accumulated in total, as well as for each domain separately. Each highly supported function received three points, moderately supported functions received two points, and low supported functions received one point. Since there is no basis to ascribe different importance to each of the functions used as an indicator for utilization of IT to support local governments goals, and since each system

is rated on an ordinal scale[1], the scores presented are only ordinal. Theoretically, adding ordinal scores is a mistake, since the overall order of the cities on IT utilization may change if different schemes are used. However, we analyzed the data using a number of different scoring schemes (such as 1-2-3, 1-6-8, and 2-4-10) and the resulting order was always the same. Thus, we conclude that the scoring schema used does not distort the order between the cities, or in other words, the very simple scoring schema used maintains the same rank order among the cities as many other, much more complex, scoring rules the author experimented with. Furthermore, the same measurement instrument was used in the large cities and in the medium size ones. That means that the level of IT utilization can be compared not only within sets, but across the entire study sample. To highlight the similarities within each pair of cities and the significant differences between the pairs, Table 8.3 is organized in pairs rather than in sets. Also, for each domain, the maximum score possible is shown; it is the number of functions used as indicators to assess IT support for that domain, multiplied by three.

Table 8.3: Scores on IT utilization:

City:	E	B	F	C	A	D
Level of IT utilization	high		moderate		low	
Administrative functions (score out of 24)	22	24	20	18	15	10
Provision of services (score out of 33)	28	28	24	23	20	17
Decision making (score out of 18)	16	14	13	10	6	7
Democratic processes (score out of 21)	13	13	10	9	12	9
TOTAL SCORE (score out of 96)	79	79	67	60	53	43

[1] Systems were rated as providing high, moderate, or low support. Since low support includes also no support, and since it is not clear how much the level of support increases with the transition from low, to moderate, and to high support, the rating should be considered as ordinal only.

The data show that there is much more similarity in IT utilization within each pair of cities than there is between the pairs. Moreover, it shows that the rank order of each city does not change when compared to all six cities rather than only to its set. This means that a city which was classified as making high (moderate or low) utilization of IT within its set maintains that classification also when all cities are ordered together. Hence, we conclude that the requirements of literal replication were met and there should be a high level of similarity in the independent variables within each pair of cities and significant differences between them.

While not the focus of this study, in eight out of the 12 points of comparison[2], the larger city in the pair makes slightly higher utilization of IT, in two cases both cities make the same use of IT, and only in two cases the smaller city rates higher on IT utilization. Considering 1) that the scales are only ordinal, 2) the consistency of this phenomenon, and, 3) the author's more subjective impressions of the use of the technology in each city, it seems that city size does have an influence on IT utilization in the cities studied. However, it is **much weaker** than the influence of the factors on which this study focuses. In general, where all other factors (wealth, political and bureaucratic behaviours) are equal, this finding suggests that large cities make slightly better use of IT compared to cities of medium size, which is congruent with findings of previous studies. This conclusion applies to cities with approximately 500,000 residents (referred to as large), and those with around 100,000 residents (referred to as medium size). It should only be tentatively proposed for cities of different sizes, since the study's sample does not include very large or very small cities.

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[2] We compared the scores of the large city and the medium size one within each pair of cities, and across each of the four domains. Since there are three pairs of cities there are 12 points of comparison.

As mentioned in Chapter 4, differences in public interest are a plausible explanation of variance in IT utilization among cities. In this study we were not able to measure this factor or control for it. However, officials in all the cities we studied reported that the four goals on which this study focuses are indeed important to them and to the public, and that, in general, the public is not very interested in how its local government pursues these goals. Furthermore, we did not find even one instance in which a decision about IT utilization was directly influenced by public preference. Considering the proximity of most of the cities studied and the above mentioned facts, we feel that it is safe to assume that there were no significant differences in public interest among the six cities studied.

8.2 The reliability and validity of the measurement scales

One of the objectives of this study was to develop ways to measure how municipalities use IT to support their goals, and the existence and strength of variables associated with political and bureaucratic behaviours. As such, at the end of each section in the case write-ups, the overall evaluation of the state of each of the variables is rated as **high**, **moderate**, or **low**. Summary tables of the more formally defined indicators used to measure each of the variables, and how each of them was rated, are also provided. By assigning numerical values to the ratings, and summing the points each city received across all the indicators that pertain to each variable, the score of the city with respect to each variable was calculated. The next section, therefore, analyzes the properties of the measures and scales developed and used in the study.

8.2.1 Reliability and validity of the dependent variables' measures and scales

Table 8.3 shows that the measures and the scoring schema developed in this study

successfully discriminate between levels of IT utilization. They also give similar scores to cities which use IT to the same extent. Table 8.4 shows the average difference in scores, across the four domains of IT support, within each pair of cities and between the pairs.

Table 8.4: Average differences in scores on IT utilization within and between pairs:

	high	moderate	low
high	1.		
moderate	3.87	1.75	
low	7.75	3.87	3.

While still smaller than any of the between pair average differences, the average difference between the two cities which make low utilization of IT is relatively high. The author believes that this is so because the low category bundles low utilization of IT with no utilization of IT. Nevertheless, the ability of the measurement scales to discriminate between levels of IT utilization, and the consistency in rating across all four dimensions of IT use, provide strong support to the validity of the measurements.

As an additional informal check of the appropriateness of the measures used to assess IT utilization, we asked senior interviewees to comment on the usefulness of the systems described under high utilization of IT. All managers and politicians talked to agreed that what the measurement instruments defined as high utilization of IT constitutes a beneficial undertaking for local government. We also compared the recommendations contained in existing strategic plans and the recommendations of external consultants (where such were used) to what this study considers as high utilization of IT and the rationale underlying the categorization of systems. We found that in cities which have strategic IS plans, these plans

are congruent with the way this study defines high utilization of IT to support local governments' goals. Further, where professional consultants were employed (cities B, E, and partially, City D), their recommendations fully conform to this study's expectations with respect to how IT can be used to support organizational goals. This provides supporting evidence for the face and content validity of the measurement tools developed to assess utilization of IT.

As described in the case write-ups, where strategic IS plans include review of the strengths and weaknesses of the current IS in the city, these evaluations were very similar to this study's conclusions regarding the use of IT in these cities. This happened in cities A, B, and to a less extent in the IS plans of cities E and F. While the conclusions these cities reached were similar to those arrived at by using the measures developed for this study, they used different methods to reach their assessments. This constitutes a multi-method triangulation which further supports the reliability and validity of the measurement tools developed.

8.2.2 Reliability and validity of the independent variables measures and scales

Each of the seven independent variables in this study is a highly complex, multi-dimensional construct. Because of that, the author feels that the most accurate assessment of the state of each city in respect to these variables is that reached by simultaneously considering all aspects of the behaviour under study. These comprehensive, but somewhat subjective, assessments appear as the overall rating in the case write-ups and are presented in Table 8.5. A more formally defined, and hence more objective and more easy checked set of indicators for each variable was also developed. How each city measured on each of these indicators is presented in the summary tables at the end of each section in the case write-ups.

To investigate the properties of the more formal measurement tools developed in this study for the independent variables, the analysis followed the same scoring procedures used for the assessment of IT utilization. Each indicator hypothesized to be highly conducive to the development of effective IS was assigned three points. Two points were assigned to indicators moderately conducive to IS development, and one point to each indicator not conducive to the development of effective IS. In Table 8.5, the score each city received is presented in brackets beside the overall rating for the city. Both the ratings and the scores are ordinal scales. Since different numbers of indicators were used for each variable, numerical comparison is meaningful only across the same variable. The data show that the more formal measures of the independent variables, represented by the scores, present the same rank order as the more subjective but holistic ratings.

The reliability of the measures was analyzed by calculating two statistics. First, the percentage of indicators that agree with the overall rating was calculated for each variable and across all cities. This is a measure of the goodness of the fit between the overall rating and the rating on each of the indicators. As the third column in Table 8.5 demonstrates, there is a considerable agreement between the two, inter-related, measures. Second, Cronbach's alpha statistic of internal consistency was calculated for each measure. The appropriateness of using this statistic with ordinal scales is debatable. However, as Emory and Cooper state:

> *Parametric tests are so versatile, accepted, and understood that they will continue to be used with ordinal data when they seem to approach interval scale in nature.* (1991, p. 175)

Concurring, Kerlinger (1986) notes:

> *The best procedure would seem to be to treat ordinal measurements as though they were interval measurements but to be constantly alert to the possibility of gross inequity of intervals.* (p. 403)

To test the sensitivity of Cronbach's alpha to the scale used, the calculations were repeated three times, using three different scales[3]. The results were quite robust and did not deviate from the alpha calculated for the original scale by more than 0.07. As the fourth column in Table 8.5 demonstrates, there is a high level of internal consistency to six out of the seven measures developed. The measure of political involvement in IS demonstrates lower internal consistency, but nevertheless is very close to the acceptable level of 0.7 (Emory & Cooper 1991).

The more formalized measurement tools developed in this study also discriminate well between cities that were rated differently, and show a high convergence of scores among cities rated similarly. Table 8.6 presents the results of the calculation of differences in scores, across all variables, between cities rated the same and differently.

[3] In addition to the original scale (1,2,3), Cronbach's alpha was calculated using a scale in which the intervals were larger (1,5,10), and a scale in which the intervals were not symmetric and not consistent across indicators (e.g. one indicator was rated on a scale of 1, 3, and 9, and another indicator was rated on a scale of 0, 8, and 9).

Table 8.5: Ratings[1] and scores of the independent variables and the fit between them:

	INDEPENDENT VARIABLES	Fit between rating and scoring[2]	Reliability (Cronbach alpha)	CITY E	CITY F	CITY A	CITY B	CITY C	CITY D
POLITICAL BEHAVIOURS	political leadership	75%	0.83	H (15)	M (12)	L (6)	H-M (14)	M (11)	L (8)
	involvement in IS	70%	0.67	M (15)	L (6)	L (5)	M (9)	M-L (8)	L (7)
	authority structure	83%	0.90	H (9)	H (8)	L (4)	H (9)	H (8)	M (6)
BUREAUCRATIC BEHAVIOURS	corporate management	80%	0.95	H (25)	M (19)	L (10)	H (29)	M (19)	L (10)
	fragmentation	79%	0.96	M (17)	H (21)	L (8)	H (24)	H-M (20)	L (12)
	incrementalism	81%	0.97	H (19)	L (9)	L (8)	H (21)	L (9)	L (8)
	dominant orientation	83%	0.97	H (15)	M (8)	L (5)	H (14)	M (8)	L (5)

note: **1)** ratings are portrayed as: H for high, M for moderate, and L for low.

2) the fit between rating and scoring was calculated by assigning each indicator points according to its distance from the rating (if rating matched the state of an indicator, 3 points, once removed, 2 points, and twice removed, 1 point). Numbers listed here are the points each variable received, across all indicators and cities, as percentage of the maximum.

Table 8.6: Average differences in scores on the independent variables within and between rating[4]:

	high	moderate	low
high	2.2		
moderate	4.7	1.5	
low	10.5	4.8	2.1

In a sense, bureaucratic behaviours designated in this study as highly conducive to the development of IS that support organizational goals, are in stark contrast with what can be labelled as "stereotyped bureaucratic behaviours". These stereotyped behaviours, often negatively associated in the literature with large bureaucracies, include preoccupation with red-tape, ever-growing payrolls, governing rather than serving, controlling rather than results oriented, status-quo bounded, developing departmentalism, and doing rather than steering (e.g. Breton & Wintrobe 1979, Downs & Larkey 1986, Wolf 1988, Osborne & Gaebler 1992). Table 8.7 compares the results obtained from the measures of bureaucratic behaviours used in this study, with eight different measures often used to assess the extent of bureaucratic behaviours. This illustrates how closely the measures of bureaucratic behaviours, developed in this study, agree with other measures of bureaucratic behaviours.

The first row (in Table 8.7) orders the cities, within each set, according to the overall score on bureaucratic behaviour obtained by applying the measurement instruments developed in this study; from least bureaucratic (left), hence most conducive to IT utilization, to most bureaucratic (right). The eight rows under "traditional measures of bureaucracy" present independent, single item indicators, traditionally associated with measuring the extent of the

[4] This was calculated by averaging the differences in scores within cities rated the same, across all variables, and between cities rated differently. Mid-range ratings, such as H-M or M-L, were not included.

"stereotyped bureaucratic behaviours". The shaded areas in the table show where the various measures agree on the rank order of the cities with the measures developed for this study. In general, results from the different measurement methods converge. This provides strong support to the validity of the measurement instruments developed in this study to assess the behaviours of the bureaucracy.

Table 8.7: Measuring bureaucratic behaviour: a multi-method comparison

Cities ordered by overall score on bureaucrats behaviours (descending order from left to right)		E	F	A	B	C	D
Traditional measures of bureaucracy	residents per public servant	90.6	95.9	62.5	157.8	111.5	142
	no. of departments	12	21	17	10	15	12
	investment in training per employee	$488	$327	$385	$412	$272	$213
	average variance in resource allocation	0.67%	0.15%	0.12%	1.27%	0.19%	0.36%
	largest change in resource allocation	6.04%	1.27%	0.5%	5.29%	0.89%	1.49%
	use of performance measurements	++	++	-	+	+	-
	use of external consultants	++	+	-	++	+	-
	steering vs. doing[5]	6.1	9.2	9.8	2.9	3.2	5.4

As an additional test of the validity of the measures, we looked at the internal consistency in rating and scoring across the three variables which describe the behaviours of the politicians and the four variables which describe those of the bureaucrats. As was explained in Chapter 4, it was predicted that the behaviours of the bureaucrats would be

[5] This measure was calculated by evaluating six functions (police, garbage, recycling, infrastructure maintenance, construction, IS development). We assigned 2 points to each function carried out entirely by internal work force, 0 to each function fully contracted out, and a proportional number to those partially contracted. Thus, a smaller score indicates that less is done internally.

highly consistent. The reason is that theoretically, and even more so empirically, the four variables are very much inter-related. However, there was no reason to assume that the behaviours of the politicians should be consistent. To facilitate comparison across variables, Table 8.8 presents the scores each city achieved as percentage of the maximum possible[6]. The variability in scores was calculated as the standard deviation of the percentages achieved by each city. In general, there is a higher level of internal consistency among variables that refer to the behaviours of the bureaucrats than among those which refer to those of the politicians. This follows the predictions made, based on the theoretical discussion, and thus supports the validity of the measurements. The data also show that consistency across variables is higher in cities E, A, B, and D, than in cities F and C. In those two cities (F, C) the fit between the overall rating and the scores on each of the indicators was also poorer than in the other four cities. Unlike the other four cities, cities F and C are rated neither high nor low on most variables. Thus, the author believes that the reason that they demonstrate lower levels of consistency is that their rating of overall moderate behaviour, in respect to each variable, consists of a mix of behaviours (some rated high and some low) rather than consistent moderate behaviours.

To conclude, while much of the instrument development was done based on theory, the refinement of the measurement tools was based on the same data used to analyze their reliability and validity. This of course means that, to some extent, the relatively good reliability and validity of the measures might be an artifact of the specific data set rather than

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[6] Since different numbers of indicators were used for each variable, raw scores cannot be compared across variables. A standardized measure is the score expressed as the percentage of the highest score that can be obtained; which is the number of indicators multiplied by 3.

a property of the instruments. To validate the measurement instruments developed in this study further, a new data set should be used. Nevertheless, it appears that these measurements are acceptable and good starting points for a more rigorous instrument development study.

Table 8.8: Consistency in ratings and scores of the independent variables:

	INDEPENDENT VARIABLES	CITY E	CITY F	CITY A	CITY B	CITY C	CITY D
POLITICAL BEHAVIOURS	political leadership	H (83%)	M (66%)	L (33%)	H-M (77%)	M (61%)	L (44%)
	involvement in IS	M (73%)	L (40%)	L (33%)	M (60%)	M-L (53%)	L (46%)
	authority structure	H (100%)	H (88%)	L (44%)	H (100%)	H (88%)	M (66%)
	Std Dev in scores	11%	20%	5%	16%	15%	10%
BUREAUCRATIC BEHAVIOURS	corporate management	H (83%)	M (63%)	L (33%)	H (96%)	M (63%)	L (33%)
	fragmentation	M (71%)	H (87%)	L (33%)	H (100%)	H-M (83%)	L (50%)
	incrementalism	H (90%)	L (43%)	L (38%)	H (100%)	L (43%)	L (38%)
	dominant orientation	H (100%)	M (53%)	L (33%)	H (93%)	M (53%)	L (33%)
	Std Dev in scores	10%	16%	2%	3%	15%	7%

CHAPTER 9

BETWEEN CASES ANALYSIS

This chapter discusses common trends in IT utilization among the cities studied, and how IT utilization is influenced by the political and bureaucratic behaviours examined in this study. It is composed of four parts. The first compares the data collected in the municipalities with the predictions of the model. The fact that these findings, with respect to the relationships among the model's variables, support the predictions of the model, is reassuring, but is not the major focus of this study.

Instead, the focus, and the reason for using the case study methodology is to provide deeper insights about **how** the municipalities studied are using IT to support their goals, and **how** the behaviours of the politicians and the bureaucrats in these cities influence it. Thus, the second part of this chapter focuses on common trends in IT utilization across the six municipalities. The third part discusses common trends in political behaviours towards IT utilization and addresses the question of **how** these behaviours influence IT utilization in the cities. The fourth part addresses the same questions with respect to bureaucratic behaviours.

9.1 Empirical data and the study's model

The model that guides this study links the extent to which IT is used to support four goals of local governments with behavioral patterns at the political and bureaucratic levels. Specifically, the model predicts that:

> **a)** Cities in which the political level provides leadership, is involved in IS planning and development, and creates a unified authority structure at the political and the executive levels will use IT to support their goals more extensively than cities in which the political level does not provide leadership, is not involved in IS planning

and development, and where authority structure is not unified.

b) Cities in which the bureaucracy is managed from a corporate perspective, strategic decision making and organizational power are centralized rather than fragmented, the organization is capable of rapid implementation of major changes, and the dominant orientation is proactive, result driven, and customer oriented will make extensive (high) use of IT to support their goals. Cities not managed from a corporate perspective, where power and decision making are fragmented, resource allocation and approach to changes are incremental, and the dominant orientation is focused internally will make low utilization of IT to support their goals.

c) The three variables (political leadership, political involvement in IS, and authority structure) which describe the behaviours of the political level are, to a large extent, independent of one another.

d) The four variables (corporate management, fragmentation, incrementalism, and dominant orientation) which describe the behaviours of the bureaucracy are closely related, and are expected to be consistent with each other.

The model does not make any predictions in regard to consistency in IT usage across the four domains along which utilization of IT to support organizational goals is defined (administrative functions, services, decision making, and democratic processes). Table 9.1 summarizes this study'd findings, with respect to the variables investigated, and presents them both as ratings and as percentage of scores. Recall, that the rating reflects the author's overall evaluation of the state of a variable, while the percentage is the sum, across all indicators, of points a city achieved on that variable, expressed as a percentage of the maximum score attainable. Recall also, that each independent variable is rated as high, moderate, or low, (and each indicator is assigned three, two, or one point) according to the extent each is hypothesized to have positive impact on IT utilization. In the case of fragmentation and incrementalism, for the sake of consistency, high means "not fragmented" and "not incremental".

The data supports predictions (a) and (b) of the model mentioned above. The cities in which most of the behaviours of the politicians and the bureaucrats are congruent with those

predicted to be conducive to effective utilization of IT, use IT extensively to support their goals, and vice versa. Also, as already discussed in Chapter 8, the extent to which politicians' and bureaucrats' behaviours are internally consistent with each other is consistent with predictions (c) and (d) of the model.

Table 9.1: Summary of findings[1]

	Variables / City	E	B	F	C	A	D
IT utilization IT support for:	Administration	22 (92%)	24 (100%)	20 (83%)	18 (75%)	15 (63%)	10 (42%)
	Services	28 (85%)	28 (85%)	24 (73%)	23 (70%)	20 (61%)	17 (52%)
	Decision making	16 (89%)	14 (78%)	13 (72%)	10 (55%)	6 (33%)	7 (39%)
	Democratic process	13 (62%)	13 (62%)	10 (48%)	9 (43%)	12 (57%)	9 (43%)
	Total score	79	79	67	60	53	43
	Overall rating	HIGH		MODERATE		LOW	
Political behaviours	Political leadership	H (83%)	H-M (77%)	M (66%)	M (61%)	L (33%)	L (44%)
	Involvement in IS	M (73%)	M (60%)	L (40%)	M-L (53%)	L (33%)	L (46%)
	Authority structure	H (100%)	H (100%)	H (88%)	H (88%)	L (44%)	M (66%)
Bureaucratic behaviours	Corporate management	H (83%)	H (96%)	M (63%)	M (63%)	L (33%)	L (33%)
	Fragmentation	M (71%)	H (100%)	H (87%)	H-M (83%)	L (33%)	L (50%)
	Incrementalism	H (90%)	H (100%)	L (43%)	L (43%)	L (38%)	L (38%)
	Dominant orientation	H (100%)	H (93%)	M (53%)	M (53%)	L (33%)	L (33%)

It appears that even where political leadership is somewhat less than high (e.g. City B), it does not impede effective utilization of IT. Similarly, cities where the politicians are not involved in IS planning and development (e.g. City F) are still able to achieve a moderate

[1] Ratings are presented as H/high, M/moderate, or L/low. Raw scores appear as numbers (the higher the number the more a city uses IT to support the goals). The percentage figures express how close a city is to using IT in ways that provide high support to all functions measured. In the case of the independent variables, the percentage figures show how close a city is to the state where all the indicators are highly conducive to the development of effective IS.

level of IT utilization. On the other hand, only cities where the behaviours of the bureaucrats are rated as high across all four variables achieved high utilization of IT[2]. This suggests that, from the point of view of facilitating or inhibiting extensive use of IT to support organizational goals, the set of variables associated with the behaviour of the politicians is less influential than those associated with the bureaucrats.

While at this level of analysis causal relationships cannot be demonstrated, it appears that the behaviours of the politicians impact IT utilization only indirectly, through shaping the behaviour of the bureaucrats. These conclusions will be further substantiated in the following sections.

9.2 Common trends in IT utilization among the cities studied

While the main focus of this study was explaining variance in IT utilization across cities, we found some common trends in how most of the cities studied use IT to support the four goals. Thus, this part focuses on **how** the cities in the study's sample utilize IT. It also attempts to explain **why** they use IT as they do in terms of the independent variables of this study. In a sense, this part describes, and explains, the causal relationships between IT utilization and some of the independent variables.

9.2.1 Interdependencies between IT utilization in different domains

The model of IT utilization used in this study does not make any predictions in regard to consistency in usage of IT across the four domains (administration, services, decision

[2] The case of City E, where fragmentation is rated as moderate, is an exception which does not challenge the general observation, since in this city the effects of fragmentation are counterbalanced by a market-like coordination mechanism, as explained in the case write-up.

making, and democratic processes). It appears, however, (see Table 9.1) that the ratings of the cities in terms of IT utilization to support the four goals are consistent across all four domains, except for one instance[3]. This means that a city that makes high utilization of IT in one domain tends to do so across all four, and vice versa, which implies that there are dependencies between them. Intuitively, it is easy to understand the reasons for these dependencies, since, for example, decision support systems rely on administrative and production systems to provide them with data, and a computer aided dispatch system requires a comprehensive and consistent database of addresses to refer to. The fact that effective utilization of IT in one domain depends on how well IT is used in other domains implies linkages between systems, and it further implies that some systems are prerequisite to other systems. These linkages and the "right order" of system development, which arises from the dependencies between systems, cannot be realized if IS development is driven by local initiatives and is done in isolation. Thus, the interdependencies between IT utilization in different domains explain why a corporate management approach, and centralized IS planning and development (as opposed to fragmented), are causally linked to effective utilization of IT.

9.2.2 Profile of IT utilization across domains

In general, the percentage figures that pertain to the dependent variables (the four upper rows in Table 9.1) display a descending order in the extent to which IT is used to support each of the four domains[4]. We found three reasons for this phenomenon. First, the

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[3] The exception is that City A, which is rated low overall in IT utilization, but makes more use of IT in the area of supporting the democratic processes than Cities F and C, which make moderate use of IT overall.

[4] There are three exceptions (out of 18 points of comparison) to this observation. Decision making is supported less than the democratic process in City A and D. Support for decision making is slightly higher than support for provision of services in City E.

dependencies discussed above tend to be directional. This suggests that support for corporate decision making and for the democratic processes can usually be achieved only after an adequate level of IT support for administrative functions and for provision of services is already in place.

Second, most IS professionals in the municipalities studied still view the departments, rather than the city as a whole or the public, as their customers. Thus, where IS development was left to the professionals, planning and priorities were driven by the information needs of the departments. Furthermore, since supporting the democratic processes, and to some degree corporate decision making, are domains which in the cities studied were not assigned to a specific department, there were no strong advocates or champions of IT support for them. The study's findings suggest that, among other reasons, this is why a corporate management approach, which focuses on the missions of the city as a whole, and the existence of an executive-level IS manager who advocates IT utilization in domains not covered by the departments, are causally linked to the extent to which IT is used to support these goals.

Third, respondents in all cities reported that there is no great public demand for utilization of IT to justify a change in the nature of the municipal services offered (e.g. on-line, remote, or customized services). There is also no public demand for the use of IT to support the democratic process (e.g. for direct access to municipal information, participatory decision making processes, or more direct representation). The lack of external pressure was amplified by the fact that neither the politicians nor the bureaucrats, in most of the cities studied, were overly interested in, or capable of, educating the public on how IT can improve municipal operations and delivery of services. The politicians, as will be explained in part 9.3, were often not knowledgable enough or interested in developing a vision in regard to the

role of IT. The bureaucrats, operating in a non-competitive environment, did not feel the need to attract "customers" by offering better services. In cities A, C, D, and F, the bureaucracy was also not very keen on improving the decision making processes. In city C (and to a lesser extent in City F) city managers felt that making decision criteria explicit[5], which in effect means setting goals and priorities, is the prerogative of the political level and not their concern. Also, they were quite content with the way things currently were and did not see the need to create more pressures on themselves. In cities A and D, senior managers even opposed the use of decision support systems. They doubted that such systems would be useful in the public sector. They were reluctant to invest without the assurance of tangible benefits. In our opinion, they were also reluctant because, ultimately, a decision support system would require establishing criteria on which they could be evaluated. As a result, especially in the cities in which the dominant orientation was focused internally, IT based systems used to change the nature of municipal services, to facilitate objective and systematic decision making, and to promote democracy, were mainly the outcome of technology driven initiatives rather than thoughtful mission driven plans. Further, especially in the areas of supporting the democratic process, and to a lesser extent corporate decision making, IT support tended to emerge as a by-product of systems developed for other purposes. On the other hand, where the dominant orientation was customer-centred and results driven, it generated a drive to seek innovative approaches to provision of services, to utilize IT to improve decisions, and to address all of the municipal missions, including support for the democratic processes (e.g. in City E). Thus, there is a causal link between the dominant orientation of the bureaucracy and utilization of IT to support the four organizational goals on which this study focuses.

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[5] This is a necessary condition for development of decision support systems.

9.2.3 Commonality in information needs

An analysis of the distribution of IT support across functions (Table 9.2) does not reveal any trends or differences in emphasis in terms of which functions are supported between large cities and medium size ones. This study assumes that existing systems are used, and that they were developed because there was a need for them. Although these assumptions were not tested, the study reveals no evidence to the contrary. Indeed, the author's impressions are that most systems, especially those rated as high, are used quite extensively and, are in general, highly valued. Hence, the fact that there are no significant differences between large and medium size cities with respect to which functions are supported by IT seems quite meaningful. It suggests that the information requirements of the cities are very similar, both in terms of which systems are needed and to what extent they are needed. In support to this conclusion, it was observed that those cities which are seriously considering large scale IS development are all struggling with similar issues, such as GIS, one-stop counters, maintenance management, networking, and public access to information[6].

Only three functions are highly supported by IT in more than four cities. They are: traffic control, water control, and the public libraries. Four functions are not supported by IT in five or more cities: facilitating remote access to services, customization of municipal services, supporting council oversight, and disclosure of municipal data. We believe, based on the cities' plans and interviews, that these four functions are not supported for three reasons: they are among the most advanced functions of local governments, there is no great public demand for them, and they require systems which are the most difficult to develop.

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[6] This also confirms that the systems chosen as indicators for IT utilization to support the four goals are indeed important to all cities, and it further supports the conclusion that size, within the range studied, is not an important determinant of the extent to which IT is used.

Table 9.2: Distribution of IT support across functions

function / city	high utilization						moderate utilization						low utilization					
	E	B	F	C	A	D	E	B	F	C	A	D	E	B	F	C	A	D
inventory control	●	*	●							*	●							*
finance management	●	*	●		●					*		*						
payroll	●	*	●	*							●	*						
personnel	●	*							●	*	●							*
consistent reference	●	*	●	*													●	*
office automation		*					●		●	*	●							*
cost control		*					●		●	*	●							*
record management		*					●		●	*							●	*
emerg' services	●	*							●	*	●							*
remote monitor	●	*							●	*	●							*
traffic control	●	*	●	*	●													*
water/sewage control	●	*	●	*	●	*												
bills/fines/fees		*		*			●		●			*					●	
permits & licenses	●	*							●	*	●							*
public library	●	*	●	*	●	*												
mang. public requests			●				●	*								*	●	*
registration/info	●	*							●	*		*					●	
remote services													●	*	●	*	●	*
customization							●							*	●	*	●	*
sharing of data		*					●		●	*		*					●	
breadth/depth of data	●	*	●							*							●	*
external linkages	●	*							●	*							●	*
managerial reports	●	*							●							*	●	*
performance measurement	●								●					*		*	●	*
analysis tools							●		●					*		*	●	*
general election	●			*	●	*		*	●									
publicizing council data		*					●				●				●	*		*
communication - public							●		●		●			*		*		*
council's oversight								*					●		●	*	●	*
disclosure of information		*											●		●	*	●	*
participation in decision							●		●					*		*	●	*
reduce info asymmetry							●				●			*	●	*		*

● = large city, * = medium size city

9.2.4 Coordination and integration between cities and levels of government

Standardization of IS planning and development, and some integration of systems across cities and levels of government may be quite beneficial. The lack of it may impede realization of payoffs from IT utilization, since in many areas, such as mapping, finance, transportation, and property assessment, there is a need to exchange information among cities and with other levels of government. Standardization and integration between IT based systems at different levels of government may significantly reduce duplication of work, inefficiencies, errors, and misunderstanding. In large metropolitan areas, which are divided into independent municipalities, services to the public can be improved if municipal borders are made transparent to the public. Systems which support provision of services can be linked to produce the desired transparency. Also, some services, especially those which require collecting, processing, and disseminating of information are practically identical in neighbouring cities.

Lack of standardization among municipal IS means redundancy in data entry, processing, and editing. Also, each municipality may not have the resources to independently undertake a major IT based project. To remedy this, because the needs are similar, joint ventures can be pursued. Further, municipalities may reduce the cost of procurement of systems and hardware if they agree on standards, search together for the best computerized solution to common needs, and present the vendors with a unified front. The lack of standardization also inhibits sharing of information between municipalities, which in turn, reduces the amount of information available to the decision makers. It also denies municipalities the opportunity to compare themselves to others by using other municipalities' data as a reference point.

In the cities studied, however, IS planning and development was not coordinated, and systems were not integrated, with other cities (even with neighbouring cities) or other governmental levels. Moreover, we found that the cities have very limited knowledge of what other cities are doing in IS. Due to a lack of interest in coordinating, there were no joint ventures, and no efforts to standardize IS across cities and/or other governmental levels. Thus, in many areas the cities studied were essentially doing the same things in IS development, but in isolation. This seems to be true not only for the cities examined in this study. For example, the very first time municipal IS managers from across the province of British Columbia met to discuss common interests was in April, 1993. In this meeting, two thirds of the managers reported that their cities had recently acquired a GIS or were considering its purchase. Each city, however, studied the subject, prepared an RFP, and negotiated with vendors independently, and thus, forfeited the benefits of coordinated efforts. There was also no cooperation in land surveys and in the task of converting base maps into digital forms. Table 9.3 shows the diversity in systems used by municipalities for some of the major functional areas.

Table 9.3: Diversity in IT based systems among 22 B.C. municipalities[7]

function	no. of existing systems	no. of different systems
GIS	15	10
E-mail	14	9
Cash-registers	16	11
Human resource	13	10
Permits & Licences	17	14
General ledger/ Budget	22	16
Job costing	16	12

From the perspective of municipalities as sub-units of a larger system, namely the local government system, this lack of standards and coordination in IS development may be seen as low utilization of IT, and probably hampers realization of more benefits from the technology. The reasons for this low utilization of IT to support linkages between cities and other governmental levels, are surprisingly analogous to those which seem to cause some municipalities not to use IT more extensively to support their goals.

Politicians, at the provincial or federal level, do not provide leadership in the area of IT utilization or policies which make standardization mandatory. They are not involved in the development of municipal IS, and thus deprive the IS function from political advocacy. This makes it harder to get funds for IT initiatives, and reduces the chances of the politicians to learn about the potential benefits of IT. Politicians, at the provincial or federal levels, also do not create a unified authority to oversee all contacts between local governments and higher levels of governments. Rather, each federal ministry or provincial agency sets its own data

[7] The data was taken from a survey done during the summer of 1994 and reported in the founding meeting of the British Columbia chapter of MISA (Municipal Information Systems Association). The survey encompassed 22 B.C municipalities.

standards and develops its own electronic links with municipalities.

Since municipalities are considered independent subunits of the local government system, decision making and power are highly fragmented. The local politicians, as will be explained in the next part and observed in a number of cities we studied, want to be as unique and as independent from others as possible. They frown upon attempts to coordinate their actions with other municipalities and are suspicious of the motives of provincial governments. Thus, since standardization or joint ventures are seen as a threat to local power and autonomy, city councils rarely approve it. There is no formal authority, comparable to a city management team, to promote a system-wide management approach, champion province-wide IT standards, or build IT infrastructure to facilitate coordination and sharing of information among cities. The focus (orientation) is almost always on what can be done within the city's borders and budget, rather than how to maximize benefits by breaking down municipal boundaries.

Based on what was observed in the study sample, and analogous to a municipality in which the independent variables fit the low category, the study suggests (but did not test empirically) that local government, as a system, can probably utilize IT more effectively if political and bureaucratic behaviours at the provincial and federal levels follow those described in the high category. Independent planning and development of IS in the cities is probably more expensive from the point of view of the province, it entails duplication of work, and forfeits realization of many tangible and intangible benefits. An example demonstrates this point[8]:

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[8] The example was given during a presentation of the B.C. LandMark project to municipal IS managers in 1994.

At the end of 1993, B.C. Systems Corporation[9] developed a prototype of a Geographic Information System (GIS) which can be of significant value to decision makers and planners in the areas of land use, zoning, and infrastructure. The system, named B.C. LandMark, can also be used to enhance operational efficiency by providing: comprehensive database for modelling of transportation, electricity, and water works. Further, it can serve as a central repository of information for businesses and the public at large.

Populating the system with data engendered serious problems. There are more than 40 different types of data that should be incorporated into the system. However, each is under the responsibility of a different agency, stored in a different format, and follows different data definition. It was estimated that just to convert the data already stored electronically would cost 10 million dollars.

Concurrently, most municipalities in B.C. are in the process of implementing similar systems for their own use. Those systems ultimately should store a sub-set of the data which the B.C. LandMark system will store. In spite of this, each municipality is purchasing its own system, and embarking on expensive projects of land surveys and data conversion to populate its GIS. Furthermore, there is no authority with the power, or the will, to set province-wide standards so in the future information could be shared.

9.2.5 In-house development vs. packaged systems

Until the late 1980's, most IT based systems in the municipalities studied were developed internally. This was partially because the cities used proprietary technologies which limited the number of ready-made solutions available to them. In addition, the few packaged solutions available were often unsuitable, partly because major vendors did not cater to a market with so few common needs identified. Also, the local politicians' desire for uniqueness, explained in the next section, and the unwillingness of the bureaucracies to change their work processes to conform to packaged computerized solutions, often let to favouring in-house development.

As most interviewed IS managers acknowledged, reliance on in-house development

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[9] B.C. Systems Corporation, is a Crown Corporation which serves the needs of the provincial government in areas of IT. The corporation is responsible for development, maintenance, and operation of various province-wide systems mainly in the communication area.

is becoming an obstacle to extensive utilization of IT to support organizational goals, since:

a) Municipalities cannot hire and fire at will, and therefore they usually do not employ IS professionals in a sufficient number to allow in-house development of large projects. Thus, in-house development policy often dictates an incremental approach to system development. This, in turn, as observed in City F and C, usually results in a patch-work system and a local problem-solving approach to IS planning since there are always urgent tasks that cannot be postponed. It also causes higher cost and a longer lag time between the decision to develop a system and a working application. It results in a growing back-log of requests, which undermines the credibility of IS, causes user dissatisfaction, and forces the IS manager to further subdivide the IS resources to respond at least to some of the requests of each department (as in the cases of City A and D).

b) In-house development policy limits the technical choices available to the city to those skills possessed by its IS professionals. Also, in-house development policy tends to reinforce itself, since once systems are developed internally, they have to be maintained, updated, and enhanced internally as well. Further, it inhibits future flexibility in the use of the municipal resources, since once a large enough cadre of IS professionals is established, the city must keep it occupied.

c) Potentially, in-house development may offer better system integration, especially if it follows a master plan and is done by a centralized IS unit (like in City F). It also may provide customized solutions to the specific needs of the departments. However, as observed in cities A and D, the incremental nature of in-house system development often negates these potential advantages. Since the IS function has limited resources and is pressured to produce working systems, integration and compliance with a master plan are usually sacrificed in

favour of a timely system delivery, and often postponed to less busy times which never arrive. Also, as already noted, most needs are not really unique and customization often means (as in cities F and C) computerization of existing procedures rather than re-thinking the work processes.

Since the late 1980's, there has been an effort, in most of the cities studied, to move from in-house development to packaged systems. This trend is in line with the general trend in the industry. However, some cities were not able to follow their conviction with actions (Cities A and D). Also, a survey of 22 municipalities in British Columbia done in Summer 1994 and summarized in Table 9.4 shows that most systems currently used in cities are still internally developed.

Table 9.4: In-house developed vs. packaged systems[10]

	computerized systems (% of municipalities)	in-house	packaged
Financial management	93%	40%	60%
Assets management	48%	37%	63%
Property related services	83%	74%	26%
Corporate information	40%	71%	29%
Recreation services	72%	35%	65%

[10] The data was reported in a recent meeting of the B.C. chapter of MISA (Municipal Information System Association) and are based on a survey circulated among 22 B.C. municipalities.

In this study's sample, only two cities adopted and followed an explicit policy of favouring packaged solutions over in-house development; these are the cities which make higher use of IT to support the four goals (cities E and B). The inability to replace the legacy systems with packaged solutions is influenced by the independent variables of this study, and thus, links these variables causally to effective utilization of IT.

Incremental resource allocation, a council's dislike of long term commitments of resources, and a lack of corporate priorities cause IS managers to divide resources across many projects. Each project tends to be too small to justify contracting out and each depends on an annual funding approval which prevents the signing of long term contracts with private vendors (e.g. cities A and D). Cost-saving and short-term consideration result in the forfeit of options for vendors' support and maintenance, in refusing updates and new versions, and in early termination of maintenance contracts with the vendors. As a result, updates and small enhancements are done internally, and over time, even systems which were bought as a packaged products acquire the disadvantages of those developed internally (e.g. City D and to a lesser extent City C).

Decisions in favour of in-house development are also the result of need assessments being done by the departments. These tend to reflect a process-oriented rather than top-down goal-oriented analysis (e.g. cities F and C), which leads to emphasizing congruence with existing procedures. We suspect that in many cases, in-house development is due more to the reluctance of the bureaucracy to change established routines (a requirement for adopting packaged solutions) than to the inappropriateness of such solutions. Also, the move to non-proprietary technology and an open-system architecture, needed to take advantage of turn-key systems, entails a major financial undertaking and a major change in the computing

environment and division of responsibilities. Cities without strong corporate management, where IS development is considered an operational expenditure rather than a capital investment, and therefore tends to be incremental, pragmatic, and frugal (e.g. cities C and F), are not likely to achieve the necessary changes even though they recognize the needs.

Lastly, avoiding conflicts with the unions, which usually oppose contracting out, rates high on the politicians' agenda. In some cities (e.g. cities A, C and D), respondents indicated that this consideration favourably influenced in-house development. It is also possible that the decision to develop in-house rather than to buy is influenced by the desire of the IS professionals to enhance their power bases and to increase their share of organizational resources. However, this study did not find support for this argument.

9.2.6 IT support for partisan goals

In Chapter 2, the possibility that IT can be used to advance goals which are not in the public interest was mentioned as part of the discussion regarding what may motivate and drive the behaviours of the politicians and the bureaucrats. This was not the focus of this study, but the author's impressions are that in the cities studied IT is not being used by the bureaucracies as a power base, to expand their "empires", or to gain fringe (non financial) benefits. We also did not find evidence that IT is being used to advance political aspirations, or strengthen the influence of the political system on other social systems.

The author believes that this is due to a number of reasons. First, no evidence was found that budget maximization, a quest for fringe benefits, or interest in a power struggle constituted major motivations for the senior level bureaucrats studied. Second, where fragmentation and internal focus exist (conditions, as in cities A and D, under which

bureaucrats may use IT to advance their own interests), the IS function as the "new kid" in the organization was too small and weak to influence IS development to its own advantage. In these cities, the large departments which do have the power, do not have the knowledge necessary to harness the technology to their own benefits. Also, the internal competition in these organizations results in an incremental rather than dramatic approach to changes, which restricts the significance of any new IS initiative. Finally, it was observed that politicians do not understand the potential of IT to advance their goals. They tend to consider influencing IS development as not rewarding politically, and focus their time and energy on other areas (e.g. community services, police, urban development).

9.2.7 Do municipalities use IT less extensively than the private sector?

While not a focus of the study, it was suggested implicitly in the introduction to this thesis that local governments, in general, do less than private organizations with respect to using IT to support their goals. At least in two cities this view was strongly rejected by the IS managers, who pointed out that compared to private enterprises in comparable areas (e.g. construction and maintenance, community services, billing and fine collection), their cities are probably close to the top in IT utilization. Based on the experience of this study, the author has reconsidered that impression, and now believes that the implicit initial position was overstated.

9.3 The behaviours of the political level and its impacts on IT utilization

9.3.1 General

Before discussing the variables relating to behaviours of the political level, three general observations are offered, which to some extent explain the fact that, in general, the politicians in the cities studied showed little interest in IT utilization.

First, while some politicians we interviewed realize the potential of the technology, they are in the minority. Even these politicians do not act as if it is their job to educate the public about how IT can (or should) change what the municipality does and how it operates. The reason seems to be that politicians wish to satisfy as many of the voters as possible. Based on what respondents in our study (politicians and bureaucrats alike) perceived, the average voter is not specifically interested in improving the democratic processes, municipal services, or municipal internal processes by using IT **if it means increases in taxes**. This is partly because the average voter knows very little about how things can be improved by IT, and partly because such improvements are only marginally important to an individual who visits City Hall at most once a year. Changes facilitated by IT, however, may be much more important from the community's point of view. Nevertheless, both politicians and bureaucrats reported that the politicians are driven mainly by needs communicated to them by individual voters rather than by a vision regarding the needs of the society as a whole. Thus, they usually react to the concerns of the average voter rather than initiate proactively. This approach is in contrast to that of leading firms in the private sector which, for competitive reasons, seek to introduce innovations sometimes before the public perceives the need for them. For example, the banking industry and supermarket chains educated their customers to the potential of IT by introducing ATM's and remote shopping. In contrast, the politicians

in the sample driven by the perceived needs of the average voter, do not champion innovative approaches to IT utilization, and are not interested in developing an IT vision.

Second, there are no incentives for politicians to be visionary in this respect, let alone champion IS planning and development. Most large IS projects take more time to develop and implement than the three year election cycle. As respondents in all cities stated, only rarely are IS projects highly visible to the public. Even more rarely does the public make the connection between better IS and better municipal management and services. Thus, as all the politicians interviewed said, there are no political advantages in being involved in the development of municipal IS.

Third, the politicians are not motivated to facilitate, or implement, better integration of IS among cities and between levels of governments. Indirectly, they even suppress such initiatives. The reason is that stressing the uniqueness of the city is a political imperative where a city is a part of a large metropolitan area, since it justifies the city's existence as an independent municipality. This differentiates between cities and allows politicians to emphasize their contributions. Thus, to the extent that politicians are involved in IS development, they usually do not encourage alliances between cities, integration of systems, or joint ventures. Also, decision making processes in municipal governments are lengthy, among other reasons because of public hearings. Once decisions are made in regard to major investments in IT, the politicians are interested in fast implementation so as to be able to point to the results. In two separate cases (both of them in City B), this type of approval blocked an attempt for a joint IS venture between two cities, since one city had already made the decision, while the other had not yet done so. Also, bureaucrats often opt to quickly commit funds allocated to IS development projects rather than wait to coordinate with other

organizations. This is because they fear that funds will be reallocated due to a shift in the politicians' priorities or a change of council members. Lastly, local politicians resent dictates from higher levels of government, which may in part explain why no provincial or federal body exists to coordinate and standardize municipal IS development.

9.3.2 Political leadership

Extensive utilization of IT to support organizational goals depends on strong, visionary, and proactive strategic leadership which sets the goals for the organization, chooses strategies, communicates its intentions to the rest of the organization, and labours to align the organization's activities with the chosen strategies (Earl 1990, Harrington 1991, Tapscott & Caston 1993). The expectation that the political level would provide this kind of leadership in regard to **how** the city operates and is managed was not found to be the case in this study. It appears that in the political systems existing in our sample, especially in those cities where being a councillor is not a full time job, it is unrealistic to expect politicians to fulfil that role. At most, e.g. in City E, the politicians demand from the administration a long term, strategic, result oriented corporate management approach, and closely monitor the operations and accomplishments of the departments. Even in City E, however, the political level did not provide a vision, was not involved in strategic planning, and did not participate in translating goals and strategic directions of the city into operational objectives. Thus, the political level in the cities studied, at best, has only an **indirect influence** on how the city routinely operates. In the area of IT utilization, the influence of the political level seems to be even less direct since: a) most politicians we interviewed are computer illiterate and (wrongly) feel that they cannot, or should not, interfere, b) IT utilization often does not have direct and highly

visible impact on services to the public, and c) IT is in most cases perceived as a support tool rather than a strategic enabler, and as such it is regarded as unworthy of the politicians' limited time.

Political leadership and corporate management reinforce each other. Only where there was strong political leadership (in the limited sense described above) a strong corporate management approach emerged. Strong political leadership (such as in City E) demands, promotes, or allows leadership at the bureaucracy level, e.g. a corporate management approach, to flourish. In city B, an inverted relationship between political leadership and a corporate management approach was observed. There, a strong corporate management approach adopted by a newly installed city management team successfully imposed a leadership role upon the politicians. Consequently, extensive utilization of IT was envisioned by the city management as the main tool to change the organization, and politicians were convinced to take part in the planning of a long-term strategic IS plan and to commit to its implementation. Where the politicians only stated their high level goals and priorities, but did not direct how the city should be managed or closely monitored the operation and accomplishments of the departments (e.g. cities C and F), the corporate management approach that emerged tends not to be strategic, results oriented, or proactive. In these cities, IT was perceived as a support tool for the operation of the departments, rather than a corporate resource with which to improve goal attainment from the city as a whole point of view. Where the politicians did not even provide high level goals and priorities in a comprehensive way, did not direct how the city should be managed, and did not closely monitor the operations and performance of the departments (e.g. cities A and D), a corporate management approach did not emerge, which leads to a leadership vacuum impeding most

initiatives to develop a more effective IS.

If the political level does not provide leadership, but instead micro-manages the daily operations of the city, it tends to prevent leadership from emerging at the administration level. The reason is that this type of political behaviour, observed in City D, and to a lesser extent in City C, tends to undermine the authority of the management team, and encourage an ad-hoc, short-term approach to problem solving. In City D, since there was also no unified authority structure, it contributed to the fact that no corporate management approach emerged. In City C, since there was a unified authority structure, it resulted in a corporate management approach which, to a large extent, reacted to council rather than took initiative, and was operation rather than mission driven.

To conclude, based on what was observed in this study, and valid at least to the population of local governments from which the sample for this study was drawn, it seems unrealistic to expect high political leadership (as defined in this study) from the political level in municipalities. The most that can reasonably be expected is that the political level will demand leadership from the administration, willingly participate in management-led strategic planning, be involved in the setting of goals and objectives, and closely monitor the operations and performance of the departments. This form of political leadership, while not directly leading to high utilization of IT, seems a necessary condition for the emergence of a corporate management approach which, in turn, is associated with high level of IT utilization to support organizational goals. As the case of City B demonstrates, city managers can induce political leadership by being proactive, pressing the politicians to set long term goals, involving them in strategic planning, and demanding that they commit resources to these plans.

9.3.3 Politicians' involvement in IS development

In the cities studied, the direct influence of the political level on the development of IS, or on how IT is being used, was found to be marginal to none. Politicians were either supportive and interested, not interested and impartial, or suspicious and even somewhat antagonistic. However, in all cities in the study's sample, the politicians were not highly involved in IS development and they did not initiate IS planning or IS projects. The reasons seem to be a combination of lack of interest, feelings of inadequate knowledge or incompetence, and lack of efforts on the part of the administration to get the politicians involved. Where politicians were moderately involved in IS development (e.g. cities B and E) it was mainly because of their general approach to their roles (i.e. high political leadership) rather than their special interest in IT utilization. That involvement was usually in the form of assigning a committee to look after the IS domain, spending time discussing IS plans, and asking for periodic reports regarding IS development and operations.

In the two cities where the IS function is an independent department, but the politicians are not even moderately involved in it (cities C and F), IT is considered to be an administrative and operational tool rather than a strategic resource. It is not clear if that is because the political level is not involved in IS or because the bureaucracy considers the IS as an administrative concern and does not seek to involve the politicians. Interestingly, hand in hand with City F's current move towards a more top-down and mission-driven approach to IS development, the administration is making efforts to involve the politicians in that domain.

To summarize, it seems that it is unrealistic to expect the political level in municipalities to drive IS development. Furthermore, it seems unnecessary for the political

level to be highly involved in IS in order to achieve high utilization of IT. Instead, moderate level of involvement seems sufficient for this purpose. That level serves as a political recognition of IS as a major aspect of the city's operation, and it gives the IS function a higher profile within the administration. Also, the importance of involving politicians in IS planning and development is not to draw on their ability to contribute to these processes but to offer an educational experience. Involvement allows the political level in the municipalities to better understand the domain of IS and its requirements, and thus, promotes support and willingness to invest in it.

9.3.4 Authority structure

A unified authority structure at the political and administrative levels was found to be the factor most strongly associated with high utilization of IT among the three political behaviours studied. A unified authority structure seems to be a necessary, but not sufficient, condition for the emergence of a strong corporate management approach. Its existence deters fragmentation of power and strategic decision making processes, as well as incrementalism. In cities where major functions were controlled by political bodies other than the city council[11], IS development tended to be fragmented. The IT based systems which supported these functions were not integrated with the rest of the city's systems and the information needs of these functions were considered separately from those of other municipal functions. This limited the extent to which these systems support organizational goals, encouraged fragmentation of the IS function, and impeded a centralized corporate approach to IS planning

[11] For example, Park & Recreation in City A, Library and Health in City D, and to a lesser degree, the police force in all cities.

and development.

The same transpires in cities where there was only one political authority, i.e. a city council, but at the administration level, authority was not centralized in the hands of one person (or, as in city F, a group) but rather divided among a number of senior bureaucrats who directly report to the council (e.g. in cities A and D). Municipal governments often tend to be prone to fragmentation and incrementalism because of the diverse nature of their operations, lack of measurable bottom-lines, and lack of consensus regarding priorities (Banfield & Wilson 1967, Nalbandian 1991, Bozeman 1993). Thus, our findings suggest that anything short of a unified and coherent authority structure at the political and administration levels may encourage these tendencies. Furthermore, in a fragmented administration, we believe that it is not reasonable to expect the bureaucrats as a group to initiate, and lobby for, changes in the authority structure, since obviously some of them are going to lose status as a result of this change. Hence, lack of a unified authority structure is probably a serious obstacle to the development of IS that provides high level of support to organizational goals.

This argument promoting a unification of authority structure, especially when taken beyond the municipal level to the provincial and federal one, may seem a contradiction to the common wisdom that argues for decentralization and limits on the power of the bureaucracy. However, the two positions are only in partial conflict. While we found that high utilization of IT necessitates a centralized approach to IS planning and development, the case of City E shows that a unified authority structure is not the antithesis of decentralization. Rather, in City E a unified authority structure makes it possible to have a controlled and methodical decentralization as opposed to chaotic decentralization that may lead to a fragmented and segregated organization.

9.3.5 Moving from low to high utilization of IT

When a city is not managed from a corporate and strategic perspective and does not utilize IT effectively, implementing IS that provide strong support to organizational goals may require a radical change in the organization. A radical change (also described as revolutionary change) is accomplished through a *"deep structure or paradigm shift"* change (Gersick 1991), i.e. a change in basic assumptions, business practices, culture, and organizational structure (Hammer & Champy 1993, Davenport 1993, Orlikowski 1993). Based on the discussion above and this study's findings, we believe that one cannot, realistically, expect the political level to initiate this kind of change. However, even if such change is initiated by professional managers (bureaucrats), it requires the support of the political level. The case of City B, and interviews from cities C and F, convinced the author that this kind of change can probably be achieved only if two conditions are met: a) a proactive, visionary, and strong city manager/management exists which actively lobbies for change, and presents the politicians with specific solutions, and b) a crisis, scandal, or strong external pressure provides the manager with the leverage needed to persuade the politicians to make politically unpopular decisions. This is in line with the literature on radical (revolutionary) change which argues that a failure, or a crisis, is required to set the stage for revolutionary changes (Tushman et al. 1986, Kanter et al. 1992, Stoddard & Jarvenpaa 1994). As demonstrated by the cases of cities A, B, and F, such a paradigm shift often requires a change in management or the employment of external consultants. This too is recognized by radical change theorists (Tushman et al. 1986, Nadler 1988, Gersick 1991) who argue that:

> *A new vision is needed to free existing members of the legacies of the past, allow them to see alternatives, and build confidence and capabilities for the future.* (Stoddard & Jarvenpaa 1994. p. 8)

This study found that the importance of external consultants lies not only in facilitating "frame-breaking" thinking, but also in helping bureaucrats persuade the politicians that what they are asking for is really needed, and to overcome the politicians' suspicions and reluctance to invest in IT.

According to radical change theorists (e.g. Tushman & Romanelli 1985, Tushman et al. 1986, Gersick 1991), a fundamental organizational change cannot be accomplished in a piecemeal, gradual, or comfortable way. Indeed, the two cities which achieved high utilization of IT (cities E and B) adopted a rapid pace in the implementation of (what they call) their strategic IS plans. In contrast, cities F and C, which also prepared strategic IS plans, opted to implement it gradually, in small increments. At the time of data collection, they were still far from achieving their objectives. Furthermore, they seemed to be falling behind their own schedules.

Indications from the case of City B suggest that even when a one-time radical and rapid change is approved, it is important to actively engage the political level in its planning, in overseeing its implementation, and in setting further goals. Otherwise, there is a danger that after the crisis passes, politicians will stop providing leadership, and withdraw their support. This is especially important in the area of IT utilization because this area is not politically attractive, and because IS development can easily be seen as a one-shot project. This is congruent with Stoddard & Jarvenpaa's (1994) findings about organizations which set out to implement radical change rapidly, but lose momentum as time passes. They attribute this diminution of progress to the fact that the leaders were not actively involved in the implementation of the change and gradually stepped further away from the day-to-day activities of the initiative. This caused the implementation team to migrate toward a more

comfortable evolutionary mode.

To conclude, based on what was observed in this study, a move towards the implementation of IS that strongly support organizational goals often requires a radical and rapid change. This kind of change will probably be initiated at the administration level, but its implementation cannot succeed without political buy-in. There are indications that such change could not gain political support, or succeed, without a strong external pressure on the municipality, such as a financial crisis.

9.4 The behaviours of the bureaucracy and their influence on IT utilization

The four variables which describe the behaviours of the bureaucracy are inter-related and cannot be addressed separately. High utilization of IT that support organizational goals seems to depend on a combination of these inter-related behaviours rather than on any one of them in isolation. As table 9.1 shows, the behavioral patterns of the bureaucracy in each of the three pairs of cities[12] are very similar. Thus, the first part of this section focuses on the behavioral patterns which characterize each pair of cities, and how the interactions between these behaviours influence utilization of IT. The second part focuses on the consequences, in respect to IT utilization, of specific types of bureaucratic behaviours.

9.4.1 Characteristics of cities

a) Cities which make high utilization of IT

In the two cities which make high utilization of IT (cities E and B), there is a strong corporate management approach and the city manager is quite powerful. In these cities

[12] Cities E & B, F & C, and A & D, which make high, moderate, or low utilization of IT, respectively.

management is **not content** with the way the city currently operates. The manager, and his team, see their roles as not only to execute council policies, but also to initiate and lobby for what they believe should be done. They are proactive and believe that the organization can, and should, be flexible and changing to adapt to the changing environment. This is coupled with a strong emphasis on result oriented management, provision of quality services, direct links with the customers, and performance-based control mechanisms. These cities are also characterized by willingness to use external resources (i.e. consultants, contractors, advisory boards). They adopt contemporary public administration managerial approaches (i.e. performance measurements, steering rather than doing, partnership with residents, joint ventures with the private sector[13]), and invest in innovative technologies. In a way, this corporate management approach and the externally focused, customer centred organizational orientation, create the driving forces which lead to strategic planning and, in turn, to high utilization of IT.

Cities B and E are also much less incremental in their approach to the implementation of changes than the other four. They are more dynamic in terms of corporate policy. They change the organizational structure much more frequently, and allocate resources in a more strategic and dynamic ways. This fosters an organizational culture which is receptive to changes and innovation, and allows managers to implement changes in a relatively short time.

In the area of fragmentation, these two cities seem to follow two different strategies. City B follows a top-down approach, which centralizes power and strategic decision making authority in the hands of the city management team. This team, led by the city manager,

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[13] For a more comprehensive review of new approaches to public administration see Osborne T. & Gaebler T. (1992) Reinventing Government: How the Entrepreneurial Spirit is Transforming the Public Sector.

actively seeks to bring down departmental boundaries and restructure the organization around its products and customers. In City E, management frequently restructures the organization to adapt to external changes and to take advantage of new technologies. Except for those high level, frequent, and quite drastic organizational changes which are imposed from the top, City E has decentralized much of its strategic decision making processes and authority. However, it has created a market-like internal accounting system which, to some extent, guarantees that the decentralized decision making follows a coherent and unified corporate direction. In the area of IS development, this method of avoiding fragmentation is found to be only partially successful. Perhaps as a consequence, the city is currently moving toward a more centralized approach to IS planning and development.

b) Cities which make moderate utilization of IT

In the two cities which make moderate utilization of IT (cities C and F), there is a moderate level of corporate management approach. Here, city managers are less dominant in the organization. As a group, city management tends to address issues from a corporate perspective, but the management team is neither visionary nor proactive. In general, in both cities there is a feeling of well being. Thus, while the need for changes is recognized and there are strategic plans which detail what these changes should be, there is no drive for radical changes and management does not see any reason to adopt a rapid pace of change. Instead, the implementation of strategic plans, including the strategic IS plan, is envisioned as a slow, incremental, and guarded process.

While both cities tend to be quite centralized, and both include a strongly centralized IS department, city management tends to leave the departments to carry on with their

operations without much interference or involvement, except for keeping tight control over resources. Similarly, while the dominant orientation in both cities is towards the customers, there is no strong emphasis on results or on breaking up departmental boundaries. These cities do not adopt contemporary managerial approaches to public administration, nor use innovative technologies to change the way they do business. This has led to a pragmatic, frugal, operational-oriented utilization of IT which is focused on supporting existing processes rather than enabling new and improved ones.

In both cities, the need to change how IS is being planned, developed, and utilized has been recently recognized. It seems, however, that significant changes will not take place until a strong enough external pressure forces them upon the municipalities. This, as already mentioned, is in line with the predictions of the theory of radical change which argues that a crisis is needed to move an organization into that kind of change (i.e. Tushman et al. 1986, Nadler 1988, Gersick 1991). There are indications, in both cities, that growing financial pressure may serve as the catharsis for the crisis. However, both cities are still in a stage of trying to confront their growing difficulties with incremental changes and budget cuts, while basically maintaining the status-quo. From the perspective of IT utilization, until external pressure is strong enough to force radical changes, we predict that these two cities will slowly fall behind in IT utilization.

c) Cities which make low utilization of IT

In the two cities which make low utilization of IT (cities A and D), there is a very weak corporate management approach. This is probably the outcome of a lack of political leadership, a fragmented authority structure at the political and executive levels, and the

personalities of the managers. In these cities, there are no strategic plans and no coherent management team. Power and decision making processes are segregated, and the dominant orientation is internally focused, defensive, and reactive rather than proactive. This pattern of behaviours creates an organizational culture which is not open to new ideas and an organization which lacks a guiding hand and a motivation to deviate from its routine. As a result, the cities are both very incremental in their approaches to change, and extremely stable in the way they allocate resources. Even if the need for drastic change surfaces (such as in the case of the strategic IS plan in City A), usually the organization is not strong nor unified enough to see it through. In both cities, the IS function is still only a division of the finance department. Top level executives are not involved in IS planning, and IS development is guided by a yearly workplan which consists of a list of small enhancements to the existing systems.

Implementation of IS that significantly support organizational goals would require a drastic and deep change in the way these cities use IT, as well as in almost all other aspects of the municipalities' operations. This, however, is probably impossible without a change in the existing bureaucratic behaviours since, as the radical theorists argue, significant changes cannot be achieved without strong leadership, focusing of the organization resources, structural changes, and radical change management tactics (Stoddard & Jarvenpaa 1994). Interestingly, in both cities, managers at all levels are **not content** with how the city operates and there is a feeling that the organization is in stagnation. However, even senior managers do not believe that it is within their power to change the situation.

9.4.2 The influence of bureaucratic behaviours on IT utilization

a) Incrementalism

Incrementalism is the result of many influences[14]. Most commonly it results from fragmentation, internally-focused and defensive orientation, lack of strong and focused corporate management, a very stable environment, a deliberate managerial philosophy, or a combination of these factors. With respect to IS development, incrementalism takes the form of a baseline IS budget (as in cities C and D) rather than budget per project, budgeting IS development as an operational expenditure rather than as capital investment (e.g. City F), or breaking the IS budget into small portions allocated directly to the departments (e.g. City A and, de-facto, City D). In all forms, according to our findings, incrementalism results in patch-work system development, preference of local solutions over more comprehensive ones, frugal and pragmatic systems rather than visionary ones, and use of IT to automate existing processes rather than as a change agent.

Another aspect of incrementalism is that IS development in the cities which follow that approach often relies only on internal resources. This, as explained in section 9.2.5, is primarily because the scope of each incremental step does not justify contracting out, and because the resources allocated to IS development are usually exhausted by the permanent staff. Thus, system development is limited in scope and the technology used. This accentuates the tendency to build on top of an outdated technology, to support existing processes rather than change them, and to adopt a local perspective to IS planning rather than corporate-wide one. In medium size cities (e.g. Cities C and D), the limitations imposed by reliance only on internal resources are more pronounced because the number of IS professionals is too small

[14] Incrementalism may also be the cause of many of the factors mentioned in the following paragraph.

to possess the range of expertise needed.

The cases of Cities A, C and D, show that incremental approach to IS development is not only caused by a lack of leadership it also leads to lack of top-level involvement in IS, since the scope of the operation is too small to warrant management's attention. In addition, the resulting ever-growing back-log in system development further discourages users, forces the IS function to spread its resources across many small projects, and discourages planners and users from 'thinking big'.

b) Fragmentation

The previous section (9.4.1) illustrated the impacts of fragmented authority structure and fragmentation of the strategic decision making processes on IT utilization. At the IS function level, fragmentation takes the form of multiple IS groups, each serving its own department (e.g. City A), or a centralized IS function which provides service on demand for all departments, but does not plan or initiate development, does not set standards and policies, and does not control the IS budget (e.g. City D).

At the authority structure and strategic decision making level, fragmentation leads to incrementalism and is caused by, or contributes to, the lack of a strong corporate management approach. At the IS function level, it impedes city-wide strategic planning and results in non-integrated systems and inability to share data across systems. Since IS development is carried out by small, independent, departmental IS groups, and/or the scope of each project is limited by the resources available to one department, only small to medium projects can be realistically contemplated. Over time, managers stop thinking of large and more ambitious IS projects.

Fragmentation at the IS function level also results in lack of support for functions

which are not the responsibility of a specific department, and to under-investment in IT infrastructure, since departments are not likely to spend money to support functions outside their areas of responsibility. This results in redundancies in data and duplication of systems, and in lack of support for departments too small to possess their own IS group. Finally, where fragmentation exists, the IS manager (or managers) is usually a middle level official rather than an executive, and the IS function merely a division inside one of the large departments, usually finance, rather than an independent department.

c) Vision and Leadership

In all the cities in the study's sample, the city managers were not very knowledgable about IT. However, in the two cities which make high utilization of IT, the city manager was involved in IS planing and the management team seemed to have a shared vision regarding the role of IT in the city. In the rest of the cities, neither the city manager nor other senior managers, except for the IS manager, had a clear notion or vision regarding the role of the technology in their city. This is probably due to the fact that most of them had spent most of their careers in public organizations where they were not exposed to extensive use of IT. Another reason is that the very diverse nature of the municipal government does not allow focusing on one, relatively narrow domain, business area, or technology.

In light of this fact, it seems important that the IS manager operates as a representative of the IS function and an advocate for IT utilization at the highest level of the bureaucracy. This, of course, is possible only if the IS manager is a member of the management team and is equivalent in status to other senior managers. It is also important, that the city manager personally and/or members of the management team are involved in IS planning. This creates an opportunity for them to learn and understand the IS domain and what it takes to utilize IT

in ways that significantly support organizational goals. It also helps them to develop and articulate a shared vision regarding the role of IT in the city so as to be able to communicate it to the rest of the organization.

In the two cities where the IS function is a division within another department (cities A and D), the IS manager is shielded from top management and from the political level. In these cities utilization of IT is low, the senior managers know very little about the IS in the city. They know even less about what the IS function is trying to achieve outside of their immediate area of responsibility. Furthermore, few of the senior managers recognize the importance of the IS domain. There is no shared vision regarding the role of IT among management, and even the IS managers tend not to think strategically.

In the two cities where the IS function is an independent department, the IS manager is a member of the city management team, but other senior managers are not involved in IS planning (cities F and C), utilization of IT is moderate, managers tend to know what is going on in the IS of the city, but they do not share a vision regarding where the city is going in respect to IT utilization.

d) Corporate control over IS planning and development

It seems that central control over IS planning, development, and standards is the best approach for achieving high utilization of IT. Such control is not only present in one of the cities which makes high use of IT to support its goals (City B) but is also used in the two cities that make moderate utilization of IT (cities C and F). Even City E, which also achieved high utilization of IT, and which until recently followed a decentralized approach, recognizes the need to move towards a more centralized control over IS planning and development. It seems that the unique needs of the IT domain and the nature of local government, where

many of the functions are highly inter-dependent, call for a centralized approach to IT planing, development, and standardization. This conclusion is contrary to some of the contemporary approaches to public administration which argue for decentralization and even for breaking up large bureaucratic organizations into a number of small, semi-independent organizations[15]. Nevertheless, city-wide standardization and central control over IS planning and development seem to be necessary conditions to achieve effective use of IT. To some extent, there are indications that even the state/province and national authorities are beginning to move towards institutionalizing IT standards, coordination, and possibly even central control over IS planning and development (Gore 1993).

9.4.3 IS expenditures and utilization of IT to support organizational goals

It is clearly not the case that "richer" cities spend more (relative to their resources) on IS than "poorer" cities[16]. Furthermore, the resources available to each city (measured as budget per resident) only weakly correspond to the extent to which each city utilizes IT to support the four goals. However, there is a much better correspondence between how extensively a city uses the technology to support its goals and the percentage of its total resources allocated to IS. Table 9.5 presents four indicators of the amount of resources each city allocates to IS, and compares them to how each of the cities utilizes IT.

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[15] In the context of local governments, community policing, neighbourhood associations that manage recreational centres, and privatization of some of the municipal functions are examples for these contemporary approaches.

[16] For example, City A is richer than City F but spends about half as much (in relative terms) on IS than City F. Similarly, City B is poorer than City C but spends almost 50% more on IS (for comparison see table 8.2).

Table 9.5: Resources allocated to IS

cities in order of IT utilization (from left to right)	E	F	A	B	C	D
	large cities			medium size cities		
IS budget % of total (avg 89-93)	3.26%	4.2%	1.2%	2.2%	1.43%	1.39%
IT related budget, % of total[1]	5.7%	4.5%	2.5%	2.2%	1.6%	1.6%
data stored per resident (Gbit)[2]	323.5	299.8	83.7	114.7	93.2	77.6
no. of employees per IS professional	20.6	24.9	87.8	34.5	48.1	52.9

[1] In cities E and A the numbers differ significantly from the budget of the IS function because much of the total budget spent on IT related issues is not controlled by the IS function. In these cases the numbers are only very rough estimates.

[2] Cities E and F store substantially more information per resident than the other cities. This is probably because they directly manage utilities (e.g. electricity, telephone, transportation) which are not managed by the other cities.

The size of the sample and the fact that the study does not measure all possible usage of IT, do not permit a strong statement regarding the causal link between expenditures on IS and the extent to which IT provides support to the organization goals. It appears, however, that the level of expenditure on IS is positively related to the extent to which cities are using IT to support their goals.

One may expect large cities to spend less money (in relative terms) than the medium size cities because of economies of scale. However, there is a significant, counter-intuitive, difference in the percentage of the total resources allocated to IS between medium size cities and large ones. It is unclear why this difference exists but it might be that costs of development, hardware, and maintenance follow a step function which overshadows the expected savings due to economies of scale.

Data per resident surfaced as a strong indicator for level of IT utilization. In general, it may be seen as a surrogate to IT usage. Since, in general, the municipalities studied do not use IT for goals other than those measured (e.g. to advance political aspirations, control other social institutions, or to reward its members), total IT usage seems to reflect utilization of IT

to support organization goals.

To summarize, the municipal bureaucracy does not operate in a competitive environment. To a large extent, there is nothing that forces bureaucrats to take advantage of the technology, except for their intrinsic drive to do the best job they are able to do. Thus, how each city utilizes IT depends, to a large extent, on the personal characteristics of its manager and management team. Where management inspires employees to be innovative by focusing on results and emphasising the quality of the services, where they create an organization capable of radical changes, and where they provide coherent and visionary leadership and strategic direction to the corporation, IT is used more extensively to support the organizational goals. Where management is content with maintaining the status-quo, where they endorse only small incremental changes, or where there is no corporate vision and strategic direction, there is no drive to implement innovative IS, and there are not enough resources and support from top level managers to see implementations through in a reasonable time.

CHAPTER 10

RECOMMENDATIONS, LIMITATIONS, AND SUGGESTIONS FOR FURTHER STUDY

10.1 Recommendations

The recommendations of this study are directed towards a municipal government that wants to use IT more extensively to support the four goals discussed in this study. The recommendations are at three levels: they refer to actions of the political level, general issues which are the responsibility of city management, and specific issues regarding municipal IS which are usually the responsibility of the IS manager. The recommendations are made from the point of view of providing the best conditions for developing and implementing IS that support the organizational goals. It is possible that some of the recommendations might conflict with other needs of the city or with social values (such as local autonomy, minimizing bureaucracy, and the right to privacy).

10.1.1 The political level

A unified authority structure was found to be most conducive to the emergence of IS that strongly support organizational goals. This means that one political body is responsible for all the city's departments, operations and offices, and one command line exists between the political level and the administration. This line connects the senior professional manager to the political level, and all interactions between politicians and bureaucrats are channelled through it. Thus, the findings of this study suggest that to enable the development of IS that strongly support organizational goals:

a) The political level should create an authority structure in which a city manager (or a management team) has the authority to direct and supervise the operations of all the city's departments and agencies.

b) All issues related to IT utilization should be supervised by a single sub-committee of the council. This sub-committee would be involved in IS development, at least to the extent of participating in strategic IS planning, and periodic discussions concerning the status of IS implementation and the operations of the IS department.

10.1.2 The bureaucracy level

Based on the findings of this study, it seems that certain structural arrangements and organizational behaviours are associated with high level of IT support for the four goals discussed. These structural arrangements and organizational behaviours are:

a) The IS function is an independent department and its manager an executive level official, who is part of the city's management team and routinely interacts with the political level.

b) IS development is regarded as corporate capital investments, rather than operational expenditures, and it is implemented in a relatively short time often by contracting out major parts of the work. Otherwise, IS development tends to becomes incremental which, in general, constraints the level of support provided by IT.

c) City management actively seeks to involve politicians in IS planning and development.

d) Large cities which achieved high utilization of IT spend, annually, between 4-5% of their resources on IS. Medium size city spend, annually, around 2% of their resources on IS.

e) Cities which achieved high IT utilization often use external consultants for strategic IS planning. The consultants have expertise which usually municipalities do not possesses

internally. They tend to look at the municipal organization from a corporate perspective and their thinking is not hindered by current organizational structure and departmental boundaries. Politicians, and to some extent senior bureaucrats, tend to accept the opinions of external experts more willingly than those of their employees or peers.

f) Based primarily on what we were told by most interviewees, and supported by the limited and anecdotal data we gathered on this isssue, it appears that much can be gained from better coordination of IS development and better integration of systems among cities (especially those who share the same metropolitan area), and between levels of governments.

10.1.3 Managing the municipal IS

Analyzing the differences in IS development policies and approaches to IS management between cities which make high utilization of IT and those which make moderate or low utilization of IT, suggests three tentative recommendations with respect to managing the IS function in local governments:

a) For those cities which currently are not using IT extensively but want to change that, it is recommended that they adopt a rapid pace for the implementation of the IS plan. This means dedicating a considerable portion of the resources available for investment to IS development. Based upon our observations and interviews, rapid approach to IS development seems more conducive to the development of effective municipal IS than a constant but incremental series of improvements. This seems true even if development is guided by a long term strategic plan and the overall investment in IS at the end of a period is the same.

This study lacks a longitudinal perspective, but considering that other issues make demands of the limited resources available to a city, we believe that rapid approach to IS

development would probably means following a step function. For a few years, a city would focus its resources on IS development, then IS development would be frozen for a number of years to be renewed as a focused effort later. We have some indications that in cities which currently do not use IT extensively to support their goals, the option of slow and incremental implementation of IS plan does not lead to the expected results. Further, we think that even in cities which already utilize IT extensively, it is wise for IS development to follow this approach, e.g. a period of rapid and dramatic IS development, followed by a period of relative stability in the IS. This recommendation stems from an integration of three factors. The first is our finding that a drastic and rapid approach to IS development is superior to slow and incremental evolution of a city's IS. The second is the recognition that most cities cannot amass the required resources for rapid IS development year after year. The third is the fact that large administrations need considerate time to adjust to new systems, especially when such systems representdrastic changes from existing routines and procedures.

b) In medium size cities (around 100,000 residents), and probably in smaller ones as well (not part of the sample), a centralized IS function is recommended. In large cities (around 500,000 residents) this solution is harder to implement and suffers from many disadvantages (such as growing distance between users and IS professionals, longer response time, and excessive control). In large cities, a distributed IS function seems preferable but it is important to maintain a strong, centralized IS function at the corporate level. This IS department would set city-wide standards, centrally plan and coordinate application development, and be responsible for the development and maintenance of the IT infrastructure.

c) To reach high utilization of IT and to maintain that level over time, a policy that favours packaged solutions seems most promising. In-house development should probably be

minimized, and so should customization of packages, since this often leads to in-house improvements and in-house developments of related systems. This seems especially true in medium size cities, and probably even more so in small cities. A significant move towards packaged solutions requires adoption of open systems architecture. This necessitates, in most cities, a drastic change from the current computing environment. Significantly, such a change cannot be achieved through a fragmented approach to IS planning and development or through an incremental approach to implementation.

10.2 Limitations

The most obvious limitation of this study is that it did not tie IT utilization to measurable indicators of performance. As such, it measured the extent to which IT based systems support functions related to four major goals of local governments, but not the extent to which this support generated payoffs. Linking utilization of IT to the performance of a city could provide more objective measures of the trade-offs between investments in IT and other means to achieve a city's goals. The implementation of the recommendations of this study should be considered within the context of the constraints a city faces and the demands other issues make on the time and resources available to its politicians and bureaucrats. Since this study did not link utilization of IT to measurable performance criteria, the study cannot provide guidelines for these considerations.

A related issue is the fact that this study attributes equal importance to each of the four domains along which utilization of IT was defined, and to each of the functions used as indicators of these domains. It would have been more appropriate to assign different weights to domains and functions, according to their relative contributions to the attainment of the

goals of local governments and the importance of these goals. This could allow a more accurate rating of utilization of IT, as well as insights into the priorities in which various aspects of IT utilization should be implemented. However, since this study did not measure the actual contributions of the IT based systems found in each city to the performance of that city, and since there is no general agreement about the relative importance of each of the domains and functions supported by IT, this refinement could not be achieved in this study.

Another limitation is the fact that this study was not able to take into account, or control for, differences in preferences of the public across the six cities studied. Theoretically, differences in public interest may constitute an alternative explanation to the variance in IT utilization across cities. Three points led the author to believe that this limitation does not constitutes a major flaw in the study. First, all senior official interviewed agreed that the four goals on which this study focuses are important, and can and should be supported by IT. They also perceived these goals to be important to the public. Second, in all cities studied the public seems not to be concerned with how these goals are achieved, and we did not find evidence that decisions about IT utilization were influenced by specific demands or objections from the public. Third, four of the cities belong to one metropolitan area, which means that environmental conditions and the characteristics of their residents are probably quite similar. Nevertheless, we cannot rule out the possibility that differences in public interest cause differences in IT utilization.

With respect to the measurement instruments developed in this study, a major concern is the fact, already mentioned in Chapter 8, that they were developed and validated using the same data set. More rigorous validation requires the use of a fresh data set in the validation phase. However, due to the small sample size, only one data set was used. The usability of

the measures of the dependent variables, those concerning utilization of IT to support local government goals, is also hampered: the scales developed for each indicator were often truncated by the most advanced IT based systems either in existence or planned among the cities investigated. This means that the scales may not be sensitive enough to distinguish between cities which make high utilization of IT, and others, not included in the study, which make even higher utilization of IT. Additional improvement to the sensitivity of the scales might be achieved if the **low** category would be divided into **low** and **not existing** categories. As already mentioned, the measurement tools may also be improved by adding weights to each of the functions according to their relative importance. Additional concerns, which are often unavoidable in qualitative research but nevertheless should be mentioned, are the lack of rigorous tests for completeness of the measures, the appropriateness of the indicators, and overlaps between them. As described in Chapter 8, we used a number of informal tests to ascertain the reliability and validity of the measures developed in the study (such as, getting feedback from interviewees, comparing data received from different informants, checking the measures in a pilot study, using two different evaluation tools, etc.). Those tests, however, are less rigorous than those available for quantitative data. Finally, while the measurement instruments developed in this study identify observable indicators (items) with which to measure each of the constructs under study, and describe scales on which to rate them, no structured data collection tools (questionnaires) were developed.

With respect to generalization of the findings of this study, two qualifications should be noted. First, this study was conducted in Western Canada where a certain political and social culture exists, and where local governments may have distinctive mandate. Second, the sample size of this study was rather small. Thus, while the author believes that most of the

findings and recommendations can be generalized to other local governments, even to cities outside of Western Canada, prudence is advised.

Finally, in a case study which focuses on complex, often ambiguous constructs, the findings represent the researcher's interpretations of the reality he/she observed. This is especially true since in this research the author alone was responsible for the evaluation of the data and the assignment of scores to each indicator. We tried to be as objective as possible. We used interview guides and detailed tables to insure consistency in data collection and interpretation across cases, and often examined our interpretations against those of senior informants. However, there is always the possibility that the findings have been tinted by personal biases. To countermand this possibility, we include as much of the raw data as practical in the case write-ups to allow the reader to make up his/her own mind.

10.3 Suggestions for further research

This study opened up a number of research avenues. The generalizability of this study's findings may be somewhat restricted, due to the inherent properties of the case study methodology. The validity of the measurement tools developed require further testing because of the small sample used in this study. Thus, a study could be launched to further develop these measures into a questionnaire-type tools and apply them to a large sample of local governments. Also, a longitudinal study of IS development in local governments could gain more insights about processes, verify the predictions made in this study, and study the outcomes of various approches to IS development discussed here.

Further research on the relationship between utilization of IT and the performance of local governments is also needed, and would be very useful, especially to practitioners.

Within that line of research, an effort should be made to identify domains or functions for which IT support will generate the most payoffs.

Lastly, in light of our impression that very little systematic thought is given to how IT can improve goal attainment in local governments, especially in the domains of supporting decision making and the democratic process, conceptual work is needed to help formalize a vision of the role of IT in those organizations. Without a clearer vision and a conceptual framework of how IT can, and should, be used, IS development in local governments may remain to a large extent technology-driven, and support to the domains mentioned above will be mainly a by-product of administrative systems.

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APPENDIX A
THE CASE OF CITY A

1.0 General

City A is one of the largest cities in western Canada. During the last 15 years the city has experienced a rapid growth due primarily to migration from the Far East and the rest of Canada. This economic boom is coming to an end the last couple of years as available space becomes scarcer and more expensive, and new immigrants and investments are turning to communities and cities surrounding it. The population of City A is currently around 480,000 people, the municipality's budget in 1993 was around $520 million, and it employed 6517 permanent workers at the end of 1993.

1.1 The IS function in the municipality of City A

The city's first computer-based information systems were implemented in the late 1960's on an IBM mainframe. These systems addressed primarily the finance needs of the city and were subsequently migrated to a Honeywell mainframe in 1973. In 1980, the drafting branch of the Engineering Department acquired a stand-alone mapping system for the purpose of converting maps to metrics, and the Police Department had some 60 Mobile Data Terminals installed, communicating with the Canadian Police Information Centre.

In 1983, the need for improved finance and costing control system, along with a broad range of other operational systems was identified, and the Honeywell was replaced with another IBM mainframe with enhanced capabilities. Responsibility for operation, maintenance, and system development remained centralized in Computer Services which was a division in the Finance Department. Starting in the early 1980's, some independent developments and operational activities were performed by the research and drafting branches of the Engineering Department. At the same time, early 80's, PC's and dedicated word processors were introduced and the FOCUS end-user reporting language was made available on the city mainframe. These developments signalled the start of the departmentalization of the IS in the city. As computer hardware became more affordable and software more powerful, several departments implemented their own computer systems: Library its Automatic Circulation System; Police and Fire their Computer Aided Dispatch and record management systems; and Engineering purchased a Traffic Signal Management system. In addition, these departments and others, feeling that they are not adequately supported by the

centralized IS unit, started to recruit their own IS professionals and began writing their own programs and developing their own systems, mainly on PC's, but some also on more powerful mini-computers and work stations. An inventory of the electronic information systems in the city today reveals in excess of 115 different systems implemented on the IBM mainframe, four other mainframe based computers ranging in capacity from around the size of the IBM to mini-computers, and on close to 800 PC's.

The organizational aspects of the IS did not change along with the rapid growth in systems and equipment. The responsibility for the core IS in the city remained in the hands of Computer Services, which is still a division in the Finance Department. This unit, which employed in 1976 46 people, is staffed now by 57 IS professionals, an annual growth rate of less than 1% over 16 years, with no change in staffing level in the last 5 years.

The process of departmentalization of IS did not change either. During the last 15 years small IS groups were created in almost all of the large departments in the municipality. Because of inconsistencies in job definitions it is hard to know exactly how many employees, whose primarily responsibilities are IS analysis, development, maintenance or support, are currently employed by City A. However, a survey made during 1992 as part of the IS plan (ISP) stated,

> *At least 16 full time IS professionals are employed independently of the centralized IS function ... This number may reach 30 if all positions throughout the city that spend a significant percentage of their time serving the computer needs of others, will be aggregate.*

This numbers mean that more than one third of the IS professionals in City A are not managed or guided by the centralized IS function.

1.2 Utilization of IT by City A

City A is making an extensive use of IT based systems. In 1981 a Personnel Management Information System (PMIS) was developed internally to collect, store, process, and report data pertaining to all positions, employees' profiles, vocation entitlements, sick leaves, and work attendance. During 1985 the city replaced its accounting system with a complete financial management system specially designed to support the functions performed by local governments (LGFS). This system, which was extensively modified and enhanced by Computer Service personnel, supports revenue and expenditure accounting, cash distribution, budgeting, and many more financial management functions. A year later, in 1986, the Computer Services's staff, jointly with American Management Systems developed

an Operations Costing & Control system (OCC) which supports three major functional areas: Project Costing - which allows initiation, tracking, and costing of work orders, as well as the automatic allocation of expenditures to the appropriate accounts; Fleet Management - which monitors city's equipment, supports maintenance scheduling and costing, and captures costs or rental revenues that pertain to each vehicle or equipment; and Inventory Management - which supports the operation of the city's "stores" by providing requisition processing, purchasing, and physical inventory reconciliation. In addition to these three major systems a host of smaller, single task systems were developed, almost exclusively by Computer Services personnel, to cover functions such as payroll (1987), real estate management (1989), capital assets recording and tracking (1987), and many more.

While all the above mentioned systems reside on the same mainframe, and were developed within a relatively short period of time, their development did not follow a long-term master plan and the various systems did not add up to a cohesive, well integrated, computerized outfit for the city. Rather, systems were developed separately, each tailored to support the specific needs of a single department (or function), and each was designed to follow the processes that were used prior to computerization. Furthermore, the major drive and justification for the investment in IT was to facilitate tight and centralized control over resources used, mainly financial. As described by the Deputy City Manager,

> *Our systems tend to be top-down controlling.... Each was designed for the specific purpose of one department without in fact anticipating the needs of the others, and [without] reviewing the process [supported by the system] from a corporate perspective.*

Thus, since each department was, and to a large extent still is, perceived as independent and the "owner" of the information generated by its function, instead of building a central repository databases to serve all systems, each system maintains and edits data independently. Integration between the systems, when it exists, is usually achieved through periodical batch processes in which data conversion and posting of transactions from one system to another take place. For example, while both payroll and human resource management functions are computerized, the systems are not entirely integrated, each maintains information that is stored also in the other system and depends on batch updates to maintain data integrity. This reduces the ability of officials engaged in either tasks to relay on accurate and timely information, requires additional administrative work, and creates potential for inconsistency of data. Similarly, the capital assets sub-system which was upgraded to on-line in 1987, supports the purchasing function in the city, and allows recording and tracking of all capital

items over $200 in value purchased by the city. The capital assets system, however, is not integrated with the accounting systems and thus, impedes accountants from taking into consideration pending purchases, the city's procurement agents from knowing what is available in each account, and it entails manually posting of transactions into the general ledger.

As various departments found the support of the core applications unsatisfactory to their needs, or too restrictive and controlling, they sought to develop departmental systems to support their unique needs and allow them the independence they desire. Thus, currently there are more than 80 large and small departmental systems which are typically very decentralized, stand-alone type of systems which support specific tasks within a specific department or division. As a senior manager described:

> *Almost as an add-on to those central financial systems, there have been departmental initiated information system. ... It began in the early 80's on the bases of an individual departments suddenly realizing that these things are out there and not being able to get the kind of service they wanted from the core systems ... almost sort of granted with the grace of the finance department additional systems were developed, basically in a very decentralized, ad-hoc, fashion ... in fact it has effectively set up a parallel system.*

2.0 Assessing utilization of IT to support organizational goals in City A

2.1 Support for the administrative functions

In assessing the level of support for administrative functions we examine the extent to which the existing IT based systems provide: a) an on-line, interactive support to those performing administrative functions; b) fully cover all processes that together make up each of the administrative functions; c) allow efficient (one-point) data entry and real time retrieval of information; and d) facilitate connectivity with related functions.

In City A, all central administrative functions chosen as indicators to the level of IT support for the administrative processes are being supported to varying degrees by IT based systems. However, while most systems provide on-line access to information to all authorized personnel, on-line data entry and real-time updates or computation is usually restricted to those within the departments which control a specific system. For example, personnel and payroll systems allow authorized managers an on-line access to information regarding their employees, but information regarding attendance, leave, injuries, cannot be updated on-line

but rather it has to be manually reported to the units in finance that controls the payroll function. Purchasing, capital assets, and the finance systems provide on-line inquiry to many users' departments, but do not offer users an on-line support to feed-in procurement requests, expenditure reporting, or immediate access to information regarding the balance in their capital expenditure accounts.

Another weakness stems from the fact that most central systems were not flexible enough to meet the specific needs of the departments. Thus, specialized sub-systems (or stand alone applications) were developed to overcome this limitation. Integration of these add-on systems with the corporate systems was not done on a on-line basis, but rather as a batch update which is usually a complex task that requires professional knowledge. In some cases systems that pertain to the same administrative function are not connected at all. For example, in City A Fire Department operates a personnel sub-system on its own VAX machine which contains data not readily available to the director of Human Resource through the central PMIS since the systems are not compatible. Specialized personnel management systems have also been implemented in a number of other departments. Notably, Engineering is operating a stand alone workers' compensation system and a computerized model that analyzes trends in workers' attendance. Both of these small systems are relevant to a broader set of users and their outputs, if shared and managed as a corporate resource, may improve decision making and efficiency of the administrative processes. Another example is the Engineering's budget system which is used for financial analysis of Engineering accounts during the preparation for budget review and contains data and options which are not available to managers outside of the Engineering Department. Thus, administrative support systems are in many cases not integrated, and while they provide full coverage of the functions, the support is far from being seamless, interactive or easy to use. In our interviews and analysis of departmental requests for IS improvements there were many complains, such as:

> *Difficulties in downloading information to our systems ... need to better integrate ... need to create interface with related functions ... access to information is slow and difficult.*

The fact that a common-address system to allow validation of addresses, polling of all information regarding a specific property or zone, and consistency in referencing properties is still on the wishing list of most city managers[1], demonstrate the severity of the problems

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[1] A current survey done by Computer Services identified more than 50 separate databases in the city which contain property-related information. In the majority of these databases, addresses do not follow a standard format.

caused by the lack of system integration.

Finally, office automation and communication networks is also not fully available to all city employees. While City A recognizes the need to connect all its offices through a computerized network and is currently in the process of installing LAN's and WAN's in various areas, there is no voice-messaging system in the city (except for aldermen), and e-mail is not yet available city-wide. There is also no easy to use interface between the Library system with its more than 300 terminals, the Fire and Police VAX systems, the city's mainframe (800 terminals), and the PC's LAN's that are installed to connect the more than 800 PC's across the city. Office automation is also not fully supported. Although there are in access of 2000 terminals/PC's in the city, only half of the city's office-workers have a computer on their tables, and it is difficult to upload or download data from the central systems into the individual productivity tools provided (spreadsheet, graphical packages, word processors).

Overall we rate the level of IT support for the administrative process as **moderate.**

Table A.1: Summary of IT support for the administrative functions in City A (underlined = characteristics of existing system; shaded cells = system as rated)

	High utilization	Moderate utilization	Low utilization
Inventory management	on-line and comprehensive support, integrated with purchasing, accounting, maintenance systems, automatic replenishing & user generated purchasing orders, tracking, reporting & analysis tools.	on-line and comprehensive but not fully integrated with accounting, purchasing and maintenance, no automatic replenishing, no on-line generation of purchasing orders, no analysis tools.	not on-line, or does not cover all types of inventory, integrated only with accounting, no managerial support functions, only record keeping.
Financial management	on-line, comprehensive accounting system, fully integrated with all functions which generate financial transactions, electronic transfer; bank reconciliation, cost allocation, point of sale data entry, budget preparation, financial analysis & reporting tools.	on-line accounting system but not capable of handling all types of accounts or transactions, or not fully integrated with associated systems, or no budget preparation, no financial analysis and no reporting tools.	accounting system which do not cover all transactions, not integrated with associated functions, redundant data entry, no budget preparation, analysis, electronic transfer, bank reconciliation & reporting tools.
Payroll	on-line, parametric system, handling all workers, automatic time capture or one time data entry, integrated with maintenance, personnel, & accounting, electronic deposit, check writing, annual reports (T4).	capable of handling all workers; electronic transfer, check writing, & annual reports, but non parametric, redundancy in time card data entry, not fully integrated with other system, or not on-line.	stand alone, non parametric & not on-line system, and/or not capable of handling all workers, no electronic transfer, no annual reports.
Personnel	on-line, central personnel records, employment history, positions, job descriptions, training and qualifications, performance appraisal, integrated with payroll & time card, analysis & report tools.	on-line, central personnel records but only current status & no performance appraisal, analysis or reporting tools, or not fully integrated with other systems and not on-line.	stand alone record keeping database, no employment history, qualifications, training, no managerial functions.

Consistency in references	all data, in all systems, which refer to the same entity share a common key, no redundancy in data storage, on-line linkages between record regarding the same entity, electronic link to B.C assessment authorities, dynamic views.	central repository database of addresses and properties which is linked on-line only with some of the systems that use that kind of information.	stand alone database, each system holds its own addresses and properties records, or none.
Office automation	city-wide network which offers an integrated and standardized office suite, including word processor, spreadsheet, communication, telephone, graphics, e-mail, file transfer, scheduling.	only between 50%-80% of the employees are provided with PC, or are connected to the network, or office automation tools are not standardized, some tools are not provided, no enveloping system to integrate the various tools.	less than 50% of office workers have PC, or are connected to a network, or office automation tools are not standardized, and, most tools are not provided nor integrated.
Cost control, job costing	on-line systems, fully integrated with accounting, inventory, personnel, & payroll, semi automatic generation and costing of work orders, allocation of costs to programs, projects, equipments and work orders, analysis and reporting tools.	the same as the high cell, but not covering all types of the city's operations, or not fully integrated with the related systems, and/or no analysis and reporting tools.	batch based system which records work orders and posts costs to appropriate accounts.
Record management	city wide, on-line, standardized, magnetic media storage of all records, full text search and retrieval capabilities.	a city-wide computerized record indexing system, or number of separate, non compatible, record management systems, or record management system that store only part of the city's records.	small stand alone databases, or departmental computerized indexing systems, or none.

2.2 Support for provision of high quality services

In assessing the usage of IT based systems to support provision of services the criterion we use is the extent to which customers directly benefit from the systems, rather than indirectly through the improvements in administrative processes.

A survey of the IT based systems which have direct bearing on provision of services in City A reveals a mixed picture. Overall, the computerized systems which are directly related to provision of services are not customer oriented, they were not design to make it easier for the tax-payer to pay his/her bill, nor to help a resident to fill an application form or to register to a recreational activity. Rather where such systems exist, they are designed mainly to make the work of the service providers easier and more efficient. Also, when the services are provided by one department, the level of IT support is significantly higher than when service provision requires coordinated work of a number of departments. For example, the Police and the Fire Departments who have to respond quickly to emergencies are equipped with a Computerized Aided Dispatch system, tied-in with the 911 emergency line. This system automatically alerts the appropriate unit and, in the case of the police allows field crews direct access to information through their Mobile Data Terminals. The system, however, does not have intelligent component for calculating optimal routes and while the data displayed is case-specific it is limited to information stored in the system itself since the

system is not connected to the rest of the city's IS. Similarly, Engineering, which alone is responsible for traffic control and provision of water and sewage services, has IT based systems which support real time monitoring and are capable to automatically adjust traffic signals (or pumps & valves) as the situation requires.

On the other hand, services which are not urgent and life saving in nature, and in which potential computerized support is aimed mainly at making customers' contacts with city-hall easier are significantly less developed[2]. For example, even in engineering, the most computer aware department, according to the City Engineer,

> *We do not put a lot of emphasizes on making it easy to file requests, or track them. We also tend, in term of the face we present the public to be disperse. It could be that somebody will have to go to two or three counters to get service ... Services are also centralized in the city-hall so people have to come to us.*

Referring to the question of improving services through IT, City Manager stated:

> *We should use IT so we can structure ourselves around the services -- we are not, we are more organized around disciplines, not around outputs. We do not make services readily accessible ... we should do much more with IT to fulfil our role as information providers.*

Deputy City Manager said,

> *Historically we have thought of ourselves more as a government than as service organization, and certainly not as an individual service providing organization ... We are not entirely customer oriented, if you look at what we have done with computers [in the area of customer orientation] we are in the dark ages. But the prime motivation of most of the systems we put in place have been for administrative management information not for customer services.*

A common customer oriented use of IT is to create a one-stop service centre, or even a number of them in convenient sites. In City A there is no such utilization of IT. Customers are still required to go to city hall; payments cannot be done remotely with credit cards or automatically through ATM machines; the systems do not have on-line data entry capability and cannot recalculate or correct errors in the customer's presence; the systems also do not provide customers with receipts and accurate balance of their accounts after payment. Moreover, each type of bill (tax, fines, permits) is payable at a different location and the IT based system at each of the cash registers, are capable of handling only one type of bill.

A more problematic area is the Permit & License domain, where at the time of data collection computer systems were used basically for record keeping only. Applications have

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[2] One exception which shows that the reason is not only the life-saving nature of the services is the state of the art computerized library system installed by the Public Library.

to be submitted on paper and distributed manually among the various departments; customers must provide information already stored in the city; there is no on-line validation of information; and customers often find it hard to get timely answers for their inquires regarding the status of their applications. Recently, however, the city undertook to upgrade this system. The planned improvements, already budgeted, include across-departments dispensing and tracking system, integration with the city's financial systems, and on-line validation of information against city's data.

Lastly, in areas where no one department has formal responsibility, such as, recording and tracking customers' requests and complains, and provision of information and registration services regarding city's activities, there is low or no system support at all. None of the departments have an IT based system to support recording, responding, and tracking requests for services, and getting information or registration to city's sponsored activities is possible only at the location of the activity. Moreover, across all services, IT is not used by the city to customize its services to the unique needs of sub-groups of customers, is not used to add value to services through additional information or more informative notifications, and is only marginally used to improve accessibility to services.

Table A.2: Summary of IT support for provision of services in City A (underlined = characteristics of existing system, shaded cells = system as rated, double lined cells = current system being upgraded)

	High utilization	Moderate utilization	Low utilization
Response to emergency calls (police, fire, ambulance)	on-line, computer aided dispatch system which covers all three services, real-time optimization of whom to alert, routing, and call-ups for reenforcement, on-line presentation of all relevant, call-specific data available in the city's systems.	the same as in the high cell, but only for some of the services, or on-line computer aided dispatch system which presents only static (not call specific) data, no automatic optimization of routing, alerts, & reenforcement.	records calls and maintains log of activities, stand-alone database of some relevant information, no automatic functions, or none.
Provision of data to emergency field crews	mobile data terminals in most vehicles, communication links which allow field crews to interrogate all city's systems, remote data entry and verification.	the same as in the high cell but only in few of the vehicles, or radio links with operator who can access all city's systems on-line.	radio links with operator who does not have on-line access to most systems, or none.
Traffic control	full coverage, automatic traffic-load sensing and scheduling of traffic lights, responsive system.	full coverage, automatic traffic lights control system but without real-time components.	partial coverage, static traffic lights control system, or none.
Water, sewage, storm-water control	full coverage; real-time monitoring of pumps and valves; automatic detection of faults; remote control.	partial coverage, or real time monitoring but no remote control capabilities.	none.
Bill and fine collection	ATM, and/or one-stop service station integrated with other city's systems, on-line data entry, query, printing of bills and receipts, flexible forms of payments (banks, instalments, automatic debiting, credit cards, checks, cash), bar code scanning.	one-stop computerized cash register not integrated with the city's systems, or a number of different systems each one capable of handling one type of payment, or system does not allow flexible form of payments.	computerized cash registers for each type of payment, not integrated with other systems, no on-line data entry, query, and printing of bills and receipts, no flexible form of payments, or none.

Issuing of permits and licences	on-line filing of applications, automatic fill-in data fields and eligibility checks, presents customers with case-specific information, inter-departmental inquiry and tracking system integrated with bill collection system.	one-stop service counter, inter-departmental inquiry and tracking system.	departmental record keeping, or none.
Public library	on-line, multi-branches, circulation system, computerized catalogues, public terminals, self search, inquiry and booking, automatic notification, remote access.	on-line but branch specific circulation system, computerized catalogues, search only public terminals, no self booking, status inquiry, or remote access.	computerized catalogues, or none.
Managing public requests and complains	on-line, city-wide system which records, channels, and tracks all types of requests and complains; generates confirmation notices and final responses; integrated with all other relevant systems.	on-line, city-wide but type-specific system; records & tracks requests for specific services. And/or, does not generate responses; not integrated with other systems.	off-line record keeping, or none.
Provision of information, registration services	on-line registration/booking system for all city's sponsored events, classes, facilities, available at most public service counters, integrated with other systems to allow on-the-spot payment and issuing of receipts/tickets /confirmation.	on-line but event or departmental specific systems, presents information and allows registration / booking only to those activities controlled by one department, not integrated with other systems.	system support for registration / booking are for local activities only, or none.
Remote access	direct access through dial-in modems or terminals in central locations to: registration services, taxes, fines, bills inquiries, permits & licences applications, and requests for services.	direct access through dial-in modems or terminals in central locations to a partial list of the services mentioned in the left cell.	none.
Customization, value-added services	notices and bills in language of choice; offering a range of options regarding format of bills and their informative content.	some of the items described in the high cell but not all.	none.

As Table A.2 shows, the extent of IT utilization to provide high quality services in City A depends on the type of service. Overall, however, we rate IT support to provision of services as **low**.

2.3 IT support for analytic, objective, and comprehensive decision making

In assessing the extent to which IT is utilized to support decision making, we focus on three areas: a) the availability of data, b) breadth and depth of data, and c) the existence of tools to manipulate and present the information in ways useful to decision makers at city management level.

In City A, data is not formally recognized as a major corporate resource and sharing of information across functions and departmental boundaries, in a timely fashion is cumbersome and, at times almost impossible. Due to the non-integrated systems, departmental ownership of data, lack of data standardization, and the less than comprehensive networking, much of the data stored in the city is not readily available to those who need it. According to a senior manager in Computer Services,

> *At least 30% of all the data collected (or generated) in the city does not reside on the mainframe, no one person is in the position to know what exactly is stored in all the*

different databases in the department.

The issue of availability and sharing of information was repeatedly mentioned also by senior management as a major obstacle to their work. A representative comments refers to:

> *Time required to gather information is excessive ... Information requested from other departments is not received promptly ... information in other departments is underutilized and unshared ... Even if [information is] available, its location and retrieval is often so complex, inefficient and staff-intensive that timeliness suffers ... Information is underutilized as a resource.*

The breadth and depth of the information made available through IT based systems are also relatively limited. Except for periodical file transfers from the provincial property assessment authorities and the operational-level exchange of information with the insurance corporation of the province, city managers and planners do not have computerized access to external networks and databases, and many cannot even access the city's own public library. For example, even though the need for demographic and neighbourhood-profile data is widely recognized, the city does not collect and store any environmental, demographic or neighbourhood data. *"Centrally stored we have some 40 M characters only, it is unbelievably low, a city like us should have 300 Million"* said the Manager of Computer Services who has an extensive experience both in public and private organizations.

In terms of computerized tools for modelling, forecasting, trends analysis, and statistics there are non at the corporate level. The finance systems do not facilitate unit-cost evaluation nor marginal benefits comparison, there are no computerized tools that monitor performance, and no systems are used to measure, calculate, and compare results-based criterion. While the planning departments do occasionally use statistical tools, these are mostly ad-hoc and do not constitute an on-going data gathering and analysis to support decision makers on regular basis. In addition, probably because the systems were designed to facilitate management control rather than decision making, the format and level of detail of data available is not very useful to the corporate executive. The City Manager complained, *"[IS] generates massive amounts of information that do not help me to understand what is going on"*. The Deputy City Manager admitted,

> *The systems are modeled after the school master ... show me your papers and I will add the red marks ... There are no exception reporting, no executive summaries. In fact most senior management do not use any computer generated reports routinely in their work.*

On the other hand, at the departmental and operational level, some of the departments are making extensive use of computerized systems to support their decision making processes.

In engineering, there are computerized systems for modelling water supply, sewage, and traffic, to optimize and schedule maintenance and garbage collection, and to analyzes trends in workers' absenteeism. Also, the Public Library is making extensive use of the data collected by their circulation system to determine demand, make books' purchasing and distribution policies, and to schedule work shifts according to the workload in each of its 22 branches. These usages, however, are basically at the operational level.

Table A.3: Summary of IT support for decision making in City A
(underlined = characteristics of existing system, shaded cells = system as rated)

	High utilization	Moderate utilization	Low utilization
Sharing of information	all corporate data is available on-line, systems & users can easily share information stored anywhere in the city, easy to use interfaces allow easy access and manipulation of data.	not all corporate data is readily available on-line, sharing information among systems often requires professional involvement, no easy to use data manipulation tools.	data is not managed as corporate resource, most systems are not compatible, very little data is available on-line.
Breadth and depth of information	corporate data is broad and deep, includes environmental data as well as internally generated data in great detail, historical data is maintained and available on-line.	only limited environmental data is available through the IS, historical data is not maintained on-line.	no environmental data is available, there is no historical data in the system, internally generated data is kept at a relatively high level of aggregation.
External linkages	on-line, dial-in linkages to many external networks and databases are available to most city's officials.	few linkages to external sources of information, no on-line, dial-in capabilities, and/or only few officials have on-line connection with external networks/databases.	only operational-level, routine and standardized file transfers, or none.
Flexible & easy to use reporting, executive summaries, exceptional reporting	flexible and easy to use report generators which allow integration of data across systems, most systems provide executive-level summaries, exceptional reporting, and graphical presentation.	most systems provide menu driven report generator, usually restricted to the data stored in each system alone, no executive-level summaries, no exceptional reporting, no graphical presentation.	only routine, standardized print-outs of data, most system do not support user generated reporting.
Performance monitoring & performance evaluation	systems support for monitoring use of resources and many parameters regarding the city's outputs, on-going, standardized, and city-wide calculation of performance measurements.	systems support for monitoring use of resources and limited outputs' indicators, some city-wide performance measurements criteria are routinely calculated.	systems support for monitoring use of resources only, no performance measurements at the corporate level, or none.
Analysis tools (modelling, forecasting, statistics)	many analysis tools are available on-line at the corporate level, tools are well integrated with the city's data, available tools cover many aspects of the city's activities.	few, task-specific, analysis tools are available at the corporate level, analysis tools are not integrated with the other systems.	none.

At the corporate level we rate utilization of IT for decision support in City A as **low**.

2.4 IT support of the democratic process

In City A, there are very few computerized systems designed specifically for the purpose of supporting the democratic process. However, administrative functions usually within the city clerk's department which are supported by IT, provide as a by-product limited

support to some of the functions chosen as indicators for this study. For example, the administrative need to record and store council minutes results in a database, which while not easily accessible to the public, can be studied if one is willing to spend the time and effort. Also, councillors have voice mail messaging system which allows the public to record their concerns, and there is a voters' list database and automatic voting machines. Exceptional in that sense, the Public Library provides the public through the terminals in its branches, as well as remotely through modems, limited information regarding consumer indexes, city council minutes' index, and a directory of community-based organization that operate in the province.

In the area of supporting council members in their role as overseer of the administration, the city provides each with a PC and access to the mainframe. There is however, no software support (EIS type of system) to help them use it, and due mostly to lack of demand from council those PC's are used as office tools rather than as an independent source of access to information.

Table A.4: Summary of IT support for the democratic process in City A
(underlined = characteristics of existing system; shaded cells = system as rated)

	High utilization	Moderate utilization	Low utilization
General election	automated voting system.	calculation and reporting of results.	voters list, or none.
Publication of council minutes, decisions, legislations	on line, search and retrieval capable system, electronically accessible to the public.	database of council minutes, bylaws, policies.	computerized indexing system, or none
Communication between the public and its representatives	system capable of recording, channelling, and tracking constituents concerns.	system that records constituents concerns, or a messaging system.	telephone, or none.
Council's oversight of the administration (monitoring city's expenditures, operations, adminstration behaviours)	on-line, EIS type of system for aldermen.	on-line, menu driven query system and report generator.	on-line connection to all city's systems, or none.
Disclosure of municipality's data (budget, plans, programs, expenditures, etc.)	on line, search and retrieval capable archive, electronically accessible to the public.	magnetic media archive.	computerized indexing system, or none.
Involvement of the public in decisions	computerized survey/poll system that actively seeks and analyze public opinion, or interactive televised council meetings.	bulletin board which carries council agendas, and/or system that record public opinion regarding issues on the agenda.	televised council meetings, or none.
Reducing asymmetry of information (collection and distribution of social, commercial, and environmental data and statistics)	on line, search and retrieval capable system, electronically accessible to the public.	database.	computerized catalog, or none.

Overall, we rate IT support for the democratic process in City A as **moderate.**

3.0 Political behaviours in City A

3.1 General description

The political level in City A constitutes of the city council with 10 council members, and the City Mayor who is elected by the public at large. Subordinated to the city council but nevertheless maintaining some independent political power are two public boards, the Library board and the Police board. These boards consist of council members and public figures appointed by the council. They draw their authority from the city's charter, their budget is coordinated through city hall, but they formally report directly to council. A third board, that of the parks & recreation, is totally independent in all matters except for its budget. The members of the parks & recreation board are directly elected by the public, the board receives a lump-sum budget from council and is totally sovereign in its operation. Departments controlled by these boards are not formally under city manager's authority, and they are more independent in determining their direction than the core "city-hall" departments.

While the details about how the municipality uses IT is usually considered as an operational matter, and thus, it should not (normatively) be the responsibility of the politicians. It is hypothized however, that the political level may influence IT utilization in the city in three ways: a) by providing well defined goals, objectives, and strategic direction; b) by being directly involved in IS planning and projects development; and c) by creating unified authority structure. In the following three sections we assess the behaviours of the political level in City A and describe how they influences IT utilization.

3.2 Political leadership in City A

In City A, there is no formal document initiated or endorsed by the council that establishes the goals, objectives, strategies and priorities the politicians expect the administration to follow. There is also no formal, institutionalized process in which council members with or without city management routinely review the operations of the city and decide what they want them to be in the future. Rather, council in City A is usually reacting to events or to city management's reports rather than being proactive, and initiative. As the City Manager said,

> *We got problems, we go to Council and ask what is important, we get a whole bunch of specific issues which have to be programmed into the next two or three years ... It is always tends to be short-term and issue specific.*

That is not to say that in City A the council does not play a role in directing the development

of the city. New developments, real-estate projects, social programs, and by-lows are usually initiated by council and take the majority of its time. Those topics, however, only rarely address the daily operations of the municipality.

The only time the council in City A addresses, in a comprehensive way, the issues of the city operations is during budget time. In City A, however, there are no procedures in which council, prior to the budget preparation process, sets goals, service levels targets or program priorities, nor does it requests detailed analysis of what can be achieved given different levels of budget. The only directive given to the administration prior to the preparation of the budget is the level of tax increase the politicians are inclined to approve. When the provisional budget book is presented for council approval, it is already "cooked", departmental requests were already reconciled with available resources and the council is presented with a long list of expenditures but not with the expected outputs. Explained Deputy City Manager:

> *Analytic analysis and prioritization is in fact a constraint on the council ... They want to put, for example, a tree regulation, it does not take a nuclear scientist to understand that the cost of putting this tree regulation greatly exceed any sort of benefit ... but they say: we want it. If you try them with that sort of information [analytic models] they say academic.*

Furthermore, when council does make a decision in regard to how the administration should operate, it usually does not go beyond stating its wishes. Council does not usually consider how its decision should fit with other city operations, nor does it define operational objectives and the strategies with which to pursue them. For example, in his inauguration speech, December 5 1988, the new mayor said,

> *The key to efficient government is an informed and involved public. I therefore asking the city manager and city clerk to report back to council with options for a city hall communication program. It is imperative that citizens receive information on city services and that city-staff receive public input on significant issues.*

No operationalizable targets were defined, the council did not demand program evaluation nor time for when results are expected. In the reports and discussions that follow no reference was made to how these goals should fit with the rest of the city operations, especially with information technology[3]. Three years later a new council approved the hiring of two communication specialists to be positioned in city clerk department. The mandate of the newly created communication division, as recommended by the City Manager, was to

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[3] The only reference to IT was the request for $20,000 to buy a PC and other equipment to the new officials.

advance: a) city-wide communication standards (logo, format); b) corporate identity; and c) multicultural communication. These goals are significantly different from the strategic goals set by the Mayor.

Thus, when council does play a leadership role in directing the administration, its attention is usually short-lived and its recommendations are general in nature and open to interpretation. Council also does not have the means to check on the information brought before it, cannot track the implementation process, and usually is not too interested in doing either.

More often, however, in areas relating to administration, provision of services, analytic decision, and democracy, council in City A is reactive rather proactive. It approves funding for plans initiated by the administration, it controls the resources available to the city through the budget process, and it reacts to perceived public concerns by presenting management with a "to do" list of issue-specific items. In each of these types of decisions council resolution and policies tend to be ad-hoc, issue-driven and far from constituting a comprehensive overview of city's goals, priorities, and strategies. In our examination of more than five years of council's minutes and policies captured in the city clerk's database we were not able to find even one instance in which council initiated, or requested, a review of where the city stood and where the city wanted to be in the future in regard to the basic tasks of local government. Likewise, neither during the budget process nor in a separate process, did the council pass resolutions regarding how it expected the city to perform, and what should be its priorities and strategies.

Political leadership can also be achieved through informal involvement in the city's daily work. Thus, we ask senior managers for their perceptions regarding the role of the council in directing the city's operations. Deputy City Manager's response represents many others. He said,

> *Council actually has very little interest in getting involved in the daily provision of government services ... They typically get involved in issues of development, neighbourhood change, new programs ... the highly visible things which constitute maybe 10 percent of what we do here.*

Analysis of the content of council minutes and policies pertaining to the four domains on which we focus, confirmed that point. Council's policies do not direct the administration to seek goals other efficient administration, quality services, analytic decision making, and democracy. These policies, however, are also not setting clear, operationalizable objectives for management to follow. In general, council debates, decisions, and policies simply do not

address these issues. When asked about council directives, senior managers' responses were:

> *They are interested in getting the things done cheaper, in satisfying the tax-payer ... There is also a motivation to stay out of trouble .. Council does not know what is happening internally ... It is unreasonable to expect council to play the strategic leadership role, they are here perhaps a day or two a week, they have no relevant background in business sense at all, and they do not know what is going on internally.*

3.3 Involvement of the politicians in the development of the IS in City A

Addressing the question of political involvement in utilization of IT we found that politicians in City A are detached from this area even more than they are from the strategic planning area. Defining council's involvement in IS, City Manager said, *"Council is remote from it, is not greatly interested in it, and sometimes antagonistic to it"*. As far as we were able to track council's records, the issues of IT utilization, role of IT, and the development of the city's IS were never given attention at the political level. There are no records of council's vision regarding usage of IT, involvement in planning, or policies regarding IT. In council's minutes and policies databases we found 52 document in which IT, computers, or IS were mentioned. Each of these documents, with no exception, dealt with the approval of management requests for specific purchase, additional position, or operational funds. Not in one of them was there a decision, or discussion regarding how the IS should be developed or how the council wishes IT to be used in the city. Interestingly, even in the discussion of the communication with the public, described earlier, there was no mentioning of IT as a possible means to achieve the goal, nor reference to the existing IS and databases in the city. Council members, explained City Manager,

> *Mostly do not understand the concept of a strategic information system, they usually do not have the background necessarily to develop a vision regarding IT.... They also operate in a different cycle, the three year election cycle, while system development needs to operate in a much longer context.*

Said Deputy City Manager:

> *The information that is important to them is that which link council with the public ... That information system is principally the news media ... it does not highlight system development, efficiency, and quality of services. It highlight events, and it highlight scandals and conflicts ... there is pretty indirect relations between this information and utilization of IT.*

When asked to identify IS projects initiated by council or ones in which council members were directly involved, all city managers we talked with said there was no such projects. In

fact, Deputy City Manager who chaired the study team that developed the Information System Plan for City A during 1992, described his efforts to get councillors involved in the planning as: *"It was like pulling teeth"*. When asked about how IT is used in the city one council member told me: *"Ask management, I do not know nor wish to know, I have too much to do as it is"*.

3.4 Authority structure in City A

Like most local governments in the province, City A follows the council-manager form of government. However, there are many versions to this model of government. At the political level the council in City A is not the ultimate authority on all municipal affairs. Park & recreation, as already mentioned, is run by an independently elected board[4], and Council tends to confer considerable amount of independence on the Police and the Library boards, due to the public nature of these boards and the political repercussions of being seen as controlling them.

At the managerial level the authority structure in the city is even more fragmented. Three major functions in the city are not under the unified managerial authority of city manager at all. City manager office has no formal jurisdiction over Park & Recreation's operations, which constitutes on average 10.8% of all the city's operational budget. In addition, the Police Department and the Public Library Department, which together use more than 22% of the city's budget, are also reporting to separate boards which have the authority to oversee all operational matters except budget related decisions. Thus, while both the police's chief constable and the director of the library routinely coordinate their daily operation with city-hall, they are formally subordinated to their respective boards and if they so choose much of their operation can be pursued independently from city-hall. Lastly, even city-hall core departments such as: Engineering, Fire, Health, and Permits & Licences, are not directly under a formal and unified managerial authority. In City A, the city manager's primary roles are to provide liaison between the council and department heads, and to oversee the long term development of the city. Deputy City Manager described the authority structure:

> *[The office of city manager] tends in terms of charter authority to be more like a post office than in fact a CEO-like office. ... in 1973 or there about, council took a very*

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[4] While in the last couple of years, both the park board and city council are controlled by the same political party, the NPA, it was not always so. Even today these two bodies are to a large extent independent.

explicit decision to increase departmental independence. They felt that too much information to council is being filtered with a strong city manager, and they want departments to take a more independent role, in fact fight with one another. There are charter provisions that have department heads reporting directly to the council not necessary through any central coordinating body.

Table A.5, summarises our findings in regard to the extent to which the politicians in City A: a) provide political leadership through well defined goals, objectives, and strategic directions; b) support IS development and are directly involved in its planning; and, c) create uniformed authority structure.

To summarize, in City A, council neither provides clear goals, objectives, and priorities for the administration to follow, nor are council members involved in long-term planing, participate in defining the objectives of the various departments, or demanding that departments will meet certain performance criteria. In a sense there is a leadership vacuum at the political level in City A since the politicians do not provide strategic leadership, demand result-oriented corporate management approach, or closely supervise the bureaucracy. Overall, we rate political leadership in City A as **low** since the political level, in general, does not fulfil the roles normatively expected from leaders.

The politicians in City A are not involved in the development of the IS, not interested, and even somewhat antagonistic. On the scale of being champions of IT utilization, actively involved and highly instrumental in the development of the city's IS to low involvement or even somewhat obstructive, we rate the political level in City A as **low**.

Overall, on a scale from highly unified authority structure to low uniformity and fragmented authority, we rate City A as **low**.

Table A.5: Summary of the ratings of variables and indicators related to political behaviours in City A

(shaded cells = current practice/situation; thick lines = factors as rated)

	High	Moderate	Low
Political leadership provision and commitment to well defined goals & strategic directions in all areas of operation.	on-going, formal processes in which council formulates and reviews the city's plans and operations, in a comprehensive way.	institutionalized, one-shot process in which council set its objectives for the term/year.	no formal process in which council set goals priorities, and directions.
	council is interested & actively involved in goal setting & strategic planning.	council supports & encourages but is not involved in goal setting & strategic planning.	council does not support nor involved in goal setting & strategic planning.
	top-down, comprehensive budgeting process in which council provides result-oriented guidelines.	bottom-up but comprehensive budgeting process; council does not provide guidelines.	bottom-up, fragmented budgeting process.
	existence of mission-driven, updated strategic plans, officially endorsed by the political level.	strategic plan/s exist but not officially endorsed by the political level, or, are not comprehensive.	there are no long-term strategic plans.
	resources are committed to long-term strategic plans.	there is a long term capital investment plan but there is no direct commitment of resources to the strategic plan.	there is no long-term commitment of funds, only ad-hoc, yearly allocation of resources.
	council is perceived as leading in all areas by politicians & bureaucrats alike.	council is perceived as leading only in some areas by politicians & bureaucrats.	council is not perceived as the leader in most areas by politicians & bureaucrats.
Political involvement in IS involvement and active participation in IS development.	council is interested and actively involved in directing IT usage.	council is interested and supportive but not involved in directing the development of the IS.	council is not interested, not involved, and even somewhat opposes the development of the IS.
	council develops formal vision and policies regarding the role of IT.	informally there is a shared vision regarding the role of IT among council members.	council does not have a vision regarding the role of IT in the city.
	council, in its goals and objectives, explicitly refers to the development of IT based systems.	council initiates few IS projects on an ad-hoc basis.	council does not initiate any IT based projects.
	there is a political body that directly oversees the IS function.	there is no special body that oversee the IS function but council receives reports and presentations from the IS manager.	council does not directly oversee the IS function nor asks for reports or presentations.
	council formally discusses and endorsed a comprehensive IS plan and commits to the plan as a whole.	council is aware of the IS plan but discusses and funds each project separately.	council is not aware nor interested in the IS plan/s.

Authority structure unified authority at the political and operational levels.	there is a coherent and unified authority structure for all aspects of the city's operations.	few aspects of the city's operations are not directly controlled by the central, political, authority.	there are a number of political bodies, each has the authority over a part of the city's operations.
	authority over all matters relating to IT utilization resides in only one political body.	there is a central authority, at the political level, that controls most IT related matters.	IT related matters are controlled, at the political level, by a number of different bodies.
	council gives the senior manager authority to direct all the executive branches of the city.	council gives the senior manager only limited authority over the operation of the departments.	there is no central authority below the council level, each department directly reports to some political body.

4.0 The bureaucracy in City A

Four behavioral patterns commonly associated with bureaucracy were proposed as major factors that may influence the development of IS that support the organizational goals (lack of coherent corporate management, incrementalism, fragmentation, and internal/control/status-quo orientation). In the following sections we describe our findings in regard to each of these four factors and assess how the Municipality of City A should be rated on each. To do so we investigated behavioral patterns in the city in general such as: the budget process, buy or build policies, allocation of resources, and issues directly related to the IS function in the city such as: the IS planning process, structure and status of the IS unit. When possible we tried to avoid the question why the administration is behaving like it does. This is certainly an interesting topic, but we feel that it does not serve the purpose of this study, and thus, we aim to establish what the behavioral patterns of the administration in City A are rather than why they are as they are.

4.1 Corporate management approach in City A

The vacuum in political leadership which results from the fact that in general the political level in City A does not provide clear strategic goals and priorities for the bureaucrats to follow, is not filled by city management. Historically, the city was managed as a collection of some 15 loosely related functions which shared resources but not much else. Today, there is a growing recognition among city management that a more corporate, mission-driven approach is needed. However, even though city manager office is doing much to transform the group of department heads into a coherent and cohesive corporate management team, it is a goal still far from being accomplished. City A is still being managed with no strategic plan, there is no systematic process in which goals and priorities are determined on a city-wide basis, and departments are to a large extent still pursuing their goals without a centralized corporate guidance.

Late in 1991 the city management group which consists of all department heads, drafted a one sentence mission statement, a one page declaration of objectives, and articulated the values held by the administration and the inter-departmental ground rules. This document, however, is very broad in nature and so high-level that to all practical matters all strategic choices can be justified by it, and it can serve as a base for whatever priority one chooses. While the City Manager recognized the need for a more detailed plan, and believe that departments should follow and develop their own strategic plan based on the corporate plan,

at the time of data collection none of that was done nor was it in the process of being formulated.

At the short term, the determination of how the city allocates its resources is accomplished through the yearly budget review process. This process, however, is not mission driven nor a top-down process in which corporate goals and objectives are reviewed and prioritized and then serve as guidelines to the process of reconciling budgetary needs with available resources. Rather, without an a-priori, formal discussions of departmental goals and next year's objectives, at the corporate management level, each department is left to develop its own plans and to submit what it considered as needed to maintain its level of service. This leaves the budget review committee with an enormous task of integrating the departmental requests into a realistic and achievable budget. This task must be accomplished without the help of clear guidelines, or even informal agreement among departmental heads regarding what are the goals and the priorities of the city. Naturally, the budget review process becomes an ad-hoc, input-oriented process. The committee does not have the time, nor the knowledge, to assess the merits of each of the departmental programs, it cannot independently judge alternatives, and it is usually too late in the process to allow the committee to initiate drastic changes in the structure of the budget proposed by the departments. There is also no direct involvement of the management group as a team in the process of prioritizing the departmental requests, thus, without corporate management backing, the committee reverts to a process of negotiation with each department which leads to a more or less status-quo in resource allocation. The comptroller of the Budget & Research Division in the Finance Department described the process during a telephone interview:

> *City manager, who chairs the budget review committee, is trying to build corporate management approach, it is a hard uphill struggle, we are still far from it. We want to move to a process closer to program budgeting, or zero-base budgeting, but budgeting is still very incremental. In the budget process there are no a-priori defined objectives, criteria, or priorities ... each department is required to submit what it takes to maintain the current level of services they are providing ... generally we are not looking at objectives, output criteria, or reevaluating existing programs. We, at budget, question the departments: why is it needed? where can we cut? but departments are defensive, they protect their interests ... at the end it is the resources we have and how to divide it between departments rather than objectives and outputs.*

For the 1994 budget, city manager office issued only one corporate level directive, each department was required to incorporate a 5% cut in the budget it submits. This across-the-board cut clearly do not represent corporate management approach to resource allocation nor mission-driven prioritization.

In the area of IT utilization, the lack of corporate management is even more evident. In City A there is no long-term IS plan, nor an executive-level steering committee that directs the development of the IS from a corporate perspective. It is not that the need for a more corporate long term approach to IS planning is not recognized in City A, rather, it is the result of the lack of corporate management, inertia, and attitudes of senior management that do not set the stage for a comprehensive top-down approach to utilization of IS. As city manager said:

> *Until the city as an organization has articulated better the direction it wants to go, it is tough to have a strategic IS initiative. Unless they're given a clear strategic direction, I think the IS guys were legitimately entitled to say: what the hell are we suppose to do, we do not know what to build because you haven't told us where the organization is going.*

The story of the ISP (Information System Planning) study group demonstrates this point. A year after taking the job, the IS manager initiated a long-term, IS strategic planning process utilizing IBM's "Business Systems Planning" methodology. A study team chaired by the Deputy city manager worked for a year to produce a comprehensive strategic IS plan. Among the many recommendation made in the final report, submitted in June 1992, it identified the lack of corporate approach to information as one of the major weaknesses of City A, and argued for the establishment of an executive steering committee. It recommended a consolidation of all IS functions into one unit which should be elevated to the status of an independent department, and identified a large number of applications that have to be developed in order to make better use of IT. While department heads were interviewed during the teams' needs assessment study, and even though the process was championed by the Deputy city manager, there was no top level commitment to the process nor clearly defined mandate and expectations.

Today, almost two years after the report was submitted, it is still in a state of limbo, neither rejected nor approved. Senior managers' reactions to the ISP report demonstrate the lack of congruence in perception regarding the role and importance of IT in City A. City Manger believe that the ISP team addressed an important issue but, as he said,

> *The ISP committee will have to go back and redo some of their work. There are a lot of nice phrases but no substance in terms of how to use the technology strategically.*

Analyzing the ISP report we did not find that critique justified, rather, we think that it stems from a differences in expectations regarding what the planning process should have produced. In contrast, a number of department heads we talked with had only superficially glanced

through the document and did not express much interest in the subject at all. Yet the IS manager believes that:

> *It took too long and end up with too many compromises ... We were a committee of twelve people and each prefer some other thing and it should have been one or the other but of course somebody should have say so, rather than compromising like we did. For insider it was very hard to say what is needed to be done, I would say impossible... we should have done it faster and with a voice that somebody would listen to. The main inhibiter to bring about a change in the way IS is perceived is their [department heads] attitude. It is cost control vs. investment attitude.*

In the meantime, the strategic IS plan was never seriously considered by the management group, nor presented to council. Computer Services is still a division in the finance department, and the city's management team is still not involved in the development of the city's IS. As the IS manager describes:

> *Now we are in between, no one knows really what should be the standard of operation. It would have been so different if we were successful in getting to the senior management ... We are doing what we feel should be done but from the bottom, at the margin, with no official backing and with no ability to tackle the main issues.*

Typically to an area where there is no top level commitment and leadership, even those recommendations that were approved are not carried out. For example, the need for executive steering committee was recognized and the city's management team decided that all department heads will sit in that committee. This committee did not convent even once. When asked why, City Manager, also a member in the proposed committee, said,

> *It might be that departments are reluctant to open issues that might force more integration or changes in the division of responsibility. Also, some top executives do not really understand the possibilities and do not see its importance, but why we did not try to make it work? I don't know the answer.*

Interestingly, almost a year after our visits to City A we learn that city management decided to try again at strategic IS planning. This time, however, the city is going to hire an external consultant. As a senior manager told me: *"Not because the ISP is not good enough, but because external expert stand a better chance to persuade top management and the council".*

4.2 Assessing the level of fragmentation in City A

The municipality in City A is to a large extent a *"collection of a number of quite independent departments with relatively little overlap"*. The fragmented authority structure at the political level, the lack of strong corporate management and the confusion of decentralization with departmentalization, shared by many top level managers, create an

organization where there is a *"strong sense of departmental "ownership", territorialism, and "turf-wars"*. City Manager, his deputy, and City Engineer estimated that: *"there is not much inter-dependency"* between departments, and that to a large extent each department is perceived and managed as a separate unit, de-facto doing what it wants to do. This managerial philosophy, which is increasingly recognized as an impediment, is nevertheless, effectively the dominant way City A operates especially in the area of IT.

In City A, the four larger departments have their own IS units, totally independent of the central IS function. Control over IS related budget is distributed among departments and thus, projects that require new equipment, software, or outside help in development, are de-facto controlled and directed by the department that "*foot the bill*". Even though in most cases departments coordinate their initiatives with Computer Services, there is no mechanism in City A that forces standardization nor an integrative approach to system development. As the IS manager said: "*I feel that the case is that they [the departments that have their own IS] cooperate only when they want to..*"

In City A, there is neither a data administrator, nor compulsory data standards, each application is "owned" by a user department which is to a large extent sovereign to decide which data to store, in which format, and who should be allowed access to the data. Analysis of the pattern of usage of the systems in the city shows that out of the 70 largest computerized systems only six are used by all 17 departments. Additional six systems are used by 12 departments, and the rest are used by only one or two departments each.

An example that demonstrates the fragmentation of the municipality is the case of the Geographic Information System (GIS), which is under development in City A. Almost all the data in the municipality have a geographic aspect to it, and much of the work done in many different departments is closely depends on maps, zoning, development plans, and sites analysis. A computerized system that integrates a digitized geographical data with text base data regarding properties, finance, ownership, population and more, is commonly seen as one of the major corporate assets. This system can serve as a tool for analysis, integration of processes, sharing of information across functions, and drastically enhance many different services and internal processes. The need for such system was recognized in City A more than five years ago, however, only when the mapping system in Engineering reached the end of its usefulness and the city stood to lose everything it had in terms of digitized mapping, actual work on developing the GIS started. In fact, what started the process was the decision in Engineering to fund the replacement of the mapping systems. Recognizing that there is

more to GIS than a mapping system, the Finance Department (host of the Computer Services unit) decided to join in and pay for some of the project and together with the planning department, set to define a broader objective for the system. Today, City Manager and the Director of Finance believe that the GIS project is being developed as a corporate project, Engineering still pays for most of the system and accordingly still drives its development. As City Engineer explained,

> *We are working on a number of IT initiatives, separately, within the department, apart from what is happening at the corporate level ... Our big initiative is the GIS, it is going to be a 2-3 million dollar investment. Council was not going to approve additional budget, so you have to finance it from the budget of the departments. The city would not make such decision, it is up to the departments. We saw [GIS] as a priority and come up with the money ... we went to other departments and invite them to join the development (and costs) but none of them were willing to give up resources ... so engineering is proceeding alone ... the other departments will ultimately have the benefits. We do try to coordinate and make sure it is not inconsistent with their needs, but basically at the application level it is geared to our needs.*

Lastly, in City A, due mainly to the fact that historically data processing and the telephone system did not have much in common, authority and responsibility for all systems that handle voice is in the hands of the Engineering Department while data is officially the responsibility of Computer Services and de-facto distributed among the various users of the different systems.

4.3 Assessing incrementalism in City A

Effective utilization of IT to support organizational goals means, in many cases, drastic departure from existing routines, work-processes, and current organizational structure. In the absence of such changes, the technology, instead of significantly enhance goal achievement, may have only marginal impact on the organization operation. Support from IT also depends on a certain level of IT infrastructure being in place before significant benefits can be realized. Thus, the ability of an organization to achieve high utilization of IT to support its goals is often in stark contrast with bureaucratic tendency to move forward in small increments.

In City A, we found that incrementalism is the common behaviour and a pattern that is not likely to change soon. Since there is no strong corporate leadership, either political or managerial, and since authority is fragmented it is almost impossible for the municipality to focus its few free resources, or to make drastic changes in its routines or structure.

The budget process in City A, as already described, inevitably results in a stable

allocation of resources across functions. In fact, an analysis of the percentage of the total budget[5] allocated to each of the departments in the last six years reveals that the larger change between two adjacent years was 0.5% and that the average yearly change in absolute values was only 0.12%.

Another reason that City A is almost bounded to the incremental approach is the municipality's inclination to rely on internal resources for almost all tasks, rather than using the market for competitive contracts or outsourcing[6]. This method drastically reduces the flexibility of the municipality since most public service professionals are unionized and it is almost impossible to layoff employees and very difficult to re-classify or move them from one position to another. As a result, a considerable part of the city's resources is tied to salaries and cannot be changed, and since the city cannot easily re-allocate workers, the resources available to develop new initiatives are distributed and unfocused.

In the area of the IS in City A, the impacts of the inability to change priorities and to focus resources are profound. While the number of systems on the mainframe increased by 28% from 1988 to 1991, the number of mainframe users by 203%, and the number of PC's installed by 296%, the staffing level did not change to keep pace with the growing workload. The same is true for the yearly budget of the Computer Services division which stood in 1992 at 6 million dollars and for all practical matter have not changed in the last five years[7]. As a result, the backlog of users demands was estimated in 1992 as 45 persons-years[8], which is equivalent to almost seven years, baring additional requests, since Computer Services can allocate only 15% percents (7 persons) of its resources to development, a

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[5] Interestingly, we got the same results when analyzing operational budget as when we calculated changes in consolidate budget (operational + capital). We used the yearly budget books as the source of the data.

[6] For example, in City A non of the tasks that easily lent themselves to be contracted out, such as; garbage-collection, recycling, minor and major construction projects, and data processing is done by outsiders. The only exception is that during the busy months at summer Engineering often contracts out work that is beyond their capacity. One of the City Engineer's deputies estimated that they usually do 70% of all construction work by internal resources even though contractors are usually 10-15% cheaper than internal works.

[7] 6 million dollars represents only resources controlled by the corporate I.S, new equipment and major projects are budgeted by the departments independently and are not included in the Computer Services budget. Very rough estimate based only on the number of IS personnel working in other departments will put overall IS budget at 9.2 million.

[8] The data was taken from the ISP report. According to the IS manager, from 1991 to the time of data collection the situation has only deteriorated.

number that is gradually diminishing as systems are aging. In the face of the growing needs and his conviction that IT should be approached differently, when asked about his ability to focus on important applications, the Manager of Computer Services admitted,

> *Because we have very little resources there is not much to argue about. We have enough to keep the shop going but no extra resources to do much else, so it is very difficult to do planning and development. That again is tied to history, that is the IS portion of the pie, there is no way we will suddenly receive much more without drastic change in attitudes.*

4.4 Assessing the dominant orientation of the bureaucracy in City A

The dominant orientation of the bureaucracy in City A is defensive. Managers are preoccupied with operational matters, cost-saving and internal efficiency, and little is done in the area of future investment, innovation, or planning. As the Deputy City Manager said, *"We are managing the crisis of the moment ... not thinking enough about where our business is heading ... I often compare this place to a "half billion a year" corner store"*. City Manager said:

> *I do not think we have looked at information systems as a way to change the organization. I think that is because we all, in this place, tend to be highly operational, very much into the day to day business and how we make the business work better, rather than how do we want to change the business. I do not think we have looked at the future of the organization enough.*

While there is no formal policy to that effect, City A tends to do things internally or not at all. The city does not contract-out any of its functions, and there are no joined ventures between the city and the private sector, nor with other municipalities or neighbourhood organizations. As a result City A directly employed approximately 8206 workers at any given day, a worker for every 62.5 residents which is much higher than in other municipalities. City A is also very input-oriented, there are no city-wide policies regarding output, or performance measurement, and the major criteria for decision making is short-term saving. Managers we talked with indicated that new initiatives were expected to: *"At least break even with existing costs of operations before standing any chance of being approved, output criteria such as level of service, or vision regarding the future, can not serve as the major justification these days"*. The following policy passed by the council on February 2nd 1992, following the recommendation of the City Manager, mirrors that orientation. It reads:

> *There would be no net increases in services or staffing in 1992 and 1993 without appropriate offsets ... Departments and boards are instructed that any recommendations for increased staff or enhanced programs be accompanied by*

recommendations for matching cost decreases or related revenue increases.

Lastly, the city tends to avoid investing resources on infrastructure or on long term development. City A spent only 0.5% of its budget on staff training during 1992 (0.2% in 1991) which is half of what other municipalities of the same size spent, and only 30% of that sum was dedicated to general education and human resource enrichment[9]. Major endeavors which are widely recognized as needed are often postponed and investments are delayed until there is no way to avoid them. For example, the development of the GIS system was postponed for five years until the existing mapping system was close to break down, and even though the need for strategic planning was recognized and mentioned in documents three years ago, both City Manager and his deputy said that maybe the growing financial squeeze will finally force the city into looking at it more closely.

Table A.6, summarises our findings in regard to the behavioral patterns of the bureaucracy in City A in the areas of: corporate and strategic vs. local and operational management; unification vs. fragmentation of power and strategic decision making authority; incremental and slow vs. rapid and drastic changes; and, defensive and status-quo vs. proactive and innovative orientation.

To summarize, we assess that City A does not have a strong corporate management, and that in the area of IT there is no corporate-level management at all. We rate corporate management in City A as **low**.

We consider decision making in City A, at the strategic level, to be extremely decentralized and uncoordinated, and that departments are relatively independent from one another and from the city manager office. On the scale of integration vs. fragmentation we rate City A as **fragmented**.

We judge the ability, or willingness, of City A to prioritize its operation, to focus its resources, and to undertake projects that demand significant changes in the way it operate as low. On the scale between dynamic and changing to incremental and status-quo bounded we rate City A as **incremental**.

We assess City A as input oriented, managed from a short-term, cost-saving perspective, and focused on the existing processes rather than on changes and innovations. We rate this dominant orientation as **low** with respect to how conducive it is for the development of IS that strongly support organizational goals.

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[9] This data was taken from a study done by the Personnel department late in 1992.

Table A.6: Summary of the ratings of variables and indicators that relate to the behaviours of the bureaucracy in City A

(shaded cells = current practice/situation; thick lines = factors as rated)

	HIGH	MODERATE	LOW
Corporate management	city management is a source of vision, manifests coherent and proactive approach to management, initiates policies and lobbies for their approval.	city management has a coherent approach to management but tends not to be visionary and to react to the political level rather than to influence it.	city management does not demonstrate visionary and coherent managerial approach, tends to see the implementation of council's policies as its only role.
	city management, as a group, champions and is actively involved in strategic planning.	city management, as a group, supports and often initiates strategic planning but is not championing it nor directly involved.	city management, as a group, is not very interested nor involved in strategic planning.
	top-down, goal-driven budgetary process, tightly connected with the strategic plan.	only capital budget is driven by an a-priory defined goals and strategic plans.	bottom-up budgetary process, disconnected from long-term plans.
	institutionalized process in which management reviews departmental plans and operations on a periodical basis.	management reviews departmental plans and operations on an ad-hoc basis when there are problems.	usually departments' plans and operations are not reviewed by city management.
	city-wide standardization of processes and managerial practices.	some processes are standardized city-wide but it is not comprehensive nor strongly stressed by management.	no standardization of processes and managerial practices.
	there is an approved, long term, and comprehensive strategic plan for the city as a whole.	there are some domain-specific (not departmental) strategic plans but not a comprehensive plan for the city.	no strategic planning at the corporate level, only at the departmental level.
	IS manager is a member of the city's management group.	IS manager is one level below city management level.	IS manager is 2-3 levels below city management level.
	IS is perceived as a strategic, corporate resource.	IS is perceived as a corporate resource but mostly used to support the operational level.	IS is perceived as a supportive tool for the departments.
	IS steering committee consists of top level executives and operates at the strategic level.	IS steering committee consists of middle level managers and operates at the tactical level.	There is no IS steering committee, or, it is not active or not influential.
	IS development is directly controlled by city management and driven by the city's strategic plan.	IS development is corporately prioritized but driven by operational, problem solving perspective.	IS development is controlled by the departments each separately driven by its own operational needs.
Fragmentation	the city is managed as one integrative entity.	departments are to a large extent independent in their operation but well coordinated at the strategic and operational level.	the city operates as a holding company with very limited inter-departmental dependencies.
	no significant signs of territorialism, turf-wars, and frictions between departments.	moderate level of authority related frictions, turf-wars, and territorialism.	many evidences to behaviours that stem from territorialism, turf-wars, and disputes regarding decision making authority.
	strategic planning is comprehensive, done at the corporate level, tend not to regarding departmental boundaries as a constraint.	strategic planning is done by iter-departmental task forces but for each domain separately.	strategic planning is done by departments in isolation, or, no strategic planning at all.
	innovations are implemented regardless of departmental boundaries, there is a conscious effort to break those boundaries.	only few innovations and changes bridge departmental boundaries, there is no stress on breaking up departmental boundaries.	changes and innovations tend to be confined to a specific department.
	there is a central IS function, all IT related budget and development are controlled and guided by the IS function.	the IS function is a central support unit, budget and development are managed by the IS but guided by departmental needs.	departments have their own IS units, IT related budget is controlled and prioritized by departments.

	city-wide standards for hardware and software.	partial standardization of hardware and software.	no city-wide standards for hardware and software.
	all data is perceived and managed as a corporate resource.	administrative related data is managed corporately, otherwise, each department manage and own its data.	most data is owned by the departments.
	most systems are integrated city-wide.	administrative systems tend to be integrated but operational systems are not.	most systems are departmental, low level of system integration across departments.
Incrementa-lism	relatively high variance in allocation of resources over the years (avg > 1%).	moderate variance in allocation of resources over the years (0.5% < avg < 1%).	very stable allocation of resources over the years (avg < 0.5%).
	relatively large portion of the city operations are contracted out.	moderate extent of contracting out.	almost all city operations are carried out by city employees.
	in the past few years the city implemented many drastic changes in its priorities and operations.	few significant changes in priorities and modus of operation occurred in the last few years.	no significant changes in priorities and operations took place in the last few years.
	IT is used as a change agent to significantly alter the way the city does business.	IT is not used as a change agent but some systems significantly changed the way the city operates.	IT is used mostly to mechanize existing processes.
	managers believe that drastic changes are both necessary and feasible.	managers believe that drastic changes are needed but can, and should, be achieved only incremental.	managers do not believe that drastic changes are needed nor that they can be achieved in the context of municipal government.
	relatively high percentage (40-30%) of IS resources are dedicated to new development.	moderate percentage of IS resources (30-20%) are dedicated to new development.	only small percentage of IS resources (under 20%) are used for new development.
	there is a sense, shared by managers, that "things are moving rapidly" in the municipality.	there is a sense, shared by managers, that the municipality is moving ahead but at a moderate rate.	there is a sense, shared among managers, that "nothing is moving" in the municipality.
Dominant orientation	criteria used to justify new initiatives are: vision, quality of services, and long-term productivity.	criteria used to justify new initiatives are related to: efficient delivery of services and operational needs.	criteria used to justify new initiatives are: short-term cost saving, control over resources used, and efficiency of existing processes.
	high emphasis on staff training.	moderate level of importance to staff training.	low importance to staff training.
	the dominant strategy in the city is proactive and innovative -- seeking improvements through investment in technology and organizational changes.	the dominant strategy in the city is effective utilization of existing resources -- seeking improvements through maximization of resource utilization.	the dominant strategy is defensive -- seeking to maintain the level of operation through cost reductions.
	the city implements many contemporary, innovative ideas regarding public administration.	only few of the contemporary innovations in public administration are implemented.	the city does not implement contemporary, innovative approaches to public administration.
	the city makes an extensive use of external consultants, and is open to its environment.	the city uses external consultants only for technical issues.	the city hardly use external consultants, and is relatively close to its environment.

APPENDIX B

THE CASE OF CITY B

1.0 General

City B is one of a number of medium size communities that together constitute a large metropolitan area in western Canada. Starting as a small rural community it is now one of the fastest growing residential areas in the region with an average annual growth rate in population and number of households of 3.8%. While primarily still a residential community, city B is becoming more and more attractive to industries and commercial firms due to its vast land reserve and its excellent freeway access to other commercial centres in the area. The population of city B is currently around 90,000. City B' municipal budget in 1993 was around 95 million dollars, and it had 462 full time employees at the end of 1993.

1.1 The IS function in the municipality of City B

The first large scale computerized system employed by city B was the Unisys System 80, acquired in 1984 to support accounting, property tax billing, and payroll, and to maintain data regarding permits, business licences, and voters' list. As often is the case in early development of IS, the major drive for the system was the need for financial control, and thus the Computer Services unit was under the control of the treasury department.

Almost from the time of its establishment, Computer Services was unable to satisfy the growing needs of the various departments in the municipality for computerized support. Staffed with only five IS professionals and having to operate and maintain applications for which vendor's support was terminated, Computer Services was unable to develop new applications and had to treat as outside of its area of responsibility the planning, maintenance, and support of PC's and departmental systems that were being developed. This situation did not change until the end of 1991. Computer Services staff, which remained stable at five, was fully occupied with the task of operating the mainframe systems and with the conversion of the aging Unisys applications to Unix-based minicomputers. Consequently, its knowledge of the existing systems and data that proliferated within the municipality was restricted to those systems that resided on the mainframe. As an external consultants group hired by the city in April 1991 reported, this had profound impacts on the IS in city B,

> *Because it [Computer Services] does not have the mandate, and as Computer Services' requests for funds become less and less accepted by council, Computer Services stop setting directions or support departmental initiatives. Thus, there is [in 1991] no cohesive IT strategy within the District which encompasses the planning of the needs*

> *of all the departments... Management and council are reluctant to appropriate funds to IT because of lack of clear cohesive objectives, and training is not emphasized, partially because management feel that there is not much reason in training workers in computers that are largely not available and not doing its work.*

This state of affairs, while severely limiting the scope of City B's investment in IT, did not stop it. Primarily based on departmental initiatives and funding, between 1989 and 1991 the number of stand alone PC's in the city increased from 12 to over 70. Engineering, which was the leading department in computerization, purchased or developed over 30 different applications during the last half of the 80's, and various departments hired or trained employees as their in-house IS experts. Demonstrating the loss of central control over the IS in the city is the fact that while city B spent in 1990 1.2 million dollars on IT, only 538,000 dollars were controlled or otherwise associated with Computer Services. The results was a disjointed, fragmented, and in comparison with other cities, underdeveloped, municipal IS. A sample of the findings of the report cited earlier demonstrates this, it stated:

> *The city uses a mix of incompatible computing environments; the Unisys model 80 framework, IBM compatible PC's, Sun's work stations and NBI's LAN in engineering, Pick-based CLASS system in Park & Recreation, SCO's Xenix-based system in the library, and several Macintoshes in the planning department... There are eight different word processors, at least four spreadsheet software packages, and two different e-mail systems have recently been implemented within Engineering and Park & Recreation... Apart from the 29 mainframe terminals, all the departments' data and applications are not available city wide... There is a lot of duplication and fragmentation of programs and data... most departments are tracking their own financial data independent from the central treasury reporting system... Data such as time-cards and billing is being entered manually into several different computerized systems and then, manually converted to fit the requirements of the payroll or the accounting systems.*

The report also stated that while there is a tremendous need to share information among the departments, the city's IS makes that difficult and in many cases impossible. The report stated,

> *The problem in sharing of information is both one of definition as well as one which involves technical integration of data. For example properties are referred to by the legal department by their legal description while the planning department often refer to the same properties by their roll number. From the technology perspective data is not easily sharable within current systems. Database were design base on specific application needs rather than planned with the view of the overall needs of the district, and sharing of information is prohibit by the lack of connectivity between P.C base systems and the mainframe ones as well as the departmental standards which differ from one to the other.*

It is of no surprise that the staff in City B, had a low opinion on the systems. The consultant

reported,

> *Generally most users are not aware of the applications' capabilities or the extent of information available vie computer in the city. The lack of awareness is particulary true between departments. [This situation] is understandable when one consider that users have a limited training on computer applications, relatively poor documentation, and limited access due to the fact that each terminal or PC serves more than three people... In general users satisfaction is quite low, they feet that information technology does not support them adequately and they have a lot of problems with getting the information and sharing it with others and between different usages and applications. For example until 1991 closing the accounts books at the end of the year took more than six months into the next year.*

All aspects of the IS function in city B changed drastically from 1991 onwards. Following the uncovering of an embezzlement in the municipality the City Manager was dismissed, together with a number of other senior managers, and a new manager was hired in August 1990. Among the first initiatives of the new City Manager was a recommendation, submitted to the council in November 1990 to invite proposals for:

> *An evaluation and audit of the district's data processing needs and comparison of options available ... for a complete systems plan. Including hardware, software, communication networks, and staff structure required by the district for the next five years.*

Early in 1991, a five year strategic information technology plan was presented to the city's management by a consulting group. Later this year a detailed implementation plan was presented to council and approved in August 1991. The following years witnessed profound changes and intensive activity within the IS function of city B. As recommended by the plan, the dispersed IS functions in the city were consolidated into one independent unit. A new IS manager with extensive experience in the private sector was hired. The IS function was elevated to the level of a department reporting directly to Deputy-City Manager responsible for Administrative Services. Responsibility for all computerized systems was transferred to the newly created department[1], and all budget related issues associated with IT were centralized in the hand of the IS manager. During these two years the total number of IS professionals in the city increased from 6.5 full time equivalents at 1991 to 16[2] at the end

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[1] With the exception of some task specific systems that remained under the control of the engineering department, basically because those systems were: working well, engineering had the knowledge to run them, and the new IS department was too busy looking at other systems.

[2] The numbers before 1992 were: 5 in Computer Services, 1 in engineering, and 3 employees that had part time IS related functions within their departments. At the end of 1993 there were 12 in the IS department, 2 in Engineering, and 4 half time positions in the other departments.

of 1993, including six half-time expert-user positions. And, the IS's operational budget increased from 650,000 dollars in 1991 to 1.2 million in 1992 and 1.5 million in 1993. These changes are even more significant than the numbers suggest since, while the major drive was to centralize the IS function, the city opted to decentralized data entry and user support functions. Thus, while the numbers pertaining to 1991 include a full time position for data entry within Computer Services, this position was cut to a half in 1993 and at the end of 1994 all data entry is expected to be preformed by non IS personnel. Similarly, expert users in many departments were trained by the IS department to provide basic support to their fellow workers as well as to perform simple system's maintenance tasks such as backups, changing tapes, and initialization. Those people, while not formally under the authority of the IS manager, serve today as the IS contact point with the departments, they identify problems and needs and routinely report to the IS manager.

1.2 Utilization of IT in city B

> *When a new guy comes into an organization he is going to take a fresh look and one of the things that was clear to me was that [the city] does not use technology effectively, it was not being used at all to speak off ... Two years ago we were in the dark ages ... we are now starting to move out of the dark ages here.* (said the City Manager)

City B does not only started to move ahead but in a short time succeeded in moving from a position where IT was only marginally used to being among the leaders in municipal IS in the province. Following, almost to the letter, the plan drawn by the consultants, city B today has a fully operational IT infrastructure, capable of supporting the major applications identified in the plan, as well as to provide a flexible platform for future development. Taking advantage of the conversion to UNIX-based minicomputers, that started in 1989, the city adopted a UNIX-based, open system, network architecture in which five minicomputers, each dedicated to a group of inter-related applications and databases provide the main computing power. These computers, of which three were already in use in 1991 as stand alone machines, are inter-connected through WAN which also provides the links between the central systems and the seven LAN's implemented in the various sites the city occupied.

At the same time that the IT infrastructure was being built the city started the process of transforming its fragmented, outdated, and ineffective software programs into a cohesive, fully integrated, on-line system. The principle that guided the change was summarized in the Five Year Strategic Information Technology Plan:

> *Key to the district future information technology directions is the concept that data must be planned and manage as a corporate resources. The plan incorporate this strategy by defining, as a goal, architecture of central repository databases that will be accessed and updated by all district computer applications. Thus, reducing and eventually eliminating data redundancy and data entry duplications.*

Following this principle, a new position of data administrator was established, to ensure city-wide data consistency while existing systems where migrated to the UNIX platform and new ones developed. As the IS Manager described:

> *We are the custodians of the data, the departments are the owners. They are responsible for defining what is needed, the content, and who will have authorized access. We help them define the entities, standardize the data, make sure it is consistent with existing formats, not redundant, and easily accessible.*

This process of standardization and centralization is getting close to completion. It includes not only the city-wide systems which used to reside on the Unisys mainframe, but also many of the departmental systems.

For example, the role of the GIS system which was purchased by Engineering in 1990 was greatly extended to become the central repository database for spatial related data and to provide a base for many applications, not exclusively those of the Engineering department. Similarly, to the existing work-stations and departmental networks the city added more than 200 new PC's. It standardized the front-end of the systems by connecting all of them into a city-wide network, and set a standard office environment which run under Microsoft Windows and includes Word's word-processor, Excel spreadsheet, MS Access database, and MS Mail.

This enables the city to ban departments and individual workers from saving data independently on their hard drives and insures city-wide sharing of information, since all data is maintained either in the central databases or on the network servers.

The plan also took a fresh look at the applications used by the city. Using a top-down, goal-oriented, and city-wide perspective, it concluded that:

> *Most applications needed by the various departments are basically inter-connected ... a relatively small number of common, basic applications, should serve as the basebone to all systems ... departmental modules should be created based on these generic applications and follow one standard, logic, and design, for all the different usages in the departments.*

This calls to a drastic change in many of the systems that were used and a substantial increase in the number of computerized applications. Following the recommendations of the plan, the city decided to implement, within three years, seven major IT based systems: finance &

budget; maintenance management (MMS); geographic information system (GIS); assets inventory; office automation, scheduling & calender; document management (DMS); and, project management.

Since, to a large extent, the old systems were already at the end of their life cycle, and their design did not fit the new, integrative, and on-line approach, many were discarded and new packaged systems were bought. Today, more than half way down the road, many of the new systems are already in place. The aging financial system was replaced early in 1993 by an ORACLE based system which supports on-line accounting and budgeting functions as well as real time connectivity to cash registers, billing, payroll, purchasing, and other functions tightly related to the finance realm. The implementation of the GIS as a central repository database was completed, it is now an integrated part of the computerized system available anywhere throughout the city's network, and in the process of being populated with many different layers of information. Each office worker in the city was provided with a PC, a standard set of computerized tools, and an on-line connection to all of the city's systems. Many other systems, such as the Library Circulation system, Point of Sale (PoS) cash registers, and the upgrading of the CLASS recreational activities management and booking system, are also in place. The rest of the projects, identified in the plan, are in various stages of needs' analysis, search for proper solution, or implementation.

Looking ahead, the successful completion of the projects, City B embarked on, within two to three years seem secure since the plan was approved by the council in its entirety and a special capital fund of 4.2 million dollar was set aside (in addition to the IS operational budget). In addition, the conscious decision to buy, rather than to develop internally, and to rely as much as possible on vendors not only for the basic product but also for system analysis, integration, updates, implementation, and to some extent for maintenance as well, makes it very likely that City B will not only complete what it set out to accomplish but also do it on time.

2.0 Assessing IT support for organizational goals in City B

In light of our expectations that City B will be successful in carrying out its IS development plan, we base our assessment of IT utilization in City B not only on those systems which are already operational but also on systems which are scheduled to be implemented in the near future, and for which council approval was secured and funds appropriated.

2.1 IT support for the administrative function

When the consultant group was invited to review the IS of City B in 1991 it received a sweeping mandate to, *"take a fresh look at the organization as a whole and its business processes, not hindered by departmental boundaries nor by the need to adhere to existing processes, structure, or systems"*. As City Manager said:

> *To me, one of the key challenges was to break down departmental barriers, that is where a lot of the friction is and that is where a lot of the inefficiency result from, when you start to defend departmental turfs. ... I wanted people to see that I was serious about not doing things the way they were done before.*

The consultants complied fully. Stating the goals of the plan they wrote:

> *[The plan] calls for re-engineering the business processes for economic and service advantages, protruding a future perspective on programs and service delivery that incorporates a move from a departmental to district-wide perspective and view, free workers from routine, internal, back-office, administrative tasks and move them to customer service and program delivery ... support the frontline workers with information and integrative tools to improve the district services, image, and workers' productivity.*

The information requirements identified by the consultants, the computerized applications which they recommended, and the detailed implementation plan subsequently adopted, mirror this perspective. Wherever possible, support for administrative process was not handled as a separate function but integrated as an interlaying level of a broader application that supports provision of services or managerial functions. Three examples demonstrate this integrative approach to municipal IS. First, while not yet operational, Inventory Control and Cost Control are two administrative functions which are being developed within the Maintenance Management System (MMS) scheduled to become operational early in 1995. This system is designed to support on-line, distributed initiation and tracking of work-orders, schedule operations, track materials and equipment, and facilitate operation costing for all municipal functions engaged in routine maintenance operations. Thus, the MMS, while providing administrative functions, is basically designed to enhance services, such as: Engineering's maintenance of roads, water, and sewage infrastructure, health and safety inspections, Parks & Recreation's facilities maintenance, and City's workshops. The MMS is also going to be fully integrated with the financial systems, purchasing, and the GIS spatial database. Thus, it will facilitate one-point data entry, automated update of inventory and accounts, and it will insure that the data maintained in the GIS is accurate and that the maintenance history of each property is electronically captured, stored, and readily available. Second example is the new financial system implemented late in 1992 on an ORACLE relational database. This system,

again, was not designed primarily for the accounting function but rather as an infrastructure for a host of managerial and service related functions. Thus, the accounting sub-system and the budget preparation sub-system are integrated with Point of Sale cash registers, and with the tax and water billing system. Third, the old stand-alone payroll system is scheduled to be replaced during 1995 with a fully automatic, distributed, time reporting modules which will download their data into the maintenance, finance, and personnel systems. Periodically, the payroll system will manipulate the data, captured through the time-cards system, using parameters taken from all three systems to which it is connected, to produce pay checks and T4 forms.

Two basic administrative functions on which work have not yet started, but which are budgeted and scheduled, are the Human Resource System (HRS) and Document Management System (DMS). Work on both systems is already programmed into the IS workplan for 1995 and currently, two committees coordinated by the IS manager but headed and championed by the user departments, are engaged in defining the needs and in surveying the market for an appropriate computerized solutions. Similar to the GIS system, which provides city-wide, consistent reference to all entities with geographical location, the DMS is planned to eliminate duplications of files and to provide city-wide access and consistent reference to text-based data. In line with the service oriented approach, the DMS is being designed not only as an administrative tool but also from the perspective of providing services to the public. Thus, links are created between this system to the Library system to facilitate public access to municipal and council information.

Lastly, as already mentioned, City B provides all office workers with a PC and a city-wide network, a standardized package of office automation tools, and a Windows based, easy to use interface which allows relatively easy upload and download of information from the central systems.

Table B.1: Summary of IT support for the administrative functions in City B. (underlined = characteristics of existing system; shaded cells = system as rated; double lined cells = current system being upgraded)

	High utilization	Moderate utilization	Low utilization
Inventory management	on-line and comprehensive support, integrated with purchasing, accounting, maintenance systems, automatic replenishing & user generated purchasing orders, tracking, reporting & analysis tools.	on-line and comprehensive but not fully integrated with accounting, purchasing and maintenance, no automatic replenishing, no on-line generation of purchasing orders, no analysis & reporting tools.	not on-line, or not covering all types of inventory, integrated only with accounting, no managerial functions only record keeping.

Financial management	on-line, comprehensive accounting system, fully integrated with all functions which generate financial transactions, electronic transfer, bank reconciliation, cost allocation, point of sale data entry, budget preparation, financial analysis & reporting tools.	on-line accounting system but not capable of handling all types of accounts or transactions, or not fully integrated with associated systems, or no budget preparation, no financial analysis and no reporting tools.	accounting system which do not cover all transactions, not integrated with associated functions, redundant data entry, no budget preparation, analysis, electronic transfer, bank reconciliation & reporting tools.
Payroll	on-line, parametric system, handling all workers, automatic time capture or one time data entry, integrated with maintenance, personnel, & accounting, electronic deposit, check writing, annual reports (T4).	capable of handling all workers, electronic transfer, check writing, & annual reports, but non parametric, redundancy in time cards data entry, not fully integrated with other system or not on-line.	stand alone, non parametric & not on-line system, and/or not capable of handling all workers, no electronic transfer, no annual reports.
Personnel	on-line, central personnel records, employment history, positions, job descriptions, training and qualifications, performance appraisal, integrated with payroll & time card, analysis & report tools.	on-line, central personnel records but only current status & no performance appraisal, analysis or reporting tools, or not fully integrated with other systems and not on-line.	stand alone, record keeping database, no employment history, qualifications, training; no managerial functions.
Consistency in references	all data, in all systems, which refer to the same entity share a common key, no redundancy in data storage, on-line linkages between record regarding the same entity, electronic link to external assessment authorities; dynamic views.	central repository database of addresses and properties which is linked on-line only with some of the systems that use that kind of information.	stand alone database, each system holds its own addresses and properties records, or none.
Office automation	city-wide network which offers an integrated and standardized office suite, including word processor, spreadsheet, communication, telephone, graphics, e-mail, file transfer, scheduling.	only between 50%-80% of the employees are provided with PC, or are connected to the network, or office automation tools are not standardized, some tools are not provided, no enveloping system to integrate the various tools.	less than 50% of office workers have PC, or are connected to a network, or office automation tools are not standardized, and most tools are not provided nor integrated.
Cost control, job costing	on-line systems, fully integrated with accounting, inventory, personnel, & payroll, semi automatic generation and costing of work orders, allocation of costs to programs, projects, equipments and work orders, analysis and reporting tools.	the same as the high cell, but not covering all types of the city's operations, or not fully integrated with the related systems, and/or no analysis and reporting tools.	**batch based system which records work orders and posts costs to appropriate accounts.**
Record management	city wide, on-line, standardized, magnetic media storage of all records, full text search and retrieval capabilities.	a city-wide computerized record indexing system, or number of separate, non compatible, record management systems, or record management system that store only part of the city's records.	small stand alone databases, or departmental computerized indexing systems, or none.

Overall, the level of IT support for administrative functions in City B is still relatively low, however, we expect it to be **high** at the end of 1995 across all functions.

2.2 IT support for provision of high quality services

In assessing the value of the IT based systems used in the area of provision of services the criteria we use is the extent to which customers directly benefit from the systems, rather than indirectly through the improvements in administrative processes. Studying the IT based systems which have a direct impact on the quality of the services and programs provided by City B we found that the city is in transition. As City Manager stated:

> *For me customer service is the ultimate goal, the arguments for revolutionizing the IS were ultimately to improve services and productivity...If we had not done it we probably would have a lower level of services, [but] at this stage customer service benefits are farther down the road...Once you get the technology up to speed, realize administrative benefits, and restructure the organization...Those were the more immediate expectations from the technology.*

Thus, many new, frontline, service-oriented systems were installed or are planned for the next year, but many more are only now becoming conceivable due to the extensive infrastructure put in place. For example, within the last two years, the city implemented a Point of Sale (PoS) system which allows customers to conduct all their financial transactions with the city from one location through computerized cash registers which accept most forms of payments and feed directly to the city's financial systems. Similarly, the city is in the process of installing a Computer Aided Despatch system in its Fire department, integrated with the regional 911 service and the city's GIS. This system will allow automatic routing of distress calls to fire stations, automatic retrieval of information pertaining to the location of the call, and suggest the best route for the emergency crews[3]. Also, the city's library was provided with an advanced Circulation system which allows users to search, query, and reserve books from monitors located in the branches as well as from their homes. Parks and Recreation's CLASS system was upgraded to allow on-line registration to all activities from each one of the 32 recreational centres. Finally, the Maintenance Management system will have a module which will allow operators to record complains, or reports regarding faulty installations, track response to those calls, analyze patterns of occurrence, and generate reports. This function, however, will cover only those calls pertaining to property and infrastructure maintenance and will not record and track calls regarding social programs and general issues which concern the public.

In addition, the Engineering department in City B is currently operating an automatic Traffic Signals system and a water and sewage control systems, both with a remote sensing and controlling abilities. There are areas, however, in which the potential of the technology to directly improve the quality of the services the city provides is still far from being realized. In those areas, however, the potential of the technology seems to be widely understood and even though decisions to purchase/develop IT based systems to support those services were not yet formally approved by the steering committee and the council, funds were set aside for

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[3] The police protection function in City B was contracted to the RCMP which is making use of their own systems including a CAD (computer aided despatch system).

them and provisions were made in the design of the current systems. For example, system support to Permit and Licenses, and to the process of approving development plans is still only at the tracking level. This, however, is going to change since City B is currently performing an inter-departmental review process which aims to re-engineer the whole process. As the IS manager told us:

> *I expect that IS will be called to facilitate the new processes. In fact, I intend to put this issue on the agenda of the IS steering committee. We can take advantage of the network to facilitate the integration of the process across all appropriate departments including the issuance of permits and doing inspections, automatically updating the property-based systems, and the payment of permits, licenses and inspections through the POS system.*

Another example where the potential of the technology is not yet realized is in the area of providing services remotely and eliminating the need for customers to physically come to City Hall. While not yet on the drawing board, both City Manager and the IS manager talk of installing a "*City Hall in the Mall*" automats which will allow the public to get information, query, pay, get receipts, and possibly fill out forms and applications, without having to stand in line at the city's counters. There are also talks of expending the passive "City Calender" information board, provided through the Library system, into a more comprehensive service which will include all City's sponsored activities as well as a more interactive functions to allow on-line registration service.

Table B.2: Summary of IT support for provision of services in City B (underlined = characteristics of existing system, shaded cells = system as rated, double lined cells = current system being upgraded)

	High utilization	Moderate utilization	Low utilization
Response to emergency calls (police, fire, ambulance).	on-line, computer aided dispatch system which covers all three services, real-time optimization of who to alert, routing, and call-ups for reenforcement, on-line presentation of all relevant, call-specific data available in the city's systems.	the same as in the high cell, but only for some of the services, or on-line computer aided dispatch system which presents only static (not call specific) data, no automatic optimization of routing, alerts, & reenforcement.	records calls and maintains log of activities, stand-alone database of some relevant information, no automatic functions, or none.
Provision of data to emergency field crews	mobile data terminals in most vehicles, communication links which allow field crews to interrogate all city's systems, remote data entry and verification.	the same as in the high cell but only in few of the vehicles, or radio links with operator who can access all city's systems on-line.	radio links with operator who does not have on-line access to most systems, or none.
Traffic control	full coverage, automatic traffic-load sensing and scheduling of traffic lights, responsive system.	full coverage; automatic traffic lights control system but without real-time components.	partial coverage, static traffic lights control system, or none.
Water, sewage, storm-water control	full coverage, real-time monitoring of pumps and valves, automatic detection of faults, remote control.	partial coverage, or real time monitoring but no remote control capabilities.	none.

Bill and fine collection	ATM, and/or one-stop service station integrated with other city's systems, on-line data entry, query, printing of bills and receipts, flexible forms of payments (banks, instalments, automatic debiting, credit cards, checks, cash), bar code scanning.	one-stop computerized cash register not integrated with the city's systems, or a number of different systems each one capable of handling one type of payment, or system does not allow flexible form of payments.	computerized cash registers for each type of payment, not integrated with other systems, no on-line data entry, query, and printing of bills and receipts, no flexible form of payments, or none.
Issuing of permits and licences	on-line filing of applications, automatic fill-in data fields and eligibility checks, presents customers with case-specific information, inter-departmental inquiry and tracking system integrated with bill collection system.	one-stop service counter, inter-departmental inquiry and tracking system.	departmental record keeping, or none.
Public library	on-line, multi-branches, circulation system, computerized catalogues, public terminals, self search, inquiry and booking, automatic notification, remote access.	on-line but branch specific circulation system, computerized catalogues, search only public terminals, no self booking, status inquiry, or remote access.	computerized catalogues, or none.
Managing public requests and complains	on-line, city-wide system which records, channels, and tracks all types of requests and complains; generates confirmation notices and final responses; integrated with all other relevant systems.	on-line, city-wide but type-specific system; records & tracks requests for specific services. And/or, does not generate responses; not integrated with other systems.	off-line record keeping, or none.
Provision of information, registration services	on-line registration & booking system for all city's sponsored events, classes, facilities, available at most public service counters, integrated with other systems to allow on-the-spot payment and issuing of receipts/tickets /confirmation.	on-line but event or departmental specific systems, presents information and allows registration & booking only to those activities controlled by one department, not integrated with other systems.	system support for registration & booking are for local activities only, or none.
Remote access	direct access through dial-in modems or terminals in central locations to registration services, taxes/fines/bills inquiries, permits & licences applications, and requests for services.	direct access through dial-in modems or terminals in central locations to a partial list of the services mentioned in the left cell.	none.
Customization, value-added services	notices and bills in language of choice; offering a range of options regarding format of bills and their informative content.	some of the items described in the high cell but not all.	none.

Overall, the extent of IT utilization to provide quality services in City B vary across functions but we expect it to be **high** across most services within the coming two years.

2.3 IT support for decision making

In assessing the extent to which IT is utilized to support decision making in City B we focus on three areas: a) availability of data, b) breadth and depth of data, and c) existence of tools to manipulate and present the information in ways useful to decision makers at the city management level.

In City B, all data is considered as corporate resource, maintained in central databases, and follow the same standards both at the logical and physical levels. In addition, since all municipal office workers have a PC on their desks and all are interconnected, data in City B is readily available to all authorized personnel and freely shared across functions and departments.

City B also made available to all staff members a wide array of external sources of information. While not collecting the data itself, City B is now in the process of obtaining census and statistical data, judged to be of relevance to the city, and integrating it with the GIS database to allow on-line query and studies of demographic and environmental trends in conjunction with city-specific information. In addition, City B provides all employees with dial-in connection to external sources of information such as: Internet, provincial network, regional databases, and to various public and academic libraries[4]. While a broad selection of information sources is made available through IT to decision makers and planners, the depth of the information within the city's databases is currently quite shallow. Trend analysis, maintenance history and costs, comparisons of alternatives, and setting performance criteria all require sufficient historical data on which to base analyses and decisions. Since most of the systems are new to City B and the city does not plan to spend resources on entering paper-based historical data into the new systems, it would take time until sufficient data accumulate to provide the needed depth to the data. According to the IS manager:

> *We now have about 10 GIG of data in the production machines, the GIS, the Library, Recreation data, and users spreadsheet and documents ... In a few years, with GIS and the Document Management system it is going to be much more ... all centrally stored ... not counting the external sources available through dial-in networks.*

In terms of the direct support computerized systems provide senior managers in City B, there are much expectations but, as yet, little to show. While the need for a managerial module in each of the major systems was identified and incorporated into their designs, naturally, it is the last one to be implemented since its usefulness depends on the functional modules. Thus, for example, the Maintenance Management system will be able to produce summary reports of activities, trend analysis, maintenance cost per property or a piece of equipment, trends in calls from the public, and exceptions reporting. Similarly, the Human Resource system is planned to provide management with summary and trends of absenteeism, cost of benefits given to certain groups of workers, cost of overtime, and many cross analyses and correlation between workers' demographics, education, and work performance. The IT based system envisioned as supporting the development process, currently under review, and the project management application identified but not yet scheduled, are also going to provide management level reports. Currently, however, apart from task specific systems in

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[4] City B is one of only four municipalities, among the 22 that participate in a survey of municipal IS in the province, who provide this access to its workers.

Engineering and the Library only the finance system is in the position to provide valuable managerial level reports. As the Manager of Administrative Services said:

> *We are starting to get meaningful information for managerial decision making from the systems ... we probably can do much more ... now with the financial system coming into place the departments are going to be able to more readily understand where they are in their budget and what they have expended ... their planning can be done better because they know where they are and how they are proceeding.*

Lastly, except for some operational level applications in Engineering, City B does not make use of IT to monitor performance, measure workload and outputs, or to calculate and report how departments perform compare to predefined criteria. Similarly, City B does not use[5] computerized models or other analytic tools to model its activities, forecast, or perform trends analysis. The only city-wide usage of a computerized system for these types of functions is on a stand-alone PC in the Personnel department which uses spreadsheet-based application to record and manipulate the information collected through the performance appraisal forms instituted in the city two years ago.

Table B.3: summary of IT support for decision making in City B (underlined = characteristics of existing system, shaded cells = system as rated, double lined cells = current system being upgraded)

	High utilization	Moderate utilization	Low utilization
Sharing of information	all corporate data is available on-line, systems & users can easily share information stored anywhere in the city, easy to use interfaces allow easy access and manipulation of data.	not all corporate data is readily available on-line, sharing information among systems often requires professional involvement, no easy to use data manipulation tools.	data is not managed as corporate resource, most systems are not compatible, very little data is available on-line.
Breadth and depth of information	corporate data is broad and deep, includes environmental data as well as internally generated data in great detail, historical data is maintained and available on-line.	only limited environmental data is available through the IS, historical data is not maintained on-line.	no environmental data is available, there is no historical data in the system, internally generated data is kept at a relatively high level of aggregation.
External linkages	on-line dial-in linkages to many external networks and databases are available to most city's officials.	few linkages to external sources of information, no on-line, dial-in capabilities, and/or only few officials have on-line connection with external networks/databases.	only operational-level, routine and standardized file transfers, or none.
Flexible & easy to use reporting, executive summaries, exceptional reporting	flexible and easy to use report generators which allow integration of data across systems, most systems provide executive-level summaries, exception reporting, and graphical presentation.	most systems provide menu driven report generator, usually restricted to the data stored in each system alone; no executive-level summaries, no exception reporting, no graphical presentation.	only routine, standardized print-outs of data, most system do not support user generated reporting.

[5] At the operational level some statistical packages are being used in Planning, and Engineering has some computerized models which support traffic, water, sewage, and infrastructure planning.

Performance monitoring & performance evaluation	systems support for monitoring use of resources and many parameters regarding the city's outputs, on-going, standardized, and city-wide calculation of performance measurements.	systems support for monitoring use of resources and limited outputs' indicators, some city-wide performance measurements criteria are routinely calculated.	systems support for monitoring use of resources only, no performance measurements at the corporate level, or none.
Analysis tools (modelling, forecasting, statistics)	many analysis tools are available on-line at the corporate level, tools are well integrated with the city's data, available tools cover many aspects of the city's activities.	few, task-specific, analysis tools are available at the corporate level, analysis tools are not integrated with the other systems.	none.

Overall, we rate utilization of IT to support decision making at the corporate level in City B as **high to moderate.**

2.4 Support of the democratic process

While widely recognized as one of the goals of local governments, and embedded in the procedures and culture of the municipality, functions that relate to strengthening the democratic process are the least supported by IT in City B. Maybe because City B was so much behind in its IS, or because city officials do not sense public demand for these types of applications, only one project pertaining to this domain was identified and prioritized by the Strategic Information Technology Plan, City B devoutly follows. This project, labelled Council Information System, is scheduled to be completed at mid 1995 and aims to provide council members with an easy to learn and use interface to all city's systems. Thus, in principle, it is the beginning of an IT based system to support councillors in their role as overseer of the bureaucracy and to reduce their dependency on information provided by the bureaucrats. However, since there is no demand from council and the single PC positioned in the council chamber and connected to all city's systems is scarcely used, the scope of the project is going to be very limited, probably only a short menu of pre-defined queries of the city's financial data.

In City B there is also a small system, installed just before the last election, which summarizes and displays on a large electronic board at City Hall the accumulating results of the elections as they are reported from the pools. These two systems, however, are the only IT based systems which are directly related to the functions chosen as indicators for IT support for the democratic process.

Indirectly, motivated by the Freedom of Information Act expected to come into force late this year, and facilitated by the city-wide network and the document management system, City B plans to provide the public electronic access to council minutes, by-laws, and policies

database, as well as to other municipal data which resides in its systems. Such access, easily implemented through the Library's terminals or through dial-in modems, will significantly support two of the functions identified as salient to the democratic process.

In City B, however, there is no IT based system to support communication between the public and its representatives (councillors), and at the time of data collection, systems such as voice-mail or a sophisticated system to record and track correspondence and other forms of communication between residents and council, were not even contemplated. In City B there are also no IT based systems which support pooling public opinion, facilitate public participation in decision making, or collect and assimilate information regarding the environment, demographics, or economics indicators.

Table B.4: Summary of IT support for the democratic process in City B (underlined = characteristics of existing system; shaded cells = system as rated; double lined cells = current system being upgraded)

	High utilization	Moderate utilization	Low utilization
General election	automated voting system.	calculation and reporting of results.	voters list, or none.
Publication of council minutes, decisions, legislations	on line, search and retrieval capable system, electronically accessible to the public.	database of council minutes, bylaws, policies.	computerized indexing system, or none.
Communication between the public and its representatives	system capable of recording, channelling, and tracking constituents concerns.	system that records constituents concerns, or a messaging system.	telephone, or none.
Council's oversight of the administration (monitoring city's expenditures, operations, adminstration behaviours)	on-line, EIS type of system for aldermen	on-line, menu driven query system and report generator.	on-line connection to all city's systems, or none.
Disclosure of municipality's data (budget, plans, programs, expenditures, etc.)	on line, search and retrieval capable archive, electronically accessible to the public.	magnetic media archive.	computerized indexing system, or none.
Involvement of the public in decisions	computerized survey/poll system that actively seeks and analyze public opinion, or interactive televised council meetings.	bulletin board which carries council agendas, and/or system that record public opinion regarding issues on the agenda.	televised council meetings, or none.
Reducing asymmetry of information (collection and distribution of social, commercial, and environmental data and statistics)	on line, search and retrieval capable system, electronically accessible to the public.	database.	computerized catalog, or none.

Overall we rate the current IT support of the democratic process in City B as **low**, but as shown in Table B.4 we expect the rating of some of the functions to improve within the next two years.

3.0 Political behaviours in City B

3.1 General description

The political level in City B constitutes of the city council with six councillors and the Mayor who is elected by the public at large. Subordinated to the City council and consisting of public figures nominated by the council, there is also the Library Board which depends on the council for budget but has the authority to operate as an independent entity in all other matters. In addition, City B contracts its police protection to the federal RCMP and thus, council does not have authority over the operations of the police.

Since by definition, the notion of IT utilization to support organizational goals views technology as the means to an end rather than an end in itself, it is not (normatively) expected that the political level will be deeply involved in the details of how City B is using computerized systems. However, decisions and actions of the politicians may have significant impacts on how the city uses IT. In the following three sections we assess the extent to which the politicians in City B: a) provide well defined goals, objectives, and strategic directions, b) support IS development and are directly involved in its planning, and c) create uniform authority structure. Each of these three domains is normatively expected from the political level and is hypothesized as having a strong impact on the extent to which the city is able to uses IT effectively.

3.2 Political leadership in City B

Until three years ago, the goals of the administration as a whole, or those of each department in City B, were not articulated and documented in a formal, comprehensive, and detailed manner by the council. There was no forum in which goals and objectives were discussed, at the political level, in a city-wide context and departments were not assigned time-frames and performance targets to meet. City B also did not have an institutionalized process in which the council reviewed the city's services and programs periodically and set directions and priorities for the administration to follow.

Nowadays, as in the last three years, prior to the next year's budget review process the council meets with the City Manager in a two days retreat to discuss directions, plans, and objectives, and to tentatively agree on next year's plans. In those meetings as the Director of Administrative Services said:

> *City Manager will present what we, the management group, suggest..., but mostly he will try to draw directly out of them [the council] what are their political goals, what do they want to see happen in the community.*

Naturally, the focus in those retreats are not so much on the daily operations and service levels but on new projects, development, and directions. However, with the city manager representing the needs and priorities of the administration and the council free of the need to decide on urgent matters, they tend to take a comprehensive look at what the city plans are and what they would like them to be. As a result, council, through the City Manager, provides the administration with clearer guidelines as to what the priorities are and what the council expects to see in the final plan for the next year. Consequently, those guidelines serve to direct the departments in finalizing their budgetary requests and setting their operational plans for the coming year.

The next time politicians in City B are asked to review and decide on goals, objectives, and targets is at the budget review process itself. Initiated and championed by the City Manager, a system was institutionalized in city B in which in the provisional budget book, presented to the council, each department articulates its missions, goals, the objectives it aims to achieve, and the targets it intends to meet before presenting its budgetary requests. In the budget approval process, the council is asked not only to approve the budget but also to endorse those goals, objectives, and performance targets. In such a way in city B the political level are clearly involved in setting and approving the goals of each department as well as in determining operational objectives and targets. For example, the part that describes the Leisure & Parks Services' budget for 1994 includes a short statement of the missions of the department, seven major goals are identified, each of them is further developed into several action plans (objectives), for each of those operational tasks a time frame is suggested, and for some additional performance target is set. provisional budget book.

Lastly, there is also a mid-year council retreat, this time with all the department heads, in which programs and achievements are reviewed and future plans are discussed. One member of the City Council said:

> *We do it twice a year, before budget time there is mission statements and setting objectives for the year, then departments tell us how they are going to attain those goals. The other time, during the year, all the departments sit down with council, we get to hear what they are doing ... council members discuss their ideas and the department heads will say what they think we should be doing.*

This goal oriented planning of each year's budget, the emphasis on identifying and formally articulating the objectives and task-level targets of each department, and the process of prioritizing programs and services from a city-wide perspective was not initiated by the politicians nor are they now the main contributors to the process. It was to a large extent the

achievement of the new City Manager. As a member of City B's council recalled,

> *The previous administration got itself into a real mess ... not being able to provide information, not being able to control funds ... eventually the system cracked and we [the council] had a problem, we had a fraud within the municipality ... a lot of them [council members] got scared ... it forced a change in top management ... the [new] people we hired were very well qualified, with a good track records from where they came from ... we did not direct them what to do, we just tell them to clean up some of these dis-organizations.*

The new City Manager, a firm believer in long term planning, and acutely aware of the need to involve the whole organization as well as the council in the process explained the changes:

> *It was clear that an organization ought to have some plan, and we did not ... the culture was not right, many people did not know about those sort of things. So we had to go through an education process ... We spent a couple of years doing some of those things on a one year basis, to get the organization to the point where it knows about setting goals, objectives, targets. Now the organization is developed a little more fully and what we are going to do in the next six to eight months is a long term strategic plan ... We have advertised for a facilitator to help us through and the council, the staff, and the community are going to put together a strategic plan ... We will have medium range plan, three to five years complete with capital, and we will have a vision for what we want the community to be fifteen years from now.*

Thus, the politicians in City B were not the initiators nor are they uniformly in support of the new management style and the leadership role forced on them. Nevertheless, the results are that they are asked to articulate their goals, they are involved in the process of prioritizing and making decisions from a city-wide perspective rather than on an ad-hoc basis, and maybe because of that they are more receptive to long term plans and are ready to commit to them.

Setting formal processes does not necessarily lead to politicians providing leadership to the organization. In City B, council is still perceived by senior managers as interested more in short term, highly visible projects than in directing the daily work of the municipality or in getting involved and committed to long term goal setting and strategic plans. But, as the following comments, which represent the way management sees the political leadership in City B demonstrate, City Manager was successful in getting the politicians' involvement, and in bringing them to take a more central role in directing the long range plans of the municipality.

> *Our council is no different from any other council, hard to pull together, to focus on a direction, because they all have their political agendas ... As yet, council is not a strong advocate for strategic planning, but over the past months council members have been talking about the need to discuss priorities in a more comprehensive way.*
> *Our City Manager has been pushing hard to get them to be involved ... made them set goals ... force them to say what they want. Some people did not like it because it*

does restrict their actions if there are definite goals, set by the whole body... Today they are more supportive, still more of a bystanders but not against it, it is the department heads and the City Manager that initiate and plan but we make sure that council is involved not only in the final decision.
In regard to the strategic plan project the council have been told that they must be fully involved and that they are probably going to have to take the lead in a lot of the cases. It was the City Manager who initiated the project, some members of council recognize the need, we have two or three who actively support it, we probably have two who are not very enthusiastic .. and we have two who are actively against even doing it.

Analysis of the content of council minutes and policies confirm management perceptions. In the five large volumes of council records there is not a single resolution, initiated by council, that calls for long term planning in the city. There are no records of council asking for articulation of goals, strategies, and performance targets, but there are also no records in which council explicitly takes a stand against such activities. It seems that the major act of political leadership council in City B took was the decision to dismiss the former manager and to choose the current one, and even that decision seem to had been forced on the council once the financial disorder was found.

3.3 The involvement of the politicians in IS development in City B

In City B there is no direct involvement of politicians in the development of the IS nor does the council as a whole possess a vision regarding how it would like to see IT being used in the city. Even those council members who understand IT and its potential, and who are firm supporters of the development of an advanced IS in the city are not actively involved in it. The majority, however, do not understand, are not interested, and are even somewhat intimidated by, and suspicious about, the whole subject. While the Mayor responded in a unequivocal *yes* to the question whether he perceives IT as a major resource to the city, he would, or could, not articulate his vision regarding IT stating that: *"it is very good to have... but it is a bottomless well"*. When asked to explain why the city appropriated a relatively large sum of money to the development of the IS the Mayor was not able to identify the major projects which are under way nor to explain the rational for them, he said, *"I do not know what this new technology will do for us, but I can tell you that we put 4.5 million into it and I would not let the money go until it start paying us back"*. In essence, the area of IT is seen by the politicians, both those who understand it and those who do not, as the domain of management. IT is viewed as an administrative tool which professional managers should understand, and it is up to them to have the vision, to identify the needs, and to convince the

council to invest in the technology. In line with this approach the politicians we talk with were unable to recall any IT related initiatives in City B that originated in the political level, and a search through council minutes revealed that the only times council discussed issues relate to IT were in response to management requests. As a councillor in City B told us,

> *Because if you take a look at the people who are at the policy level, they are there because they got elected, many of those people's primary purpose is to stay elected. Having a well run, efficient information system, that produces good information, makes the jobs people do better, is not necessarily, there is no direct correlation between the money you would spent on that and your political ambitions ... So you take that six and a half million dollars and build a new swimming pool or ice-skating ring.*

And the City Manager said:

> *[IT] not an easy thing to sell to council members, it is not politically sexy ... When we get to the point where our systems can do things directly to the public, they will indicate that they support those systems and they will cut the ribbon ... but the long road to get there is not very interesting [to politicians] and there is nothing in it to them.*

Council in City B was involved in the development of the IS plan, approved it, and committed itself to carry it out. This, however, was due more to the situation in which the politicians found themselves in the aftermath of the financial scandal, the involvement of external consultants, and the persistent lobbying of the City Manager, than to their interest or conviction in the importance of IT. A politician in City B told me:

> *The new management came to us and said: you have hired us to come in here and clean the mess, our first recommendation to you is to invest in a better information system. ... We were not in the position to refuse ... And, it came not only from staff but from consultants, the auditor said: you have got to get with it, you are 20 years behind, the way your systems are today you are going to fall further behind and be subject to more risk ... With the problems we had still fresh there was no way we could have said no.*

Today when revitalizing the IS is one of the major projects of the city, the council is not really involved in overseeing the implementation of the plan nor in planning for further developments. Periodically they receive progress reports, asked to approve vendors, sign on contracts, but as the City Manager said,

> *[Council] made the decision [to implement the IS plan] and it pretty much stayed away from it since. It has been a management thing for the past two years, we report on costs, on expenditures and progress of the projects, but [council] does not meddle in that.*

3.4 Authority structure in City B

City B follows the council-manager form of government, and in the case of City B the meaning of the word manager truly reflects the authority vested in this position. As already mentioned, except for the Library Board there are no other political bodies in city B which have authority over the working of the administration. There is also only one line of command that goes down from council to the administration, and that line reaches only the City Manager. In addition, there is the RCMP detachment which is formally under the federal authority and not that of the council or the manager. This means that formally, and in fact informally as well, City Manager is the only senior official directly reporting to council on matters regarding the managing of the city. As City Mayor stated:

> *[City Manager] is the superior of all the department heads, the council direct him, or he will go to the council to seek directions or to get approval, but how the departments operate is his responsibility.*

Informally, the authority of City Manager in City B is even broader than the formal definition. The Library and the Police even though formally not under the jurisdiction of city hall, behave and are perceived as one of the departments. The Captain of the RCMP and the Library Director sit in all city management meetings, their plans are reviewed by the City Manager prior to submitting them to the council and the needs of these two units are taken into account whenever the city as a whole allocates resources or plans its operations. Thus, in the words of the City Manager,

> *I am responsible for the operation of the entire organization, it is comparable to a CEO of a corporation ... I like to manage through consensus to the extent that I can but if that does not work I will make the decision and head to where I believe we should go.*

Table B.5 summarizes our findings in regard to the extent to which the political level in City B: a) provide political leadership through well defined goals, objectives, and strategic directions; b) support IS development and are directly involved in its planning; and, c) create uniformed authority structure.

Table B.5: Summary of the ratings of variables and indicators related to political behaviours in City B:

(shaded cells = current practice/situation; thick lines = factors as rated)

	High	Moderate	Low
Political leadership provision and commitment to well defined goals & strategic directions in all areas of operation.	on-going, formal processes in which council formulates and reviews the city's plans and operations, in a comprehensive way.	institutionalized, one-shot process in which council set its objectives for the term/year.	no formal process in which council set goals priorities, and directions.
	council is interested & actively involved in goal setting & strategic planning.	council supports & encourages but is not involved in goal setting & strategic planning.	council does not support nor involved in goal setting & strategic planning.
	top-down, comprehensive budgeting process in which council provides result-oriented guidelines.	bottom-up but comprehensive budgeting process; council does not provide guidelines.	bottom-up, fragmented budgeting process.
	existence of mission-driven, updated strategic plans, officially endorsed by the political level.	strategic plan/s exist but not officially endorsed by the political level, or, are not comprehensive.	there are no long-term strategic plans.
	resources are committed to long-term strategic plans.	there is a long term capital investment plan but there is no direct commitment of resources to the strategic plan.	there is no long-term commitment of funds, only ad-hoc, yearly allocation of resources.
	council is perceived as leading in all areas by politicians & bureaucrats alike.	council is perceived as leading only in some areas by politicians & bureaucrats.	council is not perceived as the leader in most areas by politicians & bureaucrats.
Political involvement in IS interest and active participation in IS development.	council is interested and actively involved in directing IT usage.	council is interested and supportive but not involved in directing the development of the IS.	council is not interested, not involved, and even somewhat opposes the development of the IS.
	council develops formal vision and policies regarding the role of IT.	informally there is a shared vision regarding the role of IT among council members.	council does not have a vision regarding the role of IT in the city.
	council, in its goals and objectives, explicitly refers to the development of IT based systems.	council initiates few IS projects on an ad-hoc basis.	council does not initiate any IT based projects.
	there is a political body that directly oversees the IS function.	there is no special body that oversee the IS function but council receives reports and presentations from the IS manager.	council does not directly oversee the IS function nor asks for reports or presentations.
	council formally discusses and endorsed a comprehensive IS plan and commits to the plan as a whole.	council is aware of the IS plan but discusses and funds each project separately.	council is not aware nor interested in the IS plan/s.

Authority structure unified authority at the political and operational levels.	there is a coherent and unified authority structure for all aspects of the city's operations.	few aspects of the city's operations are not directly controlled by the central, political, authority.	there are a number of political bodies, each has the authority over a part of the city's operations.
	authority over all matters relating to IT utilization resides in only one political body.	there is a central authority, at the political level, that controls most IT related matters.	IT related matters are controlled, at the political level, by a number of different bodies.
	council gives the senior manager authority to direct all the executive branches of the city.	council gives the senior manager only limited authority over the operation of the departments.	there is no central authority below the council level, each department directly reports to some political body.

To summarize, in City B the political level is more and more involved in long term planning, setting of goals and objectives, and in defining time-frame and performance targets. It is to a large extent a role they are being forced to take by the constant pushing, coaching, and lobbying of the City Manager, but nevertheless, it results in the existence of comprehensive plans and clear objectives to which the politicians are committed. Overall we rate political leadership in City B as moderate to high.

The politicians in City B are not involved, and not very interested in IT, some are suspicious and sceptical, but as a whole IT is left to the professional administrators and regarded as only one more tool for management to do its job. Overall, on the scale of being champions of IT utilization, actively involved, and highly instrumental in IS development to low involvement or even somewhat obstructive, we rate the political level in City B as **moderate**.

Clearly in City B there is a unified and well defined authority structure, which we rate as **high**.

4.0 The bureaucracy in City B

Four behavioral patterns commonly associated with bureaucracy: lack of coherent corporate management, incrementalism, fragmentation, and internal/control/status-quo orientation, were proposed as major factors that may influence the development of IS that strongly support organizational goals. In the following sections we describe our findings in regard to each of these four factors and assess how the municipality of City B should be rated on each. To do so we investigate behavioral patterns in the city in general (such as: the budget process, buy or build policies, allocation of resources) and issues directly related to the IS function in the city (such as: the IS planning process, structure and status of the IS unit). When possible we try to avoid the question why the administration is behaving like it does, while certainly an interesting topic we feel that it will not serve the purpose of this study, and thus, we aim to establish what the behavioral patterns of the administration in City B are rather then why they are as they are.

4.1 Corporate management approach in the city B

In City B leadership and strategic directions are to a large extent provided by the group of department heads led by the City Manager, especially in areas which relate to provision of routine services and the administrative processes that support them, where

Council is both uninterested and lacking the necessary knowledge. This group, and especially the City Manager himself, is not only leading the organization in implementing Council's policies, but in many cases by advising the council, initiating discussions, raising issues, and lobbying they fulfil the role of policy makers and political leaders. To achieve this role it was needed first to create a cohesive management group which will abandon the departmental perspective in favour of a corporate-wide perspective, and which will be capable of presenting the council with a coherent and unified front. City Manager achieved that by personally leading the strategic planning teams, by relying heavily on professional help of consultants and facilitators to diffuse internal revelries, and to a lesser degree by personnel changes in senior management. Choosing the revitalization of the city's IS as the major vehicle with which to bring about the desired change, the City Manager explained:

> *It is a strategy [development of the IS] of tying the organization together. Technology, I think, can be used as a bit of a spine for an organization, to pull it together ... it was a starting point to me because you could show some results almost immediately, whereas a lot of the other things that you have to introduce as a manager take longer, you know, to change the culture, the climate of the organization ... You know, I guess I am not being very complimentary, departments did have some strategies but there was nothing pulled together ... [the consultants] started with some focus- group sessions to determine what the primary goals were ... We had to agree as a group if we were going to move in a cohesive way in one direction, we had to go through a process of building consensus ... what I had to do was make sure that I developed the support for this [the IS strategic plan] throughout the organization ... so at the budget discussions this year we all presented an unanimous view, we said: strategically this is the number one priority, not for the city manager, not for city engineer, but for everybody.*

Today, there is a strong corporate management approach in City B. Major undertakings such as the long-term strategic plan, the development of the IS, and the development process review, are all projects incepted by the city as a whole, City Manager personally lead and champion each one of these projects, and all projects actively involve department heads, direct users, union representatives, and in some projects the city plans to get the community involved as well.

The short-term allocation of resources, which takes place during the yearly budget planning process, also follows a corporate approach. As already described, prior to the detailed budget preparation, city management receives some directions from Council as to its goals and priorities. Based on those guidelines, and the department heads' readings of council wishes during routine meetings along the year, each department submits its budget proposal to the management group, which then prioritize them from a city-wide perspective. As the

Director of Administrative Services described:

> *We [management group] do not usually look very closely at the operational details, but if departments are coming with new projects, new programs, they will submit them separately. A committee of department heads will go through every one of them and prioritize them from the perspective of the organization as a whole, [they] try to say here are the most important ones from the community as a whole, not for an individual department ... That process receives a real buy-in, I think, by all the department heads.*

The result of this process and the fact that the goals, objectives, and plans, of each department are reviewed and approved by all other department heads before execution, as well as at mid year and at its end, is that in City B there is a strong corporate approach to planning, prioritization, and resource allocation. During my numerous interviews and informal conversations with city's officials I was impressed by the sense of common goals, identification with the direction the city is progressing, and the knowledge people demonstrated in the activities and objectives of other departments.

In the area of IT utilization, the existence of strong corporate management is even more evident. As already mentioned, all IS functions were consolidated into one independent department, and there is a detailed, long-term plan for the development of the IS in the city. There is also an IT implementation committee headed by the City Manager and consisting of department heads which directs and oversees the actions of the IS department. Recently, due to the fact that most of the projects identified by the plan are well under way, this committee divided into two. As the IS Manager described:

> *The original, high profile committee, will become the strategic steering committee, chaired by the City Manager and consist of few department heads and me, it will looks at future needs, priorities, budget, and long-term plans. The tactical committee will meet monthly and review each project, operational problems, work under way, and technical questions.*

In City B, we found that managers at all levels know what the Strategic Information Technology Plan consists of, they know in the broad sense which applications are planned, and they tend to accept the priorities set by the plan. Moreover, when work on a project is about to begin a committee of all users which have interest in the project is created to define the needs, search for the best solution in the market, and to oversee implementation. Those committees are coordinated by the IS department but led and championed by the users themselves.

Lastly, while the IS manager in City B is not at the executive level, he is a full member of the executive steering committee, and he is in direct communication with

department heads, without having to go through his direct superior. At the executive level, it seems that the City Manager personally is the advocate of utilization of IT and the one that while not IS professional himself, is representing that domain at the highest levels of decision making in City B. As City Manager said:

> *Introducing system like this has to have a champion, and that champion has to be at the very top level in the organization if it is to work ... I will probably continue to be involved because there are still key issues that need to be implemented to change the organization.*

4.2 Assessing the level of fragmentation in City B

Hand in hand with the move to a corporate management approach, a major reorganization took place in City B during 1991. A dominant theme in the new organization was the consolidation of the disperse and fragmented units which provide internal administrative support into one department that serves all the organization. Specifically, functions which relate to IS, Legal Services, print shops, and City Clerk were moved from where they previously were and put under the umbrella of the Administrative Services department which became the central provider for internal services. Extending the reorganization to the functional areas, City B is nowadays considering an analogous reorganization of the process of reviewing and approving development applications, which is one of the central services the city provides. While not yet clear what the new organization will be, the goals are, as the Director of Administrative Services stated, to:

> *Re-engineer the whole process, instead of a number of departments each doing its own things with little coordination, we are trying to come up with better way of tracking and integrating what is done in each department, so it [the application] does not die somewhere and, subsequently, a person may have to run around to see where his application got stuck... Maybe we will change responsibilities, so somebody will have overall responsibility to see that it goes through.*

Generally, talking to people at various levels, and areas of the administration we found very little evidence in City B of "turf-wars", departmental territorialism, or fragmentation of power and decision making authority. In fact, said the City Manager, referring to the major changes the city has gone through in the last couple of years,

> *We had very little problems with bureaucratic resistance, departments defending their turf ... I think, people were hunger for change in the organization because it had stagnated for so long.*

The case of modernizing the telephone system is a good example. In the IS plan and the reorganization of the departments, voice-based systems were not mentioned and formally,

responsibility for the telephone system was left with Engineering. Town-hall in City B, however, was at that time serviced by only three switch-boards, many employees did not have a telephone on their desk, people use to wait long time for line, and all calls had to pass through the switch boards. Recognizing the need for change, and feeling that responsibility for voice systems should rest with IS in principle, and that his department is best equipped to handel it, the IS manager set to modernize the telephone system. With the backing of the City Manager and within a very short time he replaced the whole telephone system with an automatic system, installed a telephone on each employee's desk, and gave many a private line. Demonstrating that the IS department have the interest in managing voice as well as data, and is capable to do so, responsibility for that function was moved from Engineering to the IS department smoothly, without any internal power struggle.

In the area of IT, City B is also managed as one unified organization rather than a collection of a number of independent departments. There is one centralized IS department, hardware, software, and data are standardized city-wide, all IT related budget is controlled by the IS department, and all projects are perceived as corporate endeavors. Thus, all projects are managed by the IS department but throughout the whole development process representatives of all departments which have interest in the application are deeply involved.

4.3 Assessing incrementalism in City B

Utilization of IT to support organizational goals means, in many cases, drastic departure from existing routines, work-processes, and current organizational structure. In the absence of such changes, the technology instead of significantly enhance goal achievement, may have only marginal impact on the organization operations. Effective utilization of IT also depends on a certain level of IT infrastructure being in place before significant benefits can be realized. Thus, the ability of an organization to achieve high utilization of IT is often in stark contrast with the bureaucratic tendency to move forward in small increments.

City B, in the last couple of years, demonstrated the ability to focus its energy and free resources on a small number of priority projects and to bring about, in a relatively short time, drastic changes in its structure, routines, and operations. Due to strong corporate leadership, the fact that almost everybody recognized the need for a change, and the commitment of the City Manager to changes, coupled with authority structure that enabled him to do so, the municipality underwent drastic changes in many areas.

For example, there was a significant reorganization in the structure of some of the

departments. During 1993, hand in hand with the installation of the new financial system, the city re-designed its accounting system, drastically cuts the number of accounts and item-lines in the budget, and increased the flexibility of department heads to manage their budget as they see fit, as long as no major changes are introduced.

The implementation of the strategic IS plan was formally declared as *"the number one priority for the organization"* and thus, as City Manager recalled *"other people did not get their staff requests filled, or increases in resources, because we were focusing on IT"*.

The aptitude to change does not end with the one-time changes that took place during 1991-1992. The development process review will probably entail significant changes in routines and procedures, as undoubtedly will happen also when the major IT projects which are currently developed be installed.

One way to assess the ability of the city to focus its resources on priority project and to shift that focus as needed, is to look at the variance in the percentage of the total budget allocated to each of the departments. An analysis of the allocation of the budget in City B between 1990 to 1994, shows that the average change between two adjacent years was 1.3% and that except for 1992, where the largest budget's change was 2.2%, in all other years there were a number of departments which received 3% more or less than what was allocated to them in previous year. The largest change in the share of the city's resources from one year to another was a 5.3% decrease in the Park & Recreation's budget during 1993[6]. Resources allocated to Administrative Services, which hosts the IS department, also varied significantly across the years[7], reflecting years where major capital investments took place (1991,1993) and periods when the city absorbed the systems it purchased.

Another indicator to the ability of a municipality to shift its focus of attention and to adjust allocation of resources to the new corporate priorities, is the portion of the city's resources which is tied to salaries of permanent workers. In City B there is a policy, not formally stated but well recognized, of trying to contract out as much as possible of the execution of the city's works to the private sector. Thus, in City B Police protection was contracted to the RCMP, Engineering is using contractors for garbage collection, recycling,

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[6] These numbers represent changes in the consolidated budget which includes operational and capital expenditures. Similar analysis of only the operational budget reveals much smaller variance in which the average change between two adjacent years was 0.6% and the maximum change as 1.2%.

[7] Administrative Services' share of the total budget increased in 1991 by 3.1%, decreased the following year by 2.2%, increased again by 3.7% in 1993, and projected to decrease by 4.3% in 1994.

all construction works, and the majority of the infrastructure maintenance works. Similarly, food concessions in most of the city's facilities are farmed-out, and a few years ago the city even studied the prospect of contracting out its Parks maintenance but found that it would not be cost-effective. The result of this policy is that City B is the direct employer of only one worker per every 158 residents. This number is significantly lower than in other cities[8], and is in part responsible to the fact that City B can be very flexible in its allocation of resources from one year to another.

In the area of IT the attitude toward drastic changes as opposed to incremental approach is even more evident. Facilitated by the fact that the IS department started from a very low position, they choose in most cases to replace legacy systems with new ones rather than incrementally enhance the old ones. Subsequently, the newness of the systems and the heavily reliance on the vendors for maintenance, allow the IS department to assign almost 50% of its personnel to development and only 3.5 people are tied to maintenance and operation. Moreover, almost all IT projects which were implemented in the last couple of years, or which are currently under development, represent sharp deviation from how things were done before and involved not only the new IT based systems but also a significant changes in work procedures, routines, and in some cases even in organizational structure and division of responsibilities[9].

Talking with many people in the municipality we were impressed by shared feelings that, in the words of one of them, *"Things are changing, we are moving, good initiatives will not die of lack of resources nor of a too cautious and tedious approach"*. We feel that people in the municipality believe now that changes and future plans are not only words but they are being act upon. A sample of comments regarding the changes City B is undergoing reflects those sentiments,

> *The changes were so basic, you have to look back at where we were three years ago to fully appreciate it... What we did [with IS] was fairly comprehensive and fairly large scale for our size... It [the IS plan] had a pretty drastic effect and, I think, a positive effect.... There is a huge change taking place in the city.*

In fact, the manager of the IS department told me, "*The City Manager feels that there were*

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[8] For Comparison, the average among the 22 B.C municipalities that report on these parameters in the municipal IS conference April 1994, was one city employee for each 134 city's residents.

[9] For example, all data entry was moved to the front-line user, all cash transactions were consolidated from the various departmental counters into the Point of Sale operator, and in the near future there will not be a need to send workers to read water meters.

too many changes in the last two years, he wants us to slow down a bit".

4.4 The dominant orientation of the bureaucracy in City B

The dominant orientation of City B is toward building an organization which provides high quality services in cost-effective ways. As such, the city is very much market oriented, whenever possible and economically viable work is done by external agents rather than by city employees, which allows city management to focus on steering and monitoring rather than being preoccupied with operational details. City B also tries to be result-oriented rather than input oriented, it institutionalized a goal-driven budgeting process, for the last two years it is using a city-wide, standardized, performance appraisal systems for all of its workers, and there is a move away from the practice of controlling and managing input to one that emphasize the outputs and monitor the results. This move is demonstrated by the practice, set by the City Manager, that requires each department to report periodically on how well it is attaining its goals, while addressing the specific and if possible quantified objectives and targets which were set at the beginning of the year. City B, however, is still not using any city-wide, formal performance measurement tools, nor are there any well defined criteria with which departmental performances are judged.

As the strategic IS plan, the development process review, and the long-term strategic plan for the city demonstrate, City B does not focus on short-term, cost-saving approach, but rather on long term, mission oriented approach. Each of these plans started with the business goals of the city rather than the internal processes, and each used analysis techniques which were developed in the private sector, to identify the major outputs and to re-organize the production processes. Furthermore, each plan emphasizes the front-line workers and the service to the customer (be it the public or other city worker) rather than the internal working of the bureaucracy, and twice external experts were brought to aid the municipality in putting the plan together. When asked about the major criteria the city uses in deciding on those plans City Manager said: "*Vision, quality of customer services, future productivity*". The Manager of the IS department refers to how new IT based systems are being justified,

> *The main justifications is not necessarily cost-saving, it includes expectations for long-term benefits ... Effectiveness, customer satisfaction, immediate feedback to the taxpayers, those kind of factors are also taken into account... Investments that will be profitable but not right now, and that you cannot sum up in dollar.*

In line with long-term, mission-driven orientation, City B is currently investing a considerable amount of resources on developing its infrastructure. Overall, 43% of the

consolidated budget in 1993 was dedicated to capital expenditures which is a surprisingly high percentage[10].

Three examples demonstrate this point. First, within the coming two or three years the city plans to move its town-hall to a new location which will better support the growing demand for services from the public, an estimated 20 million dollars project. Second, even though at the short-term there are no cost-saving benefits, the city is in the process of installing automatic water meters which will transmit readings directly into the main system. Third, City B is considering to lay a Fibre-optic communication network between all the locations it occupied. The city also seriously consider to furnish its field inspectors with a hand-held computers, and there are planes to install a one-stop automated service counter in various central locations in the city.

In accordance with the general orientation of the city, senior managers in City B reported that City B sees the development of its human resource as one of its priorities and is investing in training a considerable amount of money. In the area of IS for example, hand in hand with the implementation of the IS plan, a major training program was put into effect. Each one of the city workers underwent an extensive training in personal computers, word processors, spreadsheet, communication package, and the functional applications that pertain to his/her work. We, however, did not find an outstanding emphasize on training in City B in general, and money-wise we found that City B is spending only a modest amount of its budget on training, 0.24% in 1992 and 0.23% in 1993[11].

Lastly, City B tries to be open to its environment. As already mentioned each employee was provided with dial-in access to many other organizations, the strategic planning activity the city is currently embarking on will heavily involve the public and not only city officials, and the city is the driving force in the efforts to establish a better coordination and maybe even integration of some of its services (such as: fire dispatch, and police protection) with neighbouring communities. Incidently, but in line with the city's orientation, the IS manager in City B was among the few IS managers in the municipalities of B.C who pushed and laboured to create a forum in which ideas can be shared across cities, and he is a firm

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[10] The number for 1992 is 46% and for 1994 it is projected to be 40%. In comparison, the average percentage of capital expenditures, out of the total expenditures in 18 municipalities in B.C was 26.7% in 1993. Data is based on a survey made in preparation of the IS managers conference, Nanaimo, April 1994.

[11] We were not able to find comparable data in other cities of the same size with which to compar these numbers.

supporter of more integration and better coordination among IS functions in the region.

Table B.6 summarizes our findings in regard to the behavioral patterns of the bureaucracy in City B in the areas of corporate and strategic vs. local and operational management; unification vs. fragmentation of power and strategic decision making authority; incremental and slow vs. rapid and drastic changes; and, defensive and status-quo vs. proactive and innovative orientation.

To summarize, we assess that in City B there is a strong corporate management approach in general, and particularly in the area of IS. We rate corporate management in City B as **high**.

We consider decision making in City B at the strategic levels to be centralized, and we assess that there is a high degree of integration, inter-dependency, and congruency in goals among the departments. On the scale of integration vs. fragmentation we rate City B as **highly integrated**.

Overall, we rate City B on the scale between dynamic and changing to incremental and status quo as **highly dynamic**.

We rate City B as result oriented, managed from a long-term, customer-services perspective, open to its environment, and susceptible to changes and innovations. Overall, we rate this orientation as **highly conducive** to the development of strategic IS.

Table B.6: Summary of the variables and indicators related to bureaucratic behaviours in City B

(shaded cells = current practice/situation; thick lines = factors as rated; double lined cells = current practice is changing)

	HIGH	MODERATE	LOW
Corporate management	city management is a source of vision, manifests coherent and proactive approach to management, initiates policies and lobbies for their approval.	city management has a coherent approach to management but tends not to be visionary and to react to the political level rather than to influence it.	city management does not demonstrate visionary and coherent managerial approach, tends to see the implementation of council's policies as its only role.
	city management, as a group, champions and is actively involved in strategic planning.	city management, as a group, supports and often initiates strategic planning but is not championing it nor directly involved.	city management, as a group, is not very interested nor involved in strategic planning.
	top-down, goal-driven budgetary process, tightly connected with the strategic plan.	only capital budget is driven by an a-priory defined goals and strategic plans.	bottom-up budgetary process, disconnected from long-term plans.
	institutionalized process in which management reviews departmental plans and operations on a periodical basis.	management reviews departmental plans and operations on an ad-hoc basis when there are problems.	usually departments' plans and operations are not reviewed by city management.
	city-wide standardization of processes and managerial practices.	some processes are standardized city-wide but it is not comprehensive nor strongly stressed by management.	no standardization of processes and managerial practices.
	there is an approved, long term, and comprehensive strategic plan for the city as a whole.	there are some domain-specific (not departmental) strategic plans but not a comprehensive plan for the city.	no strategic planning at the corporate level, only at the departmental level.
	IS manager is a member of the city's management group.	IS manager is one level below city management level.	IS manager is 2-3 levels below city management level.
	IS is perceived as a strategic, corporate resource.	IS is perceived as a corporate resource but mostly used to support the operational level.	IS is perceived as a supportive tool for the departments.
	IS steering committee consists of top level executives and operates at the strategic level.	IS steering committee consists of middle level managers and operates at the tactical level.	There is no IS steering committee, or, it is not active or not influential.
	IS development is directly controlled by city management and driven by the city's strategic plan.	IS development is corporately prioritized but driven by operational, problem solving perspective.	IS development is controlled by the departments each separately driven by its own operational needs.
Fragmentation	the city is managed as one integrative entity.	departments are to a large extent independent in their operation but well coordinated at the strategic and operational level.	the city operates as a holding company with very limited inter-departmental dependencies.
	no significant signs of territorialism, turf-wars, and frictions between departments.	moderate level of authority related frictions, turf-wars, and territorialism.	many evidences to behaviours that stem from territorialism, turf-wars, and disputes regarding decision making authority.
	strategic planning is comprehensive, done at the corporate level, tend not to regarding departmental boundaries as a constraint.	strategic planning is done by iter-departmental task forces but for each domain separately.	strategic planning is done by departments in isolation, or, no strategic planning at all.
	innovations are implemented regardless of departmental boundaries, there is a conscious effort to break those boundaries.	only few innovations and changes bridge departmental boundaries, there is no stress on breaking up departmental boundaries.	changes and innovations tend to be confined to a specific department.
	there is a central IS function, all IT related budget and development are controlled and guided by the IS function	the IS function is a central support unit, budget and development are managed by the IS but guided by departmental needs.	departments have their own IS units, IT related budget is controlled and prioritized by departments.
	city-wide standards for hardware and software.	partial standardization of hardware and software.	no city-wide standards for hardware and software.

	all data is perceived and managed as a corporate resource.	administrative related data is managed corporately, otherwise, each department manage and own its data.	most data is owned by the departments.
	most systems are integrated city-wide.	administrative systems tend to be integrated but operational systems are not.	most systems are departmental, low level of system integration across departments.
Incrementa-lism	relatively high variance in allocation of resources over the years (avg > 1%).	moderate variance in allocation of resources over the years (0.5% < avg < 1%).	very stable allocation of resources over the years (avg < 0.5%).
	relatively large portion of the city operations are contracted out.	moderate extent of contracting out.	almost all city operations are carried out by city employees.
	in the past few years the city implemented many drastic changes in its priorities and operations.	few significant changes in priorities and modus of operation occurred in the last few years.	no significant changes in priorities and operations took place in the last few years.
	IT is used as a change agent to significantly alter the way the city does business.	IT is not used as a change agent but some systems significantly changed the way the city operates.	IT is used mostly to mechanize existing processes.
	managers believe that drastic changes are both necessary and feasible.	managers believe that drastic changes are needed but can, and should, be achieved only incremental.	managers do not believe that drastic changes are needed nor that they can be achieved in the context of municipal government.
	relatively high percentage (40-30%) of IS resources are dedicated to new development.	moderate percentage of IS resources (30-20%) are dedicated to new development.	only small percentage of IS resources (under 20%) are used for new development.
	there is a sense, shared by managers, that "things are moving rapidly" in the municipality.	there is a sense, shared by managers, that the municipality is moving ahead but at a moderate rate.	there is a sense, shared among managers, that "nothing is moving" in the municipality.
Dominant orientation	criteria used to justify new initiatives are: vision, quality of services, and long-term productivity.	criteria used to justify new initiatives are related to: efficient delivery of services and operational needs.	criteria used to justify new initiatives are: short-term cost saving, control over resources used, and efficiency of existing processes.
	high emphasis on staff training.	moderate level of importance to staff training.	low importance to staff training.
	the dominant strategy in the city is proactive and innovative -- seeking improvements through investment in technology and organizational changes.	the dominant strategy in the city is effective utilization of existing resources -- seeking improvements through maximization of resource utilization.	the dominant strategy is defensive -- seeking to maintain the level of operation through cost reductions.
	the city implements many contemporary, innovative ideas regarding public administration.	only few of the contemporary innovations in public administration are implemented.	the city does not implement contemporary, innovative approaches to public administration.
	the city makes an extensive use of external consultants, and is open to its environment.	the city uses external consultants only for technical issues.	the city hardly use external consultants, and is relatively close to its environment.

APPENDIX C
THE CASE OF CITY C

1.0 General

City C is a medium size municipality within a larger metropolitan area in western Canada. Due to its excellent access to ocean and airports City C has become very attractive to developers and businesses in the region and its economy is in the process of diversifying from the traditional base of farming and fishing into light industries, retail centres for the whole region, and the base for provincial and international business establishments. Growth in City C has been particular rapid in the last decade during which employment grew at twice the regional rate and number of business establishments increased by over 250%. The population of City C is 128,773 according to the 1992 census, the municipality budget was around 137 million dollars in 1993, and it had 1007 full time employees at the end of 1993.

1.1 The IS function in the municipality of City C

City C was among the first cities of its size in the region to introduce large scale computerization into its municipality. As early as 1977 a WANG TDS 2200 system was purchased to facilitate digitized mapping in the Engineering Department, and business systems such as accounting, payroll, billing, and tax collections, were introduced and run on a Honeywell level 62 computer. Early in 1982 the municipal Administrator set up a Data Processing Review Committee (DPRC) comprising of senior executives from many of the City's 15 departments to prepare a long term plan for the development of the IS in the city. Following the recommendations of the DPR committee an IS department was created and its head, who reports directly to the City Administrator was given the a rank of director, similar to the ranks all other department heads hold. The new department was given the authority over all IT related budgets and except for some small, stand alone and task specific applications in Engineering, was held responsible for the development, maintenance, operation, and support of all the IS in the city[1]. Late in 1982 a large WANG VS minicomputer was purchased and during the following five years many applications were developed, almost entirely by the staff of the Information Services Departments. Among the

[1] At that time voice based systems such as telephones were not using computers and thus it remained the responsibility of the Clerk department.

most important ones were: the accounting system implemented in 1983; the Geographical Information System (GIS) which linked the digital mapping system and the text-based property, taxation, and permits systems which was completed in 1984; and the Capital inventory, Business Licence tracking, and Fire Response systems which were completed in 1985.

The accelerated development of the IS in City C did not continue for long. After the initial burst of development activity things settle done to a steady and relatively slow rate of growth in the IS function, the applications it develops and operates, and the number of computers and peripheral equipments the city uses. The IS department's staff which increased from 7 professionals in 1981 to 17 in 1988 stands today on 19 positions. City C developed 22 major applications during the years 1982 to 1988, but only five more applications were implemented between 1988 and 1992, a time frame in which 22 new applications were requested by the user departments according to the 1992 annual report of the IS department. The increase in the number of peripheral equipment in City C (such as: terminals, PC's, and printers) between 1987 to 1991 was also steady but slow. Adding approximately 50 new units each year the IS department was not able to stop the gap between the demand and the supply from growing[2]. Similarly, the annual operational budget of the IS department increased only by a factor of 2.3 from around $580,000 in 1988 to 1,331,100 dollars in 1992. More significantly, yearly capital investment in IT was kept at about two fifths of the operational budget all these years.

Over time, as the IS department became a more permanent feature in the municipality and the novelty of the new applications faded away, the involvement of top level management in the development of the IS in City C decreased. Probably due to the fact that the IS was doing fine, the feelings that the department head as an equal partner in the management team is capable of representing this domain alone, and the decline in the number of new initiatives the city pursued, City Administrator and department heads gradually became less involved in the development of the IS and less interested in it. As the City Administrator explained:

> *The director of IS is a senior person who sits on our department heads committee ... you can rely on him to keep us advised ... At least where we are now, information technology is not a big enough part of our operations or even an important enough part of the operation to demand that I sit on [the IS steering committee].*

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[2] The 1991 strategic IS plan, which will be discussed in the following paragraph, recognized that fact and during 1992 221 new units were added.

In 1991, facing a growing demand for services an aging, loaded-to-capacity central computer, and diminishing resources, the IS manager initiated a task force headed by himself and composed of second echelon managers from all departments to prepare a *"comprehensive computer strategy to address the information requirements of City C"*. This task force, however, was not driven by a vision regarding the role of IT in the municipality, did not address the question how IT should be used to change the way the city operate, and did not follow a top down systematic planning methodology. Rather, as can be expected of the level of people that form the task force and the reasons it was convened, it focused on four tactical level issues. As stated in the task force's report:

> *How to staff development of new systems with the present system maintenance load? How to manage the growth of microcomputers use? How to set priorities for requests from competing users? and How to manage departmental request for services effectively?*

Late in 1991 the task force submitted its conclusions in a report labelled "1991 Computer Strategic Plan". It recommended that within a period of five years the city will convert most of its applications from the aging, proprietary WANG computer to a number of smaller but powerful minicomputers and adopt an open-system architecture. It identified Human Resources, Office Automation, Communication network, and Maintenance Management as the most important areas in which new development should concentrate. It suggested that the City move to reduce redundancy in data entry by providing field operators, such as inspectors and parking enforcers, with hand-held computers, and office workers with PC's connected on-line with the main systems. The report also recommended that the city avoid as much as possible in-house development of application and rely mainly on packaged applications. It proposed a five years capital investment plan which the city should commit to. The plan, however, was never presented to the council, nor formally approved by the city management team, and no long term commitment of fund was made to finance future development of the IS in the City. As a senior manager and a member of the task force recalled,

> *The Administrator backed the plan but he did not participate in its development or actively push for endorsement. Department heads neither back it nor were they very interested ... Our recommendations were never formally discussed ... Some of those things are gradually implemented but piece by piece as the budget allows.*

Nevertheless, since 1992 the development of the IS in City C has picked up speed. Capital budget allocated to IS increased in the last couple of years by more than 30%, the city

approved three additional positions for IS professionals[3], and various elements of the 1991 plan were separately approved and implemented. Control over all IT related expenditures remain centralized in the hands of the IS manager, and the group of middle level managers that developed the IS plan was transformed from an ad-hoc task force to a permanent IS steering committee which support and advise the IS manager. Thus, while significantly slower than what was recommended by the 1991 plan, the development of the IS in City C continues to follow a master plan kept current by the IS manager and the steering committee. This plan, whoever, as can be expected from the composite of the steering committee, the lack of top management involvement, and the bottom-up planning methodology, is not mission-driven nor strategic. It is driven by the operational needs of the departments and focuses on solving technical problems in the existing systems, rather than by how IT can best be utilized to attain the goals of the municipality. The manager of Budget and Planning described the actual work of the steering committee:

> *It became an advising committee [for the IS manager], consists of middle level managers ... lately I refrain from participating, more and more every one is representing the needs of his department and pull to his direction, discussions are mainly technical regarding existing and future systems ... there are no long-term planing at the goals level.*

Accordingly, the Director of the IS summarized his department's goals in the 1992 annual report as *"Assisting and providing automated computer systems which make departments run more efficiently and effectively"*

1.2 Utilization of IT in City C

The utilization of IT in City C presents a confusing picture. 22 out of the 28 major applications in the city still reside on the aging WANG VS computer and are to a large extent based on old technology and written in second and third generation programming languages. Thus, while the planning and development of these systems were, and still are, centralized and integrated, the city do not use modern DBMS technology and sharing of information between applications requires that each will access the other application rather than a common, central repository database. Also, 24 of the major applications currently used in City C were developed internally during the early 80's and over the years changes and

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[3] One in the IS department and two in Engineering. Thus at the time of data collection there were 24 IS professionals in City C. 19 in the Information Services Department and five more, de-facto directed and coordinated by the IS manager, in the Engineering department.

enhancements were introduced in an ad-hoc fashion rather than through a comprehensive IS planning processes. This tied more and more of the IS department's resources to maintenance and support, seriously limited the ability of the IS department to use modern CASE tools or standard programs as add-ons to existing applications, and made it increasingly hard to respond to request for changes and improvements. As a result: a huge back-log of outstanding requests developed and was estimated as the equivalent of 4.5 million dollars in hardware, software, and applications development at the end of 1991; the WANG computer reached its capacity limit and there was no more room to add terminals or other peripheral equipment to it, and response time drop at times to an unacceptable level; and major applications became a patch-work of small, add-on functions and enhancements, they were increasingly harder to maintain, and in some areas the technology used inhibited changes rather than being an enabling factor.

For example, the Geographical Information System (GIS) for which City C received the URISA exemplary governmental system award in 1986 is today a primitive system compared to the modern GIS available in the market. It does not have a report generator, each query or update must be programmed by a specialist in a special purpose language which is rather complex, and it does not have the capacity to maintain historical data but only the current state of each of its 150 different layers. Another example is the financial systems which are still based on 1983 technology. They lack an easy to use interface, reports are inflexible and can not be controlled or changed by users, there is no budget preparation module, an according to the Treasury department most components are no longer adequate.

As the manager of Budgeting and Planning in the Treasury department, who is also a member of the IS steering committee, said,

> *Ten years ago we were leading in the area of IS. Since then we lost sight of the strategic direction, what we are doing is directed by the operational needs of the departments and whatever funds the city can allocate to IS on a yearly base. So it is always small, incremental changes which result in systems being too complex, hard to maintain, and inflexible. Today we are probably behind many of the other municipalities.*

A major part of the 1991 plan which City C is following was designed to overcome these limitations. Following the recommendations of the plan, City C is moving away from the proprietary WANG computer into Hewlett Packard minicomputers which operate in a network environment. Also, in the migration of the applications to the new platform the old systems are being converted to operate under the Unix operation system and the ORACLE

relational database. Thus, while the planned conversion does not include redesign of the systems nor re-engineering of the processes they support, it is hoped that it will make the systems more flexible, easier to maintain, and facilitate better sharing of data between systems[4].

City C is also following the recommendations of the plan in the area of new development. During 1992 and 1993 an automated registration system was implemented in the various recreational centres and the public library purchased a top of the line circulation system. The Operations Management System (OMS) identified as a priority in the 1991 plan is currently in the final stages of implementation, and the city is looking for a system that will answer its needs in the area of Human Resource Management. In addition, as part of the infrastructure for the new open-system architecture, and in response to the City Administrator's emphasise on *"reduction of paper work"* more than 200 PC's were added during 1992 to the 150 the city already had, and 12 LAN's were implemented throughout the city. Today, almost 85% of the offices the municipality occupies are interconnected through a WAN and office automation tools which reside on the network servers are standardized across all departments. Also, the WANG based systems are accessible to the PC network through a gateway, and the City plans to gradually replace all the old terminals (around 150) with personal computers[5].

In summary, utilization of IT in City C follows the dictate of a central steering committee, standardization of hardware is kept through the control the IS department has on the purchase of all IT equipment, and while there is no city-wide data models and central repository databases, system integration is maintained because of the centralized planning and development processes. Furthermore, development of IT based systems is coordinated with all potential users and special care is taken to make sure that data is consistent across all systems. On the other hand, the development of the IS in City C stems primarily from operational-level needs of the departments. System development does not follow a top down analysis of the information requirements of the city, and IT is used mainly to improve the efficiency of existing processes rather than to change the ways the city operates. As the City Administrator stated,

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[4] The Property Management System which is the first major application to be converted is currently getting near its completion.

[5] The reason for that is that the gateway allows only one-sided connectivity. While a PC operator can access all city applications one cannot access systems which reside on the network through a WANG terminal.

The [IS] development tend to be dominated by the process in which managers sense that there is a problem, or opportunity, but usually problem, and then we search for solutions and part of that search is to look if information technology can be useful.

Furthermore, consistent with the operational level, problem solving perspective that drives the development of the IS, but inhibiting more extensive usage of IT to support major organizational goals, City C often opted to be content with only logical integration between systems rather than the more expensive physical interface. This means, for example, that the new OMS exchanges data with the GIS only through exchange of magnetic types, there are no links between the cash registers in Permit & Licences and the accounting systems, and there are redundancies in storage of data across systems and locations.

2.0 Assessing IT support for organizational goals in City C

While the IS in City C has a detailed plan for the development of the IS in the city, the resources allocated to the department during the last two years were less than half those called for by the plan[6]. As a result, there is a growing discrepancy between the implementation plan and what was actually done. In general, while the IS department is following the content of the 1991 plan, there is a delay of almost two years in implementing it while new needs which were not considered in the plan keep accumulating. Furthermore, since the city did not commit to a long term plan of development, activities depend on the yearly budget and there is no way to know when, or if, the plan will be realized. Thus, we based our assessment of IT utilization in City C on those systems which are already operational and those which are currently under development, scheduled and budgeted.

2.1 IT support for administrative processes

In City C all the major administrative processes are supported to some extent by IT based systems. Furthermore, due to the central control the IS department has over system development, and the fact that until recently all relevant systems reside on one computer, data is consistent across all administrative applications and to the extent that the city chose to, the systems are integrated. On the other hand, the development of the IS in City C was directed

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[6] The plan called for $1,372,825 over and above operation budget in 1992, $900,000 in 1993, and the approval of additional 2.5 positions to the IS department. Actual budget for the development of the IS was $530,000 and $750,000 respectively and only one position was approved in 1994.

by the short term, operational needs of the departments rather than by a vision regarding how the city should operate. In many cases the city chose the least expensive computerized solution rather than the more advanced and visionary one. As a result of this approach to system development, although the basic functions of each of the administrative processes are supported by IT based systems, the full potential of the technology is rarely realized. While in some areas the city uses the technology in a more sophisticated ways than in others, probably because of a more visionary user, in general, cost saving considerations, operational perspectives, incremental planning, and focus on supporting existing processes result in systems support which often does not fully cover all aspects of the process being supported or not all possible users. Reflecting the same approach, features which might not be of essential such as: colour, graphical interfaces, and even on-line integration as opposed to manual transfer of files between systems, were often judged as luxury and were not implemented.

Two examples demonstrate this approach to system development. First, the new OMS which is being implemented in City C is designed to support inventory control, costing, and generation, scheduling, and tracking of work orders. The system, however, was purchased in response to needs initiated by the operational branch of the Engineering Department. It resides there, and geared to answer their requirements. Implemented under the supervision of the IS department, the data formats of the new OMS are consistent with those of the other applications in the city and the system was made accessible to all departments through the network. The requirements of the other departments, however, were not incorporated into the design of the system. Thus, departments which run essentially the same type of functions cannot be supported by this system[7]. The new OMS also demonstrates the frugality approach to system development. Out of many vendors that responde to the RFP the city chose a system that does not support graphics or colour, and integration with other systems is achieved through batch file transfer or exchange of magnetic types. This, while sufficiently answering the urgent operational needs, do not go beyond mechanizing the manual work process which the system replaced. Work orders are still generated and scheduled by the supervisor, inventory is tracked but not managed by the systems, field crews do not have

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[7] For example, the Permit & Licences Department must generate, schedule, cost, and track building inspection, as do Fire and Health, but those functions are not supported by a computerized system. The Purchasing officer in the Treasury department manages the inventory in the city's store, and various other departments such as Parks, Library, and Community centres run their own maintenance operations but their needs were not incorporated into the new OMS.

direct access to relevant information stored in the city's systems, and data entry remained centralized. Second, the accounting system in City C is yet another example of the integrative but pragmatic and frugal approach to system development. It was designed to efficiently track money flows in the municipality. As such, it is fed automatically (or through file transfers) by all systems that generate those flows and in most cases it supports on-line connection with associated functions such as: billing, payroll, bank reconciliation, and collection of tax and other payments. On the other hand, functions which are less operational in nature and more related to financial management rather than accounting, are much less supported. The financial system in City C does not have budget preparation module, historical data is not maintained on-line, there is no easy to use report generator, data cannot be easily manipulated for analysis purpose, and there is no investment management module[8].

Two other administrative functions, for which system support was provided only recently, demonstrate also the pragmatic vs. visionary, and the satisfactory vs. the best approach to system development in City C. For Record Management (RM) the City Clerk Department, which is the custodian of the city's archive, was provided with an advanced feature of the WP software package which maintain a computerized index of all the official documents. The city however, did not go beyond mechanizing what used to be a manual process. The archive itself is still paper based, the system does not support textual search nor searches for key words, and documents which originated by a wordprocessor still have to be printed, manually transferred, indexed, and stored. Similarly, the basic features of Office Automation (OA) such as: wordprocessor, spreadsheet, e-mail, and scheduling are standardized and provided throughout city but once again City C does not take full advantage of the technology. Many office workers in City C are still without a PC on their desks, there is no enveloping operation system, no consistent graphical interfaces, no support for conversion of data from one tool to another, and none of the more advanced features such as links to fax machines, telephone directories, and bulletin boards.

At the time of data collection the personnel function in City C was not supported at all by a computerized system, however, funds for a Human Resource Information System (HRIS) were set aside and the Personnel Department together with the IS department already sent out an RFP. Final decision about this system was not made yet, and as the manager in

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[8] Recently, the city developed two computerized modelling systems which relate to financial management, the Capital Investment model and a model to support decision regarding land acquisitions. These two systems do not support administrative process and will be mentioned in the section that discusses support for decision making.

the personnel department responsible for the project reported *"right now it is on hold"*, but she also stated that,

> *Basically it is going to replace our manual system. We do not intend to add much ... it would not support performance monitoring and appraisals ... It will be linked, of course, to payroll and the accounting systems and I believe that we will allow users on-line data entry, and subject to authorization, to view the information ... We real do not know for sure yet.*

The last two administrative functions on which this study focuses, the payroll and the consistency in referencing functions, are highly supported by IT based systems in City C. Both functions are operational and city-wide in nature and both are key functions on which other, more specialized, functions depends. Also both functions are supported by systems which were developed in the early 80's when a different approach to system development existed in City C. Thus, both systems are fully integrated with all other relevant systems. The payroll system allows on-line data entry by the user departments[9], and all systems share a common address key which is maintained in the GIS[10].

Table C.1: Summary of IT support for the administrative functions in City C. (underlined = characteristics of existing system; shaded cells = system as rated; double lined cells = system being upgraded)

	High utilization	Moderate utilization	Low utilization
Inventory management	on-line and comprehensive support, integrated with purchasing, accounting, maintenance systems, automatic replenishing & user generated purchasing orders, tracking, reporting & analysis tools.	on-line and comprehensive but not fully integrated with accounting, purchasing and maintenance, no automatic replenishing, no on-line generation of purchasing orders, no analysis tools.	not on-line, or not covering all types of inventory, integrated only with accounting, no managerial functions only record keeping.
Financial management	on-line comprehensive accounting system, fully integrated with all functions which generate financial transactions, electronic transfer, bank reconciliation, cost allocation, point of sale data entry, budget preparation, financial analysis & reporting tools.	on-line accounting system but not capable of handling all types of accounts or transactions, or not fully integrated with associated systems, or no budget preparation, no financial analysis and no reporting tools.	accounting system which do not cover all transactions, not integrated with associated functions, redundant data entry, no budget preparation, analysis, electronic transfer, bank reconciliation & reporting tools.
Payroll	on-line, parametric system; handling all workers, automatic time capture or one time data entry, integrated with maintenance, personnel, & accounting, electronic deposit, check writing; annual reports (T4).	capable of handling all workers, electronic transfer, check writing, & annual reports, but non parametric, redundancy in time cards data entry, not fully integrated with other system or not on-line.	stand alone, non parametric & not on-line system, and/or not capable of handling all workers, no electronic transfer, no annual reports.

[9] The city, however, opted not to purchase a system to automatically log working hours and transfer it to the payroll system.

[10] However, especially for systems which were developed lately, the GIS is used as a master file rather than as a central repository database of addresses.

Personnel	on-line central personnel records, employment history, positions, job descriptions, training and qualifications, performance appraisal, integrated with payroll & time card, analysis & report tools.	on-line central personnel records but only current status & no performance appraisal, analysis or reporting tools, or not integrated with other systems and not on-line.	stand alone, record keeping database, no employment history, qualifications, training, no managerial functions.
Consistency in references	all data, in all systems, which refer to the same entity share a common key, no redundancy in data storage, on-line linkages between record regarding the same entity, electronic link to external assessment authorities, dynamic views.	central repository database of addresses and properties which is linked on-line only with some of the systems that use that kind of information.	stand alone database, each system holds its own addresses and properties records, or none.
Office automation	city-wide network which offers an integrated and standardized office suite, including word processor, spreadsheet, communication, telephone, graphics, e-mail, file transfer, scheduling.	only between 50%-80% of the employees are provided with PC, or are connected to the network, or office automation tools are not standardized, some tools are not provided, no enveloping system to integrate the various tools.	less than 50% of office workers have PC, or are connected to a network, or office automation tools are not standardized, and most tools are not provided nor integrated.
Cost control, job costing	on-line systems, fully integrated with accounting, inventory, personnel, & payroll, semi automatic generation and costing of work orders; allocation of costs to programs, projects, equipments and work orders, analysis and reporting tools.	the same as the high cell, but not covering all types of the city's operations, or not fully integrated with the related systems, and/or no analysis and reporting tools.	batch based system which records work orders and posts costs to appropriate accounts.
Record management	city wide, on-line, standardized, magnetic media storage of all records, full text search and retrieval capabilities.	a city-wide computerized record indexing system, or number of separate, non compatible, record management systems, or record management system that store only part of the city's records.	small stand alone databases, or departmental computerized indexing systems, or none.

Overall, the level of IT support for administrative functions in City C is rated, on average, as **moderate.**

2.2 IT support for provision of high quality services

In assessing the value of IT based systems used in the area of provision of services, the criterion used is the extent to which customers directly benefit from the systems, rather than indirectly through the improvements in administrative processes. While both the Mayor and the City Administrator stated that customer service is the major focus of the city, the way City C uses IT does not, in general, mirror that approach. As the City Administrator said,

> *[Our IS] is basically supporting our administrative processes ... it probably need to be broader in scope than it is ... We have got very limited applications and technology at the moment that actually interact with customer service on the front line.*

Nevertheless, we found that a number of services are highly supported by IT based systems. These systems are a stand alone, state-of-the-art, circulation system for the public library, an advanced real-time responsive traffic control system, and a computerized system that monitors and controls provision of water, sewage services, and storm water control. For each of the services these systems support, the city was able to purchase a mature, stand alone, computerized packaged solution which solves operational needs of a specific

department while also directly improves customer services. Billing, tax and fine collection is also a service where IT is used to significantly improve customer service and at the same time to solve operational needs. In this case IT is used to provide a one-stop station capable of handling, in real-time, all types of payments, query customers accounts, prints bills and provides receipts. The system also facilitates flexible forms of payment and automatic debiting of customer's bank accounts. The system, which was developed internally did not introduce innovative solutions (such as bar codes, scanners, magnetic strips) which might have further improve the services and essentially is based on well proven, but somewhat out dated technologies.

In areas where solving operational needs did not necessarily entail direct improvement in customer service. Or where more advanced technology was needed in order to significantly improve services, IT is utilized only at a moderate level. In those areas, IT based systems are primarily built to facilitate efficient operations, they are planned after the existing processes rather than a vision regarding how best to provide services, and each tend to focus on a single process or department.

For example, each recreational centre in City C is supported by a separate computerized registration system. Thus, customers cannot use one system to search and register for activities which take place in other centres or in other facilities of the city. Also, as a by product of the new OMS customers' complains or requests which ultimately resulted in a work order in the Engineering Department are tracked by a computerized system. However, since the system was designed to answer the department problems and not that of the customers, it was not given the capability to accept complains or requests in any other areas nor to offer feedback to customers on their requests. Another example, the fire fighting despatch system determines, according to a pre-defined division of responsibility which of the seven fire stations should be alerted, indicates to the operator on which grid in the maps book to find the address, and presents the operator with information about that address. The system, however, does not have the capabilities to show the map of the area, to suggest a route for the vehicles, to take into account the status of each of the fire stations, to transfer the data directly to the crews, and to suggest which off-shift fire fighters should be called based on the location of the fire.

Even when a department do have a vision of how to use IT directly to improve customer service and asks for a system that will directly interact with the public it usually got pushed down the priority list due to resource constraints, and the conservative and frugal

approach to IT utilization in City C. As a manager in the Planning Department, which is the most advanced department in the area of IT usage told me,

> *We want a tracking system, we want the by-laws about development and zoning on the computer and terminals on the counter for the public, we want computerized cash registers and hand-held machines for the inspectors ... But, as things come up and there is only so much money [council] will look at those [requests] and say: why should we spend money on that if they did not need it last year, they got through okay.*

Lastly, in areas which do not correspond to a specific operation of the city, or where no problems are perceived, but where IT may significantly enhance the quality of the service it is not utilized at all. To some extent, in those areas where computers may improve services but where there is currently no problems, we even sense a tendency to avoid the technology, even though people are aware that it may enhance the quality of the services provided by the city. From the political level the Mayor of City C said,

> *Most of the people that elected me are up in their 40's and 60's and 70's ... they do not want to talk to any machine ... They are not comfortable with these things ... they want to talk with a person on the other side of the counter.*

And from the administrative perspective, the IS manager told me, *"Why are you asking all the time about remote services and the public accessing information from their home? We can have it but we do not ... No one asked me for that"*. Thus, provision of information to the public, customization of services, and allowing remote access to services are not perceived as an operational problem and since there is no specific target to meet and no great demand from the public neither of these areas are supported by IT. Exceptional in this sense, and further demonstrating the reactive rather than proactive approach to system development, is the case of providing property related information to individuals and firms in the real estate business. As the IS manager explained:

> *We had a problem, lawyers, developers, real estate agents ... increasingly ask for property related information ... [this] load the front desk people and take a lot of time to look for. So we develop a small application on which we record the roll number of the property they are interested in and then overnight we automatically dump the information from our systems into their Fax machines.*

Table C.2: Summary of IT support for provision of services in City C
(underlined = characteristics of existing system, shaded cells = system as rated)

	High utilization	Moderate utilization	Low utilization
Response to emergency calls (police, fire, ambulance).	on-line, computer aided dispatch system which covers all three services, real-time optimization of whom to alert, routing, and call-ups for reenforcement, on-line presentation of all relevant, call-specific data available in the city's systems.	the same as in the high cell, but only for some of the services, or on-line computer aided dispatch system which presents only static (not call specific) data, no automatic optimization of routing, alerts, & reenforcement.	records calls and maintains log of activities, stand-alone database of some relevant information, no automatic functions, or none.

Provision of data to emergency field crews	mobile data terminals in most vehicles, communication links which allow field crews to interrogate all city's systems, remote data entry and verification.	the same as in the high cell but only in few of the vehicles, or radio links with operator who can access all city's systems on-line.	radio links with operator who does not have on-line access to most systems, or none.
Traffic control	full coverage, automatic traffic-load sensing and scheduling of traffic lights, responsive system.	full coverage, automatic traffic lights control system but without real-time components.	partial coverage, static traffic lights control system, or none.
Water, sewage, storm-water control	full coverage, real-time monitoring of pumps and valves, automatic detection of faults, remote control.	partial coverage, or real time monitoring but no remote control capabilities.	none.
Bill and fine collection	ATM and/or one-stop service station integrated with other city's systems, on-line data entry, query, printing of bills and receipts, flexible forms of payments (banks, instalments, automatic debiting, credit cards, checks, cash), bar code scanning.	one-stop computerized cash register not integrated with the city's systems, or a number of different systems each one capable of handling one type of payment, or system does not allow flexible form of payments.	computerized cash registers for each type of payment, not integrated with other systems, no on-line data entry, query, and printing of bills and receipts, no flexible form of payments, or none.
Issuing of permits and licences	on-line filing of applications, automatic fill-in data fields and eligibility checks, presents customers with case-specific information, inter-departmental inquiry and tracking system integrated with bill collection system.	one-stop service counter, inter-departmental inquiry and tracking system.	departmental record keeping, or none.
Public library	on-line, multi-branches, circulation system, computerized catalogues, public terminals, self search, inquiry, and booking; automatic notification, remote access.	on-line but branch specific circulation system, computerized catalogues, search only public terminals, no self booking, status inquiry, or remote access.	computerized catalogues, or none.
Managing public requests and complains	on-line, city-wide system which records, channels, and tracks all types of requests and complains; generates confirmation notices and final responses; integrated with all other relevant systems.	on-line, city-wide but type-specific system; records & tracks requests for specific services. And/or, does not generate responses; not integrated with other systems.	off-line record keeping, or none.
Provision of information, registration services	on-line registration/booking system for all city's sponsored events, classes, facilities, available at most public service counters, integrated with other systems to allow on-the-spot payment and issuing of receipts/tickets /confirmation.	on-line but event or departmental specific systems, presents information and allows registration/booking only to those activities controlled by one department, not integrated with other systems.	system support for registration / booking are for local activities only, or none.
Remote access	direct access through dial-in modems or terminals in central locations to registration services, taxes/fines/bills inquiries, permits & licences applications, and requests for services.	direct access through dial-in modems or terminals in central locations to a partial list of the services mentioned in the left cell.	none.
Customization, value-added services	notices and bills in language of choice, offering a range of options regarding format of bills and their informative content.	some of the items described in the high cell but not all.	none.

Overall, the extent to which IT is utilized to provide quality services in City C vary greatly across functions, but on average we rate it as **moderate**.

2.3 IT support for decision making

In assessing the extent to which IT is utilized to support decision making in City C we focus on three areas: a) availability of data, b) breadth and depth of data, and c) existence of tools to manipulate and present the information in ways useful to decision makers at the

city management level.

City C's approach to data management and computerized decision support is essentially the same as to the two previous domains -- it is practical and driven by operational needs. While the centralized approach to IS planning and development guarantee compatibility and the IS architecture facilitates sharing of information across systems and users, the application development process which focuses on operational needs and cost saving often result in not realizing this potential. Thus, on-line sharing of information is supported only to the extent routine operations require it, the technical solution chosen for system integration often suffice to solve operational needs but not more, and on-line connectivity is often waived in city C in favour of a less expensive solution of two separate systems which periodically update each other through file transfer. The result of this approach is that when data is needed for managerial decision making it is not always readily available.

For example, both the new OMS and the Fire Response System (FRS) use data from the GIS but are not connected to it. While for decisions at the operational level periodic updates between the systems are sufficient, managers can not use the two systems in conjunction to support non-routine decisions. Similarly, the city-wide network allows authorized users on-line access to all city applications. However, in most applications data is not stored in a database environment and applications share data only to the extent that it is needed for their task-specific operations. This often means that only the current value of an entity can be shared across applications, and if historical data is needed from two or more domains, data must be extracted separately from each application. Furthermore, aimed to provide operational needs most of the applications were not built with a flexible report generator and non-routine queries necessitate professional programming.

Furthermore, none of the systems in City C incorporates a graphical module, all computer generated reports are still in text and tables format, and expect for the Permit system non support exception reporting. There is also no computerized systems to record, track, and analyze workers' achievements, and there is no system support for calculating performance criteria.

City C follows the same pragmatic approach also in the areas of providing its employees with information through linkages to external sources of information. Rather than providing on-line or dial-in linkage to provincial, federal, or international networks, when specific needs arise and are deem cost-justified, the IS department makes the data available to those who need it through a one time purchase of a tape or a hard copy. The same goes

for collecting environmental data and providing internal linkages. In City C there is no corporate approach to collecting environmental data. Rather, when there is a justifiable need departments are allowed to develop, purchase, or actively collect the data they need and the IS department creates for them small, ad-hoc, databases in which to store it. The IS manager referring to one specific case described this approach,

> *For example, a few planners wanted access to census information so we purchased a tape and we are going to load it on their server ... Most users develop their own small data bases, if they need information from the central systems, or from other sources, we help them to extract it and load it on their own PC ... Much of the data is not directly accessible to all users.*

Further limiting the value of the IS for decision support, and in line with the operational approach to system development, is the fact that historical data generated by the various applications is usually stored separately from the applications. This, together with the fact that not all information is managed as corporate resource, limit the breadth and depth of the information readily available for managers and often force them to relay on professionals to extract the information or to give it up altogether. In terms of the direct support computerized systems provide senior managers in City C, the City Administrator stated, *"I think that our use of information technology in management is very very weak, especially at the senior level"*

Lastly, once again as a solution to specific problems, the city developed two computerized models to support decision making. The first, a Land Acquisition model was developed after the city realized that it lost control over its operations in the real estate area *"There was even an instance where a specific piece of the city's property was 'lost', and for some time no one knew that the city owns it"*. The City Administration explained how the model was initiated:

> *We realized that in the volatile real estate market we may be costing ourselves money ... So someone in treasury just said, well that is easy to do ... a simple model with market prices, deprecation, maintenance cost, rents ... That solve our problem.*

The second model, which forecasts tax levels as determined by capital investment, was a result of the financial squeeze the city is in and the reluctancy of the council to approve increase in taxation, which force the administration to look more closely at the effects of various capital investments on the tax rate.

Table C.3: Summary of IT support for decision making in City C
(underlined = characteristics of existing system, shaded cells = system as rated)

	High utilization	Moderate utilization	Low utilization
Sharing of information	all corporate data is available on-line, systems & users can easily share information stored anywhere in the city, easy to use interfaces allow easy access and manipulation of data.	not all corporate data is readily available on-line, sharing information among systems often requires professional involvement, no easy to use data manipulation tools.	data is not managed as corporate resource, most systems are not compatible, very little data is available on-line.
Breadth and depth of information	corporate data is broad and deep, includes environmental data as well as internally generated data in great detail, historical data is maintained and available on-line.	only limited environmental data is available through the IS, historical data is not maintained on-line.	no environmental data is available, there is no historical data in the system, internally generated data is kept at a relatively high level of aggregation.
External linkages	on-line, dial-in linkages to many external networks and databases are available to most city's officials.	few linkages to external sources of information, no on-line, dial-in capabilities, and/or only few officials have on-line connection with external networks/databases.	only operational-level, routine and standardized file transfers, or none.
Flexible & easy to use reporting, executive summaries, exceptional reporting	flexible and easy to use report generators which allow integration of data across systems, most systems provide executive-level summaries, exceptional reporting, and graphical presentation.	most systems provide menu driven report generator, usually restricted to the data stored in each system alone, no executive-level summaries, no exception reporting, no graphical presentation.	only routine, standardized print-outs of data, most system do not support user generated reporting.
Performance monitoring & performance evaluation	systems support for monitoring use of resources and many parameters regarding the city's outputs, on-going, standardized, and city-wide calculation of performance measurements.	systems support for monitoring use of resources and limited outputs' indicators, some city-wide performance measurements criteria are routinely calculated.	systems support for monitoring use of resources only, no performance measurements at the corporate level, or none.
Analysis tools (modelling, forecasting, statistics)	many analysis tools are available on-line at the corporate level, tools are well integrated with the city's data, available tools cover many aspects of the city's activities.	few, task-specific, analysis tools are available at the corporate level, analysis tools are not integrated with the other systems.	none.

Overall, we rate utilization of IT to support decision making at the corporate level in City C as **moderate.**

2.4 IT support of the democratic process

In City C, the functions we chose as indicators for the democratic process are not supported by IT based systems. Most of these functions are not an important part of the routine operations of the departments and neither the public nor the political level is very demanding in these areas. Thus, the departments are not demanding, and management does not sense problems, and consequently does not allocate IS resources to support these functions. Even the Freedom of Information Act which will come into effect at the end of this year is not perceived as a cause that justifies giving functions, such as disclosure of municipal data and publicizing council minutes, a higher priority in the IS development agenda. As the

IS Manager said in regard to system support for public access to municipal data:

> *Yes we want to do it but again, it is this and money in term of what do we need more ... you can still give them [the public] the information as we always do ... [the Freedom of Information act] does not require that it be done on the computer ... as it is now it is not a problem.*

An exception to the observation that the domain of the democratic process is not supported by IT based system in City C is the fact that lately the city purchased an automatic voting machines. This further demonstrates the operational, problem solving nature of the development of the IS, since managing the election is the only function within that domain that is operational in term of the actions the city should do, complex and sensitive, and the responsibility of one department.

Table C.4: Summary of IT support for the democratic process in City C
(underlined = characteristics of existing system; shaded cells = system as rated)

	High utilization	Moderate utilization	Low utilization
General election	automated voting system.	calculating and reporting of results.	voters list, or none.
Publication of council minutes, decisions, legislations	on line, search and retrieval capable system, electronically accessible to the public	database of council minutes, bylaws, policies	computerized indexing system, or none.
Communication between the public and its representatives	system capable of recording, channelling, and tracking constituents concerns.	system that records constituents concerns, or a messaging system.	telephone, or none.
Council's oversight of the administration (monitoring city's expenditures, operations, adminstration behaviours)	on-line, EIS type of system for aldermen.	on-line, menu driven query system and report generator.	on-line connection to all city's systems, or none.
Disclosure of municipality's data (budget, plans, programs, expenditures, etc.)	on line, search and retrieval capable archive, electronically accessible to the public.	magnetic media archive.	computerized indexing system, or none.
Involvement of the public in decisions	computerized survey/poll system that actively seeks and analyze public opinion, or interactive televised council meetings.	bulletin board which carries council agendas, and/or system that record public opinion regarding issues on the agenda.	televised council meetings, or none.
Reducing asymmetry of information (collection and distribution of social, commercial, and environmental data and statistics)	on line, search and retrieval capable system, electronically accessible to the public.	database.	computerized catalog, or none.

Overall we rate the IT support of the democratic process in City C as **low**.

3.0 Political behaviours in City C

3.1 General description:

The political level in City C constitutes of the City Council with eight councillors and the Mayor who is elected by the public at large. Subordinated to the Council but to some extent independent of City-Hall administration the Public Library is managed by a board of public figures, each community centre is managed as an independent association, and the Police in City C is contracted to the RCMP. Overseeing the operations of the city there are five sub-committees of councillors, each responsible for a number of functional areas which corresponds to the division of responsibility among the city's departments. Those sub-committees do not only oversee the operations of the departments but have the authority to directly control them even without going through the City Administrator, though in practice, he is usually kept informed. Thus, at least formally, in City C there is a dual command structure where parallel to the reporting relationship each department has with the City Administration they also report independently to the political level through one of the sub-committees.

Since by definition the notion of IT utilization for support of organizational goals views technology as the means to an end rather than an end in itself, it is not (normatively) expected that the political level will be deeply involved in the details of how City C is using computerized systems. However, decisions and actions of the politicians may have significant impacts on how the city uses IT. In the following three sections we assess the extent to which the politicians in City C: a) provide well defined goals, objectives, and strategic directions, b) support IS development and are directly involved in its planning, and c) create uniformed authority structure. Each of these three domains is normatively expected from the political level and is hypothesized as having a strong impact on the extent to which the city is able to use IT effectively.

3.2 Political leadership in City C

There are three processes through which the political level in City C provides the administration with goals, priorities, and strategic direction: a) the formal articulation of the *"council objectives"*, once in a council's term, b) the yearly budget process, and c) the direct involvement of the councillors in overseeing the daily operations of the departments through the work of the sub-committees. However, as demonstrates in the following paragraphs, the extent to which the politicians in City C provide the administration with long-term goals,

priorities, and strategic directions in regard to the operation of the city is only moderate.

In City C at the beginning of each term of council the newly elected officials together with the city management gather for a two day retreat in which Council *"examine its mandate and establish its objectives"*. During this weekend, as described by the City Administrator:

> *We would say: all right, what are your collective priorities for your term of office and what would you like to see achieved ... We would talk through these issues and later we [management] try to come back to them [council] with a work program and a budget that sort of reflects and incorporates achieving their goals.*

The results of these deliberations tend to be a list of objectives which represent what the council perceives as the most important issues that stand before the city. This list, while mainly focused on large development projects, includes also references to various aspects of the services the city provides which council feels should be emphasised. The list highlights facets in the working of the administration which council wants to change, and it presents council's goals in regard to the relationships between the administration and the public. However, while the objectives articulated in those documents are usually well defined, set within a specific time frame, and accompanied with action items, they are as the Mayor wrote *"far from being all-inclusive"*. Furthermore, since it is done more as a brainstorming session than as a planning process, many of the action items rather than setting goals and policies, are in fact instructions to: *"develop a city-wide strategy ... prepare a policy ... or establish a task force to determine directions.* To transfer those initial objectives into a realistic set of achievable targets and strategic directions, each new council in City C is supposed, as mentioned in the introduction to the 'council objectives' report, to perform a bi-yearly reviews in which operational targets will be set according to staff recommendations, budget constraints, and changes in council's priorities. These reviews did not take place during the terms of the last two councils. In fact, as both the Mayor and the City Administrator stated, *"Council was not involved nor very interested in pursuing that initial process into strategic planning"*. Even in those few areas in which the administration, following its own initiative, prepared a long term plans, Council either was not interested and did not find the time to study it (such as in the case of the IS plan) or the plan was presented and discussed, usually at the sub-committee level, but no formal approval was granted and no long term commitment of resources secured.

A study of council minutes and the 'Corporate Policy Manual' reflect a similar picture. City C maintains a well organized 'policy manual' in which the missions, and in a few cases even the operational targets and the required level of performance of each

department are formally defined. And there are formal policies that give directions and clear guidelines in regard to how the administration is expected to operate. However, the council is hardly involved in preparing those documents, the manual is reviewed and updated by the administration, and to a large extent council endorsement is an act of rubber stamping. Similarly, council records bear witness to the fact that decision regarding new projects and significant investments are usually proceed by a thorough discussions which tent to focus on how the proposed project relate to the objectives of the council as well as on its cost effectiveness. However, both the discussions in council and the setting of evaluation criteria are to a large extent driven by the administration rather than by the council. As the Mayor of City C said,

> *If you look at the agendas, probably 95% of the stuff come up from the staff for the council to deal with. Occasionally, I will come up with an issue but I do not think we, the politicians, do enough of that ... usually it is sort of staff bringing things to us and they [council members] deal with the issue.*

In the budget process, the politicians play even a lesser role of leaders. In City C there is no formal process in which council set specific guidelines for the preparation of the yearly budget and departments plans, and new initiatives are not reviewed and prioritized prior to the actual budgeting. Rather, the process is almost entirely driven by the administration, and the role of the political level is to a large extent minimized to setting the tax rate. As the City Administrator explained,

> *Each department sort of forecasts how much the volume of its business is going to be and how much resources will be needed to maintain a certain level of services ... Departments will [also] recommend new initiatives and prioritized them and then we bring all department heads together and try to identify what we think are the major corporate and community priorities ... When we have an integrated recommendation we take it to council as one package.*

The provisional budget, of course, must be approved by the council who, concerned with taxes, often return it to management for trimming. Overall, however, barring small shuffling at the margins, Council in City C does not use the budgeting process to focus the city's activities, to introduce new program, or to set goals, priorities, and performance criteria. As the Mayor of City C admitted,

> *Usually we all have a kick at things ... most times you think you make the decisions, but by the time it gets to you, you may well have to go with the recommendations because it has been through so many iterations in the staff that it is hard to vote no ... [The budget] is strictly something that comes from the bottom-up.*

Budgeting in city C is also strictly a short term financial planning process. The various

line-items that appear in the budget are not connected to specific operational targets, and except for major construction projects departments are not required to show how new capital investment fit into a long term business plan of the department. Even in those cases where departments do present long term capital investment plans, council do not officially decide on them and resources are committed always only for a period of one year.

The leadership role of the politicians in City C is probably realized in the most significant way through their informal involvement in the routine operation of the departments which allows them to be more proactive instead of just reacting to whatever the staff chooses to bring up to the council attention. As the Mayor described:

> *Before I became the Mayor the council just reacted to what the staff brings up ... I stop it, I see my job to direct not to follow ... So every other week I meet with them [department heads] for about an hour and a half ... I go around the room and if they want to raise some issues they can, but generally it is for me. I would ask where is that project at? why is it not going as expected? ... I would make sure that those items that council thinks are important are being driven along and that they know our priorities and expectations ... Otherwise, what staff want to do tend to keep on going and other things never quite get there.*

Similar in its purpose and effect, in City C each department has to submit a short, monthly report of its activities, and while council rarely put it formally on its agenda, it often attracts informal discussions and comments from council members. In addition, at least once a year, but often more frequently, sub-committees dedicate a meeting to review the departments under their jurisdiction. In those meetings, which usually do not end with formal decisions, departments present their work program in an informal way, share with the councillors their problems, discuss new initiatives and priorities, and explain what they hope to achieve in the coming year. The discussions that follow allow the politicians to learn about the departments, and the bureaucrats to better understand, even if only between the lines and informally, what the politicians expect from them. Thus, while not in a formal and comprehensive manner the involvement of the politicians in the working of the departments serve as a way for council to exercise political leadership.

3.3 The involvement of the politicians in the development of the IS in City C

Council in City C do not have a vision regarding how IT should be utilized in the city nor is there a policy that addresses that issue, or any references to IT in the objectives set by council in the beginning of its term of office. As one of the aldermen said, *"I do not believe City C has a policy statement in that area at all"*. And the Mayor explained:

> *I do not spend a lot of the time laying awake at night trying to think about a vision for information technology. First because those things take a lot of money and when you are dealing with the taxpayers money, as opposed to making a profit, I guess you are more concerned about spending, and secondly, in terms of competition, in the private sector you worry about technology and how to use it in order to stay ahead, but we are not in competition with anybody. So we do not have the incentive to think about it.*

The political level in City C was also not involved in planning and directing the development of the IS in the city, primarily because council did not express an interest in it, but also due to the bottom-up approach and the operational-level perspective adopted in the development of the IS plan. Furthermore, while the long term plan for the development of the IS in the city was presented to the appropriate sub-committee and both the Mayor and the aldermen we talked with were relatively familiar with its principles, it was never discussed formally in council and thus never approved or rejected. As City Administrator said:

> *Council tend not to be particularly focused on vision about how the administration work ... If we present them with information technology improvement and can show how it allow us to deliver service in a more effective way, then they can get quite enthusiastic ... basically they expect us, as the professional managers to think about IT and how to use it and like any other managerial tool to submit it within the overall budget.*

In essence, from the politicians point of view, how the city use IT is a management concern which should be discussed at the political level only if the administration brings it up in the context of a specific problem or initiative and within the budget process. Accordingly, as far as the people I talked with were able to recall, no IT based project was ever initiated by council in City C, and the level of involvement of council members in the development of the IS in the city was always limited to being those who approve the budget. As the IS Manager said:

> *IT is not going to get them elected, they are not involved in what we are doing nor do we have projects that were initiated by the council ... We have shown them the plan but they were not really interested, we have got to push them to spend time on it.*

And one of the aldermen explained:

> *I think that the whole process [the development of the IS] was staff driven ... it certainly was not being driven from the policy level at all ... We probably should have done a better job in directing it but worrying about the computer systems is not top on the priority list.*

3.4 Authority structure in City C

In City C the Mayor is the chief executive officer, and Council through its sub-

committees, can bypass the City Administrator and directly dictate for each individual department its priorities and how it should operate. That was how City C actually operated until ten years ago. Then the senior public servant in the city was called the Coordinator. Since then the authority structure in City C had changed. As City Administrator explained:

> *Today it is an ambiguous situation [since] to create the position of city manager the city had to go to a referendum [which] nobody has done ever since the province inserted that requirement. The alternative in the case of City C was an Administrator, he has some of the powers of the manager but not all, and it is not clear what the differences are.*

Over the last couple of years it become customary that departments submit their reports to the City Administrator before taking them to the appropriate political committee. Today, departmental budgets are reviewed and integrated by the Administrator's office before being presented to the council, as it used to be in the past, and the committee of department heads chaired by the Administrator tries to draft a corporate position on each major issues before they reach the political level. So, while the dual reporting structure remains, authority structure in City C is becoming more and more unified. Yet, as the City Administrator said:

> *If we have a major disagreement ... we will kind of try to work it out ourselves, but if someone really wants to go in one direction and I do not think that is right we will have to take it to the council, I do not have the authority to decide ... Also, we have many semi-autonomous bodies: the Library, Theatre, Police, community centres, ice rink associations, we have to approve their budget but once they have got it they are in a sense free to do what they want ... At the same time, because some of them sit on our department heads committee and they do their purchasing through our purchasing department we make sure that their actions are coordinated.*

In the area of IT, authority in City C is even more unified in regard to how the systems are developed. As already mentioned all IT related budgets, including that of the semi-autonomous bodies, are channelled through the IS department and all applications are planned, developed, and implemented either directly by its personnel or in close contact with the manager of the IS department. Thus, the IS manager can ensure standardization, integration, and lack of redundancies in systems and data. On the other hand, in regard to the functionalities of the systems, especially those which are sought by the semi-autonomous bodies, the IS manager does not have real authority. In those cases the IS department tend to be in charge of performing the work but does not have the formal authority to dictate what will be the nature of those systems and how they will be used. Nevertheless, we did not detect significant consequences that result from this segmentation of authority over the IS.

Table C.5, summarizes our findings in regard to the extent to which the political level in City C: a) provides political leadership through well defined goals, objectives, and strategic directions; b) supports IS development and are directly involved in its planning; and c) creates uniformed authority structure.

To summarize, in City C the politicians do not provide the administration with comprehensive and detailed set of goals, objectives, and priorities, and they are not involved in long term planning. However, each new council in City C articulates, even if only in very broad outlines, its objectives, and through the relatively close involvement with senior management and with the daily operation of the department council informally influence what the city does. Overall, we assess the extent to which the political level in City C provides well defined goals, objectives, and strategic directions as **moderate**.

The politicians in City C are not involved and not very interested in IT. However, they are relatively well informed of the IS in the city and the general attitude seem to be positive and supportive. On the scale of being champions of IS, actively involved, and highly instrumental in its development to low involvement or even somewhat obstructive, we rate the political level in City C as **moderate to low**.

Overall, while not totally unified under one person, we did not see any evidence of fragmentation of authority in City C and thus rate authority structure in City C as **unified**.

Table C.5: A summary of the ratings of variables and indicators related to political behaviours in City C

	High	Moderate	Low
Political leadership provision and commitment to well defined goals & strategic directions in all areas of operation.	on-going, formal processes in which council formulates and reviews the city's plans and operations, in a comprehensive way.	institutionalized, one-shot process in which council set its objectives for the term/year.	no formal process in which council set goals priorities, and directions.
	council is interested & actively involved in goal setting & strategic planning.	council supports & encourages but is not involved in goal setting & strategic planning.	council does not support nor involved in goal setting & strategic planning.
	top-down, comprehensive budgeting process in which council provides result-oriented guidelines.	bottom-up but comprehensive budgeting process; council does not provide guidelines.	bottom-up, fragmented budgeting process.
	existence of mission-driven, updated strategic plan/s, officially endorsed by the political level.	strategic plan/s exist but not officially endorsed by the political level, or, are not comprehensive.	there are no long-term strategic plans.
	resources are committed to long-term strategic plans.	there is a long term capital investment plan but there is no direct commitment of resources to the strategic plan.	there is no long-term commitment of funds, only ad-hoc, yearly allocation of resources.
	council is perceived as leading in all areas by politicians & bureaucrats alike.	council is perceived as leading only in some areas by politicians & bureaucrats.	council is not perceived as the leader in most areas by politicians & bureaucrats.
Political involvement in IS interest and active participation in IS development.	council is interested and actively involved in directing IT usage.	council is interested and supportive but not involved in directing the development of the IS.	council is not interested, not involved, and even somewhat opposes the development of the IS.
	council develops formal vision and policies regarding the role of IT.	informally there is a shared vision regarding the role of IT among council members.	council does not have a vision regarding the role of IT in the city.
	council, in its goals and objectives, explicitly refers to the development of IT based systems.	council initiates few IS projects on an ad-hoc basis.	council does not initiate any IT based projects.
	there is a political body that directly oversees the IS function.	there is no special body that oversee the IS function but council receives reports and presentations from the IS manager.	council does not directly oversee the IS function nor asks for reports or presentations.
	council formally discusses and endorsed a comprehensive IS plan and commits to the plan as a whole.	council is aware of the IS plan but discusses and funds each project separately.	council is not aware nor interested in the IS plan/s.

Authority structure unified authority at the political and operational levels.	there is a coherent and unified authority structure for all aspects of the city's operations.	few aspects of the city's operations are not directly controlled by the central, political, authority.	there are a number of political bodies, each has the authority over a part of the city's operations.
	authority over all matters relating to IT utilization resides in only one political body.	there is a central authority, at the political level, that controls most IT related matters.	IT related matters are controlled, at the political level, by a number of different bodies.
	council gives the senior manager authority to direct all the executive branches of the city.	council gives the senior manager only limited authority over the operation of the departments.	there is no central authority below the council level, each department directly reports to some political body.

4.0 The bureaucracy in city C

Four behavioral patterns, commonly associated with bureaucracy, were proposed as major factors that may influence the development of IS that strongly support organizational goals: lack of coherent corporate management, incrementalism, fragmentation, and internal/control/status-quo orientation.

In the following sections we describe our findings in regard to each of these four factors and assess how the municipality of City C should be rated on each. To do so we investigate behavioral patterns in the city in general (such as: the budget process, buy or build policies, allocation of resources) and issues directly related to the IS function in the city (such as: the IS planning process, structure and status of the IS unit). When possible we try to avoid the question why the administration is behaving like it does, while certainly an interesting topic we feel that it will not serve the purpose of this study, and thus, we aim to establish what the behavioral patterns of the administration in City C are rather then why they are so.

4.1 Corporate management approach in City C

The approach to management in City C is a mix between centralized, top down, and corporate perspective in regard to future developments and a decentralized approach when managing the operational aspects of the city is concerned. When it comes to how they are performing their business departments are *"pretty much autonomous"* said the Mayor. Until recently, the Administrator was perceived more as a coordinator than as 'the boss'. Department heads had relatively close ties with the political committees that govern their activities, and since all were quite satisfied with how the city operated, departments were left to pursue their functions with no strong centralized guidance. As a result, senior management as a group provides little strategic directions to the departments, and in areas that relate to the routine services the city performs or the administrative processes that support them, they are not, as a group, the leaders nor the source of vision. Usually, unless issues are brought forward by the departments, or there is a crisis, city management tend not to intervene in how the departments are doing their tasks nor to standardize processes across departments. For example, there is no corporate-wide approach to performance appraisal, training is very much left for each department initiatives, and processes which require the inputs of a number of departments are coordinated at the operational level rather than reviewed and streamlined at the corporate level. Nevertheless, it seems that the operations of the various departments

in City C are well coordinated, and that management, through the weekly meeting of the department heads and the various inter-departmental, operational-level, teams seem to succeed in fostering an atmosphere of cooperation among the departments. It probably helps that in City C no major change in operation or structure has occurred in quite a long time, there is a very low rate of turnaround, and most departments are physically close to one another.

Gradually, however, and especially in the areas of planning the future development of the city, management in City C is adopting a more corporate, centralized approach. As the City Administrator explain:

> *It is in transition, it is far more corporate now then it used to be. It used to be much more fragmented into turfs ... At the same time, we try to adopt corporate approach only for the major issues, those that have implications for the whole organization. We try to decentralize and delegate as much as possible to the departments ... We tended, in the past to operate on a first come first served basis, we took care of council wishes as they came, we had the resources to do it ... there has been less emphasis, and need, on bringing people together to sort out what are the really important, strategic things and what are those which we can not do.*

As a result of the realization that *"operating as a corporate is increasingly important because of the financial constraints"*, and his own background of urban planner, the City Administrator initiated in 1991 a process of long term strategic planning for the city. In addition, various departments, independently create their own long term plans. The strategic planning initiatives, however, were in most cases limited in scope and scale. They did not start from the missions of the city but rather from intermediate levels such as: human resource planning, land acquisition, replacement of the old mainframe, and capital investment plan. They did not review current processes and division of responsibilities but rather took those as given. They did not involve the elected officials or the community. The planning was not championed and personally led by the City Administrator (the task forces consisted of department heads, planners, and middle level managers) and it was not supported and guided by professionals (consultants).

In line with his approach to corporate management approach, the Administrator in City C tends to see his role, and that of management, more as implementing council policies than as the ones who should initiate, lobby, and in effect be engaged in policy making and political leadership. Also, he believes that the city is doing relatively well and that there is no need, nor is it possible, to force it into drastic changes. And he believes that City C is not yet sufficiently pressed by the financial shortage to justify a comprehensive review of how the city does business or to turn to council for major commitments of funds. Thus, today as the

Administrator stated:

> *We have got what I call papers towards it [strategic plan] some of them at the departmental level and some at the corporate level ... We, however, have never put anything forward to council for them to formally endorse. We have had them go through these plans and sort of agreed to them informally.*

At the short-term, allocation of resources in City C is also a mix process. The major part of the budget, the operational expenditures that take up to 70%-80% of the total, is allocated among the departments according to self determined targets and level of service. There is no zero-base budgeting nor a process in which departments justify the budget requirements they submit according to pre-determined corporate goals and priorities. On the other hand, resources in excess of that base-level budget is allocated through a process in which all the departmental requests for supplement funding are listed together, reviewed and prioritized from the corporate perspective by the committee of department heads. This means, however, that while new projects and programs are prioritized from the corporate (as a whole) point of view, they are still basically departmental projects rather than corporate ones. Moreover, there is no formal process of evaluation, from a corporate perspective, to what extent the operational budget of the departments are justified in light of the strategic plans of the City as a whole.

IT in City C is managed with the same mixed approach. On one hand, the IS department is a corporate resource. It serves all departments, led by a top level executive, controls all IT related resources, and thus, in a position to manage the technology and the city's resources from a corporate perspective rather than a departmental one. In addition, there is a steering committee that helps determine corporate priorities and ensures that the development of the IS is coordinated and follows a comprehensive, long term plan. On the other hand, because of the lack of involvement of top level management, the bottom-up planning methodology, and the reluctancy of the City Administrator to intervene in the operations of the departments, the steering committee operates more on a tactical level than on a strategic level. The IS plan reflects a mix between corporate perspective in the areas of hardware and infrastructure brought forward by the IS department itself, and departmental perspective in the area of application development. One result from this lack of top down, mission-driven, and comprehensive approach to IS planning is that the existence of the IS plan, its content, and its goals are not widely known, and to some extent we detected a feeling that the IS manager personally has too much control over prioritization of IT based projects.

4.2 Assessing the level of fragmentation in City C

In City C we did not found evidence to strong departmental territorialism, turf-wars, or fragmentation of power and decision making authority. Departments are not independent in their decision making process at the strategic level, and there is a well established tradition of cooperation and coordination among them. On the other hand, in line with the decentralized management style there is little emphasis on integration of processes across departments, breaking up departmental boundaries, or on streamlining processes by re-structuring the organization. Also, as already mentioned in the previous section, city management as a group tends not to be personally involved in strategic planning and there is little emphasis on creating an integrated vision and comprehensive strategic plan for the city. Rather, long term thinking and planning are split up to functional areas and delegated to the appropriate departments, or in the cases of issues which do not fall within the boundaries of one department, to inter-departmental committees or task-forces. Formal decisions, are made by the management group based on the recommendations of the departments or task-forces but usually only in regard to those aspects of the plans which require specific actions or which have budgetary implications. The result is that each department or inter-departmental committee is asked to address a narrowly defined issue which usually corresponds to a specific process in the city rather than to address the broader issue of the goal or mission which that process aims to serve. It also leads to options and recommendation being developed by middle level management who naturally tend to focus on operational problems rather than on strategies. Often, as in the case of the IS steering committee, the focus of the planning and recommendations put before the decision makers in City C is on specific problems which arise in a specific processes. Rather than on the reason for those processes or on how the city should change altogether the way it does business. Thus, while there is no fragmentation of authority, often there is fragmentation of the content of decision making because of the piecemeal approach and the operational orientation of the decision making process.

This phenomenon is especially true in the area of IT. In this area the basis for the centralized decision making process which governs the development of the IS is need assessments which are done by each department separately, rather than through a top down analysis of the information needs of the city as a whole. As a result, while there is no fragmentation of the IS function (decisions regarding the development of the IS are made by

the corporate management only, hardware and software are standardized, and system development is coordinated across all applications) there is no shared vision regarding the future role of IT in the city. Subsequently the development of the IS tends to be functionally fragmented. Similarly, while all the projects are budgeted by the IS department and perceived as corporate projects, they are often ear-marked for a specific department and the scope of each project is usually limited to the immediate needs of that department. This result in seeing each project more or less as a separate entity which needs to be integrated with the rest of the IS in the city only to the extent that satisfies the needs of the department that requested it and where elimination of redundancies in data is cost-effective. Thus, once again, there is fragmentation in system development not because of fragmented authority structure but because of the lack of long term vision and the focus on narrow, operational level, and short tern needs.

For example, when the public Library purchased its circulation system it was done through the IS department who made sure that the system complies with the city's standards. The IS department, however, did not broaden the scope of the project beyond the Library needs to reflect future needs of the city and thus, requirements that the system could have support (such as: outlet for municipal information, remote access to services, central archive) were not incorporated into the system. The design of the new OM system, which was mentioned earlier, is another example for centralized development and local perspective.

Lastly, in City C there is no data administrator position and consistency of data is maintained only where integration of systems was perceived as important enough to warrant the extra cost. This as already mentioned, is usually the case in most of the administrative systems in the city but rarely in those which are perceived as departmental, which significantly limits their usefulness in supporting organizational goals.

4.3 Assessing incrementalism in City C

Utilization of IT to support organizational goals often means drastic departure from existing routines, work-processes, and current organizational structure. In the absence of such changes, the technology, instead of significantly enhance goal achievement, may have only marginal impact on the organization operations. Effective utilization of IT also depends, in many cases, on a certain level of IT infrastructure being in place before benefits can be realized. Thus, the ability of an organization to achieve effective IS is often in stark contrast with the bureaucratic tendency to move forward in small increments.

In City C management and Council are quite content with how the city operates and do not feel the need for drastic changes or re-engineering. By choice or natural inclination, management style in City C is cautious and somewhat removed which did not provide the organization with strong, dynamic, and charismatic corporate leadership which is essential to undertake major changes. Management, also did not provide the municipality with a comprehensive strategic plan to indicate the directions the city should move and to highlight pivotal points on which efforts should be focused. Furthermore, management, and especially the administrator, do not believe that drastic changes are desirable in the context of a public organization and they are not willing or able to personally champion such changes. As the City Administrator told me:

> *There is a tension between a mandate that come from the top which says I want you to move in that direction, and the day to day needs of the departments ... I may have a vision where I want the city to go but I have got to keep the boat afloat while I rebuild it ... In our case that means I can only move incrementally towards the goals ... There is also, specifically in the area of IS, the sense that some people who have made big jumps in the past have jumped wrong, so there is a certain amount of caution that says: maybe we can sort of keep accumulating things slowly in the right direction.*

One reason that often causes incremental resource allocation is the tendency of bureaucratic organizations to rely heavily on internal work force rather than on the more flexible contract workers. From this aspect City C is at middle way, neither relying solely on internal work force nor trying to contract out as much of its operations as possible[11]. The policy in City C, however, as the Mayor stated is: *"To prefer internal work force on contracts as long as routine work is concerned"*, and the result is that the municipality is the direct employer of one worker for each 110 of its residents, which is somewhat higher than the provincial average[12]. The stabilizing effect of a large, unionized work force, and the fact that in City C *"there was very little turnover in the staff"*, are probably part of the reasons that City C finds it difficult to focus its resources or to bring about faster changes. It seems that the organizational inertia and the union are a significant barrier to change, especially in regard to new technology. As the Mayor stated,

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[11] In City C the police, garbage collection, and recycling are contracted out. Park maintenance is done by city employees as well as half of the work load in sidewalks, roads, infrastructure maintenance, and almost all IS development and maintenance.

[12] For comparison, the average among the 22 largest municipalities in the province was in 1993 one city worker for every 134 residents.

Technology is part of the union contract and thus, it is almost impossible to change. You cannot fire anybody ... We cannot bring in new technology and say this is it either you learn it or you take a hike ... it does not work that way here, changes are slow, agonizing process.

And the city Administrator said:

We got people sitting in positions where they are fairly comfortable with what they are doing ...They are not necessarily going to be willing to jump into new stuff [IT] which they are not very sure about ... Some people usually at the middle management level know how to use the technology and they become the change agents ... So, we get more push to change from the bottom up than we have from the department heads and that naturally is more incremental.

Often external pressures are needed to trigger organizational changes where there is no strong corporate leadership and there is significant organizational resistant to change. However, in City C there was no crisis and the financial squeeze is not yet severe enough to force the city to deviate from its incremental approach into a more drastic shift of priorities and resources. So as the City Administrator said,

The growing pressure on resources is going to force us to change more drastically. Traditionally, there was a reorganization only when we have reached a certain level of complexity and pressure to do it ... At the moment we are still cutting back, we have not yet reach the point where the contractions are so great that we can no longer do our jobs as we used to.

Lastly, the budget process in City C, described in the previous section, is to a large extent a bottom up process, and at the corporate level management only trim down departmental requests, with no a-priori defined goals, emphasise, and targets. As a result, at the final stage it is almost impossible to deviate from the bureaucrats' tendency to spread the available budget across all departments, and the politicians' attempt to please everyone. As the Mayor described :

Every department has what they consider to be equally as good, equally as valid projects and they want a piece of the pie, it just would not work to take a whole chunk of money and give it to one department. Also, I cannot say to the taxpayers: this year we are raising taxes but we are not hiring any new policemen, firemen, health people, or investing in recreation facilities or anything else, we are giving all to computers. We have to, at least partially, satisfy everybody.

One indicator that clearly demonstrates this incremental approach is the analysis of the percentage of the total budget allocated to each of the departments and how it changes between one year to another. In City C between 1988 and 1993 the average change in the relative share each department received between two consecutive years was 0.19% and the

largest change that occurred within that frame of time was only 0.89% of the total budget[13]. Resources allocated to the IS function reflect also only incremental growth, while in 1988 the IS function's share of the city's budget was 1.16% it increased gradually in increments of about 0.08% to become 1.47% in 1993.

The impacts of the incremental approach on the development of the IS are easily detected in City C. Since the aging systems were all internally developed and the incremental increase in operational budget barely covers the growing demand, 80% of the IS personnel are tied today to operation, maintenance, and support and only 3.5 people (18%) are free to develop new systems. As a result, systems were allowed to fall behind the advancing technology and the accumulating needs of the departments. Further, the city is years behind the IS development plan, there is a large backlog of users' requests, and without drastic change in the resources allocated to the IS department it is not going to catch up, let alone look beyond the operational level. In fact, the incremental approach may be one of the reasons that no visionary plan for the IS was ever developed in City C. Since users tend to scale down their expectations and new projects are usually downsized to address immediate, operational needs, while more advanced use of IT is not even planned since it is clear that it could not be realized. As both the Mayor and the City Administrator reflected,

> *The incremental approach to changes, especially in the area of IT, is going to prevents the city from taking full advantage of the technology, probably cause the city to always lag behind what it should be doing, and probably cost the city more in the long run.*

4.4 The dominant orientation of the bureaucracy in City C

The indicators we use to assess the major orientation of the city's bureaucracy present a mixed picture of City C. On one hand the Mayor and the City Administrator stated that: *"The major orientation, what concern people the most, is the customers"*. In support of this statement we found that in City C there is a tendency to favour the front-line departments over the administrative units. The front-line departments are organized in a way that allow customers to interface face to face with the officials they need rather than through forms or receptionist. Managers in those departments are stationed close to the service counters, and they try to be available and visible to the public. In many cases, such as the development

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[13] Analysis was possible only for operational and small capital expenditures because data regarding large capital investment was not available in a comparable format. This limitation, however, should not represent serious bias since the data analyzed include all the departmental budget and all expenditures that relate to I.T.

approval process, the city went to great expense to provide the customers with one stop service. Also, in the last couple of years the city allows transactions that used to require the presence of the customer at city hall to be performed by mail. Similarly, in a rather unique initiative, the management of the recreational facilities was decentralized and placed at the facilities themselves, partnerships in managing was formed with the communities those facilities aim to serve, and each centre was given autonomy to decide which programs would better serve the specific needs of the neighbourhood.

City C is also very cost oriented and takes great pride in being among the municipalities with the lowest tax rate in the province. In the past this concern did not clash with long term investments in the operations of the city and the criterion used to approve new IT projects was more that of future efficiency rather than short term saving. In the last couple of years a short-term, cost-savings criterion is becoming more and more dominant and as already mentioned, departments are having problems budgeting long term improvements. As one of the Councillors explained:

> *Things like computer enhancement, training of staff, and a whole lot of other programs are investments that pay off in the long term ... Our current council, however, is a mix of three different groups and their main trust seems to be cutting the budget ... I do not know why they are making cuts that, I think, are really false economy ... They may cut today but those cuts are going to get us in trouble tomorrow, and we have done that across the board, through all the departments, whether it is health or police or computers.*

While the bureaucracy in the city is strongly motivated to provide services rather than to govern, and the dominant orientation is toward the customer rather than internally at the bureaucracy itself, City C is also very traditional. Maybe because of the lack of visionary management, or because of the direct control the politicians have over the departments, or simply because there was no major crisis to jolt the city into taking a fresh look at how it does business. The fact is that in many aspects City C is still managed and operates as it used to ten years ago and except for the partnership in management program non of the contemporary approaches to public administration takes hold in City C. For example:

City C does not adopt the motion that governments should focus on steering and contract out the doing. There is no corporate emphasis in City C on performance measurement, management by objectives, zero-base or program budgeting, nor are there city-wide standards for performance appraisal. While there is a well established tradition of public hearing and there are good relations between city-hall and other public institutes in the city, the city does not move beyond the traditional means to communicate with the public. Thus, while the Administrator strongly believes in open government he said:

We are still far from it ... partially because the bureaucracy want to preserve its

power ... also because people use information in public in context and out of context to challenge and question decisions, so to protect our decision making process we want them to have the final report not the drafts or the raw data ... There is also the problem of privacy, what we should give out and what we should not. So, the bureaucrats say: I do not have to make those complex decisions upfront ... if the information is all mine, I do not have to decide how to structure it ... I can manage the information I give out each time someone ask for it.

The combination of emphasis on provision of services, cautious and tradition, and increasing concern with short-term efficiency, result in very operational oriented management. Thus, the focus is on how the existing work processes can be made more efficient and effective rather than what should be done differently. Improvements which do not have direct and easily detectable impacts on the operations of the city tend to be neglected. For example, accompanying the instalment of the PC network only those workers whose job required them to work with systems loaded on the network server (wordprocessor, spreadsheet, e-mail) were trained. Furthermore, the training was focused on teaching the workers to work with the systems rather than offer them a chance at a more comprehensive computer literacy program. Similarly, City C does not emphasis staff training as a long term investment and tends to focus on task-specific domains. Overall the city spent only $270 per employee on training in 1993 which is much lower than in other municipalities. Another indicator for the operational orientation is the fact that City C is making only minimal use of external consultants, who are usually less inclined to stick to tradition and are skilled in strategic thinking. None of the "*papers toward strategic planning*" was done with the help of external experts, and where such help was sought, such as in the case of the current study of the feasibility of using hand held computers by field inspector, the consultation is technical in nature and limited to a specific operational problem. Lastly, in the area of IT the base for decision making regarding IT based projects is the operational needs of the departments rather than a long term plan or a vision regarding the role of IT, and the major justification for the existing IS as well as for new projects is as the IS manager stated: *"To help the operations of the departments, to make their job easier, not necessarily to save money but also not to change the way they operate."* In line with that approach, monitors are distributed to those who have clear functional need for them and not to all office workers. The city does not subscribe to external networks, databases, or MIS associations, and as a manager in the planning department stated:

If you cannot justify new technology as a cost saving, and there is no overriding functional need ... such as the public or the council want something and there is no sensible way to do it without new systems ... Then you tend to wait until it is so

common that everyone just say: Hey, that is the only way to go.

Table C.6, summarizes our findings in regard to the behavioral patterns of the bureaucracy in City C in the areas of: corporate and strategic vs. local and operational management; unification vs. fragmentation of power and strategic decision making authority; incremental and slow vs. rapid and drastic changes; and, defensive and status-quo vs. proactive and innovative orientation.

To summarize, in City C there is a mix between corporate approach to planning the future development of the city and decentralized approach for planning and managing the operational aspects of the city. The IS function is managed from a corporate perspective but as an operational support function rather than as a major strategic resource. We assess the extent to which City C follows corporate management approach as **moderate**.

Overall, we consider decision making in City C at the strategic level in general, and especially in the area of IS, to be well coordinated and centralized in the sense that it is done by a central authority and follows the priorities of the city as a whole. However, decision making in City C is fragmented in the sense that each decision tends to address a narrow issue in separation from the broader perspective. Integration is kept at a relatively low level, and decision making tends to focus on local problem solving rather than on city-wide vision. On the scale of integration vs. fragmentation we rate City C as **high to moderate**.

We rate City C on the scale between dynamic and changing to incremental and status-quo as **highly incremental**.

Overall, we rate City C as oriented toward serving its customers but from a pragmatical, operational, and traditional perspective rather than from a visionary, long term one. We rate this major orientation of City C as only **moderately** conducive to the development of IS that strongly support organizational goals.

Table C.6: Summary of the ratings of variables and indicators related to the behaviours of the bureaucracy in City C

	HIGH	MODERATE	LOW
Corporate management	city management is a source of vision, manifests coherent and proactive approach to management, initiates policies and lobbies for their approval.	city management has a coherent approach to management but tends not to be visionary and to react to the political level rather than to influence it.	city management does not demonstrate visionary and coherent managerial approach, tends to see the implementation of council's policies as its only role.
	city management, as a group, champions and is actively involved in strategic planning.	city management, as a group, supports and often initiates strategic planning but is not championing it nor directly involved.	city management, as a group, is not very interested nor involved in strategic planning.
	top-down, goal-driven budgetary process, tightly connected with the strategic plan.	only capital budget is driven by an a-priory defined goals and strategic plans.	bottom-up budgetary process, disconnected from long-term plans.
	institutionalized process in which management reviews departmental plans and operations on a periodical basis.	management reviews departmental plans and operations on an ad-hoc basis when there are problems.	usually departments' plans and operations are not reviewed by city management.
	city-wide standardization of processes and managerial practices.	some processes are standardized city-wide but it is not comprehensive nor strongly stressed by management.	no standardization of processes and managerial practices.
	there is an approved, long term, and comprehensive strategic plan for the city as a whole.	there are some domain-specific (not departmental) strategic plans but not a comprehensive plan for the city.	no strategic planning at the corporate level, only at the departmental level.
	IS manager is a member of the city's management group.	IS manager is one level below city management level.	IS manager is 2-3 levels below city management level.
	IS is perceived as a strategic, corporate resource.	IS is perceived as a corporate resource but mostly used to support the operational level.	IS is perceived as a supportive tool for the departments.
	IS steering committee consists of top level executives and operates at the strategic level.	IS steering committee consists of middle level managers and operates at the tactical level.	There is no IS steering committee, or, it is not active or not influential.
	IS development is directly controlled by city management and driven by the city's strategic plan.	IS development is corporately prioritized but driven by operational, problem solving perspective.	IS development is controlled by the departments each separately driven by its own operational needs.
Fragmentation	the city is managed as one integrative entity.	departments are to a large extent independent in their operation but well coordinated at the strategic and operational level.	the city operates as a holding company with very limited inter-departmental dependencies.
	no significant signs of territorialism, turf-wars, and frictions between departments.	moderate level of authority related frictions, turf-wars, and territorialism.	many evidences to behaviours that stem from territorialism, turf-wars, and disputes regarding decision making authority.
	strategic planning is comprehensive, done at the corporate level, tend not to regarding departmental boundaries as a constraint.	strategic planning is done by inter-departmental task forces but for each domain separately.	strategic planning is done by departments in isolation, or, no strategic planning at all.

	innovations are implemented regardless of departmental boundaries, there is a conscious effort to break those boundaries.	only few innovations and changes bridge departmental boundaries, there is no stress on breaking up departmental boundaries.	changes and innovations tend to be confined to a specific department.
	there is a central IS function, all IT related budget and development are controlled and guided by the IS function.	the IS function is a central support unit, budget and development are managed by the IS but guided by departmental needs.	departments have their own IS units, IT related budget is controlled and prioritized by departments.
	city-wide standards for hardware and software.	partial standardization of hardware and software.	no city-wide standards for hardware and software.
	all data is perceived and managed as a corporate resource.	administrative related data is managed corporately, otherwise, each department manage and own its data.	most data is owned by the departments.
	most systems are integrated city-wide.	administrative systems tend to be integrated but operational systems are not.	most systems are departmental, low level of system integration across departments.
Incrementa-lism	relatively high variance in allocation of resources over the years (avg > 1%).	moderate variance in allocation of resources over the years (0.5% < avg < 1%).	very stable allocation of resources over the years (avg < 0.5%).
	relatively large portion of the city operations are contracted out.	moderate extent of contracting out.	almost all city operations are carried out by city employees.
	in the past few years the city implemented many drastic changes in its priorities and operations.	few significant changes in priorities and modus of operation occurred in the last few years.	no significant changes in priorities and operations took place in the last few years.
	IT is used as a change agent to significantly alter the way the city does business.	IT is not used as a change agent but some systems significantly changed the way the city operates.	IT is used mostly to mechanize existing processes.
	managers believe that drastic changes are both necessary and feasible.	managers believe that drastic changes are needed but can, and should, be achieved only incremental.	managers do not believe that drastic changes are needed nor that they can be achieved in the context of municipal government.
	relatively high percentage (40-30%) of IS resources are dedicated to new development.	moderate percentage of IS resources (30-20%) are dedicated to new development.	only small percentage of IS resources (under 20%) are used for new development.
	there is a sense, shared by managers, that "things are moving rapidly" in the municipality.	there is a sense, shared by managers, that the municipality is moving ahead but at a moderate rate.	there is a sense, shared among managers, that "nothing is moving" in the municipality.
Doninant orientation	criteria used to justify new initiatives are: vision, quality of services, and long-term productivity.	criteria used to justify new initiatives are related to: efficient delivery of services and operational needs.	criteria used to justify new initiatives are: short-term cost saving, control over resources used, and efficiency of existing processes.
	high emphasis on staff training.	moderate level of importance to staff training.	low importance to staff training.
	the dominant strategy in the city is proactive and innovative -- seeking improvements through investment in technology and organizational changes.	the dominant strategy in the city is effective utilization of existing resources -- seeking improvements through maximization of resource utilization.	the dominant strategy is defensive -- seeking to maintain the level of operation through cost reductions.
	the city implements many contemporary, innovative ideas regarding public administration.	only few of the contemporary innovations in public administration are implemented.	the city does not implement contemporary, innovative approaches to public administration.

	the city makes an extensive use of external consultants, and is open to its environment.	the city uses external consultants only for technical issues.	the city hardly use external consultants, and is relatively close to its environment.

APPENDIX D
THE CASE OF CITY F

1.0 General

City F is the largest city in this study's sample. It was founded as a fort and a trading post in 1875. Due to its location on an important crossroad it soon became the commercial centre for the agricultural settlements in the whole region. The shift to industrial agriculture in the 30's and the discovery of oil in the city's immediate area in 1947 lured many companies to locate their administrative headquarters in City F. With them came financial institutes and service industries. During the second half of the 20th century the economic base of City F has further diversified. Today there are many manufacturing industries in the city and it became the home to many research and development facilities. More than two thirds of the province's advanced technology companies are currently located in the city. This subsided the impacts of the slowdown in the oil and agriculture industries and helped City F maintain the highest annual growth rate (2.1%) among the large cities in our sample. During the 60's the city annexed three outlying towns which made it one of the largest cities in Canada. The population of City F was 717,133 in 1992. The municipal budget in 1993 was around 738 million dollars (not including utilities[1]), and at the end of 1993 the city had 7475 permanent employees on its payroll in functions which correspond to those fulfilled by other cities in this study.

1.1 The IS function in the municipality of City F

The IS function in City F evolved over a long period of time in a slow, guarded, but continuous process. It first emerged in the mid 60's as a data processing unit within the Finance Department. Ten years latter, after acquiring a large IBM mainframe and developing a number of large administrative systems the IS function was recognized as a separate entity and the Data Processing Services Department (DPSD) was created. In the following years DPSD slowly expanded its scope of operation and its areas of responsibilities. As a service department it developed and operated a multitude of computerized systems for the line departments. When the city upgraded its telephone system, in 1985, responsibility for all

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[1] City F directly owns and operates few functions which in other cities in our sample are owned by regional or provincial authorities, such as, water supply, waste and sewage treatment, and transportation. To allow comparison we do not consider IT based systems, budget, and manpower that relate to those functions in this report.

communication systems[2] was transferred to DPSD. When the printing and micrographic functions became heavily computerized they too were moved to DPSD. In 1986, the city employed 250 IS professionals, all of them in DPSD[3]. The city's annual expenditure on IS related programs was a little over 26 million dollars, all of it directly controlled by DPSD.

In the second half of the 80's a slow process of moving responsibilities, for IS operation and support, to the line departments started. The reasons for that process, as the Manager of the DPSD explained, were:

> *You need to know a lot about the business on an on-going basis to effectively use technology ... It was necessary to have somebody that could interface with the technical people who transfer needs into systems ... Also, we were building a lot of large applications for the departments and those applications needed long-term care, attention, and feeding to keep them update and effective.*

This process, which is still on-going, did not alter the centralized role of the DPSD, nor did it have a significant impact on the guarded and incremental approach to IS development. While a position of system coordinator was established in all departments, and some of them directly employ IS professionals, it did not compromise the cental role of DPSD. As the manager of DPSD explained,

> *Operationally, they report to the departments but functionally they report to me ... A lot of them are doing coordination roles and interfacing-type role ... Some are also doing simple maintenance and end-user kind of support.*

Exceptional are two larger IS group in Electric Systems and Engineering, each about 15 people, which are doing also small system development projects. However, said the DPSD manager, *"We control the budget, we set the policies and standards, and they take their specific business requirements and translate them into systems"*.

Today DPSD is staffed by 334 people of which around 80 are not in the IS business. There are 45 IS professionals in the departments, and the city's expenditure on IT related programs was a little over 32 million dollars in 1993, 30 million of it directly controlled by DPSD. This represents a very moderate growth of the IS function (19.6% in manpower and 23% in budget) which was built incrementally over the last seven years.

While DPSD controls almost all IS resources and all system development initiatives must get its approval and conform to the city-wide IT standards, DPSD's role in directing the

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[2] Except radio which until these days is the responsibility of the Engineering Department.

[3] DPSD employed additional 76 workers in jobs not directly related to IT such as printing, microfilms, and mail.

development of the city's IS is secondary to that of the line departments. In essence, in regard to the ends towards which the technology is used, DPSD has remained a service unit driven by requests from its customers (the departments) rather than a leader which sets long-term directions and strategies to IT utilization. DPSD's influences IS development through consulting departments which seek computerized solutions, by initiating small pilot projects to investigate new technologies, and by the choices it makes in implementing systems requested by the departments. In all its years of operation, however, DPSD did not initiate a comprehensive IS planning, it did not strive to articulate the city's vision regarding the role of the technology, and it did not actively seek to involve the board of commissioners[4] or the council in the development of the IS. DPSD manager's view of his role demonstrates this approach:

> *I am not at the strategic end of the apex as far as what it takes to make a municipality work ... I always was at the administrative side of the business, I am trying to provide services to the rest of the departments not to tell them what to do and how to achieve their business goals.*

Typically, when a department identifies a need for an IS application it puts together a business case, often with the help of business analysts from DPSD, and submits it to DPSD. Once a year, during the budget process, DPSD consolidates all the requests and presents the list with its recommendations to the Information System Steering Committee chaired by one of the commissioners and consists of a number of department heads. This committee is not involved in IS planning nor does it set goals or strategic directions to IS development. Its sole responsibility is to prioritize the demands made upon DPSD by the departments. Furthermore, in the last ten years IS plans have not been discussed, outside of the budget process, at the commissioners level nor presented to council. Thus, IS development is to a large extent driven by the operational needs of the departments. It does not follow a top-down, mission-driven, systematic planning methodology, and it is not driven by a coherent and well articulated vision regarding the role of IT in the municipality. Rather, as the Manager of DPSD stated:

> *It is up to the different businesses to let us know what they need ... really all we can do is plant some seeds and generate ideas ... [Departments] are the ones who drive application development ... If it is some thing that have to be forced on them it would have to come from the board of commissioners or council not us, and they usually are*

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[4] City F is managed by a board of four commissioners, each responsible to a number of functional areas and the corresponding departments, and the Mayor who is an ex-officio member.

not into directing IS development.

In City F, system development is budgeted from the operational budget of DPSD[5]. This means that DPSD's capacity for new development depends mainly on its staffing level which has remained constant in the last seven years. During this period of time, as the DPSD Manager estimated, *"On average we were able, each year, to allocate about 23% of our resources to new development which translates to 30% or 40% of the requests for application development"*. This approach to allocation of resources and the need to satisfy many customer led to an incremental approach to system development which fits well with the city's cautious and conservative approach to computerization. Rather than embarking on ambitious and innovative projects and seeking to use the latest technology, City F prefers to rely on mature technologies and to use IT only in areas in which its benefits are already well proven. In most cases large IS projects are implemented in relatively small increments. Usually, detailed planning is done only from one step to another, and often the focus is on the intermediate objectives rather than on the long term goals. For example, in the new GIS project and the improvements to the Planning Department system the long-term goals are only vaguely articulated. In general, IS development in City F is an on-going process of upgrading old systems, adding new modules and functionalities to existing systems, and expanding usage of systems to new customers.

While IS development in city F does not follow a long-term plan, the pivotal role of DPSD ensures that to a large extent systems are integrative in nature, data is consistent across applications, and there are only limited cases of redundancies in data or duplication of systems. Also, through the work of the Information System Steering Committee, corporate priorities are kept and new initiatives are disseminated across departments. As the Manager of the Application Division in DPSD explained:

> *We coordinate all the departmental IS planning, although we hold them accountable to generate their own IT plans ... When we go into an application area we are not bounded by the one department that requested it. We will look at it corporately, if there is a common core for a number of applications we will build around it ... we do not build a lot of similar systems ... Conceptually, you can see a lot of similarities in the needs of the various departments but actually they do not do business in the same way ... We can only suggest a generic solution, we do not tell them [departments] how to operate ... ultimately we will support them in whatever direction they want to go ... So, you look at the thing corporately but you build the pieces on a business by business basis and you make sure you correlate where the boundaries are ... Also, to*

[5] Only purchase of hardware and large operation systems are considered as capital investments.

> *do a more comprehensive job, reach consensus and build one collective system, takes so long that all of the customers will lose interest.*

Furthermore, in many areas in which IT is used for basic, city-wide functions (e.g: office automation, communication, database management), DPSD is the only force that directs IT utilization and it seems to have clear notion, albeit not articulated, where it is going to.

To summarize, the IS function in City F is more of a back-office service unit, than a high profile, headquarters level, department charged with directing the utilization of a strategic resource. System development is directed to a large extent by the unique needs of each departments. There is only limited involvement of top management in IS, and development is usually incremental and conservative. DPSD however, possesses considerable resources and authority. Through formal and informal channels it gives focus to IS development, and in many cases it leads IS development at least where technology is concerned.

This state of affairs seem to satisfy managers in City F, as in fact was the impression we got from most managers we talked to in regard most other aspects of the city's operation. They feel that City F is well managed, efficient, and overall better off than many other municipalities. As the Manager of DPSD said in regard to utilization of IT: *"We are doing really well"*. One of the commissioners said, *"There are more than one way to do it [IS development] but our way is working here, we are getting results"*. One of the councillors perceived this sense of well being as a problem, but nevertheless confirmed its prevalence. He said: *"I guess part of the problem is [that] we think the city is pretty darn efficient"*.

Somewhat contradicting the last statements, and maybe signalling a new approach to IS planing, the manager of DPSD has recently embarked on a comprehensive, top-down and long term IS planning for the city as a whole. He explained,

> *We are really at a massive change in the technology. I represent the city's initiative on technology and I really felt that we have to find a way to readjust the way we use the technology to be more effective ... We could not do that any more by incremental steps driven by the various requests from the departments ... we have to provide vision ... Also, the budget's cuts are forcing us to re-think how we do business and to use the technology to support re-structuring and re-engineering.*

The first fruit of this initiative is an "Information System Architecture Plan" (ISAP) completed at the time of data collection. In this plan DPSD identifies eight major technical directions which should guide future IS development. It also plans to push this initiative further and start developing comprehensive plans for application development. However, at the time of data collection the ISA plan was not yet formally approved, no specific IS

development plans were derived from it, and no budget was allocated to implement its recommendation. Thus, we do not consider this plan in our report, except for demonstrate weaknesses in the existing systems.

1.2 Utilization of IT in City F

City F's utilization of IT is dominated by three major characteristics.

First, the major part of the city's IT based systems is still based on old technologies. This is due to: **a)** The city's cautious and conservative approach to new technologies. As one of the managers in DPSD said: *"We do not take risks, we only work with mature technologies and we like to see work done by others before we jump into it"*; **b)** The incremental approach to system development dictates a slow process in which new applications are built on top of old systems rather than from scratch, and thus, tends to perpetuate old technologies; **c)** The size of the city makes any significant IT project a major financial undertaking; and, **d)** the lack of long term plan for IS development and the focus on solving local operational needs, channel planners to solutions which can be implemented in short time and without undue disruption to the existing systems. In most cases this means that new systems are based on technologies already in use unless they are small stand-alone systems.

As a result, the major part of the city's IS is still based on mainframe architecture. Out of the close to 4700 terminals used by the city's office workers more than 3000 are black & white "dumb terminals" with no independent computing power nor graphic (bit-mapping) capabilities. Many of the major systems are still written in third generation languages (most are in Cobol but some such as the civic sensus system, are in Fortran) and most are not based on relational database. As will be shown in the next chapter this characteristic of the IS in City F seriously impedes effective utilization of IT. This limitation was recognized in the recently completed ISA plan which recommended to: a) shift computing capabilities to desk-top; b) implement systems on relational database and in a client-server environment; and c) develop or acquire systems developed with advanced software, methods, and tools. Following the city's incremental approach the plan did not recommend migration of the existing system to the new environment. Also, as already mentioned, practical implications of those recommendations have yet to be translated to plans and budget.

Second, utilization of IT in City F is very pragmatic, frugal, and process oriented rather than visionary and goal oriented. It focuses on the practical and immediate needs of the departments, strongly emphasizes control and security, and heavily influenced by technical

considerations.

A few examples demonstrate this point: First, a few years ago the city developed a system for the permit and licenses function. The scope of the project, however, was limited to automation of the development permit process. It did not address other types of permits nor associated processes such as scheduling of inspections or collection of fees. As the manager of the Planning and Development Department explained:

> *It was the most urgent need ... What we do when we start developing an upgrade is we say what is the most important thing we need ... The inspection thing was not critical for us ... We are working to automate all processes but as I said we are basically driven by our critical business needs.*

Second, dial-in access to external networks (such as, InterNet, and governmental networks) is given to city officials on a case by case basis and access is terminated once the immediate need no longer exists. Third, access to corporate data follows the same principle. While technologically almost all data in the city's systems is accessible to all workers *"we basically make it available only on the basis of need-to-know"*, said the manager of the Communication Division in DPSD. Finally, one of the departments wrote in its strategic IT plan: *"allocation of IT resources will be guided by the principle that staff will be provided with the necessary tools to serve their business 'needs', and not their personal 'wants'."*

As a result of this pragmatic and frugal approach to IT utilization, IS is to a large extent perceived as an operational tool rather than a strategic one. Most systems are not based on visionary concepts, their design lack imagination, and they do not facilitate creativity and innovativeness. Also, probably a result and a reason, top management in City F is only marginally involved in IS development. Maybe the most damaging result is the fact that IT is used in City F primarily to automate existing procedures. As one of the councillors stated, *"[The systems] tend to support the way [the administration] was used to do business ... You know, as long as the money is there it is business as usual"*. This characteristic of IT utilization was recognized as a limitation by the ISA plan as well as by city management. As the Manager of the Planning and Development stated, *"I think it is fair to say that it [IT utilization] has been more of mechanizing the existing processes ... We are on the threshold of needing to change the way we do business because of the availability of resources"*. Thus, following a directive from the board of commissioners, departments are currently engaged in strategic planning, utilizing the Business Process Reengineering methodology (BRP), and emphasise is given to utilization of IT to facilitate those plans. However, at the time of data collection no practical implications were formulated.

The third characteristic of IT utilization in City F is the relatively high level of connectivity and integration between applications, and the centralized approach to data management. As the Manager of the Planning and Development Department said, *"Every system developed in the city is a corporate system, and all data is accessible"*. This is primarily due to the centralized IS planning and development processes, the dominant role of DPSD, the mainframe architecture, and the strong emphasise on control aspects built into each system. This third characteristic of IT utilization in City F is probably the strongest points of its IS, from the point of view of technical efficiency as well as utilization of IT to support organizational goals. It results in the fact that there are hardly any duplications in data entry, very little redundancies in systems or data storage, and almost no inconsistencies in data. It also facilitates sharing of data city-wide.

In conjunction with the other two major characteristics, however, it also poses an impediment to effective use of IT, since connectivity and integration without advanced technology to provide flexibility in usage lead to under-utilization of information. As the Manager of the Application Division in DPSD said:

> *The systems have a lot of details in them ...[but] it is geared to accounting, payroll ... It would probably be very hard to do something else because the data is not structured, there are no keys, no data models.*

Emphasis on integration combined with the incremental and pragmatic approach to system development is also partially the reason why IS development capacity is to a large extent limited by DPSD staffing level. Among other factors, it is because whenever packaged systems are bought (excluding small stand-alone systems), they have to be heavily customized to the way the city does business and to facilitate integration with the rest of the city's IS. Thus, as the Manager of the DPSD said:

> *[Turn-key system] might be cheaper upfront, if you are going to live within the parameters it offers ... [but] it takes us a lot to fit it in with our systems, to keep it updated ... 35%-40% of our systems has been bought, but we still did a lot of work on them ... I mean, our full suite of financial applications are purchased packages, but we have done a lot around them to make them interface and to add value and new functionalities.*

In the last couple of years DPSD became aware of many of the limitations mentioned above. The city purchased MISA's[6] generic municipal data model, DPSD chose ORACLE relational database for all future development, and it is more and more inclined to adjust work

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[6] Municipal Information System Association.

processes to available packaged systems rather that to modify them or to rely on in-house development.

2.0 Assessing utilization of IT to support organizational goals in City F

We based our assessment of the extent to which IT is used in City F to support organizational goals on those systems which are currently in operation, and in general did not take into account systems mentioned in the ISA plan or technologies DPSD is currently experimenting with[7].

2.1 IT support for administrative processes

In general, the basic information requirements of the administrative processes which are managed corporately fit nicely with the characteristics of the IS in City F. Thus, many are highly supported by IT. The computing environment in the city and its approach to system development led to less than high utilization of IT in areas in which administrative processes differ from one department to another. Also, the frugal and incremental approach to system development result in the fact that in many cases basic requirements are supported but more advanced computerized features which are not perceived as critical are often missing.

Payroll, inventory management, financial management, personnel, and common addresses, are all functions managed corporately. All are supported by mainframe based systems, well integrated with each other, and comprehensive. Those systems are accessible city-wide, facilitate on-line data-entry, and in the case of the inventory, financial, and payroll systems there are also some financial EDI capabilities and other types of electronic links with banks and suppliers.

Maintenance management and costing, however, are functions managed independently by the departments and it is commonly accepted that each department, or even each division, has its own unique needs and priorities. Thus, different systems were purchased or developed for some units while others do not have IT support for these functions at all. Furthermore,

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[7] As already mentioned, the new ISA plan recommends radical changes in IS development, and currently DPSD experiments with hand-held computers and imaging technology for record management. However, no specific operational plans exist in regard to implementation of the ISA plan's recommendations or the follow-ups on the experiments, and no budget was allocated to those undertaking. Somewhat different is the case of the GIS project which was initiated in 1992 with an approved budget of 16 million dollars to be spent over five years. However, while there are a lot of ideas how the GIS should interface with other applications to significantly enhance their value, there are as yet no concrete plans nor budget for those enhancements.

among the existing maintenance management systems, some provide sophisticated features[8] and some only record keeping and listing. Thus, as the Manager of the Budget office said, *"Job costing is more the departments' side, some have systems and some do not"*. This of course means that the level of support for inventory management and cost control varies across departments. Overall we rate it as high for inventory management and moderate for cost control.

The personnel function in city F is also only moderately supported by IT, basically because of the same reason. Many aspects of this function (such as, performance appraisal, training, and analysis) are managed in City F by each department separately and thus, either supported by local spreadsheet-based systems or not supported by IT at all. Similarly, there is a corporate indexing system for record management which is used by most of the departments. However, each defines its own indexes and due to security consideration there are no linkages between the systems.

Lastly, the domain of office automation is managed corporately by the DPSD and is standardized. About 90% of the office workers in City F have a terminal/PC on their desk and all are connected through a city-wide network. However, the frugal approach to allocation of IS resources dictates that office tools are given on a 'need-base' rather than as a basic kit of productivity tools. Thus, for example, advanced telephone features (such as, follow-me, who-is-calling, voice massages) are available only to managers and receptionists. Many workers still have only the basic office automation package which does not support spreadsheet, graphics, or database applications[9]. Table D.1, summarizes our findings in regard to utilization of IT to support the administrative processes in City F.

Table D.1: Summary of IT support for the administrative functions in City F
(underlined = characteristics of existing system; shaded cells = system as rated)

	High utilization	Moderate utilization	Low utilization
Inventory management	on-line and comprehensive support, integrated with purchasing, accounting, maintenance systems; automatic replenishing & user generated purchasing orders; tracking, reporting & analysis tools.	on-line and comprehensive but not fully integrated with accounting, purchasing and maintenance, no automatic replenishing, no on-line generation of purchasing orders, no analysis & reporting tools.	not on-line, or not covering all types of inventory, integrated only with accounting, no managerial functions only record keeping.

[8] Such as, automatic generation and scheduling of work orders, linkage between work orders and inventory, and automatic capturing of time spent and material used.

[9] This is also because most of the terminals are still black & white "dumb terminals" which cannot technically support those features.

Financial management	on-line, comprehensive accounting system, fully integrated with all functions which generate financial transactions, electronic transfer, bank reconciliation, cost allocation, point of sale data entry, budget preparation, financial analysis & reporting tools.	on-line accounting system but not capable of handling all types of accounts or transactions, or not fully integrated with associated systems, or no budget preparation, no financial analysis and no reporting tools.	accounting system which do not cover all transactions, not integrated with associated functions; redundant data entry, no budget preparation, analysis, electronic transfer, bank reconciliation & reporting tools.
Payroll	on-line parametric system, handling all workers, automatic time capture or one time data entry, integrated with maintenance, personnel, & accounting, electronic deposit, check writing; annual reports (T4).	capable of handling all workers, electronic transfer, check writing, & annual reports. But, non parametric, redundancy in time cards data entry, not fully integrated with other system or not on-line.	stand alone, non parametric & not on-line system, and/or not capable of handling all workers, no electronic transfer, no annual reports.
Personnel	on-line, central personnel records, employment history, positions, job descriptions, training and qualifications, performance appraisal; integrated with payroll & time card, analysis & report tools.	on-line, central personnel records but only current status & no performance appraisal, analysis or reporting tools, or not integrated with other systems and not on-line.	stand alone, record keeping database, no employment history, qualifications, training, no managerial functions.
Consistency in references	all data, in all systems, which refer to the same entity share a common key; no redundancy in data storage, on-line linkages between record regarding the same entity; electronic link to external assessment authorities, dynamic views.	central repository database of addresses and properties which is linked on-line only with some of the systems that use that kind of information.	stand alone database, each system holds its own addresses and properties records, or none.
Office automation	city-wide network which offers an integrated and standardized office suite, including: word processor, spreadsheet, communication, telephone, graphics, e-mail, file transfer, scheduling.	only between 50%-80% of the employees are provided with PC, or are connected to the network, or office automation tools are not standardized, some tools are not provided, no enveloping system to integrate the various tools.	less than 50% of office workers have PC, or are connected to a network, or office automation tools are not standardized, and most tools are not provided nor integrated.
Cost control, job costing	on-line systems, fully integrated with accounting, inventory, personnel, & payroll, semi automatic generation and costing of work orders, allocation of costs to programs, projects, equipments and work orders, analysis and reporting tools.	the same as the high cell, but not covering all types of the city's operations, or not fully integrated with the related systems, and/or no analysis and reporting tools.	batch based system which records work orders and posts costs to appropriate accounts.
Record management	city wide, on-line, standardized, magnetic media storage of all records, full text search and retrieval capabilities.	a city-wide computerized record indexing system, or number of separate, non compatible, record management systems, or record management system that store only part of the city's records.	small stand alone databases, or departmental computerized indexing systems, or none.

Overall, we rate IT support for the administrative processes in City F as **moderate**.

2.2 IT support for provision of high quality services

In assessing the value of IT based systems used in the area of provision of services, the criterion we use is the extent to which customers directly benefit from the systems, rather than indirectly through the improvements in administrative processes.

In City F services for which well established and commonly used computerized solutions exist tend to be highly supported by IT. For example, all traffic lights are controlled by a responsive, real-time system. Pumps which control water supply, sewage, and storm-

water are regulated electronically in real-time, and the public library has a computerized circulation system and catalog. On the other hand, as the Manager of the Application Division in DPSD explained:

> *We are just breaking into the area of using IT to enhance the quality of the services we provide ... Traditionally we never seek to be at the leading edge ... we tended to focus on providing standard services in the most efficient way.*

Also, utilization of IT to enhance the level of service often means allocation of IS resources to projects which are not seen by the departments as answering their most urgent problems. It often has to by initiated by a holistic, top-down, and mission-driven planning process, and often it necessitates reorganization within and between departments. Those conditions do not characterize IS development in City F.

As a result most, of the services this study chooses as indicators to the level of IT support for provision of services are only moderately supported. For example, the city has three different dispatch systems, all of them fulfil the basic requirements of the units which use them but none are the state-of-the-art in the area of computer aided dispatching. Except for EMS[10] which has a static map display the other two systems are tabular. Police have mobile monitors in its vehicles, hooked up through the dispatcher to the city's main computer, but Fire and Ambulances do not. None of the dispatch systems have AVL[11] capabilities or intelligent routing and automated alarm components. As one of the commissioners said in regard to this situation:

> *It makes sense [to consolidate this function] but for a city to get what you are talking about, a big city with three separate unions, it is easier said than done ... Also, the ones that are not yet there do not need to be either ... The Police Department determines the type of system they need, Engineering has a whole different wrap of information requirements.*

Partly to provide better service and partly to improve internal efficiency there is a computerized cash register which allows payments of all types (tax, utility, fines) to be made in one location. It also facilitates flexible forms of payments (through banks, monthly instalments, or credit). The cash registers, however, are hooked only to the accounting system and cannot query the customer's account nor provide detail break down of the amount owed. As the Manager of the Application Division explained:

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[10] Emergency Medical Support

[11] Automated Vehicle Location

If you want to have information about a certain account, to query why or how much it was a year before you have to go to the specific department ... Computer wise it is not a problem [to provide all that in one location] but is there such a thing as a super clerk? one person that knows everything about property tax, utility bills, fines?

Similarly in its result, but probably because of the incremental and frugal approach to computerization, the Permit and Licenses function as already mentioned is only moderately supported by IT.

Two functions which are not exclusively related to a specific department or to operational efficiency but nevertheless are supported by IT, are managing public requests and complains and provision of information to the public. In the case of managing public requests, the Request For Assistance (RFA) system was developed in response to council concern. The system allows officers in the city's Information Centre, the Commissioners office, and the Aldermanic office to log requests, electronically transfer them to the appropriate departments, track them, and automatically generates confirmation and final notices. The RFA system, however, is not integrated with the departmental work order systems nor with their request tracking ones. The second function, that of providing information to the public, is moderately supported by two small systems initiated as a pilot by DPSD. One is a bulletin board which carries limited information about the city's activities, its institutes, application procedures, and the council's agendas. The other is called the City-On-Line system and it gives lawyers, developers, and real estate brokers a dial-in access to the city's commercial and property database. Apart from this system, there is no other systems which support remote access to, or customization of, services in City F. Table D.2, summarizes our findings in regard to utilization of IT to support provision of services in City F.

Table D.2, Summary of IT support for provision of services in City F
(underlined = characteristics of existing system, shaded cells = system as rated)

	High utilization	Moderate utilization	Low utilization
Response to emergency calls (police, fire, ambulance).	on-line, computer aided dispatch system which covers all three services, real-time optimization of whom to alert, routing, and call-ups for reenforcement, on-line presentation of all relevant, call-specific data available in the city's systems.	the same as in the high cell, but only for some of the services, or on-line computer aided dispatch system which presents only static (not call specific) data, no automatic optimization of routing, alerts, & reenforcement.	records calls and maintains log of activities, stand-alone database of some relevant information, no automatic functions, or none.
Provision of data to emergency field crews	mobile data terminals in most vehicles, communication links which allow field crews to interrogate all city's systems, remote data entry and verification.	the same as in the high cell but only in few of the vehicles, or radio links with operator who can access all city's systems on-line.	radio links with operator who does not have on-line access to most systems, or none.
Traffic control	full coverage, automatic traffic-load sensing and scheduling of traffic lights, responsive system.	full coverage, automatic traffic lights control system but without real-time components.	partial coverage, static traffic lights control system, or none.

Water, sewage, storm-water control	full coverage, real-time monitoring of pumps and valves, automatic detection of faults, remote control.	partial coverage, or real time monitoring but no remote control capabilities.	none.
Bill and fine collection	ATM, and/or one-stop service station integrated with other city's systems, on-line data entry, query, printing of bills and receipts, flexible forms of payments (banks, instalments, automatic debiting, credit cards, checks, cash), bar code scanning.	one-stop computerized cash register not integrated with the city's systems, or a number of different systems each one capable of handling one type of payment, or system does not allow flexible form of payments.	computerized cash registers for each type of payment, not integrated with other systems, no on-line data entry, query, and printing of bills and receipts, no flexible form of payments, or none.
Issuing of permits and licences	on-line filing of applications, automatic fill-in data fields and eligibility checks, presents customers with case-specific information, inter-departmental inquiry and tracking system integrated with bill collection system.	one-stop service counter, inter-departmental inquiry and tracking system.	departmental record keeping, or none.
Public library	on-line, multi-branches, circulation system, computerized catalogues, public terminals; self search, inquiry, and booking; automatic notification, remote access.	on-line but branch specific circulation system, computerized catalogues, search only public terminals, no self booking, status inquiry, or remote access.	computerized catalogues, or none.
Managing public requests and complains	on-line, city-wide system which records, channels, and tracks all types of requests and complains; generates confirmation notices and final responses, integrated with all other relevant systems.	on-line, city-wide but type-specific system; records & tracks requests for specific services, and/or does not generate responses, not integrated with other systems.	off-line record keeping, or none.
Provision of information, registration services	on-line registration/booking system for all city's sponsored events, classes, facilities, available at most public service counters, integrated with other systems to allow on-the-spot payment and issuing of receipts /tickets /confirmation.	on-line but event or departmental specific systems, presents information and allows registration/booking only to those activities controlled by one department, not integrated with other systems.	system support for registration / booking are for local activities only, or none.
Remote access	direct access through dial-in modems or terminals in central locations to: registration services, taxes/fines/bills inquiries, permits & licences applications, and requests for services.	direct access through dial-in modems or terminals in central locations to a partial list of the services mentioned in the left cell.	none.
Customization, value-added services	notices and bills in language of choice, offering a range of options regarding format of bills and their informative content.	some of the items described in the high cell but not all.	none.

Overall, we rate IT support for the provision of quality services in City F as **moderate.**

2.3 IT support for decision making

In assessing the extent to which IT is utilized to support decision making in City E we focus on three areas: a) availability of data, b) breadth and depth of data, and c) existence of tools to manipulate and present the information in ways useful to decision makers at the city management level.

One of the strategies identified in the ISA plan was, *"The city will actively encourage and support improved decision making with electronic tools and data facilities"*. At the time of data collection, however, City F's IS supports this domain only to a moderate extent,

primarily due to the following facts:

a) Most existing systems were designed to solve operational needs. They include, as the Manager of the Application Division in DPSD said, *"A lot of so called standard reports but that does not help you with the what-if analysis"*.

b) The structure of the data and the tools available to manipulate it are not flexible nor easy to use by managers who are not IS professionals. Thus, as the Manager of DPSD said, *"It is not easy for managers to construct reports on an ad-hoc basis or to dig into the information ... It is got to be made a lot easier for them to do that"*.

c) While the city collects and stores a considerable amount of information[12], both regarding its internal operations and its environment[13], and while most systems maintain on-line historical data for ten years, data is not easily available due to the 'need-to-know' principle. Thus, even though, technically, data can be made accessible to everyone within the organization, it is usually not the case. For example, a manager in the City Clerk department said,

> *For demographics and economic information you have to go to our Census and Election office ... It is on the systems but we do not have access ... Corporate Resources has the data from Stat-Canada I cannot get it.*

d) Apart from the areas under DPSD's responsibility, IT is only marginally used in City F for performance monitoring and appraisal[14]. Most operational departments have ways to evaluate their operations. But, data that ties work, material, and costs, to production is either in paper files or on local spreadsheet-based applications, it is not standardized nor electronically available at the corporate management level. Similarly, apart from the financial area, where management and the budget office make extensive use of a computerized corporate modelling and analysis tool, other tools are strictly departmental and task-specific.

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[12] According to DPSD's 1993 report the city stores more than 215 Gbit of information.

[13] On an annual base, the city gathers data regarding demographics, economics, recreation habits, education, and other types trough a comprehensive civic census.

[14] DPSD uses technology extensively to measure and report parameters, such as data entry volumes (keystrokes), telephone calls duration and delay in answering, mail sent, and forms processed, on an on-going basis and across all municipal functions.

Table D.3, summarizes our findings in regard to utilization of IT to support decision making in City F.

Table D.3: summary of IT support for decision making in City F
(underlined = characteristics of existing system, shaded cells = system as rated)

	High utilization	Moderate utilization	Low utilization
Sharing of information	all corporate data is available on-line, systems & users can easily share information stored anywhere in the city, easy to use interfaces allow easy access and manipulation of data.	not all corporate data is readily available on-line, sharing information among systems often requires professional involvement, no easy to use data manipulation tools.	data is not managed as corporate resource, most systems are not compatible, very little data is available on-line.
Breadth and depth of information	corporate data is broad and deep, includes environmental data as well as internally generated data in great detail, historical data is maintained and available on-line.	only limited environmental data is available through the IS, historical data is not maintained on-line.	no environmental data is available, there is no historical data in the system, internally generated data is kept at a relatively high level of aggregation.
External linkages	on-line, dial-in linkages to many external networks and databases are available to most city's officials.	few linkages to external sources of information, no on-line, dial-in capabilities, and/or only few officials have on-line connection with external networks/databases.	only operational-level, routine and standardized file transfers, or none.
Flexible & easy to use reporting, executive summaries, exceptional reporting	flexible and easy to use report generators which allow integration of data across systems, most systems provide executive-level summaries, exceptional reporting, and graphical presentation.	most systems provide menu driven report generator, usually restricted to the data stored in each system alone; no executive-level summaries, no exceptional reporting, no graphical presentation.	only routine, standardized print-outs of data, most system do not support user generated reporting.
Performance monitoring & performance evaluation	systems support for monitoring use of resources and many parameters regarding the city's outputs, on-going, standardized, and city-wide calculation of performance measurements.	systems support for monitoring use of resources and limited outputs' indicators; some city-wide performance measurements criteria are routinely calculated.	systems support for monitoring use of resources only; no performance measurements at the corporate level, or none.
Analysis tools (modelling, forecasting, statistics)	many analysis tools are available on-line at the corporate level; tools are well integrated with the city's data; available tools cover many aspects of the city's activities.	few, task-specific, analysis tools are available at the corporate level; analysis tools are not integrated with the other systems.	none.

Overall, City F has a broad and deep information base. However, the extent to which that information is easily available and can by used to support decision making at the corporate level is only **moderate.**

2.4 Support for the democratic process

When asked to evaluate IS support for the democratic process in the city the manager of DPSD said:

> *I cannot answer that, I just do not know ... Our policies are very open but the systems are build for our people to be efficient in helping you, they are not build for the public to use.*

The Manager of the Application Division further explained,

> *I am not sure I can answer that question ... It never really came up as an issue in itself ... One of the strategies in the ISA plan refers to community-wide electronic communication but at the moment there is hardly any support for that function.*

Those quotes reflect what we heard from many other managers in the city. Conceptually, IT utilization was only rarely associated with the mission of the municipal government to support the democratic processes, unless the systems have direct operational implications. Practically this domain's requirements were not integrated to any of the existing systems.

Some examples demonstrate this point. First, With all the activity currently being done in the area of supporting Record Management no consideration was given to the question of public access to the records. Second, tthe city built a small system which helps front-desk employees to provide commonly sought information but it was not even conceptualized as something that should be directly available to the public. Third, As the law requires, a lot of the city's official documents (council minutes, budget, reports) are available in hard copy in the city's public library. However, there are no linkages between the library and the city systems to facilitate electronic search of those documents.

Slightly from a different perspective one of the councillors said,

> *When I came on the city council I figured I should have computer and should be able to directly find out: How many people are in my ward? How many building permits? traffic counts? how the departments are using their resources? I cannot ... it is all in there but not connected, not in a way that I can reach for.*

Lastly, following a very practical approach, the city chose not to invest in automated voting machines since, as the Manager of the Election and Census Division told me at a telephone interview, *"We have an experienced staff and we calculated that it is going to cost more ... We do have electronic link to the media to report as counting progress".*

Table D.4, summarizes our findings in regard to City F's utilization of IT to support the democratic processes.

Table D.4: summary of IT support for the democratic process in City F
(underlined = characteristics of existing system; shaded cells = system as rated)

	High utilization	Moderate utilization	Low utilization
General election	automated voting system.	calculation and reporting of the results.	voters list, or none.
Publication of council minutes, decisions, legislations	on line, search and retrieval capable system, electronically accessible to the public.	database of council minutes, bylaws, policies.	computerized indexing system, or none.

Communication between the public and its representatives	system capable of recording, channelling, and tracking constituents concerns.	system that records constituents concerns, or a messaging system.	telephone, or none.
Council's oversight of the administration (monitoring city's expenditures, operations, adminstration behaviours)	on-line, EIS type of system for aldermen.	on-line, menu driven query system and report generator.	on-line connection to all city's systems, or none.
Disclosure of municipality's data (budget, plans, programs, expenditures, etc.)	on line, search and retrieval capable. archive, electronically accessible to the public.	magnetic media archive.	computerized indexing system, or none.
Involvement of the public in decisions	computerized survey/poll system that actively seeks and analyze public opinion, or interactive televised council meetings.	bulletin board which carries council agendas, and/or system that record public opinion regarding issues on the agenda.	televised council meetings, or none.
Reducing asymmetry of information (collection and distribution of social, commercial, and environmental data and statistics)	on line, search and retrieval capable system, electronically accessible to the public.	database.	computerized catalog, or none.

Overall, we rate IT support for the democratic process in City F as **low**.

3.0 Political behaviours in City E

3.1 General description

The political level in City E constitutes of city council which is composed of a representative from each of the fourteen wards in the city and the mayor who is elected by the public at large. The council is divided to four permanent standing policy committees and a host of ad-hoc committees. The four senior committees have decision making authority to a limited extent, but they do not directly supervise the operations of the municipal departments. Rather, they are decision making bodies to which, on an issue base basis, the administration turns for final approvals or resolutions. Through the Police Commission and the Public Library board, council also controls these two functions which are managed separately from the municipal administration.

We do no expect, normatively, the political level to be deeply involved in the details of how the city is using computerized systems. However, decisions and actions of the politicians may have significant impacts on how the city uses IT. In the following three sections we assess the extent to which the politicians in City F: a) provide well defined goals, objectives, and strategic directions, b) support IS development and are directly involved in its planning, and c) create uniformed authority structure. Each of these three domains is normatively expected from the political level and is hypothized to have a strong impact on the extent to which the city is able to use IT to support its goals.

3.2 Political leadership

While the initial response of all managers we talked to in City F was that council provides leadership and directions to the administration we found that statement somewhat too smartening, at least as city's council measure up to the rather demanding normative criteria set by this study. Precipitated by economic downturn in the mid 80's, council in City F became aware of the need for comprehensive strategic planning. In 1990 an after extensive work, council produced a strategic plan called "Charting City F's Future". In this plan council identified five issues which it *"felt were key to the city's future"* . For each one council identified a set of goals it hoped to achieve and possible strategies which, when acted on, would move the city closer to meet the goals. Having set the vision, goals, and strategies in a relatively detailed way, council in City F did not proceed to closely supervise their implementations and did no create institutionalized processes with which to routinely review departmental plans and operations. Council did not even demand that the administration would follow its example and develop a long term strategic plan.

Nevertheless, since the completion of council's strategic plan, in a slow cascading process, the board of commissioners developed its own plan in 1991, and the departments are currently in various stages of developing their own. Those plans were developed (or being developed) without active involvement of the politicians and in most cases were not even presented to the council, let alone officially endorsed. Furthermore, departments do not report routinely to council and there is no systematic process in which their plans and operations are reviewed by council apart from the budget process. Typically, departments need only the commissioners' approval for their plans and objectives before execution, as long as there are no significant budget implications[15]. Council got involved only on an issue-base, ad-hoc fashion, to render final decision regarding issues brought up by the administration. As one of the councillors said:

> *We have not updated the strategic plan [since 1990] nor reviewed and discussed those of the departments ... Each department knows what the issues are and unless the mayor or an alderman recognizes a problem it is up to the individual departments to ascertain what their needs are and to respond to them.*

The only time the political level addresses the city's operations in a comprehensive way is through the budget process. Even in that extremely important process the council, as the

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[15] The fact that the Mayor is an ex-officio member of the board of commissioners amounts to some political control or direct influence on the operation of the departments.

Manager of the Budget office stated, *"Only came at the end of the process ... just tinkering mainly"*. At the onset of the annual budgetary process council sets upper limit to the city expenditures by setting tax rate. Then they leave it to the commissioners to decide what the process will be and to provide the departments with guidelines[16]. Once the final proposal is ready, council must approve it and technically can change it, but so late in the process council's impacts are usually only at the margins.

Political leadership is also the willingness to commit resources to a long-term plan. In City F there is a five year capital investment plan for which resources are committed. However, capital plans are discussed and committed to on a project by project basis rather than on a plan basis. Hence, resources needed for the implementation of a long-term mission-driven plan are only partially secured. This fact is especially bothersome in the area of IS development since IS projects are only rarely capitalized in City F. Thus, most IS projects are scheduled in small incremental stages to fit the more or less fixed operational budget of DPSD, and there is political commitment to a long term IS development plan.

2.3 The involvement of the politicians in the development of the IS

In City F IS is viewed by the politicians, and in many cases also by senior management as an administrative and technical domain. None of the issues, goals, or strategies articulated in the council's strategic plan referred to information technology, and as one of the councillors said, *"I cannot recall council ever asking the administration to update us on their information technology"*. Also, managers and politicians alike were unable to recall any IT related initiative that came from the political level in the last ten years. Furthermore, as an administrative domain none of the council's committees specializes in IS and DPSD is not reporting nor closely supervised by the political level. A study of council's minutes reveals that in the last five years IS development was not discussed at all at the political level except within the context of the budget process. The process of approving the ISA plan demonstrates this detachment of the political level from the domain of IS. The Manager of DPSD described:

> *Our strategic plan [ISA] was accepted by the board of commissioners ...We probably will take it to the auditing committee [council level] but just for information ...*

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[16] Towards 1995, the city plan to significantly change its budget process by introducing elements of zero-based budgeting, more top-down focus, and earlier involvement of the political level. Those changes were initiated by the administration and at the time of data collection were not even presented to council.

Council interaction will be on the budget. It [strategic IS plan] is being dealt with at the administration side not at the political level.

Not surprising, when asked about council's vision regarding the role of IT in the city, one of the councillors said, *"No, we do not have one, we do not even think in that way ... to us it is a technology and we are not experts"*. Regarded as only a technology, the politicians in City F usually support IS projects since "*the administration needs them to do its work*". They however, tend not to see the technology's strategic role. Thus, they are not really interested nor willing to invest heavy money on it. For the politicians, as one of the councillors explained, many systems are *"Nice to have, but everything costs a lot ... So you try to keep patching the systems you have, and try to keep up to date, but not to do a drastic change"*. Nevertheless, probably because the administration did not even ask for substantial investment in IT, except for the GIS project, most managers we talked to said that council attitude towards IS development is *"supportive but remote"*.

3.4 Authority structure

In City F there are no elected bodies aside from the city council. Thus, all municipal functions are directly controlled by one political authority. While some of council work is carried out in committees which have decision making authority, it does not compromise the uniformity of the authority structure since are no direct report relationships between a department and a committee. Furthermore, as already mentioned, the domain of IT is addressed by the political level only within the context of the budget process. Unlike some other departments' budget, DPSD's budget is reviewed only by the Committee of the Whole. Thus, at the political level, authority over all matters relating to IT utilization resides in only one body.

At the administration level, the formal authority structure is less unified. Two important functions, the Police and the Public Library, do not report to the city commissioners. Once they receive their budgets from council they are free to use it as they see fit. To some extent this explains why in City F the Police department is pursuing its own initiatives in the area of IS, and the Library system is not compatible to, nor integrated with, the rest of the city's IS. However, as the manager of the Application Division in DPSD said: *"In the case of the Police we do much of the work so we know what is going on ... [and] there was no reason not to reach some agreement with the Library, there was just no need"*.

City F's governing system which is based on three commissioners, each directly

responsible to a number of departments, and a chief commissioner who is first among equals rather than the manager, may also constitute a birch in the uniformity of the authority structure. To some extent each of the commissioners is inclined to favour the interests of the departments under him and each has the authority to direct these departments' operations independently from the other three. The commissioners, however, are not independently accountable to council but rather jointly as the board of commissioners. They also seem to work as a team rather than in isolation. Thus, while authority at the administration level is not centralized in the hand of one official and there are few functions which are not under the control of the board, there is a fairly unified authority structure at the administration level.

Table D.5, summarizes our findings in regard to the extent the politicians in City F: a) provide political leadership through well defined goals, objectives, and strategic directions, b) support IS development and are directly involved in its planning, and c) create uniformed authority structure.

To summarize, the politicians in City F provide long-term vision and goals in respect to the development of the city. In regard to how the city routinely operates and how council's vision and goals are being translated to actions, council is mainly reactive and depends on the administration to provide leadership and guidance. Also, council in City F provides only vague guidance in respect to how the city should be managed and it does not closely supervise the departments' operations. Overall, we assess the extent to which the political level in City F provides well defined goals, objectives, and strategic directions as **moderate**. On the scale between being champions of IS, actively involved, and highly instrumental in its development, to low involvement or even somewhat obstructive, we rate the political level in City F as **low**. We rate the authority structure in City F as **unified**.

Table D.5: A summary of the rating of variables and indicators related to politics in City F

	High	Moderate	Low
Political leadership provision and commitment to well defined goals & strategic directions in all areas of operation.	on-going, formal processes in which council formulates and reviews the city's plans and operations, in a comprehensive way.	institutionalized, one-shot process in which council set its objectives for the term/year.	no formal process in which council set goals priorities, and directions.
	council is interested & actively involved in goal setting & strategic planning.	council supports & encourages but is not involved in goal setting & strategic planning.	council does not support nor involved in goal setting & strategic planning.
	top-down, comprehensive budgeting process in which council provides result-oriented guidelines.	bottom-up but comprehensive budgeting process; council does not provide guidelines.	bottom-up, fragmented budgeting process.
	existence of mission-driven, updated strategic plans, officially endorsed by the political level.	strategic plan/s exist but not officially endorsed by the political level, or, are not comprehensive.	there are no long-term strategic plans.
	resources are committed to long-term strategic plans.	there is a long term capital investment plan but there is no direct commitment of resources to the strategic plan.	there is no long-term commitment of funds, only ad-hoc, yearly allocation of resources.
	council is perceived as leading in all areas by politicians & bureaucrats alike.	council is perceived as leading only in some areas by politicians & bureaucrats.	council is not perceived as the leader in most areas by politicians & bureaucrats.
Political involvement in IS interest and active participation in IS development.	council is interested and actively involved in directing IT usage.	council is interested and supportive but not involved in directing the development of the IS.	council is not interested, not involved, and even somewhat opposes the development of the IS.
	council develops formal vision and policies regarding the role of IT.	informally there is a shared vision regarding the role of IT among council members.	council does not have a vision regarding the role of IT in the city.
	council, in its goals and objectives, explicitly refers to the development of IT based systems.	council initiates few IS projects on an ad-hoc basis.	council does not initiate any IT based projects.
	there is a political body that directly oversees the IS function.	there is no special body that oversee the IS function but council receives reports and presentations from the IS manager.	council does not directly oversee the IS function nor asks for reports or presentations.
	council formally discusses and endorsed a comprehensive IS plan and commits to the plan as a whole.	council is aware of the IS plan but discusses and funds each project separately.	council is not aware nor interested in the IS plan/s.

Authority structure unified authority at the political and operational levels.	there is a coherent and unified authority structure for all aspects of the city's operations.	few aspects of the city's operations are not directly controlled by the central, political, authority.	there are a number of political bodies, each has the authority over a part of the city's operations.
	authority over all matters relating to IT utilization resides in only one political body.	there is a central authority, at the political level, that controls most IT related matters.	IT related matters are controlled, at the political level, by a number of different bodies.
	council gives the senior manager authority to direct all the executive branches of the city.	council gives the senior manager only limited authority over the operation of the departments.	there is no central authority below the council level, each department directly reports to some political body.

4.0 The behaviours of the bureaucracy in City F

Four behavioral patterns, commonly associated with bureaucracy, were proposed as major factors that may impede, or negatively influence, the development of an IS that strongly support organizational goals. These are: lack of coherent corporate management, high degree of incrementalism, high level of fragmentation, and a dominant orientation which is internally focused emphasizing control and status-quo. In the following sections we describe our findings in regard to each of these four factors and assess how the municipality of City F should be rated on each. To do so we investigate behavioral patterns in the city in general (such as, the budget process, buy or build policies, allocation of resources) and issues directly related to the IS function in the city (such as, the IS planning process, structure and status of the IS unit). When possible we try to avoid the question why the administration behaves like it does, while certainly an interesting topic we feel that it does not serve the purpose of this study. Thus, we aim to establish what the behavioral patterns of the administration in City F are rather then why they are so.

4.1 Corporate management approach

To the extent possible in a very large and extremely diverse organization, corporate management approach in City F is centralized. At the same time, with twenty one departments the municipal government in City F is the most departmentalized among the cities in this study's sample. In addition to the functional departments and the major administrative functions, most support functions (such as, fleet maintenance, printing, publication, purchasing, legal, and stores) are organized as central agencies. As such they provide standardized internal services and are regulated by binding corporate policies and procedures. In general, departments are forbidden from developing their own support functions or from seeking support other than that provided by the city's internal service departments. Furthermore, internal services are treated as a fix overhead rather than on a market-like, pay for service basis, and department heads have relatively little discretion in regard to how to use their resources.

Budget is allocated to programs[17], of which each department may have many, and managers require commissioners' approval to shift resources from one program to another. Even things such as installation of a telephone, connection to external network, or purchasing

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[17] Programs are functions, specific operations, or service centres carried out by identifiable resources, such as street cleaning, data centre operation, application development, or garbage collection.

of a PC require the signatures of the division manager, the department head, and that of the manager of the centralized service unit which does the work.

Until recently, this centralized corporate management approach was focused mainly on assigning tasks to the departments and maintaining control over resources used. There was very little emphasis on evaluating the departments' performance, streamlining operations from the city as a whole point of view, or corporate strategic planning. The perception was that the city is doing quite well and that each department is doing its best to improve its operations. Thus, in regard to the routine operations of the city the board of commissioners which constitutes the city's senior management, tended to be content with setting operational objectives for the departments, maintained close financial control, and regulated inter-departmental issues through policies and regulations. As one of the commissioners stated,

> *The board sets a lot of policies that they [departments] operate under, also we set their operational goals. For example, we told the street division that all roads should be passable within 24 hours of a major snow storm ... [but] to a large extent we allow departments to carry on with what they have been doing in the normal process of doing business.*

Since city management does not initiate changes nor strongly stressed result oriented management, departments were left to do their assigned tasks as they used to, and routine settled in. There were, and still are, strictly enforced policies, standards, and procedures regarding the use of resources. However, there was very little corporate guidance in respect to planning or management practices, and there was no emphasis on managing the city operations from a corporate perspective rather than that of a department. Department heads were not a part of the city's executive level. There were no routine meetings of all department heads with the board of commissioners and the strategic direction of each department was, to a large extent, determined by each department and its commissioner.

The following three examples demonstrate City F's management approach. The budget process, one of the key tools for setting direction, was based on a bottom-up process in which each department submitted its requests based on the last year expenditures, and the board of commissioners consolidate all requests, using primarily, a cross-the-board cuts. Another example is the fact that the organization of the municipality in City F, its structure, and the division of responsibilities among its departments did not change in the last ten years. Thirdly, neither the budget process nor the operations of the departments were guided by a long term, corporate strategic plan. They were also not tied to performance criteria. New initiatives almost always came from the departments, were departmental in their focus, and

were implemented on a departmental base rather than on a corporate one.

In the last couple of years there is a significant move in the city towards corporate long term management in addition to centralized control. However, probably because there is still a sense of well being and no urgency, and because the shift involves a cultural change in a very large organization, the change is proceeding very slow. The commissioners' strategic plan, published in mid 1991, identified many goals pertaining to issues the commissioners felt are most important for the continuous well being of the city. The strategic portion of that document, however, was painted only in a broad brush. In general, it identified activities that should be done in order to determine how to reach the goals rather than set strategies. For example, it called to,

> *Determine if additional revenues may be generated from city facilities ... prepare strategic plans for the delivery of community services ... Develop a program for management development ... Explore opportunities for joint venture with the private sector ... Establish inter-departmental task force to review current customer services programs ... Tie strategic plans to the formal corporate budget and policy process.*

Since then, departments and task forces have been working on translating those broad directions into implementable strategies. In 1993 a new budget process was initiated. Departments were required to submit budget requests based on 90% of their previous year expenditure level and to indicate the significance of each additional 2% (up to 100%) on the level of service they provide. Those ten percents were later allocated by the board of commissioners according to corporate priorities. Additional changes to the budget processes are scheduled to 1995. They aim to tie the process to the strategic plan and to involve city management earlier in the process. Also, late in 1993 each department submitted a list of performance measurements relevant to its areas of operations. In 1995 those would also be incorporated into the budget process as well as into a quarterly departmental report. Furthermore, a number of inter-departmental task forces were created to look from a corporate point of view at issues such as: streamlining the city's operations by restructuring, reengineering processes, and customer services.

All of those changes were initiated by the board of commissioners. The commissioners, however, are not actively involved nor personally championing those changes. They are also not pressing for revolutionary changes. Rather, they seem content with the slow and gradual pace in which those changes in management approach are implemented.

For example, Most departmental strategic plans are only now in the process of being revised to fit the board's plan, three years after its completion. The budget process is still,

in essence, a bottom-up process disconnected from the long term plans and from performance criteria. There is still no institutional process in which departmental plans and operations are reviewed routinely by city management. Only recently the board of commissioners started to meet with the department heads as a group.

Furthermore, as yet, except for steering the organization toward a more long-term corporate management approach, no clear and coherent vision of where the city should be heading for was articulated. Neither did a strong statement regarding how the city should be managed and which strategies should be followed emerge from city management.

Management of the IS domain in City F reflects the same managerial approach. As already mentioned, DPSD is a corporate service department which centrally controls all IT related budget. There are corporate binding standards regarding the use of the technology, and most systems are integrated and considered as corporate. However, while DPSD's manager is in a senior position he is not at the strategic apex of the organization. Neither he nor the board of commissioners are driving the development of the IS in the city. DPSD is controlling IS development and the Information System Steering Committee (ISSC) is prioritizing it corporately. But, IS is not perceived as a major corporate resource and its development is driven mainly by the operational needs of the departments. As the Commissioner who chairs the ISSC stated:

> *The steering committee deals with development of the IS. We say this system should go first and this one next ... We are not really leading IS development nor directing what should be developed, only what is more important ... We do not know what technology is being developed ... mainly, initiatives come from the departments, sometimes from the data processing people.*

The changes in management approach described above are also very apparent in the area of IS. The ISA plan is one indication to the move toward a corporate strategy regarding IT utilization. The GIS project is another instance in which, for the first time, IS is developed as a corporate project. Further, currently DPSD is working with the departments to expand the corporate strategic approach adopted in the ISA plan to application development. As a manager in the Engineering Department said:

> *I have been in the city since 1967. The GIS project we have been working on the last two years is the only project that I am aware of that has been treated as corporate ... Until now each department added a little bit here and a little bit there because they did not have the funding, and no one looked at what we do from a corporate perspective. It is still continue to happen, but I think things are changing now ... We are working in partnership with departments to jointly do projects ... It is still departmentalized for the initiatives, but, for example the scanning project, now I*

would not do it myself ... They [DPSD] formed a committee that is looking at the scanning requirements on behalf of the corporation.

Again, similar to what is happening in the area of corporate management in general, the changes in the approach to IS development have not yet translated to clear corporate vision, strategic direction, and approved and budgeted implementation plans. Talking with the commissioner who is responsible to the IS domain it was clear to me that the city still regard IT as a supportive tool rather than a strategic resource. Asked about city management's vision regarding the role of the technology in local government the Commissioner referred to: *"Moving away from the mainframe ... network environment ... PC's instead of terminals"*. When pressed to refer to what the IT is used for, the commissioner admitted that the city has not taken the corporate strategic approach to address the substance of IS development. *"It is so much of a dreamer approach"*, he said when given some examples of corporate visions regarding IT, *"We have not done it and I am not sure it is worth doing. The technology is changing so fast, we are concerned with how to best support the departments"*. Thus, while a relatively well articulated vision and strategic direction emerged from the ISA planning in regard to technological choices and architecture, how it is being use is still not managed from a corporate perspective nor driven by a long term visionary strategic plan.

4.2 Assessing the level of fragmentation

Often the size of a bureaucracy, the diverse nature of its operations, and the lack of common denominator with which to compare the results of the various sub-units lead to fragmentation of organizational power and the formation of small empires within the organization. This in turn, may lead to lack of coordination and cooperation, inconsistencies, lack of focus in the organizational decision making process, and inefficient use of resources. Each of those factors may seriously impede the development of effective IS.

Even though the municipality of City F is divided to 21 departments and their heads seldom sit together as a group to coordinate their operations or decide on the strategic directions the city should take, we did not find significant signs of authority related frictions or turf-wars between the departments. Paradoxically, the combination of a strong control-oriented centralized management, a stable organizational structure, and the lack of strategic management approach seems to explain this fact. In City F the departments are not independent in their strategic decision making. They have to refer most new initiatives to the

board of commissioners and their options in regard to how to operate are constrained by corporate policies and procedures. Also, there is no pressure on the departments to constantly examine the way they do business and there is no emphasis from the board of commissioners on breaking up the traditional division of responsibility in search for efficiency and effectiveness. Thus, over time friction points were regulated and the boundaries between departments' activities coordinated.

On the other hand, strategic decision making in City F tends to be issue-based rather than mission-driven and comprehensive, and issues are usually initiated from the bottom rather than from the top. Thus, while decisions are taken at the corporate level they are usually narrow in their scope and fragmented in their focus.

For example, in the last couple of years the city has been trying to reduce the number of its employees. This, however, is done at the operational level. Each department, in isolation, was asked to examine its operations and suggest where to cut. No comprehensive examination was done at the corporate level to identify redundancies and duplications of functions across departments. Yet another example, in the commissioners' strategic plan three items which relate to making the public more aware of the city's position and actions were identified. They were: *"Communicate the city's commitment to equal opportunity ... Develop a public information program about the city services ... Develop an innovative way to publicize the budget process"*. Each of those items was discussed in isolation and each was assigned to a different department to act upon.

The same situation exists in regard to IS. Development is centralized, software and hardware are standardized, and IS development's priorities are set by a corporate committee. The need requirements, however, are defined by the departments and tend to be constrain by the local and operational point of view of this level.

For example, currently DPSD is experimenting with imaging technology at three different departments. The focus of these pilots is to find the best technology to support document handling in those departments. The city, however, did not precede these pilots with a study of the record management function from the corporate as a whole point of view, nor are the pilots driven by a long term plan which specifies how the new technology should fit with the rest of the city's systems. Also, as already mentioned, the city is currently developing its GIS. The trigger for this very expensive undertaking, close to $16 million in five years, was DPSD's realization that *"Now we have mature technology to support mapping facilities and to connect location related data with graphically displayed maps"*. While it is

clear to most managers that the GIS project will have implications regarding many of the city's operations, what exactly are they and how best to take advantage of the technology beyond replacing existing support with a better one, was never formally discussed.

4.3 Assessing incrementalism in City F

Utilization of IT to support organizational goals often means drastic departure from existing routines, work-processes, and current organizational structure. In the absence of such changes, the technology, instead of significantly enhancing goal achievement, may have only marginal impact on operations. Effective use of IT also depends on a certain level of IT infrastructure being in place before significant benefits can be realized. Thus, the ability of an organization to achieve "high" IT utilization (as defined in this study) is often in stark contrast with the bureaucratic tendency to move forward in small increments.

Management and council in City E are quite content with how the city operates and while the commissioners recognize that the growing financial pressures require innovative solutions they do not feel the need for drastic and rapid changes. Asked about the nature of the changes in the city all managers we talked with agreed that they were mainly incremental and gradual. However, they all indicated that in the last two or three years some major changes are taking place. As one of the commissioners stated,

> *For a long time they [changes] were mainly focused on doing things better, improving internal processes, cost saving, maintenance ... in the last two years they [changes] are much more dramatic.*

Nevertheless, there is no sense of urgency in the municipality. Rather, as the slow move to strategic planning and the fact that the restructuring and reengineering exercises have not yet produced a single change demonstrate, the city is content with moving towards its goals in a slow and evolutionary mode. Thus, managers' perceptions regarding the shift in the city's approach to changes seem to reflect their expectations rather than what actually was done in the last couple of years.

For example, the average change in allocation of resources among the departments in the last five years was only 0.15% of the total budget. The largest change that occurred between two consecutive years in the share of the city's resources allocated to one department was a 1.27% increase in the Police share of the 1993 corporate budget. This represents an increase of only 3.9% in the Police annual budget. In 1993, the year in which the most drastic changes in allocation of budget occurred, the shares of five other departments changed but in no more than 0.7% of the total budget which for those departments represented a

change of between 5% to 1% of their annual budget. In 1994, the city returned to a much more incremental budgeting and the average variance in departmental share was only 0.007% of the corporate budget.

Another indicator to the ability of an organization to affect radical and rapid changes is the extent to which it is tied to a large, relatively inflexible work force. From this aspect City F was for a long time in a relatively good position. The City directly employs only 7,475 permanent workers (not including utilities) which translate to a rate of one public service employee per 96 residents. This rate is the highest (high mean a relatively smaller government) among the three large cities in this study sample and significantly higher than the average among municipalities of comparable size. Those numbers reflect only part of the picture. Another part is the portion of the city's operations which are contracted out[18]. In this aspect City F is in a less favourable position. Even though the need to significantly reduce the city's work force was recognized in 1991 by the commissioners' strategic plan, and suggestions were made to privatize some of the city's utilities, changes in this area are taking place very slowly. At the time of data collection the city still does most of its routine works by internal work force. No function was privatized or contracted out in its entirety, and there was no policy nor a detectable move toward more reliance on contracted work force[19]. Thus, since the inception of the work force reduction initiative, three years ago, only 2.5% cuts were achieved, and those cuts were spread across most departments equally. This of course drastically constrains the ability of the city to shift resources from one area to another and perpetuated the incremental approach to changes and resource allocation. As the Manager of the Budget office confirmed,

> *We are still quite incremental in our budgeting, I do not think that we really focus resources or significantly shift them ...that has not been the case for maybe the last ten years ... There is a real reluctance to take one priority and run with it, ... I do not think they [management] have a consensus on just which are the priorities.*

The same incremental approach is even more pronounced in the area of IS development. In addition to the general approach to changes, investments in IS development are not capitalized. Thus, development or purchasing of packaged applications is constrained

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[18] By itself the high rate of residents per city workers may also represent that the city is doing less than others.

[19] In City F only new construction projects are contracted out. Other functions which in some of the other cities are contracted out (such as: garbage collection, recycling, maintenance of streets, parks, water and sewage, managing police, community centres) are all done primarily by city workers.

by the more or less fixed operational budget of DPSD.

Thus, for example, while the ISA plan identified the need to dramatically change the IT infrastructure in the city, implementation is not perceived nor planned as a high priority, focused, corporate effort. Rather, as the Manager of the DPSD said, *"The [ISA plan] is a vision for the next ten years which will guide us as we slowly improve our systems"*. As such, implementation is envisioned as a long and gradual process which fit into the normal schedule of maintenance, upgrades, and new developments.

Furthermore, as the Manager of DPSD said: *"DPSD tends to keep the pressure on incremental stuff right across the board"*. Hence, what each department can expect is only small improvements. Which might explain why even the DPSD's manager thinks that visionary thinking regarding the role of IT is *"So global and grandiose that there is no much point in it"*. The result is that IS initiatives come from line managers who naturally focus on their immediate problems and how to improve existing processes rather than on how to use the technology to change the way things are done. Also, DPSD's approach to system development is conservative and guarded. It tends to avoid the risks inherent in leading edge technologies, and except for the technical aspect it does not see it as its role to provide vision in regard to how to use IT. Not surprising, one of DPSD managers said that what constrains IS development in the city is: *"The lack of vision, the need to educate the users, [and the fact that] they [do not have the time in their schedules to adopt new technologies"*.

4.4 The dominant orientation of the bureaucracy

It is hard to assign to City F any particular dominant orientation. The city does not follow a defensive strategy, cost saving is not a necessary component of every new initiative, and the departments are very much customer oriented rather than internally focused. Furthermore, what drives the city is not only to survive and to maintain status-quo. On the other hand, the city is not seeking improvements through investments in technology and organizational changes, and is not driven by a strong innovative and proactive managerial approach. City F is conservative, quite rigid in its structure and approach to changes but at the operational level it is open to its environment and seeks to serve as best as it can.

The following examples demonstrate the city's orientation:

First, many departments in the city are doing customer surveys as part of their routine operations. They ask customers to evaluate the services they get and to suggest improvements. The city, however, does not involve citizens in its planning processes (except

where urban development is of concern). The surveys usually do not present the public with alternative ways for provision of services. For example, when the planning department did a customer survey regarding its front desk operations, it did not suggest a city one-stop counter but only a departmental one. And, it did not point out innovative ways (remote access, on-line application) in which services can be provided.

Second, often departments use external consultants to help them plan or solve problems. Usually, however, use of external sources is focused on operational and technical issues rather than on what should be done and how best to structure the organization. For example, external help was sought when council did its strategic plan and when DPSD worked on its ISA plan. In both cases experts were brought to facilitate the meetings and to provide methodology but not to provide expertise in the topics areas themselves.

Third, more and more, departments are using output measurements rather than resources-used based criteria. However, performance measurements are not standardized city-wide and city units are not compared nor put in direct competition with alternative service providers.

The conservative nature of city F is also exemplified in the fact that none of the temporary approaches to public administration was adopted in the city. As already mentioned, there was no significant change in structure or organization in the city for more than ten years. The city dose not follow the notion that governments should focus on steering and contract out the doing, is not engaged in joint ventures with the private sector, and does not encourage self-management of community services and facilities. City F also does not emphasize staff training as a long term investment. Training is usually focused on task specific domains, rather than on bettering the work force, and overall the city spent only $327 per employee on training in 1993. This number is the lowest among the three large cities in this study sample. Lastly, budgeting in City F is still incremental and bottom-up rather than top down and performance based.

Utilization of IT, as already mentioned in various parts of this report, reflects the same dominant orientation. IT is used extensively to improve services but basically to enhance the efficiency and effectiveness of how the city operates rather than to facilitate improvements in what the city is doing. It is used where needed rather than as a change agent to provide new possibilities, alternatives, and services, or to enrich workers jobs. And, IT is used cautiously only when the technology is mature and there is certainty of the operational benefits rather than driven by a visionary perception of what the role of the technology should be.

Table D.6, summarizes our findings in regard to the behavioral patterns of the bureaucracy in City F in the areas of: a) corporate and strategic vs. local and operational management, b) unification vs. fragmentation of power and strategic decision making authority, c) incremental and slow vs. rapid and drastic changes, and d) defensive and status-quo vs. proactive and innovative orientation.

To summarize:

Corporate management approach in City F is in a state of transition. City management is no longer content only with assigning responsibilities and controlling the use of resources. The commissioners are trying to advance corporate vision and perspective regarding the city's operations and are promoting corporate strategic planning and result-oriented management approach. Those changes are slow and gradual, and as yet, did not have significant impacts on how the city is working in general and specifically on its IS. Furthermore, there are no concrete plans nor budget for the implementation of some of the new ideas being discussed currently. Overall we assess the extent to which City F follows corporate management approach as **moderate**.

There is no fragmentation of organizational power and strategic decision making authority in City F. The fragmented, issue-base decision making process which often characterizes City F is due to the lack of a visionary and strong corporate management, and the incremental approach to implementation. On the scale of integration vs. fragmentation we rate city F as **integrated** and **centralized**.

Due to lack of strong visionary corporate management and the perception that the city is doing fine the basic inclination of City F is towards gradual and incremental changes. In the area of IS development this tendency is even more pronounced. Overall, on the scale between dynamic and changing to incremental and status-quo we rate City F as **highly incremental**.

We rate City F as oriented towards serving its customers but from a pragmatic, conservative, and operational perspective rather than from a visionary, long-term strategic one. We rate this major orientation of City F as **moderate** with respect to providing conducive environment to development of IS that strongly support organizational goals.

Table D.6: Summary of the variables that relate to the bureaucracy in City E

	HIGH	MODERATE	LOW
Corporate management	city management is a source of vision, manifests coherent and proactive approach to management, initiates policies and lobbies for their approval.	city management has a coherent approach to management but tends not to be visionary and to react to the political level rather than to influence it.	city management does not demonstrate visionary and coherent managerial approach, tends to see the implementation of council's policies as its only role.
	city management, as a group, champions and is actively involved in strategic planning.	city management, as a group, supports and often initiates strategic planning but is not championing it nor directly involved.	city management, as a group, is not very interested nor involved in strategic planning.
	top-down, goal-driven budgetary process, tightly connected with the strategic plan.	only capital budget is driven by an a-priory defined goals and strategic plans.	bottom-up budgetary process, disconnected from long-term plans.
	institutionalized process in which management reviews departmental plans and operations on a periodical basis.	management reviews departmental plans and operations on an ad-hoc basis when there are problems.	usually departments' plans and operations are not reviewed by city management.
	city-wide standardization of processes and managerial practices.	some processes are standardized city-wide but it is not comprehensive nor strongly stressed by management.	no standardization of processes and managerial practices.
	there is an approved, long term, and comprehensive strategic plan for the city as a whole.	there are some domain-specific (not departmental) strategic plans but not a comprehensive plan for the city.	no strategic planning at the corporate level, only at the departmental level.
	IS manager is a member of the city's management group.	IS manager is one level below city management level.	IS manager is 2-3 levels below city management level.
	IS is perceived as a strategic, corporate resource.	IS is perceived as a corporate resource but mostly used to support the operational level.	IS is perceived as a supportive tool for the departments.
	IS steering committee consists of top level executives and operates at the strategic level.	IS steering committee consists of middle level managers and operates at the tactical level.	There is no IS steering committee, or, it is not active or not influential.
	IS development is directly controlled by city management and driven by the city's strategic plan.	IS development is corporately prioritized but driven by operational, problem solving perspective.	IS development is controlled by the departments each separately driven by its own operational needs.
Fragmentation	the city is managed as one integrative entity.	departments are to a large extent independent in their operation but well coordinated at the strategic and operational level.	the city operates as a holding company with very limited inter-departmental dependencies.
	no significant signs of territorialism, turf-wars, and frictions between departments.	moderate level of authority related frictions, turf-wars, and territorialism.	many evidences to behaviours that stem from territorialism, turf-wars, and disputes regarding decision making authority.
	strategic planning is comprehensive, done at the corporate level, tend not to regarding departmental boundaries as a constraint.	strategic planning is done by inter-departmental task forces but for each domain separately.	strategic planning is done by departments in isolation, or, no strategic planning at all.
	innovations are implemented regardless of departmental boundaries, there is a conscious effort to break those boundaries.	only few innovations and changes bridge departmental boundaries, there is no stress on breaking up departmental boundaries.	changes and innovations tend to be confined to a specific department.
	there is a central IS function, all IT related budget and development are controlled and guided by the IS function.	the IS function is a central support unit, budget and development are managed by the IS but guided by departmental needs.	departments have their own IS units, IT related budget is controlled and prioritized by departments.
	city-wide standards for hardware and software.	partial standardization of hardware and software.	no city-wide standards for hardware and software.

	all data is perceived and managed as a corporate resource.	administrative related data is managed corporately, otherwise, each department manage and own its data.	most data is owned by the departments.
	most systems are integrated city-wide.	administrative systems tend to be integrated but operational systems are not.	most systems are departmental, low level of system integration across departments.
Incrementa-lism	relatively high variance in allocation of resources over the years (avg > 1%).	moderate variance in allocation of resources over the years (0.5% < avg < 1%).	very stable allocation of resources over the years (avg < 0.5%).
	relatively large portion of the city operations are contracted out.	moderate extent of contracting out.	almost all city operations are carried out by city employees.
	in the past few years the city implemented many drastic changes in its priorities and operations.	few significant changes in priorities and modus of operation occurred in the last few years.	no significant changes in priorities and operations took place in the last few years.
	IT is used as a change agent to significantly alter the way the city does business.	IT is not used as a change agent but some systems significantly changed the way the city operates.	IT is used mostly to mechanize existing processes.
	managers believe that drastic changes are both necessary and feasible.	managers believe that drastic changes are needed but can, and should, be achieved only incremental.	managers do not believe that drastic changes are needed nor that they can be achieved in the context of municipal government.
	relatively high percentage (40-30%) of IS resources are dedicated to new development.	moderate percentage of IS resources (30-20%) are dedicated to new development.	only small percentage of IS resources (under 20%) are used for new development.
	there is a sense, shared by managers, that "things are moving rapidly" in the municipality.	there is a sense, shared by managers, that the municipality is moving ahead but at a moderate rate.	there is a sense, shared among managers, that "nothing is moving" in the municipality.
Orientation	criteria used to justify new initiatives are: vision, quality of services, and long-term productivity.	criteria used to justify new initiatives are related to: efficient delivery of services and operational needs.	criteria used to justify new initiatives are: short-term cost saving, control over resources used, and efficiency of existing processes.
	high emphasis on staff training.	moderate level of importance to staff training.	low importance to staff training.
	the dominant strategy in the city is proactive and innovative -- seeking improvements through investment in technology and organizational changes.	the dominant strategy in the city is effective utilization of existing resources -- seeking improvements through maximization of resource utilization.	the dominant strategy is defensive -- seeking to maintain the level of operation through cost reductions.
	the city implements many contemporary, innovative ideas regarding public administration.	only few of the contemporary innovations in public administration are implemented.	the city does not implement contemporary, innovative approaches to public administration.
	the city makes an extensive use of external consultants, and is open to its environment.	the city uses external consultants only for technical issues.	the city hardly use external consultants, and is relatively close to its environment.

APPENDIX E

Empirical research on IS in the public sector:

AUTHOR	FOCUS	METHOD	DV	IV	MAIN CONCLUSIONS
Perry et al. 1994	Comparing two approaches to computerization.	Case study.	The effect of computerization on the work and employees in national governments.	Scandinavia's top-down, centrally controlled, and comprehensive approach. US's incremental, fragmented, ad-hoc, and operational approach.	In Scandinavia work was reorganized along with computerization, and the effects of computers on government employees were more significant. In the US computers tend to automate existing operations.
Danziger et al. 1993	The influence of structural arrangement of the IS function on the quality of computing services?	Survey of 1869 end users in 46 cities.	End users ratings of the quality of computing services.	Centralization vs. decentralization, orientation of IS professionals, frequency of technical problem.	Only half of the users rate computing services as excellent. The structural factor (de/centralization) was found to be not influential. Factors related to the technical quality of the systems, the social interactions between users and IS professionals, and the orientation of those experts were found most influential.
Kraemer et al. 1993	The usefulness of computer based information (CBI) to public managers.	Survey of 260 public managers.	Managers' perceptions regarding the usefulness of CBI.	Role, usage of computers, competence in computers, frequency of usage of CBI.	CBI is important to most managers and many report that they are extremely dependent upon it. Managers find CBI more helpful for financial control than operational control. Variance in perceived usefulness is best explained by quality and accessibility of information, and the manager's style of using CBI. Managers who use staff to retrieve information are more satisfied than those that directly interact with the computer.
Bretschneider & Wittmer 1993	Sectoral differences in adoption of microcomputers.	Large scale survey of private and public DP organizations.	Extent of adoption.	Sector, size, experience with computers.	The sector within which an organization operates has a major differential effect on adoption of microcomputer technology. Public organizations have more microcomputers per employee. Possible reasons are that public organization operate in information intensive environment, and/or PC's are used as a side payment in lieu of salary.
Caudle et al. 1991	Concerns of public IS managers, how they differ from those of their private counterpart.	Survey of federal, state, and counties IS managers.			The main issues that concern public IS managers are: 1) integration of technology, 2) comprehensive planning, 3) information requirement identification. There is a considerable agreement between managers in the two sectors on the top ten issues. The ranking of issues is markedly different. The public sector appears to be lagging - integration and strategic planning is still at the top while those issues seem to be under control in the private sector. Linking IS planning and budgeting, and technology transfer are issues unique to the public sector. Size and level of government differentiate between managers' responses.
Bretschneider 1990	Empirical test of the premise that public MIS differs from the private one.	Survey data from state and private DP organization.	Hypotheses regarding organizational environment, managerial actions, planning, status.	Public vs. private.	Public data processing managers are confronted by greater external review than their private counterparts, especially in procurement and personnel, more red-tape, interdependencies, and procedural delays. They put more weight on "state-of-the-art" as a criterion, and are placed slightly lower in the organization. The author concludes by saying that it is not clear whether these different managerial practices are used because they work better or because they are dictated by the nature of the public organization.

AUTHOR	FOCUS	METHOD	DV	IV	MAIN CONCLUSIONS
Northrop et al. 1990	Does early investment in computerization pay?	Two surveys in 1976 and 1988, in 46 leading cities.	Perceptions of top management.	Sample was stratified according to level of integration, automation, technical sophistication, user involvement, charging for services.	Increases in payoffs were reported in fiscal control, cost avoidance, and better interaction with the public. Payoffs also increased, but to a lesser degree, in availability of information and in monitoring performance and manpower allocation. There was no change with respect to cost saving, and IS contribution to planning and policy-making is still very low.
Kraemer et al. 1989	The nature of change in organizational computing.	Seven case studies in cities, plus results from previous studies.	A three by three matrix of states, state change, matrix define by: locus of control and technical, operational or strategic motivation.	Demographics, form of government, authority structure, structure of IS department.	Most changes appears not to be explained by environmental factors. Management actions are the most important factor in promoting changes. The role of managers depend on the state of computing the city is in, and on the state they want to reach. The actions of managers can be characterized, and to some extent predicted, by determining who control computing and his/her dominant orientation towards appropriate use of the technology. There are reasons to believe that there is a trend toward the strategic state, encouraged by managers awareness, economic forces, and technology.
Kraemer & Kling 1988	The use of computers in governments.	Large scale survey of US municipalities.	How many applications out of a portfolio of 264 are computerized.	Categories of usage such as, basic services, control, regulatory functions, new services, informing the public.	Computerized services tend to be used primarily to support: 1) basic services such as police, fire, and sanitation, 2) increase efficiency through automation of data handling, 3) enhance social control. Even where implemented system can be used to improve effectiveness, equity, or offer new services they are rarely used for those purposes. Computer systems in local governments often miss the opportunity to provide direct social oriented services to the public.
Frantzich 1987	The use and implications of IT in the US congress.	Case study, interviews.	IT impact on monitoring and tracking, analysis, power, and communication.		IT has significant and mainly positive impacts on congress. It improves communication with constituency, speeds-up policy processes, provides congress with tools to track, monitor, and control the executive and the bureaucracy, and enhances the quality of the staff work. IT also gives more power to those who know how to use it, publicizes the political process, increases the power of the legislators over the executive branch, facilitates more decentralization, and may be easily used to advance partisan politics.
Miewald et al. 1987	State legislators use of IT for oversight.	Interviews with senior staff members and legislators in nine states.			Overall IT has not so far changed the fundamental nature of oversight. No state is closing rapidly on the ideal system proposed - a centralized, comprehensive, and institutionalized process based on independently derived data. The level of professionalism of the staff is a good indicator to IT usage, but now the legislators have to put the issue high on their agenda. Use of IT for oversight varies greatly among states. There is a trend toward centralization. The area in which IT is used most for oversight is budgeting. The study claims that rapid and drastic change in IT utilization is a possible alternative to the incremental process.
Kraemer et al. 1987	Understanding the process of development and use of modelling systems, what leads to success.	Case study in federal agencies.	Policy use, political use, institutionalization of use.	Environmental preconditions, organizational attributes, technology, existing policies and procedures.	Technology is not a decisive factor. Users' need determine use. Use is political not less than rational. Internal competition breeds need. Use of models change the political agenda. Flexible transfer and funding policies are important. Modellers should maintain political neutrality.

AUTHOR	FOCUS	METHOD	DV	IV	MAIN CONCLUSIONS
Laudon 1985	How environmental, institutional, or hybrid models explain adoption, management, and use of criminal history systems.	Survey US states.	Early, late, and non-adoption, management practices, level of use.	Environmental necessity and/or opportunity, sociopolitical culture (reform values), organizational structure, technical resources.	Environmental pressures and opportunities, and technical resources are powerfully and consistently related to adoption, but technical resources seems as an outcome of environmental factors rather than an independent variable. Utilization is primarily determined by institutional factors. Management practices are related to institutional factors (weakly) and are not influenced by environmental factors at all.
Dutton & kraemer 1985	Understanding the process of developing and using fiscal impact models.	Case studies in five cities.	Four perspectives.	Who is involved, what motivate the main players, the impact of the system, who control the process, who is served by it.	The consensual perspective best explains modelling. Politicians, management, and external interest groups are the main players. Technology and vendors play only secondary role. Successful modelling requires involvement of all players and city-wide perspective. Politicians and senior bureaucrats rarely initiate modelling. Modelling tends to focus the political debate on assumptions and decision criteria and thus, serves the rational management approach, but also preserves the biases of the dominant interests.
Danziger & Kraemer 1985	The impact of computers on the performance of detectives.	Survey of 374 detectives in 40 cities.	Police detectives' perceptions.	Organizational environment, computer package, user characteristics.	Most detectives enjoy information benefits from computing. A database-based system would be more appropriate to the task. Environmental factors (size, region) are much less significant than 1) the workers' competence with computers, 2) routinization of work with computers, and 3) availability of experts' support.
Kresslein 1984	What are the states' IRM strategies, how these strategies effect PMIS, which factors account for the diversity.	Survey and interviews with senior officials in seven stats.			A general trend to selectively centralize IT planning and acquisition. States have recognized information as a strategic resource, are moving toward coherent MIS strategy, and elevated responsibility for the oversight function to senior policy level. Control of technology is increasingly distributed to end-users but there is more concern about the quality of corporate-wide IS. State are taking an integrative approach to IT management. Technology is being applied increasingly to delivery of services.
Danziger et al. 1982	The phenomenon of computerization in local governments.	Survey and case studies in US cities and counties.	Who controls, what is the basis for decisions, who is served.	Extent of computerization, formal organization structure, value orientation, distribution of power, impacts of computers.	Reinforcement politics perspective best explains computerization. Computerization is a complex interaction of many interest groups whose influence and interest vary. The extent of computerization correlate with size, region, and external funding. Politicians rarely initiate IS projects, their influence is strong but indirect. Reform values lead to more computerization. Computerization does not change power structure nor revolutionize how the city operates or provides services. A trend towards centralization and corporate perspective. Control over computing should be decentralized to users and clients.
Kraemer et al. 1981	IS impact on the performance of local governments, management of the IS function.	Large scale survey and selected case studies.	Managers' perceptions on the usefulness of IS, power shifts, operational performance, work environment.	Reform-post reform structure and values, size, extent of IT usage (number of IPT), formal arrangements for managing IS, user involvement, attitude towards IS, selected computer performance measures, type of political structure.	Computers increase the technical quality of information and usage of information. Computer-base information is only "somewhat useful" to management decision making and planning. Computers improve fiscal control but not the ability of top management to monitor and control units under their responsibility. Computers improve work environment but do not reduce work pressure. Technical problems in integration and retrieval. Top management report more favourably than department heads. Cities with reform values and structure tend to be more computerized. Cities that believe and invest in advanced technology report better results. Structural arrangement for managing IS should be application specific. Need to move to database design.

AUTHOR	FOCUS	METHOD	DV	IV	MAIN CONCLUSIONS
Perry & Danziger 1980	What make an innovation adoptable for local governments.	Survey of 10 IT applications in 350 public organizations.	Extent of adoption.	The relevance of the innovation to the organization's domain, integration (probability of internalizing the innovation), risk, need.	All dimensions of the "integration" concept are weakly linked to adoptability, the most critical among them is visibility. Very low uncertainty is negatively linked, probably because potential adopters view the easiness to evaluate the innovation as a negative factor. The link between organizational aspects and adoptability take the form of an inverted U. This suggests a bias toward more complex applications which benefit a wider spectrum of actors. Like uncertainty, low risk tends to decrease adoptability, at high risk, however, adoptability remains constant. That is probably because the public organization's context minimizes the chance that failures will be discovered. Need has the weakest association with adoptability and beyond the lower range it is not influential.
Bozeman & Bretschneider 1980	The differences between private and public MIS (PMIS).	Conceptual paper supported by short cases.			The model that determine MIS success is not adequate for PMIS. Public IS should be managed and evaluated by other/additional criteria such as, accountability, benefits saving, data sharing, privacy, and lack of "screw-up".
Perry & Kraemer 1979	What influences IT innovation in local government, the effect of external intervention.	Statistical analysis of survey data.	Rate of diffusion, transfer, adoption, resource sharing.	Innovation attributes (task, cost, complexity, etc.), external influence (region, market, grants), internal influence (political system, IS staff, executive support, perceived need, etc.).	Innovation attributes play a significant role in determining diffusion. Federal financial assistant is useful but it should be directed towards breakthrough technologies. Technology transfer seem more costly and less beneficial than expected, primarily because cities do not want to change in order to accommodate the technology. Executive support (politicians & senior management) was found significant not in the frequency of applications adoption but in their distribution among organizational units.
Kraemer & King 1977	The state of the knowledge on computing in local governments, guidance to policy-makers, research questions.	Synthesis of research literature on computing in local governments.			The book relays heavily on research in the private sector. Suggests that cities should: develop EDP policy, use cost-benefit analysis to decide in-house vs. service bureau computing, de/centralization according to each specific application, develop a training policy, and pay attention to privacy and disclosure issues. Size is a decisive factor in computerization decisions.
Danziger & Dutton 1977	Factors which influence innovation.	Survey of 403 cities and 310 counties.	Measures of adoption, commitment, investment, extensiveness, and sophistication of EDP.	Selection environment characteristics, facilitators (external support), interest and dominant values.	EDP innovation is higher with increasing size and organizational complexity. EDP innovation is higher where the values of professional management and reform are dominant, EDP innovation is higher where central or departmental administrative official (rather than politicians) have control over decisions. The impact of the environment is contingent upon the capabilities of the specific innovation relative to the needs.
Laudon 1974	The role of advance technology in bureaucratic reforms.	Case studies of states, counties, and cities units.	The impact of IT on bureaucratic structure, how social structures shapes the use of the technology.	Centralization vs. decentralization, changes in power, roles, and nature of the administrative work.	Computerization did not lead to bureaucratic reforms, at best, the impact of computers has been to increase efficiency of existing routine processes. This failure is due primarily to political and bureaucratic forces. There is a lack of political commitment. There is a need for theory of information. The technology is not yet up to the tasks in many areas. Bureaucratic motives disguised as professionalism often inhibit changes.