

MANAGERIAL ACCESS TO INFORMATION

by

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ABSTRACT

The purpose of this study was to examine managerial access to information within organizations and its relationship to certain organizational variables. The study had three objectives:

1. to develop and use a simple framework within which the literature on access to information could be integrated;
2. to test specific hypotheses which link important organizational variables with access to information;
3. to suggest prescriptions, based on the findings, for improving managerial access to information which can be used by organizational and information system designers.

A framework was developed to describe how access to information in organizations is controlled directly, by imposing rules, and indirectly, by erecting barriers to the retrieval and use of information by organizational members. Data on the regulation of access, organizational variables, and managers' characteristics were collected by means of a structured questionnaire from 170 middle managers in British Columbian organizations. In addition, fifty-three interviews with middle managers were conducted in the Vancouver area.

Fourteen hypotheses linking access to organizational variables were derived on the basis of the framework. Additionally, other relationships concerning the direct and indirect regulation of access were proposed. The study showed that access to work-related information is regulated in organizations largely indirectly whereas access to personnel information is often governed by elaborate rules. Additionally, the perceptions of access were found to be inversely related to the inconveniences of retrieving information but was almost independent of the problems of

using information.

Several of the relationships hypothesized between the organizational variables and access to information were supported. Access was somewhat poorer in larger organizations, as hypothesized. Contrary to expectations, however, access was found to be significantly better in organizations with more levels of authority. In organizations where an attitude of trust and openness is prevalent, significantly better access to information was found. This was also found to be the case in organizations where sharing information is an accepted "norm". The use of computer technology was associated with greater barriers of access to information managers do not need for their jobs.

The findings were used to suggest prescriptions for improving managerial access to information. For example, it was suggested that as access is governed more by retrieval problems than by problems in using information, the systems designer should concentrate on minimizing the inconveniences of retrieving information. It was further suggested that because of the greater problems of access associated with size, managerial access could be improved in larger organizations by providing more effective facilities to promote access to information.

The study concluded with a discussion of the research methodology, pointing out its advantages and limitations, and with suggestions for further research into managerial access to information.

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INTRODUCTION

The aim of this study is to explore managerial access to information within organizations and its relationship to specific organizational variables. The study does not attempt to deal with access to all resources in the organization¹: the concern here is with access to a specific commodity - information. Although much of the discussion of access to information is applicable to all levels of employees, the empirical work concentrates on middle management only, focussing attention on their access to internal information. The equally important questions concerning access to organizational information by those outside the organization are not directly covered, although it is hoped that several of the results will find application in this area.

Forrester is one of the few writers to alert us to the importance of access to information. He suggests that "organizations can be seriously handicapped by the loss of energy consumed in the struggle for information", and proposes that, as a general principle, new organizations should allow wider and more convenient access to information than is normally practiced (Forrester, 1965). Other writers, when discussing increased interdepartmental access to information, have offered a counter argument, claiming that widespread access to information can be detrimental to individuals and organizations (Ackoff, 1967; Argyris, 1971). While there is no agreement on whether access to information improves performance or not, there is a consensus that access to information plays

¹ Mechanic (1962) discusses access to information, persons, and instrumentalities by lower-level participants.

an important role in shaping organizational behaviour. It is clear that a lack of access to information needed to perform a task will result in ineffective performance. However, while access to information is an important variable in determining organizational behaviour, little is known about the factors which influence access and the mix of strategies that organizations use to control or promote access. The major objective of this study is to investigate these access patterns and their determinants within Canadian organizations.

Organizations offer formal authority to individuals to access organizational resources, including information (Mechanic, 1962). Associated with a given position in an organization is the authority to access certain types of information and the lack of authority to access other types of information. In order to allow managers to perform their tasks effectively, the organization must at least recognize their need for formal authority to secure access to essential information (Barnard, 1938:175). This authorization is referred to in this study as the direct regulation of access to information. Forrester, writing about the problems caused by a lack of access authority, comments, "Most persons in most organizations feel that they do not have access to all of the information they need. Sometimes they lack the information specifically needed to accomplish their duties" (Forrester, 1965). In their findings on access to personal information, Westin and Baker (1972:430-431) use the expression "rights of access" to refer to the authority given to individuals to access their personnel records.

Formal access, however, is not a sufficient condition. Managers must be capable of both retrieving and using information (Dhalakia and Sternthal, 1977). For example, managers may be authorized to receive

accounting reports but, because the reports are held in another city, access to this information is made extremely inconvenient (Simon et al., 1954:61). In this example geographic location was an effective barrier to access. Gerstberger and Allen (1968) use the expression "channel accessibility" in a similar study of data choice among engineers. Although the term is not clearly defined, it would seem from the context that it too is a measure of geographic location. Additionally, other barriers to access have been identified such as timing and incompatibility of information sources (Simon et al., 1954:61-63) and, in a more recent study, an individual's ignorance of the existence of his own personal record (Westin and Baker, 1972:431). These and other restrictions or barriers are the ways an organization regulates access to information indirectly. Thus, although there may not be a rule (direct regulation) governing access to information, the organization may choose to regulate access to this information by manipulating costs associated with its retrieval and use (i.e., constructing effective barriers to access).

An organization's direct and indirect regulation of access to information provides us with a structure by which access can be studied. However, although this structure would be a contribution to the literature on access (represented largely by the references given above), more important contributions can be made by applying the structure to different areas of study. Firstly, the study of managerial access to information gives us a way of evaluating management information systems. By analysing managerial access to information, it should be possible to assess the effectiveness of the current information system as viewed from a manager's perspective. If common barriers to access are found in organizations then general recommendations can be made to systems designers allowing

them to concentrate on minimizing those barriers that form the greatest inconveniences. In addition to measuring a manager's access to an organization's information, the study also examines the effects of technology of access on the manager's view of access. For instance, does computer technology reduce some barriers to access while increasing others? The relationship between the maturity of the information system and access to data is also studied. Finally, the study measures managerial access to personnel records from the perspective of both direct and indirect regulation of access. This could corroborate the view that general secrecy is reported to surround middle managers' grades and salaries (Forrester, 1965). The same data could also reveal what rights of access exist in different organizations (Westin and Baker, 1972). By measuring access to personnel information we have a more useful perspective than that of privacy, a term that has always been difficult to define (Sieghart, 1976:12f).

Secondly, the study relates organizational variables to access and provides us with insights into organizational theory and behaviour. Several authors have identified information as one of the key ingredients of organizational effectiveness (Steers, 1977; Galbraith, 1973). However, information is worth little if it is not made available to the individuals who need it to perform their duties, and so access to information is a better indicator of the effectiveness of an organization than the sheer volume of information available (Galbraith, 1973; Forrester, 1965). Specifically, some of the more important organizational variables are used in this study of access. As an example, the relationship between the size of the organization and access to information is explored: do large organizations have special problems in providing effective access

to data? Are there inherent barriers to access associated with size and how can organizational designers minimize the effects of these barriers?

Thirdly, the study of access has implications for policy analysis. It is expected that the authorization and convenience of access to particular types of information varies greatly across companies. Should the current policies be changed to reflect a more open attitude to information access or is access to information inadequately regulated in some organizations? An attempt will be made to apply the results to answering these and other questions by suggesting general policies that organizations can adopt.

The study proceeds as follows: Chapter One describes in detail the structure of the access model used in the rest of the study. The chapter examines the literature from several areas as it applies to direct and indirect regulation of access to information. Chapter Two looks at several organizational and other variables and their relationship to access. Each independent variable is discussed using the literature to suggest possible relations to access. Chapter Three details the study: firstly, the hypotheses derived from Chapter Two are explicitly stated, then the data collection methods are discussed. These include the development of a questionnaire to measure access and the independent variables, and a description of the interview methodology. Included in this chapter is a description of the sample selection procedures. The findings are presented in Chapter Four. Chapter Five concludes the study by providing a normative view of access policies and an outline of future research possibilities.

CHAPTER ONE

A FRAMEWORK FOR STUDYING ACCESS TO INFORMATION

Intentionally or otherwise, organizations regulate individual access to information by two mechanisms. The first is the organization's policy of access to information: this determines which participants are authorized to have access to what types of information. This is an organization's direct regulation of access to information. The second, indirect form of regulation, is through mechanisms or facilities the organization employs to enhance or hinder the retrieval and use of a particular type of information. Employees can be authorized to have access to a certain type of information but it may be impractical to retrieve and use it. For example, they may be allowed to see their personal evaluation reports by the organization but because they are kept in another factory they find it impossible in practice to retrieve them. These two types of regulation, direct and indirect, form the framework with which it is possible to examine the literature concerning access to information in organizations. Some organizations will emphasize direct regulation while others will emphasize indirect regulation of access. The differences between organizations need not concern us at this point. Instead we will discuss access to information for a general organization type, returning later to examine the differences across organizations.

I. Direct Regulation of Access to Information

The organization's policy concerning access to information may be formalized in a document, describing which people are authorized to have access to which type of information, (e.g. Cary, 1976) or it may be transmitted informally through a socialization process or through the tacit understanding that on joining the organization the employee generally accepts the authority structure in the organization. Buried in this structure will be the policy concerning access:

"In joining the organization he (the employee) accepts an authority relation, i.e., he agrees that within some limits (defined both explicitly and implicitly by the terms of the employment contract) he will accept as the premise of his behavior, orders and instructions supplied to him by the organization. Associated with this acceptance are commonly understood procedures for "legitimizing" communications and clothing them with authority for employees."
(March and Simon, 1958:90)

In the same way, the organization equips the participants with authority to access certain types of information whilst denying them access to other types of information.

It is possible to depict an organization using an information processing model (Galbraith, 1973:8ff). Clearly, information and its processing are essential ingredients to the effectiveness of any organization, without which some organizational tasks would be impossible.

"The absence of a suitable technique of communication would eliminate the possibility of adopting some purposes as a basis for an organization." (Barnard, 1938:90)

One of the obvious areas of access to information that must be established by organizations is supplying employees with information (or the resources to get information) that is relevant to their job performance, although

even here some important restrictions may apply:

"Most persons in most organizations feel they do not have access to all the information they need. Sometimes they lack the information specifically needed to accomplish their duties." (Forrester, 1965)

The degree to which organizations ensure that employees have access to job-related information is a key issue in what Thompson (1967) calls "technical rationality". If a sufficient number of employees has authority of access to job-related information denied to them it is unlikely that the organization can function effectively. However, not all job-related data supplied to employees is of equal importance to the organization. A simple dichotomy is therefore proposed. Job-related data can be either confidential or non-confidential where confidential information is information which if released to other organizations (or interested parties) would be (or is assumed to be) damaging to the performance of the company of origin. An obvious example is the leaking of customer lists to a competitor resulting in a loss of business for the aggrieved organization. The reason for distinguishing between these two types of job-related information is that organizations are likely to adopt different policies in handling these types. A further categorization is made to distinguish between information (confidential or non-confidential) that is needed for the employee's job and that information which is not needed. Once again, it is expected that some organizations' policies on access make clear distinctions along these lines while others do not.

The remainder of the information held in an organization is further divided into personal and non-personal categories, the latter category being a catch-all for general information kept by the organization.

Personal information is subdivided according to whether employees can see their own personal files, see their subordinates' and see their colleagues' (peers). Once again access policy is expected to differ according to the category. A summary of this detailed structure is given in Figure 1.

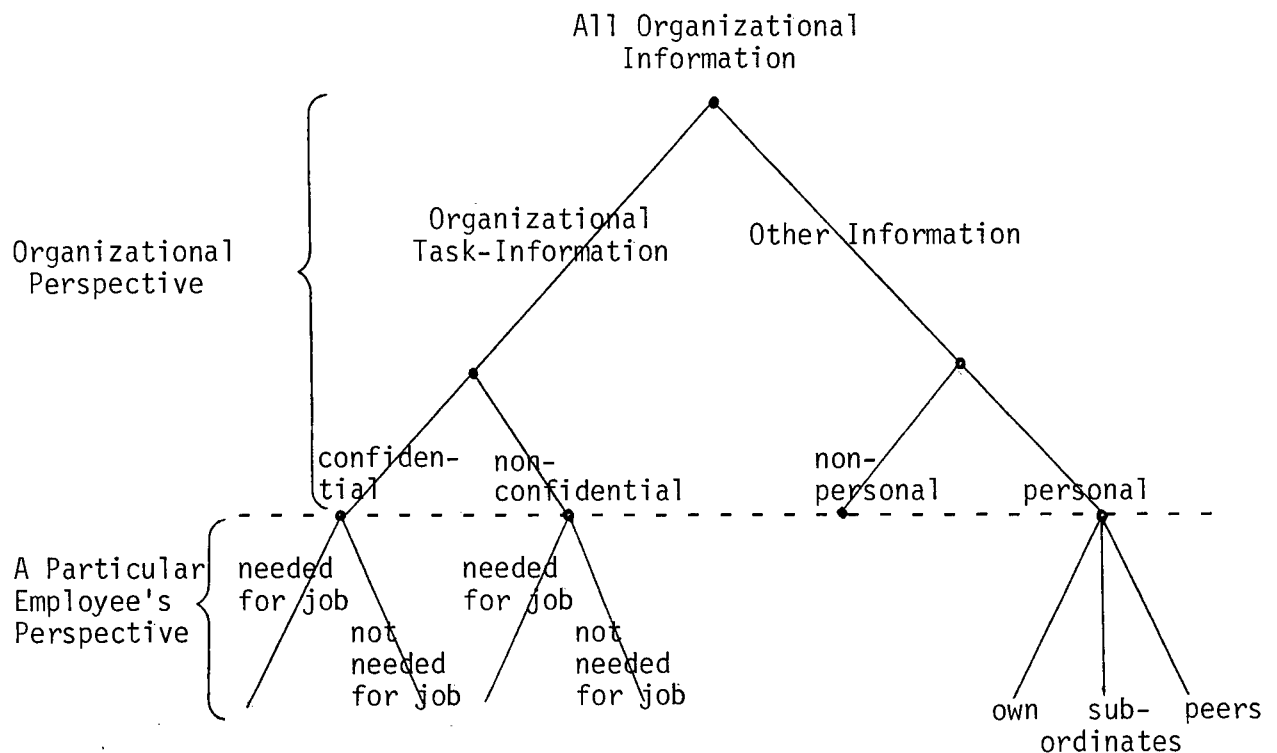


Figure 1

Information Categories

1.. Organizational-task information

An organization typically has one or more principal tasks that it performs. The data required for these tasks have been labelled organizational-task information to distinguish it from other, internally held information used for ancillary purposes (e.g. personnel information needed for manpower functions). In a manufacturing organization, task information would typically consist of inventory reports, production scheduling reports, sales statistics, and so forth. As a contrast, in an educational institute, whose principal tasks may be identified as education and research, the organizational-task data would consist of such items as class schedules, curriculum notes, academic journals, books, etc.

(i) Information needed for the individual's job

At the level of the individual the organization needs to furnish access to information related to the job. One of the functions of an executive is to ensure effective communication, and hence access to information within organizations (Barnard, 1938:217). Nord makes a similar point when he refers to the tasks of managers and the flow of job-related information.

"One of the most important jobs of a manager is to aid in the establishment of communication networks that facilitate task performance by the channels of information exchange and expertise and transmitting both operational and technical knowledge." (Nord, 1972:368)

The whole thrust of Galbraith's model is the acquisition and processing of task-related information in order to make the organization effective in the face of increasing uncertainty (Galbraith, 1973).

In order to enable the individual to perform effectively the organization must recognize the person's need for formal authority to secure access to essential information (Barnard, 1938:175). This does not, however, prevent other employees failing to acknowledge another's authority of access. A study of access to government information found that the perceived status of the inquirer was a strong determinant of the success of the inquiry (Divorski et al., 1973). This and other barriers to access will be discussed in the next section, as the main purpose here is to examine an individual's formal access authority. Additionally, the organization may only authorize access to a particular form of the information. Much reporting in organizations involves the distribution of filtered, interpreted information, or what Sorter calls "value" information to distinguish it from the original "events" information (Sorter, 1969). One department may supply another with reports summarizing its activities while the raw data are not communicated by the department that "owns" it. Again, the dysfunctions associated with interpreted information are covered in the next section, the point to be made here is that for the same individual, access may be authorized to one form of information (e.g. interpreted information) but not authorized for another form of the same information (e.g. the original information).

Access to interpreted rather than the original information is an example of the situation that exists between managers at the same level in different departments. In general, it is possible to identify three different levels for which formal access to information may be granted by the organization: at the same level, a lower level, and a higher level, all with respect to a particular individual (Bacharach and Aiken, 1977).

For the majority of the organizations where task specialization and hierarchical organization are normal, it would be expected that the policy on access to job-related information would vary somewhat according to these three directions. At levels beneath an individual one would expect that access to job-related information would be potentially unlimited, subject to the information falling within the individual's sphere of authority. Thus it is expected that departmental managers would be authorized to have access to any job-related information within their departments if only because "the departmental organization defines reasonably well the groups within which sharing of information is needed" (Cyert and March, 1963:109). At the same level, however, many managers would not have access to raw data held by other departments. For example, a production manager would expect to see summary sales forecasts but the manager would not normally be authorized to have access to the original figures used to construct the forecasts. Indeed, such restrictions on access may be beneficial to the organization. Ackoff (1967) and others have commented on the dysfunctions possible if unlimited interdepartmental access is allowed. Formal access to data held at a higher level is largely a function of the executives who control it. An important task of an executive is to establish and maintain effective access authority to job-related information for others in the organization (Barnard, 1938). The access to information at higher levels is enhanced by the increased attention that such information seems to be given (Sussman, 1974).

When an individual accepts a position in an organization, that person is responsible for understanding the rules and regulations that are relevant to the position and those of the employees under the individual

and, as already noted, this includes the company policy with regard to access to information (see for example: Mechanic, 1962). At the very minimum, the person should ensure that information is made available for the essential functions performed by the department. Additionally, the individual is responsible for the rights of access that subordinates may have to their personnel records. Typically, new managers face a period of "indoctrination" by which they learn such procedures through reading manuals or by on-the-job observations. Because every new position has some start-up "costs" of learning these new procedures (Arrow, 1974) this suggests that a relationship should exist between the perceived ability of access to job-related information and the length of time a person has spent in that position (Mechanic, 1962).

(ii) Information not needed for individual's job

There would be very little dispute among organizations about the need for authorizing access to information (confidential or non-confidential) that individuals need for their jobs. However, where the information is not needed for the individuals' jobs one would expect some variety in policy. The choice is normally between regulating access by direct means or by indirect means.

In the case of confidential information it is expected that, because of the general need of the organization to protect such information from falling into the hands of competitors or other interested parties, organizations will normally confine access to only those who need it for their job (Cyert and March, 1963:109). This would be accomplished in some organizations by rules and regulations (direct means) while in others, prohibition would be achieved indirectly by making it too "costly" for indi-

viduals who do not need the information to retrieve and use the data. In the accounting department we would expect to find only certain members with access to detailed information for cost accounting purposes. Pricing formulae are typically confined to a few members of an organization. Similarly, information on important industrial processes and formulae will sometimes be known only by one or two members of the organization with all other members excluded from access. In competitive industries, such secrecy is vital to the performance of the firm. If important information is leaked the consequences could be disastrous financially, and hence one would expect the firm to use whatever resources necessary to prevent unauthorized access and disclosure. Thus, it is not surprising to find companies pursuing ex-employees who attempt to exploit for personal gain the data they were once privy to (Aiken, 1974:40).

In the case of non-confidential information, the regulation can also be by direct means (rules prohibiting or allowing access) or by indirect means ("costs" making it difficult or easy to retrieve and use the data) or by both means. Any prohibition of access of employees to non-confidential information is not to protect valuable information from outside leakage, as with confidential information; instead it might be used to reflect the atmosphere of regulation in an organization where everything is regulated. Hence, if you do not need information for your job then in these organizations there is a rule preventing your access to that information.

If the information is held by other departments then the structure of the departments normally prohibits access without the necessity for formal rules. One of the problems of large scale management information systems (MIS) is precisely that, unless they are carefully designed, they

do not recognize departmental boundaries and affiliations with respect to information. This point is clearly laid out in the following extract:

"When organizational units have inappropriate measures of performance which puts them in conflict with each other, as is often the case, communication between them may hurt organizational performance, not help it. Organizational structure and performance measures must be taken into account before opening the flood-gates and permitting the free flow of information between parts of the organization." (Ackoff, 1967)

Both Argyris (1971) and Bariff and Galbraith (1978) discuss similar effects of MISs upon organizations.

Within departments there are two potential advantages to not prohibiting access to information even when it is not needed for an individual's job. Firstly, the availability of this information allows individuals some freedom to determine their own patterns of access. Downs, commenting on the extent of this behaviour, said, "The vast majority of all communication in large organizations [is informal]" (Downs, 1967:269). Barnard (1938:224) also recognized the importance of this type of access although, contrary to his belief, it may not be under the control of the top executives (Rogers and Agarwala-Rogers, 1976:101; Mechanic, 1962). The second reason for the importance of such information is that certain jobs require individuals to acquire and use information beyond that which can be specified formally for their jobs. This requires access to information for what Mintzberg (1973) calls the detection of opportunities. It is assumed that individuals have authority of access to information for their regular jobs but their performance can be improved if they can find useful problems to solve or make their current problem-solving more comprehensive (Pounds, 1969). For example, a portfolio manager may gain

considerable advantage over peers by gaining access to the right kinds of financial journals even if they are not considered strictly necessary for a manager's job. Arrow illustrates the same point:

"General news sources about business conditions may be read simply because of their intrinsic interest and hence at virtually no cost; but these may constitute a certain amount of monitoring. Finally, simply social associations with business connections may constitute a source of information, the stronger because much evidence shows that personal influences are regarded as more reliable, which means that they convey more information, subjectively measured, at a given cost." (Arrow, 1974:51)

Without some incentive from the organization to make access to such information less costly, the manager's choice of access is likely to depend heavily on personal attributes. "He may find it cheaper to open certain information channels in ways connected with [his] abilities and knowledge ... It is cheaper to proceed to the chemical analysis of compounds similar to those already studied" (Arrow, 1974:41).

The discussion of the nature of the relationship between organizations and the types of mechanisms they choose to regulate access will be postponed until the total structure of the access model has been presented.

2. Other information

Apart from internal organizational-task information the organization maintains and provides varying degrees of formal access to personal and non-personal information.

(i) Personal information

In addition to information that individuals need to perform their jobs, there will be personal information that individuals may or may not have access to. Firstly, there will be information about themselves that

the individuals may have some rights of access granted to them by the organization, the state, or by contractual agreement through the union. Secondly, there will be personal information about their subordinates to which they will have some degree of formal access, normally in order to carry out the personnel functions of managers (evaluations, writing letters of recommendations, etc.), but not necessarily confined to these functions. Finally, individuals may have some access rights to personal information concerning other individuals in the organization who are not their subordinates; for example, other managers (peers). As all of these areas touch on the rights of access to personal information the subject will be discussed in general before drawing conclusions about the policy of organizations in the three areas mentioned above.

There are two types of personal information that the individual will be concerned with. The first type is the information collected and maintained by organizations concerning the individual and as we shall see from the literature, the amount of such information gathering varies widely between organizations and between countries. The second is information relating to on-the-job safety or health hazards. For the first type of information the issues of privacy and confidentiality take precedence. The employees have an interest in the organization restricting others' access to their personal information. In the second area, the employees are concerned to see unencumbered access to such information relating to hazards which personally affect them.

There would of course be further information which would interest employees in general. For example, unions negotiating contracts for their members would value better access to detailed management accounting

information in order to improve their bargaining position. As it is they are normally restricted to summarized financial information such as annual reports or quarterly statements of earnings. Although the union could claim that it is entitled to have access to such information, it normally falls in the category "access is prohibited". An exception to this policy is when organizations wish to demonstrate that they are bargaining in good faith by opening the detailed records to union scrutiny.

When employees enter an organization or request government services they admit the organization's right to collect and retain personal information about them. This admission is part of their decision to participate (March and Simon, 1958). The extent of their right to determine for themselves when, how and to what extent this information is to be given to others is a popular definition of the privacy of information (Martin, 1976:271). One of the prime ways to recognize a person's privacy right is to restrict the volume and type of information collected by the employer to "...what is necessary to enable the employer to assess his suitability for work on which he might be or is employed" (Great Britain, Parliament, 1972:95). The extent of information gathering is likely to vary for cultural reasons as well as with different tasks and organizations, but most people would agree that some information gathering is necessary:

"These included questions about height and weight at ages 18, 20, 25, 30, 35, 40 and 45; about reading matter; and about family background and marital history."
(Great Britain, Parliament, 1972:94)

In the U.K., to overcome capricious information gathering, the main trades union body has called for a standardization of questions, "which could be recommended as appropriate for use in normal circumstances"

(Great Britain, Parliament, 1972:94). Other questions such as surreptitious gathering of personal information and the use of questionable techniques (e.g. polygraphs) are also relevant here.

Employees are not only interested in controlling what personal information gets collected by the organization; they would also like to know that the information is being used as originally intended. This is the issue of confidentiality of information (Auerbach Publishers, 1976:5). Confidentiality is broken when unauthorized persons gain access to information in order to carry out functions not originally sanctioned by the individuals or the organization.

If the information collected is being used by the organization for legitimate purposes, then the individuals will want to know that the information that others are using to make decisions concerning them is a true representation of their current situation. They may, of course, prefer the information to be biased in their favour but as that is an unlikely situation to be maintained all the time they would like their personal information to be as complete, accurate, relevant, and timely as is reasonably possible (Auerbach Publishers, 1976). This is clear from the draft code of the UK Code of Industrial Relations Practice: "[Planning of manpower] ... needs to be ... based on adequate and up-to-date personnel records" (Great Britain, Parliament, 1972:97). A mechanism to ensure that information does satisfy these requirements is to allow individuals access to their personal records, with the right to challenge their content.

One of the main means of providing privacy and confidentiality of information is through security built into the organization's systems of

information handling. These include the control of physical access to information, technical safeguards such as passwords and encryption of data, and administrative safeguards, the latter being exemplified by the following suggestion:

"... the principle of "separation of duties" may be applied: that is, access to some data may be allowed only with the knowledge and consent of someone in a different part of the organization." (Great Britain, Parliament, 1975:7)

On the one hand, the employee would like to restrict the organization's information collection activities with respect to personal information and to prevent disclosure (access) to unauthorized personnel. On the other hand, the employee would like the right of access to information which affects the employee personally, and the examples of health and safety related information have already been mentioned. This second area of access is what one author calls the person's right to know, and freedom of information rights in this area would go a long way to remove secrecy and create a climate of trust (Riley, 1977:22). In Canada not only are there no laws requiring organizations to provide access to hazard information for their employees but, in addition, many of the government reports of studies into industrial hazards are not publicly available. Hence, the government may have evidence of the harmful effects of toxic material but it is not obliged to provide access to that information for the employees, union, or organizations (Riley, 1977:22). Clearly, even if the organizations themselves possessed such information there may be strong incentives against allowing individual or union access to take place (Aykroyd, 1980b:46). Similarly, the individual's right to access his own record and be assured of reasonable privacy and confidentiality

all involve a substantial cost to the organization (Goldstein, 1975).

Until now the issues of privacy, confidentiality and freedom of information for an employee have been discussed as "ideals". Frequently, what occurs in the organization is largely at the discretion of those who control access to the information. Although there have been some moves to ensure public access to government records the same has not occurred in the private area. In the U.S., the first major piece of legislation was introduced into this area in 1967 when the freedom of information act (FOIA) was implemented to allow the public to obtain information from federal agencies describing what information the agency is permitted to collect and maintain. Unfortunately the act was widely misinterpreted by agencies and Relyea (1977:327-8) reports that excessive fees were sometimes charged, requests were delayed and refusals seemed arbitrary. These are all substantial barriers to access. Such problems caused the act to be widely amended in 1974. In the same year, the Privacy Act was signed which subsequently allowed individuals access to their own records held by federal agencies, and this has been followed by some states enacting similar legislation. Also, 1974 saw the introduction of the Buckley Amendment allowing individuals to access their higher education records. Some believe that because of this amendment the quality of letters of recommendation has changed to a "more noncommittal format" (Auerbach Publishers, 1976:3). To overcome this, it is possible for applicants to sign away their right to access letters of recommendation and allow the schools to adopt more candid information gathering (Shaffer et al., 1976). Several European countries have adopted legisla-

tion governing government information, although the scope and enforcement mechanisms vary greatly (see Sieghart, 1976:195ff, for a summary of recent legislation). To add to the open government laws already in place, the U.S. in 1977 introduced the "Sunshine Act" requiring most federal agencies to open their meetings to the public. In addition, 39 states have enacted similar laws (Hirschhorn, 1977). Although there have been some efforts in Europe to introduce similar rules of access into industry (e.g. the industrial democracy movement), attempts to open up executive decision making to employees have not met with any success this side of the Atlantic.

In the private sector only limited provision has been made for employees to gain access to personal information. The Swedish Data Act of 1973 covers both public and private sectors, but does not apply to manually stored records. In the U.S. the proposed HR 1984 was a bill that would extend privacy laws to cover privately held data but this has not yet become law. Westin (1979) gives a summary of the current situation concerning employee rights of access. For example, the state of Michigan has had, since 1978, an "employee right to know" law. Generally, however, the way to deal with employee rights of access to information has been left largely to the discretion of the private industry in the U.S.

(Benson, 1978). One organization that has taken a leading position on employee privacy is I.B.M. (U.S.). They have laid out stringent procedures to be adopted by their staff governing: what line managers can and cannot see; outside requests for information; information required by law; and the rights of the individual to access personal information (Cary, 1976). For instance, line managers have access to the following information on any of their subordinates; job-related information, performance appraisals,

performance plans, letters of recommendations, record of awards, sales records, production assignments, etc. The same managers have no access to their subordinates' medical history, personal finances, payroll deductions and life insurance. All employees are authorized to access anything in their own records but are prohibited access to another's record unless the latter is being considered for a position in their department. There is some indication that U.S. industry might be willing to adopt similar procedures. A recent survey by Harvard Business Review showed that of those business subscribers who responded, 87% were in favour of employees being able to access their personal records, if some sensitive information were excluded (Ewing, 1977).

In Canada there is evidence that although the employee does not have legal rights to access personal information, most can gain some access. The Canadian Task Force on Privacy and Computers (1972) found:

"Most, though not all employees have the right to see and rebut their records, although many employers made it clear that they would want to know why an employee wanted to examine his file before letting him do so. In the case of unionized employees, the terms of access and the nature of the information in the files are often governed by clauses in the collective agreement."
(1972:55)

The right of access is granted by the organization to the employee either by tradition or by contractual arrangements. Clearly, to make an employee justify his reasons for wanting access to his own record could act as a strong barrier to access.

In order to implement rights of access for the employee it is possible to identify three methods of regulation: the self-help solution, the Ombudsman solution, and the licensing solution (Sieghart, 1976:123). The three methods probably have differential impact upon the ease of

access. The self-help solution is the one that North Americans are more familiar with. It is the regulation adopted by the 1974 Privacy Act and implemented within I.B.M. (U.S.). It provides the access mechanism but it relies on the employees' initiative to ensure that their personal records are complete and accurate while giving them an opportunity to challenge the content. Sieghart associates this solution with the American tradition (1976:124). The Ombudsman solution is a European idea (also imported into Canada in some provinces for other purposes) and has found advocates in two of the German states (Hessen and Rhineland-Palatinate), although the experience there has not been an overwhelming success. The ombudsman or commissioner has had difficulty in securing information on what files are maintained by the government. Finally the Swedish Data Act (1973) uses licensing as a mechanism for regulating access. All private operators of automated personal files must register their files with the Data Inspection Board, which is given wide-ranging sanctions to ensure compliance. The results of the licensing method seem particularly encouraging.

"... it has every appearance of being cheap, effective and not likely to obstruct the normal needs of data processing within an advanced industrial society, while still providing substantial protection for the privacy of personal information." (Sieghart, 1976:128)

It is clear from the evidence that the ideals of employee rights of access vary widely from country to country and in places, like Canada, where there are no legal rights to know, access is likely to vary at the discretion of the organization, subject to other factors such as union contracts or industry norms. Without legal sanctions the organizations will tend to provide access according to economic considerations. As

their benefits are largely intangible and difficult to measure, employee rights of access will tend to be low on the priority list for organizational resources.

Returning briefly to the three categories of access for personal information it is now possible to suggest some general rules for organizations in Canada. Firstly, one would expect managers to have high authority of access to information about subordinates for most types of personal information. It is expected that in most commercial organizations the need to get the job done overrides any movement to restrict access to personal data. Secondly, because the right of access of individuals to their own records is not formalized in Canada, it is largely determined by industry norms or union agreements. Hence such authority of access is expected to vary across industry. In the final category of access to other, non-subordinate records, it is expected that authority to access is very low. The organization has nothing to gain from providing access to this type of information and some organizations clearly guard the information that concerns status (salary, grade, etc.), often promoting a "climate" of ignorance in these areas particularly for middle management (Forrester, 1965). An exception to this is found in public bodies such as universities where both grade and salary of the members of faculty are theoretically public information (Forrester, 1965). In the particular case of the University of British Columbia, a report including salary details is published annually by order of a statute but the salary figures are presented in ways that often conceal the true facts (Financial Statements, University of British Columbia, 1979). This is an example where members of the university and the public have the authority to access this information but because of the way the information is published the use-

fulness of access is severely limited in practice (i.e. regulation of access is by indirect means).

(ii) Non-personal information

Non-personal information is a general category for information collected and used by the organization that does not fit into any of the previous classifications. It includes the sort of information that the organization or union may use to promote access in general, such as newsletters and bulletins. Because this will be covered by questions concerning facilities to promote access, it will not be considered further in this study. Our emphasis will be on the information concerning the main tasks of the organization and the personal information collected and maintained by the company.

II. Indirect Regulation of Access

The last section discussed the direct regulation of access, the organization's formal policy on access. However, achieving authority of access to information is not the only barrier to information that individuals face in an organization. They must be capable of both retrieving the information and using it (Dhalakia and Sternthal, 1977). The facilities to enhance or hinder retrieval and use of information are the means by which the organization regulates access indirectly. Individuals may have authority to access an information source but they may be unable to get the information because of technological barriers (perhaps they do not know how to use the retrieval system). Additionally, even if they could overcome the technical barriers, the individuals may not be able to comprehend the information they receive. For example, they may be able to obtain a three hundred page report on inventory levels, but because of its volume they find themselves unable to effectively process it; they may have access to information from foreign branch offices, but they cannot read the language. From an individual's viewpoint there will be barriers associated with each of the components of the feasibility of access, retrieval and use, and each of these barriers will have a subjectively estimated cost associated with it (Arrow, 1974:51). What follows is a fuller discussion of these barriers as they apply to any type of information used by the organization.

1. Barriers to Retrieval of Information

There are several factors to retrieval which mitigate against the individual getting the information he is seeking. Some of these barriers will be more important for particular individuals and organizations but

the extent to which the individuals perceive these barriers to be "costly" in retrieving the information compared with the "value" of the information to them, determines the feasibility of retrieval. For some job-related needs, the importance of getting the information will be so great that they will bear almost any cost in overcoming the barriers to retrieval. In other non job-related areas, the barriers may effectively seal off access to a particular type of information.

(i) Ignorance of information

An obvious barrier to retrieval is the individuals' ignorance of a type of information that they actually have authority to access. They may need it for the jobs they are performing, or they may be legally entitled to access it, but because of their lack of knowledge of its existence they cannot retrieve it. In the public sector, many of the statements of principles governing personal record-keeping argue against the secrecy of the existence of files. For example, the H.E.W. report in the U.S. states: "There must be no personal data record-keeping systems whose very existence is secret" (Great Britain, Parliament, 1975:47). In Sweden, where the Data Act covers both public and private sectors, "a personal register may not be started or kept without permission of the Data Inspection Board" (Sieghart, 1976:165). In their U.S. study, Westin and Baker found that there were few cases where institutions believed that members of the public were kept in total ignorance of their records. A more major problem was the prevalent lack of access authority the public has to all or some of their records (Westin and Baker, 1972:431-2). In Canada there is no law of disclosure in either the public or the private areas (Riley, 1977). Where regulations do exist, the

rules cover personal record-keeping. No organization is obliged to disclose the existence of non-personal information to employees.

As previously mentioned, the organization seeks to remove the barrier to ignorance for new employees as they undertake a period of training or indoctrination into company policies. This effort will normally apply to those areas that are valuable to the company, i.e. job-related areas. However, if the firm is concerned to maintain a climate of trust and openness (Zand, 1972) then one indication of this is its efforts to remove the barrier of ignorance concerning information in general. It is possible, however, that many firms use ignorance as a means to promote secrecy and to discourage the informal sharing of data. If an organization wishes to protect information from access, maintaining ignorance of its existence will normally be a much less costly mechanism than security.

(ii) Retrieval procedure

Ignorance is obviously a total barrier to access. However, if we assume that the individual does know about the existence of the information and is authorized to have access there remain further barriers to retrieving the data. One of these is the procedure that the individual must employ to retrieve data. This is what Arrow calls part of the "capital costs" of data (Arrow, 1974:39). In order to retrieve data one must first expend time and effort in learning the retrieval procedures. However, in a study of engineers it was found that while ease of use and channel accessibility (used as a largely physical concept in their study) were both significant factors in choice among sources of data, accessibility dominated ease of use in the measure of cost to the engineers

(Gerstberger and Allen, 1968).

In the retrieval of computerized data there have for several years been advocates for both the special procedural languages of retrieval (Zloof and de Jong, 1977) and the use of "natural" language (i.e. English) to retrieve data (Codd, 1974). The special languages involve a large initial investment in learning but allow high rapidity in the on-going formulation of retrieval requests. For natural language retrieval the trade-off is reversed; almost no effort in learning is paid for by a lengthy dialogue with the machine in order to agree on the request. However, there is some evidence to show that managers do not perceive themselves to be computer terminal operators, preferring to use others where such retrieval is necessary (Keen and Scott Morton, 1978:152). If this is so, the argument for and against different procedural languages may be misplaced.

(iii) Geographic barriers

In the Gerstberger and Allen study (1968), accessibility and frequency of use were strongly related. It is not clear from the work exactly how accessibility was defined but it is clear that the geography of access was strongly implied in their use of the term. The lower the perceived geographic barrier to access, the more frequent use of data was found. Geography is one of the factors in the difference in costs for different directions (Arrow, 1974:41). The same point is vividly brought out in the following extract:

"So long as data could be obtained in the same factory, there was little or no problem of access; so long as the data were located in the same city the problems were slight; but where data were located in a different city from the person who needed access to them, the problem was frequently regarded as serious." (Simon et al., 1954:62)

One of the conclusions of the same study supported this:

"The most important consequences of centralization or decentralization of the record function have to do with the accessibility of the documents ... [This] points in the direction of relatively great geographic decentralization." (1954:7)

In a study of a library system at a major university, the distance of faculty offices from the library was an important variable in the library use (Greene, 1973).

The weight of these studies support the claim that the perceived geographic barrier is an important "cost" in determining the feasibility of retrieval.

(iv) Timing

With respect to the retrieval of information there are two major components of timing. The first is timeliness, which is measured as the time between the events occurring and the data being accessible (Burch and Strater, 1974:34). This is what Gregory and Van Horn call "reporting delay" (Gregory and Van Horn, 1960:352). Clearly, if a manager believes a report is going to arrive after it is needed for a decision it is of only general value to him and this will act as a large barrier to retrieval. On the other hand, timely access to important data sources could be highly valuable to certain decisions (for example, the release of expected or current profit figures during wage negotiations). Mintzberg (1975) notes that much formal information in organizations arrives too late.

The second component of timing is the elapsed time required to retrieve data once it is accessible. If individuals believe the retrieval time is too great they may not attempt to get the data. Experiments with persons using computer terminals indicate that it is not just the delay

that is important; the variability or uncertainty in time to retrieve can also lead to frustration (Shneiderman, 1978:429). Clearly, elapsed time to retrieve data should be strongly related to the difficulty of the retrieval procedure.

(v) Confidence in source

It is expected that lower confidence in a type of information results in a greater barrier to retrieval and use of that information. If the value of such information is perceived as being sufficiently low, the individual may discount the information by either not retrieving it or if it has been retrieved, by not using it. In some circumstances, employees may have alternate sources which can be used to verify one another and hence reduce their dependence on one source (Thompson, 1967:32). In other cases where there are no alternatives or, for various reasons (e.g. economic), the employees choose not to use them, they then have the problems of bias, distortion, and omission to deal with. This will be discussed in the section "Barriers to Use of Information", although, of course, these problems are closely tied to confidence in the source.

An individual may have confidence in either an impersonal source of information or in other persons as a source and for each situation the degree of confidence will vary with the individual's previous experiences. Koester and Luthans (1979) and Luthans and Koester (1976) found that managers lacking computer experience place significantly higher confidence in a computerized report than computer-experienced managers. In the Pearl Harbour attack it was the people in the local intelligence unit that lacked credibility: "Members of military intelligence failed to respond to a communication of the impending attack sent by lower ranking

officers in a unit which had low reputation with the Intelligence Office" (Nord, 1972:367). Wilensky (1967:48,59) ascribes this kind of problem to the structure of the organization. He also gives several examples of similar "pathologies". Managers will, in general, evaluate messages from their superiors as being more valuable than those from their subordinates. In organizational hierarchies, there should be little if any reason for conscious distortion of downward communication (Sussman, 1974; Lawler, Porter and Tennenbaum, 1967).

Even a source which is perceived as low in credibility may be valuable to an individual as a verification mechanism:

"For executives removed from actual operations, the greatest significance of attention-directing accounting data lies in the information they transmit independently of operating supervisors." (Simon et al., 1954:27)

In the same study this also was found to be true of factory foremen except that their important sources of information were the face-to-face contacts they had access to on the factory floor. "He regards accounting information as only a supplement ... to the other sources" (Simon et al., 1954:23). The executive use of staff in conducting technical analyses is another source of verification.

Where the use of alternatives is too costly to employees, they may select one person they respect as an expert in one or more fields and use this person as a source of information. This expert is sometimes called the opinion-leader who filters information through a "two-step" process (Lazarsfeld et al., 1968:151; Ladendorf, 1970; Porter, 1974). Apart from any considerations of low data verification, the use of opinion-leaders may entail a high "cost" of exposure. The individual is

openly dependent on another's opinion (Dewhirst, 1971).

(vi) Other barriers to retrieval

There will normally be a monetary cost associated with the access of formally reported information. Although in some firms the cost to an individual may be zero, in many the cost of formal reporting is a budgeted item, and, depending on how the organization's budgetary control system is set up, this may be charged in real dollars or internal money (Turney, 1977). As the charging of these items is intended to motivate individuals and make them cost conscious, one would expect perceived cost to be a potential barrier to retrieval.

Other barriers to retrieval are those related to the individual. Some individuals may perceive that the retrieval of a certain type of information makes them feel awkward or embarrassed which acts as a deterrent or barrier (Canadian Task Force, 1972:55). A particular example has already been given where employees have to justify their requests for access to their superiors. It is likely that the importance of this exposure as a barrier is greater where the climate is non-trusting and where the information is held by other people (Zand, 1972). In such cases, the use of computerized retrieval of data as an alternative to personal contacts may appear more attractive because of the neutrality of such technology. The person is not so exposed to others. However, the manager's fear or reluctance to use such technology may outweigh this advantage (Carter, 1976). This will be discussed further under the section "Technology of Access".

2. Barriers to use of information

Individual access to information, as has been shown, is dependent upon the rules of access of the organization, the barriers to retrieving the information, and finally, how readily the information can be used. Clearly, the decision to retrieve the information will depend not only upon the barriers to retrieval, but also the ease of using the information. The barriers to use are discussed below.

(i) Mode and format

Once the information has been obtained the first thing of concern is the "mode of presentation" and this is a potential barrier to use of information. Mason and Mitroff (1973) claim that although computer usage has become an "article of faith" for most MIS work, "Stories, drama, role plays, art, graphics, one-to-one contact and group discussions may be more effective in some information contexts" (Mason and Mitroff, 1973: 484). They then discuss why this is important: different psychological types will want different types of presentation in order to be individually effective, "... Feeling and Intuition types may react extremely negatively to the idea of computer generated information, especially when it is numerical rather than verbal" (Mason and Mitroff, 1973:484; also cf. Keen and Scott Morton, 1978:152).

Not only is the mode important, so also is the format (Dhalakia and Sternthal, 1977). The format is the way the information is arranged within a particular mode. For example, numerical information may be presented in graphical or tabular formats, with or without explanation text. Zmud (1978) found a performance improvement through the use of graphical techniques for presenting numerical information and this supports the

work of Simon and Newell (1971) concerning human limitations on the processing of information. Churchman and Shainblatt (1965) found that rather than reduce processing, individuals will actually ignore information that is presented to them in a format incompatible with what they expect. If computer displays are taken as one example, the range of potential factors affecting performance of processing is staggering:

"The size of the display screen, brightness of the display, glare, flicker, contrast, typefont size, typefont design, graphics or color capability, and physical placement may all affect users." (Shneiderman, 1978:429)

(ii) Comprehension

Once the barriers of format or mode of presentation have been overcome, the individual is faced with the task of turning the data into information - the problem of comprehending the data - and there are barriers associated with this (Arrow, 1974:40). First of all, the barrier of language must be faced; if employees do not understand the coding mechanism they cannot comprehend the information or, worse still, they may misinterpret the information. Secondly, employees must be able to cope with the volume of information presented before comprehension can take place. Finally, the content of the message must be assessed for bias, inaccuracies, and omissions during the interpretation of the information.

(iii) Language

Before comprehension can proceed, the individual must understand the language of the message and this involves an initial cost to the person:

"Learning a foreign language is an obvious example ... the subsequent ability to receive signals in French requires this initial investment. ... the technical vocabulary of any science is [another] case in point. The issue here is that others have found it economical to use one of a large number of possible coding methods, and for any individual it is necessary to make an initial investment to acquire it." (Arrow, 1974:39-40).

Attempts have been made to measure the general level of education required to read messages and this has found some application in the accounting literature (Smith and Smith, 1971).

(iv) Volume of information

Another barrier to the processing of information is its volume. This will be more apparent for those managers working under pressure of time. One of Ackoff's complaints is not that MIS provides too little relevant data but that managers are given an "over abundance of irrelevant information ... I have seen a daily stock status report that consists of approximately six hundred pages of computer print-out. This report is circulated daily across managers' desks" (Ackoff, 1967). Managers under time constraint cannot process such large volumes of information (cf. Simon and Newell, 1971).

One way to reduce the volume of data is to take the raw data ("events") and summarize or condense them ("value" data) (Sorter, 1969). There is some evidence that the use of summary information is better for technical decision making under relative certainty, but that performance has to be traded-off against decision time and decision confidence (Chervany and Dickson, 1974). Mitzberg claims that one of the problems with formal information systems is that they tend to aggregate information too much. This makes reports too general to be of use to the manager

(Mintzberg, 1975). Others have tried to explore the individual differences between people as measured by their cognitive "style" and hence match people with volume of output (Benbasat and Dexter, 1979; Benbasat and Taylor, 1978). Very little experimental work, though, has been done on the effect of time pressure on the choice of information volume and performance (Wright, 1974). However, for many organizations the manager may have little choice of mode, format, and volume of output for formal reporting, especially if others are receiving the same or similar reports.

(v) Interpretation

The information may be perceived as biased, inaccurate, or incomplete. These three barriers to interpreting the information are considered together. The question of incompatibility of information sources will be addressed later.

When a manager in an organization considers a source of information, consciously or otherwise, it will be assessed for biases, inaccuracies, and omissions. The manager may rely heavily on one person as a source of information needed for task performance. This saves the managers time and effort in gathering and processing information from a variety of sources. The other person acts as an interpreter for the manager, filtering out "unwanted" information and condensing and processing it to more manageable proportions. An example of this would be a manager's request to the accounting department for special reports or opinions. As with the retrieval of information, the manager has a degree of confidence in the source which is expressed in the belief that bias, inaccuracy, and relevant omissions are low. Of course, the benefits of using other people as interpreters of data may have to be "paid" for by such items as low veri-

fication, dependence on others, and exposure to others.

In hierarchical-type organizations the distortion of upward communications has long been recognized (Athanassiades, 1973; Downs, 1967:119). At each level inferences are drawn from the raw data and these are communicated, not the raw data. This is important to the manager because: "his interpretation must be based primarily on his confidence in the source and his knowledge of the biases to which the source is subject, rather than on a direct examination of the evidence" (March and Simon, 1958:165). This process the authors call the "absorption of uncertainty" and it has distinct implications for the effectiveness of the organization: "If it is true that typically only a very small portion of the total available information is ever recorded by the organization, the processes by which the initial screening takes place has extraordinary importance in determining the final decision" (Cyert and March, 1963:20). Again: "... information is a resource that symbolizes status, enhances authority and shapes careers. In reporting at every level, hierarchy is conducive to concealment and misrepresentation" (Wilensky, 1967:43). Others have noted the reluctance to communicate undesirable information or the "mum" effect (Rosen and Tesser, 1970; Berry and Otley, 1975:180).

If the upward communication from subordinates is distorted, what can be done about it? Cyert and March (1963:110) claim that counter-biasing occurs but this may only apply to tasks where the decisions are made fairly frequently (Pettigrew, 1972:202). In fact, the greater the uncertainty surrounding the task, the wider the range of values a variable may assume and the wider the range of latitude officials have in emphasizing one part of it without being proved wrong (Downs, 1967). For more

routine tasks, constant bias can be allowed for without even removing it (Feltham, 1972:123). Inaccuracies and omissions require other remedies. The primary way of reducing these is to use alternative sources for the same information (Berry and Otley, 1975:180; Simon et al., 1954:23,27; Downs, 1967:119).

(vi) Incompatibility of information

Finally, the individual, faced with integrating information from several sources, has a potential barrier to interpretation. For example, one report may be summarized by month, another by product, and there may be no opportunity for disaggregation for comparison purposes. This difficulty is in addition to the problem of geographic dispersion of information types (Simon et al., 1954:79).

Summary

This chapter has laid out the structure by which we can examine internal access to information. Organizations regulate access to information by direct and indirect means. The direct means by which access is regulated is the organization's policy on access, the rules that specify, for individuals, what types of information they are authorized to access and what types they are prohibited from. These rules may be formalized in a document or, more likely be informally established by an internal socialization process that occurs after an individual joins an organization.

Indirectly, the organization regulates access to information by the way it promotes or hinders the retrieval and use of information. The extent of this regulation varies across both individuals and types of information. Thus, for a particular employee, access to one type of infor-

mation may be made highly convenient, while another type of information may have sufficient barriers associated with it to effectively prohibit access.

It has been demonstrated that access is an important area for study. In the next chapter we will attempt to explain some of the variations in direct and indirect regulation of access to information in organizations.

CHAPTER TWO

DETERMINANTS OF ACCESS

In the last chapter, access was treated largely as an isolated subject with only cursory reference to the context within which the direct and indirect regulation of access operates. The purpose of the current chapter is to identify some of the more important features of the organization's context which directly affect access to information or which interact to make an impact upon access to information. This will lead in the next chapter to a series of hypotheses linking access to its determinants and these hypotheses will form the basis for the subsequent empirical work.

The first factors considered are those external variables that can have an impact upon access to information. These are shown to act largely as constraints upon the direct regulation of access. Secondly, the chapter examines some of the important structural variables as they have an impact upon access. The variables considered are size, decentralization of authority, level of authority, shape of the organization, and routineness of technology. The third factor is the subjects' perceptions of the general attitude towards data sharing. Fourthly, technology of access is examined for its effects upon access. Lastly, two variables (departmental affiliation and the subjects' experience of their positions) are discussed in relationship to their influence on access to information.

I. External Regulation of Information

The organization's enterprise governs the market within which it must operate. Although the organization may seek to control or influence it, the market is assumed to be a fixed part of the organization's environment, especially in the short term (Pfeffer, 1978). In an informational sense the organization's survival is dependent upon securing access to and processing of information sufficient to match the organization's task(s) (Galbraith, 1973). This in turn governs the organization's policy with regard to individual access to information for job-related purposes and generally organizations will want to ensure access to information in these cases. But another condition of survival, the degree of which will vary from industry to industry, is the need to protect certain types of information from unauthorized access. For a manufacturer, these information types might include research and development reports, production figures, customer lists and so on, all of which may have a substantial value to competitors. Thus direct and indirect regulation of access to work-related data depends somewhat on the extent and value of confidential information held by the organization. This is at least partly determined by the competitive nature of the organization's environment. For example, in the competitive chemical manufacturing industry, where the survival of a company is dependent on its ability to protect proprietary formulae, it is expected that this confidential information would be strictly confined to those who need it for their jobs. Additionally, an emphasis is likely to be placed on security mechanisms to prevent unauthorized access, internally or externally. In research laboratories employees are typically required to sign agreements pro-

hibiting the release of technical information to those outside the organization. In many cases, sanctions are used to ensure that individuals comply (Aiken, 1974). In non-competitive organizations or regulated monopolies, such as utilities, where the extent of confidential information is much lower or non-existent, the leakage of certain information types may no longer affect the commercial advantage of the organization. Instead, leakage of such information needs to be prevented because of the embarrassment it could cause the organization which may in turn lead to further external interference in the running of the organization. For example, a non-profit educational institute might want to protect the details of the wages of its clerical staff, not because of the commercial effect of leaking this information, but because of the embarrassment caused to the institute by wages that are generally lower compared to those available outside.

The second item in the informational environment that could have an impact upon access to information is the general and specific regulation of organizational information by governments. These requirements may be in direct conflict with the organization's aim of protecting key information sources. For instance, the government may require a manufacturer to disclose data concerning toxic substances to an appropriate agency. The information may have enormous commercial value to the firm and it will therefore want to ensure that the agency applies stringent security to such information before disclosure takes place (Duelstgen, 1979). The law may also require that information concerning the health and safety of employees is made readily available. In Canada, only Newfoundland has legislation requiring that employers disclose health- and safety-related

data to employees although Quebec is proposing similar regulation (Aykroyd, 1980a:40). In California the National Labor Relations Board ruled in one case that unions did have the right to access information, "on raw materials and chemicals stored, handled and processed in the company's plant ... this was rather a hollow success, however, as unions succeeded in obtaining only the trade, and not the generic names, of the chemicals involved" (Aykroyd, 1980b:46). Clearly, one way for the organization to protect sensitive information is to control the form of the information released. In the Californian example, the organization was able to bypass the intention of the ruling by releasing non-sensitive information instead of the original data.

The law may also require that personal information is regulated. Whereas the confidential data for an organization will be suitably protected from unauthorized access, without legislation there is little incentive to protect personal information from such access, especially as the implementation of security will normally be costly (Goldstein, 1975). It is expected, therefore, that in such cases as in Canada where there is no regulation, the organization will apply little or no resources in this area, the exceptions being the cases where a particular industry sets a standard concerning personal data (Cary, 1976) or where unions have negotiated an agreement that includes rights of access (Canadian Task Force, 1972).

The informational environment is highly dependent upon the country in which the organization operates. In the area of personal information, this can be easily demonstrated by comparing legislation across several countries (Sieghart, 1976). In the regulation of toxic substances there are already differences between Canadian and American practices (Aykroyd,

1980a, 1980b). It is clear that many less developed countries have little or no regulation of information. Consequently some industries will find strong incentives to establish subsidiaries or research laboratories in these countries, using such countries as data havens rather like some companies seek out and use tax havens.

As the external regulation of information acts largely as a constraint upon access to information and because the study will be conducted in one country, this factor will be largely controlled. Any industry-specific exceptions to this will be commented upon during the presentation of the results.

II. Structure

The manner in which relations are patterned and differentiated within organizations is called structure (Thompson, 1967:51). The organization needs to balance the needs of differentiating between various functions while providing sufficient coordination of those functions in order to achieve overall effectiveness (Lawrence and Lorsch, 1967). The typical hierarchical structure adopted by most organizations is very effective in restricting access to information and therefore provides some ordering to the patterns of access. If everybody had access to everybody, the organization would collapse under an overload of information (Galbraith, 1973). However, this restriction also brings with it certain costs to the organization, costs in the sense of distortion, biasing, and omission of data - information pathologies (Wilensky, 1967; Rogers and Agarwala-Rogers, 1976:106). Although there are many ways of dimensioning struc-

tures (Steers, 1977:57-69) the following variables have been selected because of their acceptance in the literature and their relevance to the access question.

(i) Size

The organization's size can be thought of as a contextual variable (Pugh et al., 1969) or as a structural factor. From the point of view of this study, the interest lies in the effect the size of the organization and the size of the work unit have upon access to information. Bacharach and Aiken (1977) correlated organizational size with communication behaviour at two levels of authority. Using a logarithmic measure of the number of employees, they found that size and communication activity were positively related, as hypothesized, for supervisors but not for department heads. Size was also strongly correlated to their measures of shape (width and height). This confirms the work of Pugh et al. (1969:93) who found size to be highly correlated with the structuring of activities.

Steers (1977:67) reports that size appears to be positively related to increased efficiency while being negatively related to employee attachment to an organization. The larger the organization, the lower the identification an employee feels towards a firm. Also, the work unit size has been found to be positively associated with job dissatisfactions. In the study of access, the size of the organization and work-unit may be important in two dimensions. Firstly, some of the physical barriers will appear to be greater as size increases. The individual is likely to have further to travel in order to retrieve the information needed. This will be heightened by the increased need to use sources of information (Bacharach and Aiken, 1977). Secondly, as well as increasing physical barriers, the literature suggests that in larger organizations the atti-

tudinal barriers will also appear larger. As size increases, the individual generally feels less attachment to the firm or work group.

It is expected that both organizational size and work-unit size will be related to access to data (Comstock and Scott, 1977:179). However, because of the "washout" effect of treating a collection of subsystems (e.g. departments) as a united system, it is expected that the size of the work-unit will be of greater significance than the size of the whole organization. A similar argument on the treatment of technology at an organizational and a work-unit level is presented in Steers (1977:78).

(ii) Decentralization

The extent to which lower participants in a hierarchy have authority to make decisions concerning their tasks is called decentralization of authority, or just decentralization (Steers, 1977:60). Tushman (1979) used the ratio between vertical and horizontal communication behaviour as a measure of centralization; the higher the ratio the more centralized decision making would be. Hage et al. (1971) measured decentralization by asking individuals questions about their authority to make decisions in several areas. They found a strong positive relationship between decentralization and communication behaviour. As decentralization is related to participative decision-making it was argued that more decentralization led to more participation and hence greater communication (Steers, 1977:60). Bacharach and Aiken (1977), using the Hage et al. (1971) instrument, found consistently strong relations between communication behaviour and decentralization for both levels studied in the organizations. Read (1962) found that "open communications" were strongly related to decentralization. This will be captured by measuring the attitude of individuals to data-sharing.

A seemingly conflicting notion has been raised by Galbraith's information processing model (Galbraith, 1973) where decentralization is proposed as one method of reducing communication. The conflict, however, is vacuous. The communication studies all refer to activity within the work-unit, not between the work unit and others in the hierarchy. This distinction is useful nonetheless when we look at the effects of decentralization upon access to information. Namely, it is expected that the demand for access would be greater for information held within the decentralized work-unit while less demand should be found to information stored outside the unit (Cyert and March, 1963:109). Additionally, because the decentralized unit should contain all of the information required to perform the tasks, the physical barriers to access will appear to be correspondingly lower. This is contingent upon the record-keeping function also being decentralized and therefore under the authority of the unit:

"The most important consequences of centralization or decentralization of the records functions have to do with the accessibility of documents and the reliability of the source records. Both of these criteria point in the direction of relatively great geographic decentralization." (Simon et al., 1954:7)

(iii) Organizational level

Bacharach and Aiken (1977) studied the communication behaviour of supervisors and department heads within bureaucracies. One of their most significant findings is the differences between the two levels:

"Regarding department heads, the major finding is the lack of effect of these structural dimensions upon the frequency of department head communication."
(Bacharach and Aiken, 1977:373)

With regard to access, it is expected that individuals at differing levels

will perceive differences in barriers to access of information. For example, managers have more resources available to access information. As well as being able to afford retrieval equipment and on-going costs, they also have available manpower to retrieve and process information on their behalf. Although they may find access personally difficult because of the complexity of technology, for instance, they may have several alternative paths available to them (Keen and Scott Morton, 1978:152). At the highest levels, executives are likely to believe they can get any information. Clearly, this is not true of the workers on the shop floor who, if they need to access an information source, have no alternative but to get it themselves unless they can find alternative sources of information (e.g. such as the "opinion leader", Rogers and Agarwala-Rogers (1976)).

It is expected that the higher the individual is in the hierarchy, the less barriers will be perceived to the access of information. A potential confounding effect is the expected positive relationship between the level of the individual in the hierarchy and the informational content associated with the person's job. Some higher level jobs are almost totally data-oriented while others lower down in the hierarchy are relatively data-poor (Poole, 1978). Hence, the workers on the shop floor may find large barriers to accessing information but not find this a great problem because they rarely need to retrieve information to perform their jobs. On the other hand, the manager in a "data-rich" position will develop a greater expertise in handling documents than the shop-floor worker (Weber, 1947; Mechanic, 1962). Put another way, access to information is part of a manager's normal work.

(iv) Shape of organization

For this variable two dimensions are identified: horizontal and vertical differentiation. Horizontal differentiation refers to the degree to which the organization organizes itself into departments, each specializing in a particular function (e.g. marketing, production, etc.). Vertical differentiation is a measure of the number of distinct authority levels that exist from the employees to the executives. Both dimensions are believed to have an effect upon access to information.

Horizontal differentiation may be thought of as an attitudinal variable, a structural variable, or both (Lawrence and Lorsch, 1967). Horizontal differentiation or departmentalization is a way of clustering together activities which can then be performed relatively independently of each other. This has a clear effect upon the needs for information access: "The departmental organization defines reasonably well the groups within which sharing of information is needed" (Cyert and March, 1963:109). March and Simon (1958:169) refer to this as loosely-coupled programs of action. However, there will be important occasions when interdepartmental access of data is necessary. In those cases the individual will normally find access to another department's detailed data to be difficult (Ackoff, 1967). The tendency will be for individuals to limit access of information to that which can be easily obtained within the department: "Generally, persons tended to communicate with others who were within easy reach, and also with others who were closely related [structurally] in the organization" (Aguilar, 1967:112). Thus, although departmental differentiation may be important to the organization's effectiveness, it also increases the barriers to access between departments. The provision

of extensive data processing technology to force data sharing between departments may only serve to make the situation worse (Argyris, 1971; Bariff and Galbraith, 1978).

Bacharach and Aiken (1977) defined a department as any unit with at least two persons and two levels. The head of the department also had to report to the chief executive, in their case the mayors or other local government officials. The number of such departments was the way they measured the width of the organization. They found a weak inverse relationship between the number of departments and communication behaviour, but only for subordinates; no relationship could be found for department heads. Lawrence and Lorsch used a composite measure which used the differences in orientation as well as differences in the formality of the structure (Lawrence and Lorsch, 1967:10).

Bacharach and Aiken used a count of the number of levels of authority as their measure of vertical differentiation. They found a strong positive relationship to communication behaviour but, once again, only for subordinates. In relation to access to information, the number of levels of authority is likely to provide a measure of the potential distortions and omissions, that vertically transmitted data can suffer. The more people that screen the information on its way through the hierarchy, the more "concealment and misrepresentation" is likely to take place (Wilensky, 1967) and the more uncertainty gets absorbed at each level (March and Simon, 1958:165). Others have noted the tendency of individuals to transmit only favourable information to their supervisors (Rosen and Tesser, 1970; Berry and Otley, 1975:180). It is to be expected, therefore, that all else being equal, the number of levels in the organization will determine the inaccuracy, bias, and incompleteness of data generated in-

ternally. In organizations with large vertical differentiation, it is expected that the individual will face larger barriers to access of information from sources down the hierarchy and will therefore seek alternative access paths or sources when counterbiasing is not feasible (Berry and Otley, 1975; Pettigrew, 1972; Cyert and March, 1963). As was mentioned, the higher the level of the individual in the organization, the more resources the person can muster to find these alternative access paths or sources, somewhat mitigating the effect.

(v) Routineness of technology

The technology of an organization can be thought of as processes (Woodward, 1965), as relationships between units or individuals (Thompson, 1967:15-18), or as existing at the level of individual tasks (Hage and Aiken, 1969; Comstock and Scott, 1977:181). Because the focus in this study is on the routineness of technology, it is this latter measure of technology that will be used here (Bacharach and Aiken, 1977:370-1). This level of focus seems to be the one best suited to the empirical work in which the subjects are individual managers.

One dimension of tasks performed in organizations is their degree of routineness or predictability. Thompson (1967:134) suggested a four-way classification of tasks according to the degree of uncertainty both in the goals of the task and in the methods used to achieve those goals. A task is predictable or routine to the extent that its goals are well defined and its means/ends relationships can be specified. Simon (1960) calls this kind of task "programmed" where a procedure can be constructed and applied every time. This has also been called a "structured" task (Mason and Mitroff, 1973). Simon (1960) contrasts a programmed task with

a nonprogrammed or unstructured task where the problem faced is unique and will not yield to an established procedure. Although he dichotomizes tasks in this extreme way, Simon does acknowledge a continuum between these two extremes. Keen and Scott Morton (1978) introduce a third, intermediate category of semistructured tasks, where the problem is only partly programmable.

Several writers have suggested that communication behaviour will be affected by the degree of uncertainty within the task. Predictable tasks, "will have low information-processing requirements which can be fulfilled by fixed programs, rules, and standard operating procedures. Furthermore, since relevant information is likely to be higher in the hierarchy, routine tasks can be accomplished with more supervisory decision making and less extensive peer communication" (Tushman, 1979:84). Comstock and Scott (1977:177) make a similar point; routine or predictable tasks can be handled with more standardized procedures and less internal communication. The opposite is true of nonroutine tasks:

"It is clear that when the purpose is not simple - that is when the requirements are complex and not obvious, or the conditions require precision of coordinated movements, or the nature of the individual action is difficult to grasp by the actors ... - much more communication is necessary than under the contrary conditions." (Barnard, 1938:107)

This is elaborated on by Tushman (1979):

"If a subunit's task is nonroutine, it must attend to substantial information processing requirements, since complex tasks require generating and evaluating alternative approaches to solutions. Furthermore, the more complex the task, the less likely that the requisite task information will be available from any one individual, even the supervisor. To deal with this complexity requires peer decision making and extensive peer contact." (Tushman, 1979:84)

Tushman used four three-point scales to identify the routineness of technology. Because he was studying a research and development laboratory, his four scales were: Basic Research, Applied Research, Development, and Technical Services, representing the range from nonroutine tasks to highly routine ones. Tushman also used Pelz and Andrews (1966) technique to weight the scores according to the percentage of tasks in each category (Tushman, 1979:87). Bacharach and Aiken (1977:370) used a simple six question measurement to capture routineness of technology. Tushman found significance between task routineness and communication in the direction hypothesized. Bacharach and Aiken found significant findings for departmental heads but not for subordinates.

What are the implications of routineness of technology for access to information? For routine, predictable tasks, the organization can specify in advance the types of information that individuals need to have access to in order to perform their jobs effectively. That is, the patterns of access can be predetermined by the organization. However, when the task is less routine, it is not possible to totally plan for the information requirements of the job and hence the organization can only partly specify the information individuals are required to have access to. The individual, in order to perform nonroutine tasks, requires more access to information than for predictable tasks. But the organization can only support the task by authorizing access to pre-determined information (Keen and Scott Morton, 1978:1). In order to perform their nonroutine tasks effectively, therefore, individuals must exercise discretion and initiative in gaining access to additional information. To be effective, they need more access to information than the organization might normally

classify as not needed for their jobs. Without support from the organization, the individuals' choice of access will depend on the barriers they perceive to access. These types of nonroutine jobs are likely to be assigned to workers "having sufficient general training and experience to be able to act effectively in uncertain situations" (Comstock and Scott, 1977:181). But the degree to which the organization perceives this type of job to be important to its effectiveness will determine the extent to which the barriers of access to non-task information are minimized for individuals performing this type of work. If, as seems to be widely held, managerial tasks consist largely of unstructured or "wicked" problems (Mason and Mitroff, 1973), this issue will be pervasive in organizations. One clear method to support this type of task is for the organization to improve the attitude to data sharing, thereby reducing many of the barriers to access.

III. Attitude to Data Sharing

In the communication literature the individual's attitude to data sharing has been consistently found to be strongly related to communication behaviour (Dewhirst, 1971; O'Reilly and Roberts, 1976; Athanassiades, 1973; Zand, 1972).

Dewhirst measured the influence of norms of data sharing upon information channel utilization (Dewhirst, 1971). Using one perceptual question to measure the individual's perception of sharing norms, he confirmed his hypothesis that the use of interpersonal channels is directly related to the strength of the perceived norms. O'Reilly and Roberts (1976) found a

relationship between source credibility and a series of independent variables, two of which were perceived information accuracy and perceived openness of communication.

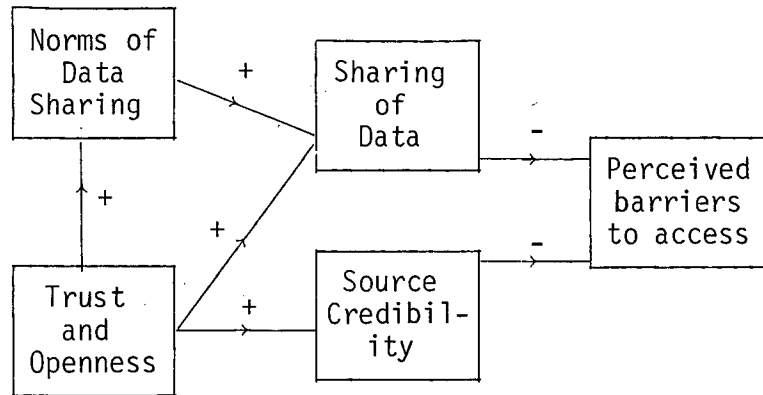
Athanassiades (1973) proposed that upward distortions in communication behaviour would depend upon the organization's climate. In fact, he did not measure climate but he selected two normative extremes of organizations for his study. A police department was chosen as a "heteronomous" climate, typified by elaborate rules and regulations. A university was used to represent an "autonomous" climate where emphasis is placed on individual freedom. As hypothesized, the "freer", more open climate was associated with lower distortion of communication.

Zand (1972), using a concept developed by Gibb (1964), claimed that an attitude to trust would influence information behaviour:

"One who does not trust others will conceal or distort relevant information, and avoid stating or will disguise facts, ideas, conclusions, and feelings that he believes will increase his exposure to others, so that the information he provides will be low in accuracy, comprehensiveness, and timeliness; and will therefore have low congruence with reality. One who does not trust will try to minimize his dependence on others."
(Zand, 1972:230)

Using a controlled laboratory experiment, Zand found that trust was significantly related to all the variables he examined. Of particular importance to access to information, trust was related to openness about feelings and search behaviour. The greater the perceived trust, the greater the perceptions of openness and search behaviour. Similarly, Roberts and O'Reilly (1974) and Burke and Wilcox (1969) found that a subordinate's trust in a supervisor acted as a facilitator of open communication exchange. Also, if subordinates perceive that their supervisor is supportive,

then significant increases in their reliance on the supervisor as an information source have been found (O'Reilly, 1977). Piecing all these elements together it is possible to see the following simplified relationships with respect to access:



Sharing of information will be positively associated with organizations where the perceived norm is to share. However, sharing norms may not be related to increased source credibility. An individual may share information because everyone expects it but it is not clear that this sharing will alter the information pathologies discussed earlier (e.g., Wilensky, 1967). On the other hand, trust (and openness, which is strongly related to trust) will influence both sharing behaviour and confidence in the source of information (source credibility). Trust will also influence the norms of data sharing (i.e., data sharing is a necessary but not sufficient condition of trust and openness). Both sharing of information and increased source credibility will reduce the perceived barriers to access of information. As these attitudes may be localized in an organization, it would be necessary to distinguish between these variations. One way to accomplish this is to measure trust and "norms" of data sharing at the

work unit level, rather than for the whole organization.

Attitudes to sharing data may be influenced by structural effects (Steers, 1977:106; Athanassiades, 1973). Both size of organizations and level in the hierarchy have been found to influence an organization's climate. It may also be that a similar relationship will be found for attitudes to data sharing which would indicate that data sharing is one possible dimension of an organization's climate (Muchinsky, 1977). This finding would also support Forrester's claim that, "Much of the character and atmosphere of an organization can be deduced from the way it internally extends and withholds information" (Forrester, 1965).

Finally, the attitudes found towards data sharing can also be a demonstration of the desire of individuals to create data monopolies and accrue power for themselves:

"To possess information is to possess power. A monopoly of information can give a form of security. There are, in all organizations at all levels, a selective withholding and extending of information. Sole possession of information can make others dependent on oneself ... Control of information channels can isolate certain persons from the remainder of the organization and keep them within one's own sphere of influence." (Forrester, 1965)

In one recorded case, maintenance engineers were able to gain a power advantage over the organization by retaining control over access to manuals required to service the machinery (Crozier, 1964). The expertise of the maintenance engineers is a good example of one of the factors that contributes to the power of lower participants in the organization (Mechanic, 1962). As the same author notes, "lower participants do not usually achieve control by using the role structure of the organization but rather by circumventing, sabotaging, and manipulating it". The engineers were

successful in maintaining their powerful position by manipulating the access to important information allowed to others. At the same time, organizations are continually seeking ways to neutralize their dependence on experts by making their tasks more routine by using, for example, standard operating procedures (March and Simon, 1963; Hickson et al., 1971; Crozier, 1964). The "gatekeeper" is another good example of an individual who effectively controls the access to information for others (Pettigrew, 1973; Rogers and Agarwala-Rogers, 1976).

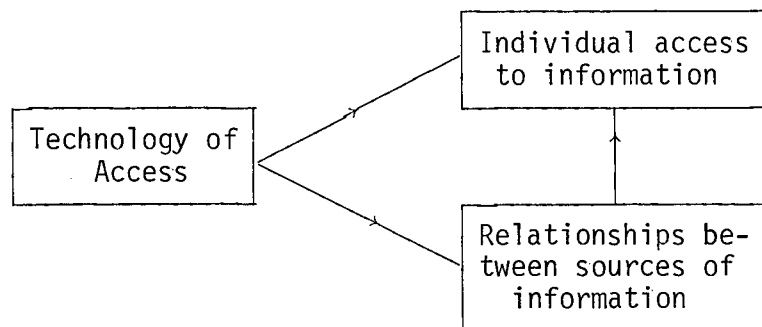
Power gained through an individual's control of access to information is not treated explicitly in this study. The major thrust of the work is to treat access to information as the potential to retrieve and use information. The study does not deal with individual choice behaviour and individual manipulation of access for others even though these are important subjects. The study is interested, however, in how the organization as a whole is seen by individuals to withhold or extend access to information. Something of the emphasis taken in this study is apparent in the following statement:

"Just as an individual hoards information, so does the organization as a whole. Competitive position is often believed to rest on secrecy to a far greater extent than is the fact. Information is withheld from individuals inside the organization on the excuse that this keeps information from outsiders."
(Forrester, 1965)

IV. Technology of Access

In this section, the technology used to access information is examined for its effects upon the direct and indirect regulation of access (Mason and Mitroff, 1973). Generally, it is proposed that technology will in-

fluence access to information in two connected ways. Firstly, technology has a direct impact upon an individual's perception of access to information. Access to a particular information type may appear to be faster/slower, easy/difficult, etc. according to the type of technology employed. Secondly, the technology can influence the relationships between information sources. Some technologies can provide communication links between sources and hence change the feasibility of access over that available without such technology. The following is a simple representation of the relationships:



Because technology is important to both organizational-task information and other information in different ways, these will be considered separately after a discussion of the effect of technology upon the direct regulation of access.

Effect of Technology upon Direct Regulation of Access

The question being raised here is: Can a company's policy on access to information be influenced by the type of access technology employed? The only indirect evidence we have for this in the literature is when non-computer technology is replaced by computer technology. As one writer has noted, there are certain built-in inefficiencies in operating administrative, non-computerized retrieval systems (Canadian Task Force, 1972). Different

types of information in such systems tend to be stored in different places and often have different formats. Additionally, several people may be needed to obtain the information that is wanted (e.g. secretaries and clerks). The introduction of computer technology and especially telecommunication links brings with it the potential for removing some or all of the protective inefficiencies that were previously there. The new system also means that the access procedures must be formally stated if only because the software demands such formalization. Systems designers refer to this process as "designing the environment" of the computer system in recognition of the importance of formalizing the procedures that the computer system will affect when it is brought into operation.

Where it was previously possible for an organization to "muddle through" with an informal policy on access, the introduction of computer systems will often act as an organizational trigger to formalize the direct regulation of access. This process is likely to apply for all types of information that are affected by computer technology.

Effect of Technology upon Indirect Regulation

Indirect regulation refers to the barriers to retrieval and use of data, and the effect of technology will be treated in that order for both organizational-task information and other information.

(i) Organizational-task Information

The first requirement is to find a classification of technology of access. Clearly, it must be a classification that individuals can readily assess as it will be used in the data collection phase. Burch and Strater (1974:28) use a four-category classification of data processing methods;

manual method, electromechanical method, punch card equipment method, and the electronic computer method. Although the various classes do include, or at least imply the access technology, the classification scheme suffers from at least two problems. Firstly, the manual method includes access to both documents and people. Several writers have indicated the importance of personal contact rather than impersonal (e.g. Arrow, 1974). Secondly, punch card equipment has largely been eliminated from organizations with the advent of small, cheap computers.

Aguilar classified management sources of information according to whether they were personal or impersonal:

"Examples of personal sources include direct telephone conversations, letters, personal memoranda, and so forth. Examples of impersonal sources include publications, conventions, and scheduled meetings." (Aguilar, 1967:65-66)

If we take these classifications it is possible to exploit the advantages of both. The following is a proposed classification for the technology required to access (retrieve and process) information:

1. No Technology.
e.g. face to face personal contacts, meetings,
use of others.
2. Manual Technology.
e.g. Internal Mailing system - regular reports,
memos, letters.
Use of mechanical filing system - clerks,
secretaries. Requesting special reports,
use of reference library.
3. Electromechanical Technology.
e.g. Telephones
Conference calls, computer conferencing
Microfilm/microfiche readers.
4. Electronic Computer Technology.
e.g. Requesting regular or special printed reports -
batch system
Use of online computer terminals.

Using this classification it is now possible to examine the likely effect of the different kinds of technology upon the indirect regulation of information.

Retrieval

The first barrier previously discussed was ignorance. It is reasonable to expect that a properly designed electronic system can maintain ignorance of a source of information more reliably than a manual system using fallible people. For example, the human "grapevine" can be very efficient in redistributing information around the organization (Rogers and Agarwala-Rogers, 1976:100-1), whereas computer-stored information can be strictly controlled so that only those who need it can gain access to it.

The retrieval procedure is clearly affected by the technology of access. If the access is to be face-to-face then there will be certain procedures to be adhered to before access can take place (etiquette) and the degree of cooperation will somewhat vary with the relationship (e.g. peer to peer, subordinate to supervisor). Building-up a network of personal relationships is what Arrow (1974:39) would call part of the "capital costs" of acquiring information. With manual access to information, the procedure, once established, might be very "cheap" to use. For example, the receipt of regular reports, memos, and other notices involves the manager in no effort of retrieval, whereas establishing those channels of information may have been very costly. An individual could also find it costly to personally retrieve manual records. But this would be accomplished at no cost if intermediaries are used to access the files for the manager (e.g. clerks or secretaries). Generally, the higher the technology that is used to retrieve information, the greater the initial effort to learn the re-

trieval procedures. This can, however, be mitigated somewhat by the use of intermediaries. In computer retrieval of data the use of difference access languages involves a tradeoff between a large investment in learning the language and the on-going ease of use of those languages (Zloof and De Jong, 1977; Codd, 1974).

For the issue of geographic barriers to access, there is only one clear effect on access. Using electronic or electromechanical technology it is possible to "compress" the distances between people and between people and information. The individual need only be as far away as the telephone or computer terminal. This would appear to have a clear advantage over face-to-face access when the geographic barrier is great and at least one study has shown that this technology can increase interpersonal communication (Turoff and Starr, 1978). This effect was also apparent in Aguilar's study; "Generally persons communicated with others who were within easy reach, and also with others who were closely related in the organization" (Aguilar, 1967:112). On the other hand, just because the telephone brings people near does not mean that an individual prefers to use it. Mintzberg (1973) found a clear managerial preference for face-to-face contact with others.

Technology is likely to influence both aspects of timing: the reporting delay, and the retrieval delay. Electronic computer technology has a clear speed advantage over manual processing of numerical information and hence the reporting delay, once all of the data transactions are available, should be drastically reduced using computers. Computer reporting can be made available for retrieval more readily than manual reporting (Stewart, 1971:255). Similarly, on-line information retrieval is potentially much

faster than manual retrieval (Burch and Strater, 1974:31). If the computer files are available, an on-line retrieval is clearly faster than waiting for a batched-processed report to be sent by the internal mail system. This advantage may have to be paid for, however, by frustration caused by the uncertainty in retrieval times exhibited by some computer systems (Shneiderman, 1978).

The only results of studying the effect of computer technology upon the confidence in the source of information have been stated elsewhere and they show that non computer-experienced individuals place more confidence in computerized output than non-computerized output (Luthans and Koester, 1976; Koester and Luthans, 1979). Other studies have indicated the powerful influence of personal information sources over impersonal (Arrow, 1974; Lazarsfeld et al., 1968).

The direct cost of access to information may be important or not to the individual depending on how the organization makes individuals accountable for their access to information. If the employee is directly billed for all equipment needed (terminals, microfilm readers, etc.) and computer time used, this would be a clear barrier to using more technology. If not, then other considerations might govern the individual's choice of technology, such as the difficulty of learning the retrieval procedure. Generally, however, the initial set-up costs for electronic computer systems are going to be high compared with other technologies (Burch and Strater, 1974:31).

The last barriers to retrieval to be considered are the ones associated with the individual's attitude to access. There is sometimes a certain psychological "cost" or exposure associated with access of informa-

tion (Zand, 1972; Dewhirst, 1971). Dewhirst mentions this in connection with the use of informal, interpersonal channels. The use of others as sources of information can indicate your dependence upon them. In such cases it may be thought that the use of a "neutral" technology such as computerized data retrieval may be preferred. There is, however, evidence to indicate that managers do not see themselves as terminal operators (Keen and Scott Morton, 1978: 152).

Use of Information

Both the mode of output and the format of the output are potential barriers to processing the information (Mason and Mitroff, 1973). For managers, more technology may be resisted and a preference for more personal sources of information shown. If the technological mode of output can be chosen, the format can be designed to suit the individual. In practice it may not be.

Once individuals have obtained the information they must be able to comprehend it and technology can have an impact on comprehension. The output will be presented in a certain language or code. It is not clear that the technology of access will differentially affect this barrier to access. A computer-generated report may be identical in language (coding) to a manually-generated one. In the area of volume of information, however, it is possible to spot a difference in the technologies. In manual systems, the production of reports is often expensive as is the marginal cost of each extra requirement. For example, a secretary has to type each additional page requested. In computer systems, the marginal cost of producing extra pages is much lower once the programs have been written and this can result in a superabundance of reported information, not all of it relevant

(Ackoff, 1977). Because cost may not be a great factor in this kind of reporting, care must be taken to ensure that the report is designed so that it is at least capable of being processed by the individual and does not swamp the person with an overload of information (Chervany and Dickson, 1974).

Once the information is captured by a computer system it can generally be transmitted, processed and outputted without any loss of accuracy (Burch and Strater, 1974:31). It may still suffer from the bias and incompleteness that existed when it entered the system, but even here the computer systems can do limited, automatic tests to check for these. Any other technology suffers from inaccuracies, biases, and omissions, particularly person-to-person contacts, although individuals develop methodologies to deal with these, such as counterbiasing and the use of alternative sources or paths of access (Cyert and March, 1963; Berry and Otley, 1975; Downs, 1967).

The technology of access can also affect the relationships between sources of information. For example, the centralization of information in in one or more computer files can permit access to diverse information sources where once it was not feasible. The keyword retrieval systems providing access to abstracts is a good example of this gathering process. An individual can use the computer's technology to search quickly through all the required indices. However, in organizations, the bringing together of several previously unlinked sources of data can be the cause of many dysfunctions (Bariff and Galbraith, 1978). Managers, who previously had control over access to their information, can find themselves forced to share it with other departments (Argyris, 1971; Ackoff, 1967). Whereas the physical

barriers to access can be made much lower by the use of computer technology, the psychological affects on the manager may outweigh any other considerations (Argyris, 1971).

In the section covering structure, the relationship between routineness of technology (task structure) and access was examined. Is there also a link between the manager's job and the technology of access? Simon (1960) used the terms programmable and non-programmable to indicate the extreme types of jobs possible in an organization. This indicates that some jobs can be so structured and defined that computer programs can be written to replace a manual series of instructions, whereas other jobs require human judgement or compromise and therefore cannot be programmed (Thompson, 1967). The influence of computer technology has largely been seen in organizations in routine, structured jobs (billing, payroll, etc.) whereas the more ill-structured tasks have scarcely been affected (Brady, 1967), and where the type of technology used to access information is non-computerized (see also Mason, 1969). Computer technology is being introduced into this less structured area of problem solving but as a support to the individual, not as a replacement (Keen and Scott Morton, 1978:1).

(ii) Other information

For other types of information the issues of access feasibility are different from those of organizational-task information. For information that the individual needs to access (job-related information) the organization will try to ensure that access is feasible. For his own personal records, the individual, and, if legislation is in effect, the organization, is concerned with keeping these from unauthorized access while ensuring that health and safety information is easily available where this is impor-

tant. On the other hand, for information considered prohibited to an individual, it is the organization that wants to make sure it is secure from internal and external access or leaks. Finally, non-personal information will normally have no requirements attached to it. With this framework, it is now possible to look at the impact of technology upon privacy, confidentiality, and security. To simplify the discussion, the first three categories will be considered together as "manual" technology, the other category being electronic computer technology. These reflect the two major dimensions identified in the literature on privacy, confidentiality, and security.

One of the early concerns of writers on privacy was that computer technology would mean an inevitable increase in data collection:

"... once an organization purchases a giant computer it inevitably begins to collect more information about its employees, clients, members, taxpayers, or other persons in the interest of the organization."
(Westin, 1967:161)

The second concern was for the misuse of information once it was collected, that is, the loss of confidentiality:

"... the three [fears] which seem to be uppermost in the public's mind are [the computer's] facility to compile "personal profiles", its capacity to correlate information and its provision of new opportunities for unauthorized access to personal information."
(Great Britain, Parliament, 1972:180)

Before computers, personal files were generally scattered throughout the organization. With the advent of fast telecommunication links and high-speed processors the linking of files became feasible whereas because of poor access to information it was previously infeasible: "Computers, as a consequence of their own efficiency, break down many of the protective

barriers of inefficiency, which in the past have helped to shelter privacy" (Canadian Task Force, 1972:111). This does not mean that data sharing did not previously occur: "the mails, teletype, telephone, phototransmission and radio sets were used for the data transmission, and many organizations moved extremely high volumes of information about people through these media", and Westin found evidence of manual building of individual "profiles" (Westin and Baker, 1972:252). However, computer technology does have the potential for making these links much more easily. Once the links are established it can handle almost any volume of information.

Both of these concerns have not been confirmed in practice. Westin and Baker comment "the organizations that we visited have not extended the scope of their information collection about individuals as a direct result of computerization" (Westin and Baker, 1972:249, their emphasis). Similarly, they found that for data-sharing, "... nothing in computerization itself has produced a sharing of identified information to a broader class of users within multibureau organizations or among organizations before computers" (Westin and Baker, 1972:255). This was confirmed in the U.K. study (Great Britain, Parliament, 1972:179). Nonetheless, the threat of computer technology to privacy and confidentiality remains a real one (Great Britain, Parliament, 1972:181) and the attempt to ban the use of single identifying numbers (e.g. S.I.N.) as a universal record identifier is evidence that some individuals fear the implications of using such integrating devices (Canadian Task Force, 1972:85-90).

Individuals are not only concerned that personal information is kept from unauthorized access; they also need to know that the information being used is accurate: "inaccuracy in a personal record may result in

dangers to privacy; a conviction for dishonesty might, for instance, be attributed to the wrong John Smith; a taxpayer might be listed as a defaulter when his assessment was in fact under appeal" (Great Britain, Parliament, 1975:5). Although accuracy is somewhat a function of computer hardware and software, the general consensus is that computer technology results in an increase in accuracy compared with manual system equivalents (Westin and Baker, 1972:298; Great Britain, Parliament, 1975:5). Among the reasons for this are the errors that are found and removed in converting manual files to computerized ones and the (potential) use of software to check for accuracy, completeness and reasonableness (Westin and Baker, 1972:299-300).

Security is the means to ensure the privacy and confidentiality of information (personal or otherwise). Again computer technology can be a means to breach the security systems in organizations. Using a computer terminal and having access to the organization's computer system, it is possible to access information without even physically entering the organization. However, the practice does not match the potential, leading Westin and Baker to comment:

"We found no instances of complete-outsider intrusion, solely by technological means, into computer files to obtain information content, ... We found far more examples of information breaches from manual files, reflecting their presently greater value in confidential information." (Westin and Baker, 1972:314)

The later UK study confirmed this finding (Great Britain, Parliament, 1975:7). This leads to the conclusion that security is probably at least as good for computer files as for their manual equivalents and there are good reasons for believing that security of computer-held information can

be far superior compared with manual systems. For example; terminal entry to computer systems can be restricted physically and by passwords, usage can be recorded, communication links can be made free of intrusion by electronic encryption of information, computer files can be centralized, and they can be easily duplicated to reduce the chance of total loss (Sieghart, 1976:90-94; Martin, 1976; Canadian Task Force, 1972:101-110). But whether organizations make their computer systems secure is a function of outside pressure:

"Although no system operating in the active world of government, commercial, and private life can be made permanently and completely safe, there are available techniques for providing far more security for information in computerized files than are presently being used ... [This] will depend primarily on outside pressures, especially the attitudes of regulatory agencies and law makers on how important it is to ensure the confidentiality of information in various sectors of record-keeping." (Westin and Baker, 1972:315)

Maturity of the Information System

Finally in this section on technology of access we will examine the effect of the maturity of the computer information system upon the individual's view of access to information.

Gibson and Nolan (1974) were the first to propose that information systems are subject to the learning curve within organizations. This resulted in a model consisting of four stages in the growth patterns: initiation; expansion; formalization; and maturity. Each stage is associated with different types of applications that are computerized, a growth in specialized personnel, and a need for different management techniques. The model has been modified subsequently to include a fifth stage (Nolan, 1975), and even further stages were later added with the

model adapted to distinguish between growth patterns in different functional units (Nolan, 1979).

Empirically the stage hypothesis was tested by Lucas and Sutton (1977). Instead of using the absolute budgeted amount spent in the D.P. department as originally proposed by Gibson and Nolan (1974), they normalized budgets in terms of the G.N.P. to account for inflation. Using 12 years of data, the researchers tested three models of growth: linear, exponential, and the learning curve. The best fit was a linear relationship with the learning curve providing the worst explanatory power. They conclude that D.P. budgets do not provide a good predictor of the stage of maturity.

As a different approach the number of years since major problems were involved will be used as a simple measure of maturity of the computer system. This, coupled with the measure of personal use of computer retrieval, will provide a composite measure that will be tested against the findings on access. Where a computer system is mature (most of the problems having been solved) and the individual use is high then it is suggested that the barriers to job-related information will be assessed as lower than when there are still major problems with the computer system but the usage is still high (Bjorn-Anderson and Hedberg, 1977).

V. Other Determinants

As well as the factors treated so far there are two further variables that suggest themselves as being associated with access to information. The first is the departmental affiliation of the individuals and the second is the number of years the individuals have been employed in their

current positions.

(i) Departmental affiliation

As the study will concern itself with subjects from various departments in various organizations, it would be valuable to test if access to information is dependent on the subjects' departmental affiliation. Are certain departments in a better position to gain access to a given type of information?

As mentioned before, departments largely contain the information that they need to function within their boundaries (Cyert and March, 1963: 109). This means generally that the individuals in a department would normally have better access (direct and indirect) to information peculiar to their department. For example, the production department manager is likely to have good access to production information and the marketing manager would be privy to market details. The personnel department should have good access to personal information but may have poor access to many other types of information.

The one department that has a potential to handle a great deal of the information used by most of the other departments is data processing. This, of course, depends upon the pervasiveness of computing in the organization and what stage of maturity of applications the system has reached (Gibson and Nolan, 1974). In some organizations computer applications may only have touched job-related information. In other companies it may have affected both job-related information and personal information. Clearly, because of its expertise the data processing department will have access to the information from most applications that are computerized and it is therefore expected that D.P. managers will believe they have

better access to most types of information than managers in comparable positions in other departments. If this is so it would somewhat confirm the work of Bariff and Galbraith (1978) who suggest that power will accrue to the data processing department because they control several strategic contingencies (Hinnings et al., 1974).

(ii) Experience of position

In addition to their departmental affiliation, the number of years individuals spend in their jobs is expected to improve their view of access to information. Arrow (1974) has commented upon the initial investment in learning new procedures and gaining contacts before signals can be obtained and interpreted. Weber noted that the time spent by a bureaucrat in becoming familiar with an organization's rules and regulations etc. gave a considerable advantage to the bureaucrat over the new (political) incumbent (Weber, 1952). Mechanic (1962) has developed the following formal hypothesis: "Other factors remaining constant, as a participant's length of time in an organization increases, he has increased access to persons, information, and instrumentalities". Although Mechanic deals primarily with lower participants in organizations, his hypothesis is clearly extendable to other ranks of employees and can be (partially) tested in this study.

Summary

Chapter Two has identified several organizational and other variables which are likely to influence the direct and indirect regulation of access to information. For each variable the literature was presented and discussed and likely relationships to access were identified.

It was shown that the external regulation of access through mechanisms such as government legislation acts as a constraint upon the direct and indirect regulation of access to specific information types. By using a Canadian sample of middle managers these factors are largely controlled in this study. Next, a series of structural variables were considered. It was argued that increasing size is likely to have a negative impact on both the convenience of access and on the manager's authority to access non job-related information. Decentralization of authority is expected to be positively related both to a manager's authority to access information and to the manager's ability to be able to retrieve and use information. The literature suggests that the level of the manager in the company's hierarchy will be positively related to the ability to access information. The manager may require more information access than other employees lower in the hierarchy, but the organization can supply the manager with more resources to effect such access. Increases in the "height" or the "width" of an organization are likely to increase a manager's barriers to access. In the case of the "width" it was argued that this relationship should only hold for non-routine tasks. Higher routineness of the manager's job is expected to reduce the barriers to information required for the manager's job. However, because these jobs are predictable in their information requirements, an organization can determine more clearly what information the managers are not authorized to access.

Both high "norms" of data sharing and a positive attitude of data sharing are expected to reduce many of the barriers to information access. It was also argued that the effect should be more pronounced for the latter variable. The technology used to access information is expected to

influence the direct and indirect regulation of access. For routine tasks, it was argued that the high deployment of computer technology would probably increase the convenience of access to required information, while reducing the authority and convenience of access for information not required for the job. A discussion of the literature on access to personal records using various forms of technology was also presented. For managers in companies with "immature" computerized information systems it was suggested that they would have impaired access if their work demanded the high use of computers.

Some literature was presented showing that data processing managers are likely to have better access over information than other managers. Finally, the manager's greater experience in a job was shown to improve the ability to access information. The presentation of the relationships as formal hypotheses is given in Chapter Three.

CHAPTER THREE

THE STUDY

The objective of the empirical study was to test hypotheses linking access to the independent variables described in Chapter Two. This chapter begins with a formal statement of the hypotheses that were tested. The chapter also describes the development of the questionnaire, the interview technique employed, and the population sampled.

Although the study is concerned with how organizations regulate access, the empirical work focussed largely on managers' perceptions of these regulations. In this study we assumed that the managers' perceptions of their organization's direct and indirect regulation of access to information formed the "enacted environment" to which they reacted (Weick, 1969). Of course, individual managers may not understand correctly their duties or their rights of access. However, it is assumed that their perceptions of the regulation of access formed part of the basis for the subsequent actions they took concerning the retrieval and use of information.

I. The Hypotheses

For each independent variable one or more formal hypotheses are stated.¹ After each hypothesis a summary of the rationale is presented.

1. Access and Size

H₁: The "costs" or barriers to access of information in larger companies/departments are higher than those experienced in smaller companies/departments.

Rationale: As the size of the company/department increases it is expected that attitudinal barriers to access will also increase as a result of employees experiencing greater alienation from their company (Steers, 1977). Additionally, the size of the unit affects the geographic dispersion of information and the need for greater communication (Bacharach and Aiken, 1977). In each of these cases the direction of the relationship suggests that managers should experience greater barriers to access in larger companies/departments. Because of the "washout" effect of treating a collection of different departments as a whole company, the relationship between the barriers to access and size should be more pronounced for departments than for companies as a whole.

H₂: A manager's authority to access non job-related information is lower in larger companies/departments than in smaller units.

Rationale: For larger companies/departments it is expected that more formal control of access has been established. This results in greater restrictions being placed on informa-

¹ The hypotheses are all written as the alternatives to corresponding null hypotheses.

tion, particularly that which the manager does not require to perform his job.

2. Access and Decentralization of Authority

H₃: A manager's authority to access information is higher in those companies with greater decentralization of authority.

Rationale: A manager able to exercise greater authority over decision-making is also expected to be able to exercise greater discretion over work-related and personal information, i.e., a manager's local authority includes authority over information.

H₄: A manager's "costs" or barriers to access of information are lower where authority is decentralized compared with those cases where authority is not decentralized.

Rationale: Part of the reason for decentralizing decision-making is to reduce the need for inter-department communication (Galbraith, 1973). The department should contain most of the information a manager needs to perform his job. Hence, access to information within the department is mainly required. Consequently, the barriers to information are expected to be lower.

3. Access and Organizational Level

In this study, organizational level was largely controlled by choosing a population of middle managers. For this reason the effect of the subjects' level upon access to information was not tested.

4. Access and the Shape of the Organization

The shape of a company was measured by the number of levels of authority in a manager's department (an indication of the hierarchical depth of the company), and the number of distinct departments (the width of the company)

(Bacharach and Aiken, 1977).

H₅: A manager's "costs" (barriers) to using information are greater in companies with greater vertical differentiation (levels of authority).

Rationale: The number of levels of authority governs the number of different people that process the information before the manager receives it. The more intermediate processing that takes place the greater the likelihood for distortion and omissions to occur (Wilensky, 1967; March and Simon, 1958).

H₆: For managers performing non-routine jobs in companies with high horizontal differentiation (more departments) the "costs" of access to job-related information are higher.

Rationale: For routine, predictable jobs the proliferation of departments may improve the managers' access to information by bringing closer together those whose jobs are similar (Cyert and March, 1963; Aguilar, 1967). For non-routine jobs, however, a greater number of departments is likely to result in greater "costs" of access to job-related information because the local department will not contain all of the information the managers need for their jobs. In these cases the managers will normally find access to information held in other departments to be more difficult and inconvenient (Ackoff, 1967).

5. Access and Routineness of Technology

H₇: A manager who performs more routine tasks faces lower "costs" (barriers) to access of information required for such tasks and higher "costs" (barriers) to the access of information that is not required for the tasks.

Rationale: For routine, predictable jobs the organization can specify in advance the types of information the manager needs and the

patterns of access necessary to retrieve the information.

The same reasoning can be used to argue that the manager who performs routine jobs can be barred from the access of information not required for the job (Comstock and Scott, 1977).

6. Access and Attitudes to Data Sharing

H₈: Managers in departments where the norm of data-sharing is high face lower "costs" (barriers) to the retrieval of job-related information and have higher authority to access the same information.

H₉: Managers in departments where the attitude to data sharing is characterized by trust and openness, face lower "costs" (barriers) to the retrieval and use of all types of information and have higher authority to access this information.

Rationale: The norm of data sharing in a department results in a greater sharing of information required for the job. Trust and openness, however, result in both an increase in information sharing and increased credibility for the information source. This leads to a lowering of the "costs" of both retrieval and use of all types of information (Zand, 1972; Dewhurst, 1971; O'Reilly and Roberts, 1976). For each type of information for which the manager has increased access there will be a corresponding increase in authority.

7. Access and the Technology of Access

H₁₀ Managers who perform routine jobs and who use computers frequently face lower "costs" (barriers) of access to information.

Rationale: The use of computer technology can affect access directly, by increasing the speed of retrieval, for example, or indirectly by altering the patterns of access to previously unconnected sources of information. It is to be expected, therefore, that for routine jobs where the requirements for information

are known and the patterns of access are relatively stable, the retrieval of such information will appear to be more convenient to the manager. Additionally, there is some evidence to suggest that managers have increased confidence in using computer-generated information (Koester and Luthans, 1979; Luthans and Koester, 1976).

H₁₁: Managers who use computers frequently for their jobs have lower authority to access information not required for their jobs and face higher "costs" (barriers) for the retrieval of such information.

Rationale: Computer software can enforce more effectively the access authority structure than manual administrative systems. Therefore, managers who use computers frequently should have lower authority to access information not required for their jobs and face increased barriers to the retrieval of this information.

8. Access and the Maturity of the Information System

H₁₂: Managers in companies where the computerized information system is immature but where their work demands frequent computer use face higher "costs" (barriers) of access to job-related information.

Rationale: The managers' access to information is made harder when both the information system still has major problems and the managers' work requires its use.

9. Access and Departmental Affiliation

H₁₃: Managers from data processing departments face lower "costs" (barriers) of retrieval to all types of information compared with managers from other departments.

Rationale: It is expected that data processing managers will have more convenient access to most or all types of information

that are administered through their department. Although they may be capable of retrieving all of the information stored on the computer files, it is not expected that d.p. managers are capable of or interested in using a large proportion of the data that passes through their department.

10. Access and Experience

General information processing skill is assumed to be positively related to the manager's age. Specific, job-related information processing skill is measured by the number of years the manager has held the current position in the company.

H₁₄: Managers with greater experience (general and job-specific) face lower "costs" (barriers) of access to all types of information.

Rationale: All new jobs require substantial start-up "costs" before managers are familiar with the rules and practices of access. With experience (general and job-specific), managers develop personal networks of contacts to enhance their access ability (Arrow, 1974; Mechanic, 1962).

11. Relationships Between Authority, Retrieval, and Use

In addition to testing the formal hypotheses presented above, the following relationships were considered to be of special interest and, therefore, they were the object of further analysis. One type of analysis was performed to demonstrate the relationship between the authority ratings for different types of information. It was hypothesized that access to confidential information would be less authorized than access to non-confidential information and that authority to access work-related information would be greater than authority to access non work-related information. It

was also postulated that authority to access subordinates' records would be higher than the authority to access either the subjects' own records or those of other managers. The analysis produced a complete ordering of these authority measures. A similar analysis was carried out for the measures of indirect regulation for each type of information. A parallel ordering to the authority profiles was envisaged for the general question on access ability.

A second type of analysis was performed to investigate the links between authority and access ability. For this purpose, the component variables that a priori measure retrieval and use were aggregated to form two composite variables for retrieval and use for each type of information. Each variable was tested for intertest reliability. Correlational analyses were then conducted between each rating of authority to access and the corresponding composite variables for retrieval and use, as well as between authority and each individual variable.

In the final analysis, the relationship between general access ability and the composite variables for retrieval and use were sought. The questions addressed here were, what are the relative weights given to retrieval and use in determining access, and how do these weights change given the different information types?

II. Data Collection

Before testing the hypotheses presented in the previous section a combination of questionnaires and interviews was employed to gather the data. They are both described below.

1. Questionnaire Development

A copy of the questionnaire used in this study is presented as appendix I. The four sections in the questionnaire are as follows:

- (i) Rules of access to information
- (ii) The practice of access
- (iii) General questions about access
- (iv) Questions about the company, the work, and
the manager

(i) Rules of access to information

In this section, the objective is to measure the managers' perceptions of their authority to access different types of information. The types of information are those discussed in the first part of Chapter One. For job-related information the categories used are confidential/non-confidential, and needed for the job/not needed for the job. It was found that in the course of the pilot study that it was necessary to be more precise over some of these terms. For example, in order to help managers understand what was being referred to as confidential information, the term was defined as "information which if released to other companies would prove harmful to the performance of your company". This was done to stress the value of this type of information if leaked to competitors in the belief that companies would handle this information differently. Subsequently, this was modified to cover those companies which do not have competitors,

such as regulated monopolies.

A further suggestion made was incorporated into section I which enabled the managers to focus on specific examples of confidential and non-confidential information. A range of examples was developed and modified in the pilot study to include those found frequently in commercial companies. An open-ended category was included for further examples peculiar to the individual subjects.

Personal data is divided according to whether managers are authorized to see their own files, their subordinates' files, and other managers' personal information. The personal items are subdivided into four broad categories, the most obvious one being job status (salary, grade, job history) as this has had special mention in the literature (Forrester, 1965). A seven-point Likert-like rating scale was used throughout this section.

(ii) The practice of access

In this section of the instrument the objective was to obtain the manager's assessment of various factors that may enhance or hinder access to data. Again, seven-point Likert-like rating scales were employed throughout this section.

The factors were those developed in detail in the second part of Chapter One; each statement forms a summary of the discussion presented there. One additional statement was added after the pilot study, "others fail to recognize the manager's legitimate authority to get this information", otherwise all of the statements were derived from the literature. The statements were divided into two, approximately equal groups and one group was reversed. That is, there are some statements that describe the company

as enhancing access to information while others refer to barriers to access faced by managers. The rationale for this was to prevent subjects providing patterned responses to the statements. Several subjects confirmed in the interviews the effectiveness of this device in making them carefully consider their responses to the statements, while others commented on the comprehensiveness of the statements on access. Finally, the statements were randomized to prevent order effects, and a summary statement on retrieval and use of information was appended.

The order of the information types is the same as in section I. In cases 1-2 and 3-4, the subject is asked to bring forward the examples used in section I. This has had the disadvantage of making the subject turn back pages if the examples previously used cannot be recalled. However, it does ensure that the subject is focussing on the same information types used in the previous responses and it is thought that this outweighs the inconvenience caused by the exercise. Where it is appropriate, the manager is given the option of leaving a particular column blank if the data type cannot be retrieved. This is logically necessary because if the data type cannot even be obtained, it is pointless to ask the manager to respond to statements about its retrieval and use.

(iii) General questions about access

These two questions were used to supplement the information gathered from the first two sections. The first question was designed to assess the manager's view of how much data the company classifies as confidential. The subject has already indicated in section I the items that are confidential and the greater number of items ticked would be a rough indication of how pervasive confidential information is in the company. However,

there may be items not covered by the examples given that are nonetheless confidential. The answers to this statement give a more comprehensive assessment.

The second question asked the managers to indicate which features exist in their company to promote access to information and how effective these features are. The responses to this question were used to supplement the data gathered in section II of the questionnaire.

(iv) Questions about the company, the work, and the manager

The questions in this section follow closely the discussion of the independent variables in Chapter Three. The general objective in this section was not to develop new instruments to measure these independent variables but to use, where possible, established measures.

Size of the Company

Two measures of size were used in this study. The first is the total number of employees in the local organization (Bacharach and Aiken, 1977: 369). As it is unreasonable to expect managers to know the exact number of employees, five equal interval categories were used with an additional open-ended category for large companies (Bouchard, 1972).

The second measure, which is believed to be the more important one, is the number of employees in the manager's department and each subject was asked for an exact rating.

Shape of the Company

The horizontal differentiation is measured by the number of departments and this was done by asking the subjects to circle a number up to 10. If the number of departments is greater than 10 (the normal case in large companies) the subjects were asked to specify the number. Vertical differ-

entiation was obtained from the number of levels of authority from the department head to the lowest category of worker. Originally, the question was put without the word "authority" and several subjects in the pilot test interpreted this to mean job grades. Finally, the same part asked the subject to indicate which level he/she is at, using "1" to represent the department head or higher.

Routineness of Technology

The six items to measure routineness of technology at the individual level came directly from Bacharach and Aiken (1977) who follow the tradition of Hage and Aiken (1969) in measuring technology at an individual level. Their instrument was adapted to include seven-point Likert-like rating scales to provide consistency with the previous sections. Three of the statements were reversed.

Decentralization of Authority

To measure decentralization of authority, an instrument was used that was first developed by Hage et al. (1971). They asked managers to respond to whether they could make decisions in various areas (18 in all). The instrument was modified in two ways during the pilot study. Firstly, subjects found that for some areas they could make decisions but only after they had referred the matter to their superior. Secondly, several subjects had trouble with the word "sanctioning". The first problem was eliminated by asking them to respond YES/NO to whether they could make decisions in these areas without reference to a superior. The second ambiguity was cleared up by changing the word "sanctioning" to "disciplining". These were both considered minor changes that should not materially affect the instrument.

Retrieval Technology

The categories for retrieval technology were developed from those suggested by Burch and Strater (1974) and Aguilar (1967). An additional question was appended to ask the managers to estimate, to the nearest ten percent, the frequency of use of the four technologies for work-related information. Some concern was expressed prior to the pilot study about the feasibility of using this question but several subjects in the pilot test commented on its usefulness in interpreting the other questions on retrieval technology.

Attitudes Towards Data-Sharing

Attitudes to data-sharing were measured in two ways. Firstly, the "norms" of data-sharing were measured with a single question from a study of communication behaviour (Dewhirst, 1971). Attitudes of trust and openness of communication were measured by four questions adapted from another communication study (O'Reilly and Roberts, 1976). Once again, a seven-point Likert-like rating scale was used for consistency with the rest of the instruments. No particular type of data was focussed upon in these questions. The measures for routineness, decentralization, and attitudes to data-sharing were subjected to an intertest reliability measure (Siegel, 1956:229).

Maturity of the Information System

Two measures were used to measure maturity of the computer information system. The first measure of maturity was the number of years computers have been used for technical or administrative functions. The second question requested an estimate of the number of years since most of the original

computer problems were overcome and the computer was accepted into the normal procedures of the company. Subjects were asked to tick a box with a given range associated with it. For the second question, an additional box was given for subjects to indicate if major problems still exist.

Biographical Details

The final part of the questionnaire requested biographical details from the subjects. The items were; age, sex, highest level of education, job title, number of years at present level, department, and company type. These are largely used for sample reporting purposes. "Age", "number of years in present position", and "department" were used in testing specific hypotheses.

2. Pilot Study

Eleven subjects were used as a pilot test to reveal any weaknesses in the instrument. This resulted in the following discoveries and changes in addition to the ones mentioned above in the text:

1. The instrument was too long. At nineteen pages it was felt that subjects would resist answering the questionnaire. The length of the questionnaire was cut by two methods. Firstly, the sections on general information (non-personal) were dropped. Although the subject of access to general information was of some interest, its elimination was made possible by the questions in section III on features to promote access to data. Additionally, several subjects mentioned their difficulty in understanding exactly what general information was. Secondly, the whole questionnaire was retyped on large-sized paper and then photo-reduced by 25 percent. Together, these methods produced a questionnaire that was nine pages in

length without any loss of readability. Although the number of questions had only changed slightly, it was felt that the new questionnaire was of greater acceptability than the older version. Timing results indicated that most managers could complete the questionnaire using twenty to forty minutes. This was important because the data collection involves a mailing sample as well as a number of interviews.

Finally, a covering letter was added to the instrument. This explained the purpose of the study and assured the subjects of the confidentiality of their responses. The letter also offered them a final report comparing access across several companies.

3. The Research Interview

Because it was not possible to gather all of the data required on access using a questionnaire only, one part of the sample was interviewed. For both the pilot test and the main study, these subjects were contacted by letter, telephone or both. If they agreed to participate in the study, a questionnaire was sent to them by mail (if they had not already been sent one) which they were asked to complete prior to an interview. The interviews were arranged over the telephone and they were normally scheduled during work hours.

The interview method is what Bouchard (1972) calls a type II, where specific questions were asked by the researchers but the subjects could respond in an open-ended manner. This leaves considerable flexibility for the researcher and the subject to explore areas that require extensive elaboration. The responses from the questionnaire represent the more structured approach (Type I). Additionally, a method of questioning called "funneling" was adopted where possible. This method is to sequence

questions from the most general type first (e.g. does the company have a formal policy on access to information?) leading to more specific questions later (e.g. can you give specific examples of the policy formation process?).

Tandem interviews are reputed to be extremely effective especially at the exploratory stage (Bouchard, 1972; Kincaid and Bright, 1957). This method was adopted for some of the pilot study interviews, otherwise solo interviews were employed throughout. The length of the interviews generally fell within the range of 40-60 minutes although some subjects were so enthusiastic that up to ninety minutes would be used in the course of the interview.

The objectives of the interviews were as follows:

1. They enable the subjects to clear up any difficulties they may have had with the questionnaire and therefore increase the validity of their responses. Few subjects found any difficulties and where they did these were only minor points. The majority of subjects had little difficulty in both reading and answering the questionnaire.
2. The interviews allow the researcher to supplement the questions in the questionnaire. For example, several of the respondents had been in the organization for a great deal longer than they had been in their present position. It was apparent that general knowledge about the company and the contracts made over a number of years in several departments was important to the subject's view of access to information.
3. They lead the interviewer to new areas of importance to access not covered in the questionnaire. For instance, industry competition seemed to be an important factor in influencing the policy and practice of access. Although this was not covered directly in the questionnaire, it did become apparent during the course of the interviews.

4. The interviews reveal many anecdotes about access to information. For example, several subjects mentioned examples of information leaks and how these led to policy or practice changes. These examples are invaluable to the understanding of access and point to further areas for study.

At the completion of each interview, the questionnaire was collected if it had been completed or if it had not, a return stamped-addressed envelope was left with the subject.

4. Population of Subjects

Subjects were chosen from a population of approximately 1,150 middle managers in various companies throughout the province of British Columbia, Canada. For the mailing sample, subjects were systematically selected from two mailing lists. For the interview sample (questionnaire and interview) the subjects were chosen judgementally from middle managers in the lower mainland of British Columbia. The criteria for selection in the interview sample was to use middle managers from a wide variety of companies and departments. The initial contact in most of these companies was the data processing manager and further subjects were solicited from these contacts. In order to discover any differences, the samples were subject to an inter-sample difference test for each variable.

The total number of questionnaire subjects selected from the population was under 500. This number was chosen on the assumption that a minimum response rate of twenty percent would provide a sufficient number of useful questionnaires to enable a meaningful interpretation of the results and to gain increased significance from the measures of the relationships.

CHAPTER FOUR

THE FINDINGS

I. The Sample

1. Response rate

For the total sample, 466 questionnaires were distributed to managers. One hundred and seventy usable scripts were returned, giving an overall response rate of 36.5%. In the case of the interview sub-sample, a total of 55 questionnaires were sent to managers and 53 interviews were conducted. From this sample, 51 valid questionnaires were obtained for a response rate of 92.7%.

Because the response rates varied somewhat between the sub-samples (one interview, two mailings) and because of the different selection techniques employed, a K-sample median test was conducted for each dependent variable. Significant differences in seven percent of the variables were obtained (10 out of 135). This inter-sample difference was judged to be sufficiently small to enable the sample to be treated as a whole in subsequent analyses.

2. Total sample

The distributions by industry and departments of the responses received from the total sample are given below in tables I and II.

Table I

Composition of Total Responses by Interview

Forestry	11
Mining	6
Manufacturing Industries	17
Construction Industries	6
Transportation, Communication, and other Utilities	29
Trade (wholesale and retail)	17
Finance, Insurance, and Real Estate	19
Community, Business and Personal service Industries	30
Public Administration and Defence	35
Total	<u>170</u>

The companies ranged in size from less than ten employees to twenty-three thousand. The mean size was 2,537 while the median was 503 employees.

Table II

Composition of Total Responses by Department

Marketing	8	Medical	2
Sales	5	Data Processing	14
Finance	24	Transportation	2
Accounting	42	Maintenance	1
Purchasing	3	Public Relations	3
Personnel	9	Warehouse	1
Customer Service	5	Education	1
Engineering	7	Training	1
Labour Relations	2	Credit	1
General Administration	25	Planning	7
Building	2	Production	1
Real Estate	4	Total	<u>170</u>

Departments varied in size from one to over 1,000 employees. The mean was 63 while the median was 18 employees.

3. Interview sample

The distributions by industry and departments of the responses received from the interview sample are given below in tables III and IV.

Table III

Composition of Interview Responses by Industry

Manufacturing Industries	2
Transportation, Communication, and other Utilities	16
Trade (wholesale and retail)	8
Finance, Insurance and Real Estate	5
Community, Business and Personal service Industries	10
Public Administration and Defence	10
	<hr/>
Total	51
	<hr/>

Table IV

Composition of Interview Responses by Department

Marketing	2	General Administration	8
Sales	1	Medical	2
Finance	4	Data Processing	13
Accounting	4	Maintenance	1
Purchasing	2	Public Relations	3
Personnel	3	Warehouse	1
Customer Service	4	Education	1
Engineering	1	Planning	1
			<hr/>
		Total	51
			<hr/>

II. Profiles of Access and Authority

In this section we report on the differences in authority and barriers to access of information perceived by managers. The types of information that are considered are given below:

- Case 1: Confidential information required for the manager's job
- Case 2: Confidential information not required for the manager's job
- Case 3: Non confidential information required for the manager's job
- Case 4: Non confidential information not required for the manager's job
- Case 5: Own personal details
- Case 6: Subordinates' personal details
- Case 7: Other managers' (peers') personal details.

The indices used to measure authority for cases 5, 6, and 7 were simple linear combinations of four measures. The four measures were job status (salary), job performance, general comments, and biographical details. These combinations were submitted to a reliability test (Siegel, 1956:229) and their components were found to be significantly associated with one another ($p < .01$).

1. Types of information chosen by the managers

In section I of the questionnaire (Appendix I), the managers were asked to tick those types of information that were considered confidential to their organization. The following types of information were subsequently chosen by managers to represent important examples in their companies of confidential and non-confidential information:

(i) Confidential Information

	n	%
Minutes of Board Meetings	31	18.2
Detailed Sales Reports	16	9.4
Customer Lists	14	8.2
Pricing Formulae	14	8.2
"Other" category	45	26.5

(ii) Non Confidential Information

	n	%
Production Figures	40	23.5
Inventory levels	14	8.2
Machine Service Reports	14	8.2
Supplier Details	13	7.6
"Other" category	27	15.9

Discussion: Almost one in five subjects chose minutes of board meetings as the most important example of confidential information in their company, suggesting the important and strategic nature of such details to many companies, even though these details are often terse or highly summarized. Similarly, detailed sales figures were prominent in the choice of several managers. Both of these items of information featured highly in the interviews. An analysis of the "other" category for confidential information revealed that approximately 50% of subjects chose types of information that were peculiar to their companies.

2. Distributions of authority and access measures

(i) Authority

Using a Likert-like seven-point rating for authority to access the seven types of information, the following median values were recorded with 1 and 7 representing the lowest and highest possible authority, respectively.

	Authority Rating	Percentage of subjects with: Lowest Authority (1) Highest Authority (7)	
Case 1: Confidential information required	6.68	7.1	63.3
Case 2: Confidential information not required	3.32	28.9	24.7
Case 3: Non confidential information required	6.89	4.3	74.4
Case 4: Non confidential information not required	6.54	4.8	51.8

	Authority Rating	Percentage of subjects with: Lowest Authority (1)	Highest Authority (7)
Case 5: Own personal details	6.91	0.0	58.8
Case 6: Subordinates' personal details	6.95	1.2	69.6
Case 7: Other managers' (peers') details	1.48	45.8	4.8

(ii) Access

For each category of information, a general question on the ease of access was answered by the subjects. The question was worded, "Generally, it is easy to get and use this type of information", with ratings of 1 and 7 representing extremely poor and extremely good access, respectively. For each of the cases 2, 4, 5, 6, and 7 a significant number of subjects¹ indicated that information could not even be retrieved and consequently these subjects provided no response for the question on access. In the distribution of access given below, the adjusted values for lowest and highest access were recalculated on the assumption that if managers cannot obtain a certain type of information, then their access is the lowest (1). The recalculated percentages are given in parentheses. Otherwise the figures are for subjects who had at least some access.

¹ The numbers of subjects who indicated that a particular kind of information could not be obtained at all were 66, 25, 5, 9, and 101, respectively.

	Access Rating (Median)	Percentage of subjects with: Lowest access (1)	Highest access (7)
Case 1: Confidential information, required	5.59	14.1	32.1
Case 2: Confidential information, not required	4.47	9.7(45.3)	24.3(14.7)
Case 3: Non confidential, required	6.35	7.1	47.6
Case 4: Non confidential, not required	5.72	8.4(23.0)	41.3(34.7)
Case 5: Own personal details	5.71	10.3(12.9)	32.7(31.8)
Case 6: Subordinates' personal details	5.87	9.3(14.1)	36.6(34.7)
Case 7: Other managers' (peers') personal details	2.57	37.7(74.7)	10.1(4.1)

The two groups of managers who could not obtain work-related information when it is not required for their jobs (cases 2 and 4) will be used in the analysis later to provide examples of those managers who are barred explicitly from obtaining information.

The median values for each variable used to measure access (i.e. the barriers to access) are presented for the seven cases of information as Appendix II. In considering the barriers, the lowest value 1 represents the highest access whereas 7 is the poorest access.

(iii) Techniques used by companies to prevent access

In the interview sample, managers related details of several techniques their companies used to regulate access directly and indirectly. The details of these mechanisms are presented in Appendix VI and are summarized below in table V using the categories developed for the questionnaire.

Table V

Summary of Techniques to Prevent Access

a) Direct Regulation

Directives from management concerning access policy
Channeling of external statements (use of public relations or
a designated spokesperson)
Sanctions or threats to employees
Special report markings

b) Indirect Regulation
Retrieval

1. Difficult or lengthy access procedures
Physical security (guards, badges, designated areas)
Use of computer technology to deter unauthorized access
2. Embarrassment
Retrieval difficulties (need to justify requests to others)
3. Permission of superior
Retrieval difficulties
4. Location
Retrieval problems (inconvenient distance)
5. Existence not known
Promotion of ignorance of information existence
Non-recorded information
Visual access to information
6. Failure of authority
Retrieval problems
7. Timing
8. Cost
Use of computer to promote information cost awareness

Use

1. Difficult language, symbols, or jargon
Coding of information
2. Irrelevant details
Information overload
3. Missing details
Use of summarized data

3. Profiles of authority and access

The values presented in previous tables give a qualitative picture of the relative order of authority and access. Additionally the individual subject's ratings were also subjected to an inter-case Wilcoxon matched-pairs ranked-signs test (Siegel, 1956:75). If case 1, for example, has authority ratings consistently higher than case 2 at a .05 level of significance, this is denoted as $1 > 2$ in the presentation below.

(i) Ordering of authority

The analysis produced the following order for authority

$$\left. \begin{array}{c} 3 \\ 5 \\ 6 \end{array} \right\} > 1 > 4 > 2 > 7$$

In addition, case 6 was found to be significantly greater than case 5. The ordering shows that non-confidential information required for the managers' job has approximately the same ratings as personal information about themselves and about their subordinates with the one exception mentioned above. These three types of information are authorized significantly more than confidential, required information. Confidential information which is required for the job, as expected, has higher authorization than non confidential information that managers do not require for their jobs. Confidential information not required has lower authority ratings than non confidential information which is not required. Finally, information concerning other managers is found to be significantly lower in authorization than any other type of information.

(ii) Ordering of access

The second analysis produced the following order for access.

$$3 > \left\{ \begin{array}{c} 4 \\ 5 \\ 6 \end{array} \right\} > 1 > 2 > 7$$

Additionally, although cases 4, 5 and 6 were indistinguishable from one another, cases 5 and 1 were also not significantly different. The profile shows that the best access was obtained by managers to non confidential information that they require for their jobs. Access to this information was significantly better than access to non-confidential information not required for the job, and to the first two types of personal information. These three categories were generally more accessible than confidential information required for the managers' jobs (see above for an exception to this, though). However, access to confidential information was significantly lower in the situation where it is not required than when it is required. Once again, access to other managers' personal details provided the lowest ratings of all.

Discussion: The authority and access ratings provide good support for the hypothesized relationships. Authority to access confidential information is lower than the ratings for non-confidential information. Authorization to access work-related information is much higher than managers' authority to access information not required for their jobs. Also, authority of access to personal details of subordinates is higher than the authority to access one's own details (marginally higher) and those of other managers (substantially higher). The pattern for the general questions on access parallels the ratings for authorization.

The relationships that were hypothesized for authority and access across the information types formed only a partial ordering of the ratings. Using the Wilcoxon method it was possible to obtain a complete ordering of

the ratings. This raises few surprises but there are some interesting differences between the order for authority and the order for access. Firstly, for authorization there is a clear priority for work-related information. Cases 3, 6, and 1 are all relevant to the work of managers and feature highly in the order. The exception is case 5, information about themselves, which is rated approximately level with the authority to access non-confidential information and authority to access subordinates' details. Both types of information (cases 4 and 2) which managers do not require for their jobs are generally low in authority. The lowest authority of all was found for access to other managers' details. This means that managers perceive that they have significantly higher authority to access confidential information not required for their jobs than they have to each others' personal details. Secondly, a similar pattern appears in the ability to access information. However, non-confidential information has obtained the dominant rating in terms of ease of access. Case 3, non-confidential information that is required by the managers, is easier to access than any other type. When the non-confidential information is not required for the manager's job (case 4) the ease of access is only slightly lower. Towards the lower end of the scale of ease of access we find confidential information (cases 1 and 2) and associated with this is the ease of access to other managers' details (case 7). The ease of access ratings do not include those subjects who could not obtain the specified information.

The following conclusions are suggested by this evidence. Firstly, managers in the sample were authorized to have access to information needed for their jobs and generally had lower authority or no authority to access information not needed for their work. Secondly, non confidential

X information was easier to obtain and use than confidential information. For example, managers had greater access to non confidential information not required for the job than to confidential information required for the job. This probably reflects the greater security and secrecy that is applied to confidential information and implies that the regulation of confidential information is generally indirect. Thirdly, personal information about themselves or their subordinates is perceived by the managers in a similar way to non-confidential information. Generally, access is authorized and it is reasonably easy to obtain. Fourthly, access to personal details about other managers is almost universally unauthorized and extremely difficult to obtain in practice even when it is authorized. For this type of information the closest parallel is confidential information where it is not required for the managers' jobs. However, access to other managers' details would seem to be treated with even greater care than confidential information.² Lastly, the managers generally believe that their authority and ability to access information concerning themselves is relatively high, providing some additional support for a similar finding from another Canadian study (Canadian Task Force, 1972).

Further evidence was obtained from the interviews. These results generally support the above conclusions and provide some of the details that were not possible to collect in a structured questionnaire. For work-related information (cases 1-4) over fifty percent of managers claimed that access in their company is supplied on a "need to know" basis. Sometimes this rule was applied to confidential information only. In other cases it would be applied to both confidential and non confidential

² This supports the assertion made by Forrester (1965).

information alike. Apart from denying authority to access information that is not needed, the companies in the interview sample used a variety of indirect regulation mechanisms in order to seal off access to certain types of information (ignorance of existence, non-recording of information, coding, physical security, etc.). Each of these is fully discussed in Appendix VI. The point to be made here is the clear separation made in many companies between information needed and not needed for a manager's job. A few examples will illustrate the point. In a department store, the manager received detailed monthly operating figures for her department and for similar departments in other store locations. Similar reports for other departments (i.e. not needed for the manager's job) were not available. In several companies, the minutes of manager's meetings were only available to managers in those departments which were materially affected by items discussed at the meeting.

Although the pervasive rule was access to information on a "need to know" basis, there were exceptions. Two managers from the same company noted that most work-related information was available to them whether they needed it or not. Their concern was that they were sent too much unnecessary information (Ackoff, 1967; Mintzberg, 1975). Usually this information would not be confidential. However, in one other company, managers openly received confidential profit plan information regardless of whether it was needed for their jobs.

In contrast to policies concerning access to work-related information, personal (personnel and payroll) information on employees at all levels was often the subject of elaborate rules of access. In ten of the companies, the rules of access were written down and made available to management and occasionally to other employees. In all of the companies

visited the managers understood that rules of access to this kind of information did exist even if they were not always personally familiar with the rules.

All of the managers interviewed were provided with access to personal information at least on a "need to know" basis. At least some information on subordinates and other employees who are seeking employment in the manager's department was always available (cf. Cary, 1976). The rules on the managers' access to their own records varied a great deal from company to company. In nine companies managers had the right to access information kept on them. In four companies the managers were strictly forbidden from such access. Managers in three companies commented that they had never tried to access their own record and did not know what their rights of access were.

Although the questionnaire results make it appear as if access to their own records is good for managers, the interview findings indicate that many of these managers may be assuming that their authority and ability to access this information is adequate. In practice they may have never attempted to retrieve this information. Almost all managers agreed that the one area they were prevented from accessing was information, particularly on salaries, about other managers both at their own level and at a higher level. The exception to this was in those organizations where they are required by law to publish salary and expense payments. This strongly supports the questionnaire findings.

In three of the companies the rules of access to personal information were very elaborate. This situation was found where the rules of access were built into the collective agreement with the union. For example, in an industrial board the rules of access to personal information covered

grievance procedures. Detrimental comments on employees have to be purged after a set time period. The agreement covers the extent of personal data collection and excludes management's keeping of informal records. Only the formal records can be used in grievance procedures.

Personnel and payroll information were often treated differently in the companies. In all but three companies, personnel information was kept in a central department in a documentary form. Several managers commented that most of this information could not be computerized. In all of the medium or large companies, payroll information was computerized and was often administered by a payroll department. The amount of personnel information collected varied a great deal between the companies. In one privately owned company very little personal information was used. Neither sick leave was recorded nor were medical records kept. In contrast, the human resources department of a large corporation kept extensive records in an effort to be seen to be fair to the employees, including managers. In one company, the managers were required to take a psychological test. The results were not shown to the individual concerned. The same company also kept extensive records on disciplinary actions. This was apparently in response to a decision in the courts to tighten labour regulations concerning grievance processes.

The important factor that determined the access policy on payroll information was salary details. The exceptions to this were found in those organizations covered by the need to report the salaries of managers publicly or for salaries of employees covered by collective agreements. In all other cases, salaries of middle or higher managers were treated as very sensitive information. Again, this was reflected in the questionnaire findings. In two cases, talking to other employees about

salaries was a cause for disciplinary action. In four of the organizations there were at least two payroll systems corresponding to the levels of the individuals in the organization. For example, one company had three levels of payroll. The first level was a general payroll and was used largely for unionized workers where the pay rates are published and reasonably well known internally. The next level was a "semi-private" payroll for middle management which was administered by the controller's secretary. Some status was attached to being on this payroll. Managers were strictly prohibited from accessing each other's details. Indeed, when one manager wanted the general salary levels, not of specific individuals, but of junior managers in another department for comparative purposes he was told that the information was not available to him. The last and highest level of payroll was for executives only and the president's secretary handled this through an outside bank. An interesting situation arose in some companies where the unionized workers' salaries began to exceed those paid to some managers. The access to this information was often only one-way; the managers knew what the workers were paid because it was published in an agreement that many managers had, but the reverse did not apply. In one company this had led to some friction. In another company, the problem was solved by tying the managers' salaries in the unionized department to union increases. Because the policy was not well known in the company, there were no complaints from managers in other departments.

On the whole, most managers were content with the policy of secrecy that surrounded their salaries. It is clearly beneficial to the companies as many anomalies concerning salaries are bound to arise over years of employment and the effect of making salaries public would tend to push

levels up as managers aim for compatibility with each other. But it was surprising that the general comment voiced by the managers was that it would only make them discontent if they knew what other managers earned.

The personnel department or its equivalent was more often than not centralized in the organization. In only three of the companies interviewed were the personnel records decentralized. In one of these three companies this was in accord with the organization's general decentralization policy. This company issued only guidelines to departments on the ways in which personnel and payroll information might be handled, although in practice most departments used the guidelines as directives. In the other two companies, the managers kept their own official personnel records on employees. These were copies of those kept in a central system. In all other cases the personnel department kept the records. Depending on the location of the department the managers had varying degrees of ease of access. In one situation the department was moved to a separate location several miles from the main building; in another example some of the important back records on leave and attendance were maintained in Ottawa. The difficulty of obtaining this information, particularly on subordinates, was a key factor in the manager's decision to maintain his own informal records on his staff, a widespread practice in the companies which will be discussed later (Section V). For those using decentralized systems the incentive to develop an informal system was much less and in the three cases recorded, no informal record-keeping was reported.

Some of the indirect means of controlling access to personal information are parallel to the techniques employed for work-related information (see Appendix VI). Where the record-keeping is decentralized, some of these barriers to access did not apply. In general, the lowest barriers

to access were associated with retrieving subordinates' details and this is in accordance with the emphasis found in companies on access to information that a manager "needs to know". Obtaining his/her own record was sometimes more difficult and getting information on other managers was normally impossible.

Summary

The results presented in section II can be summarized as follows:

1. Organizations use a variety of techniques to prevent access to information (see Table V).
2. Access to work-related information is regulated more indirectly than access to personal information. The major exception to this is the "need to know" rule which is used widely to regulate access to all types of information.
3. Authority and access ability vary significantly according to the type of information. Again, the "need to know" rule applies generally to both authority and access.
4. Access to confidential information is significantly more difficult than access to non confidential information. Access to work-related information is significantly better than access to information that is not work-related.
5. Managers' access to their own files or those of their subordinates is generally regulated in organizations in the same way as access to non confidential information.
6. Access to details about other managers, particularly salary details, is largely unauthorized and extremely difficult in practice.

III. Constituents of Access

In this section, the findings were analysed to provide evidence for two types of relationships. Firstly, the connection between direct and indirect regulation of access was sought. That is, is a manager's authority to access information matched by the ability to retrieve and use this information? Secondly, which components of indirect regulation of access are more important in determining overall access to a particular type of information and how do the relative weights of these components vary across the different types of information (cases 1-7)?

1. Direct and indirect regulation of access

X The following two variables for retrieval and use were constructed from a simple linear combination of the eight variables for retrieval and the eight variables for use that were defined in Chapter 1. This was repeated for each type of information.

a. <u>Retrieval</u>	b. <u>Use</u>
1. Difficult procedures	1. Errors
2. Embarrassment	2. Difficult to compare
3. Permission of superior	3. Missing details
4. Location	4. Biased
5. Existence not known	5. Badly presented
6. Authority failure	6. Bad layout
7. Untimely	7. Jargon
8. Cost	8. Irrelevant details

A high value for retrieval or use (maximum = 7) represents the highest measure of a barrier or the poorest access, whereas the value 1 represents the lowest measure of a barrier or the best access.

A table of intercorrelations of barriers is presented in Appendix III. The type of information chosen for this purpose was non confidential, needed for the manager's job. An analysis of the other types of information showed similar patterns of intercorrelations. Several features of this table are worth noting. Firstly, the majority of correlations are less than $\tau = .250$; the highest being $\tau = .550$. Secondly, the higher intercorrelations tend to be among either retrieval or use variables.

(i) Distributions of retrieval and use

As the components of retrieval and use were aggregated to form new variables, an intertest reliability test was performed (Kendall) and the results, given in Appendix IV, show high significance for all of the new variables ($P < .001$). Additionally, the variables were subjected to a Kolmogorov-Smirnov one-sample test (Siegel, 1956:47) to investigate if the new, composite variables for retrieval and use could be considered normally distributed. The findings supported the normality assumption for all of the variables except for the one that measures the use of confidential information required for the job. These findings were used as the basis for the multivariate analyses that were subsequently performed linking access to its components.

Retrieval	Mean	Use	Mean
Case 1	3.09	Case 1	2.94
Case 2	3.57	Case 2	2.94
Case 3	2.63	Case 3	2.86
Case 4	2.93	Case 4	2.90
Case 5	2.95	Case 5	2.79
Case 6	2.73	Case 6	2.80
Case 7	4.23	Case 7	2.99

Discussion: The mean values for Retrieval follow the same pattern for the general question on access presented in section II. However, the same is not found for the mean values for Use which show a remarkable consistency across the different information types (cases 1-7). This suggests that the managers perceived variations in access (indirect regulation) across information types as differences in retrieval difficulty but not as variations in the difficulty of using information.

(ii) Relationship between authority, retrieval, and use

Kendall rank correlations (τ) were performed between authority and the general question on access and between authority and the composite variables for retrieval and use.

Case 1: Confidential information required	τ	sig
1. General access	.2156	.001
2. Retrieval	-.2728	.001
3. Use	-.2257	.001
Case 2: Confidential information, not required		
1. General access	.3271	.001
2. Retrieval	-.3429	.001
3. Use		n.s.
Case 3: Non confidential information, required		
1. General access	.2007	.003
2. Retrieval		n.s.
3. Use		n.s.
Case 4: Non confidential information, not required		
1. General access	.1395	.045
2. Retrieval	-.2359	.001
3. Use	-.1627	.012
Case 5: Own personal details		
1. General access	.2657	.001
2. Retrieval	-.3057	.001
3. Use	-.1319	.027
Case 6: Subordinates' personal details		
1. General access	.3682	.001
2. Retrieval	-.3351	.001
3. Use	-.1272	.001

	τ	sig
Case 7: Other managers' personal details		
1. General access	.2820	.002
2. Retrieval	-.4159	.002
3. Use		n.s.

Discussion: Several comments can be made based on these findings. Firstly, all significant relationships ($\bar{p} < .05$) are in the anticipated directions. That is, authority and the general access questions are all positively related while authority and the barriers (retrieval and use) are negatively related. This means that higher authority is generally associated with better access and lower barriers to access. Secondly, the relationships are only of moderate strength (τ) and in some cases (e.g. Case 3) are not even significant. In section II it was noted that the profiles of authority and access differed and here is further evidence for this difference. Thirdly, there is a systematic difference between the relationships for retrieval and use. For every case where significant results were found, authority and retrieval are more strongly related than authority and use, providing support for the conclusion presented above, namely, that retrieval plays a larger part than use in determining access.

2. Constituents of access

(i) Access and individual barriers

Although a multiple regression could not be run linking access to its constituents,³ Kendall correlations were run and the strongest relationships (all significant at $p < .05$) are presented in Appendix V. For

³ The constituents had in many cases a J type of distribution which cannot be transformed - see Rummel, 1970:286.

each case, the letters R and U denote whether a variables measures retrieval or use, respectively.

Discussion: Firstly, all of the relationships are in the anticipated direction. Because the general question to measure access is measured positively while the individual barriers are measured inversely, the relationships were expected to be inverse, and this was found to be the case. Secondly, there is a dominance displayed by certain of the retrieval variables for all types of information that is not paralleled by the variables to measure use. Analysis of the data suggests that difficult procedures come up most consistently across all types of information as providing the largest barrier to access taken individually. For work-related information, location was almost as important a barrier to access as difficult procedures, confirming the work of some earlier studies (Simon et al., 1954; Greene, 1973). For access to personal data, bad timing, embarrassment, and authority failure were individually important in determining the inconvenience of access to this information.

The interviews were helpful in interpreting some of these results. For example, a common barrier to the access of personal information was the manager's need to justify a request for information to a member of the personnel department. This vetting of requests was particular prevalent when managers made requests to view their own files (cf. Canadian Task Force, 1972). In one company, such requests to see their own details have to be reviewed by the personnel manager. In another company, managers have to get the approval of their vice president before the personnel department will release the information. Clearly, such a method of regulating access would explain why bad access to personal records was associated with difficult procedures, embarrassment, and authority failure.

Although timing was not mentioned in the interviews with respect to the access of personal records, the questionnaire results indicated that it too is strongly related to the inconvenience of access. Its absence from the interview data is thought to be explained by the frequently mentioned problem of the location of personal records. Badly located records are one cause of the bad timing of information. This is especially true for subordinates' records which are normally required by managers on a daily basis. In all but three of the large companies visited, the personnel department contained the only copies of personal records. This resulted in many managers being a considerable distance from information that was needed frequently. In one company, the personnel department was located a considerable distance (several miles) from the main building, and although a courier service was provided, the problems of access were judged by managers to be high.

(ii) Access and retrieval and use

By exploiting the normality of the distributions of the composite measures of retrieval and use, seven multiple regressions were run using the basic regression equation:

$$\text{Access} = \beta_1 * \text{retrieval} + \beta_2 * \text{use}$$

The following regressions were obtained.

Case 1: Confidential information, required.

$$\begin{array}{lcl} N = 167 & \text{Access} = -.479 * \text{retrieval} & - .096 * \text{use} \\ & F_{1,166} = 40.338 & F_{1,165} = 1.609 \text{ (n.s.)} \\ & R^2 = 27.6\% & r = .4818 \end{array}$$

Case 2: Confidential information, not required

$$\begin{aligned}
 N = 102 \quad \text{Access} &= -.553 * \text{retrieval} - .111 * \text{use} \\
 F_{1,101} &= 42.787 \quad F_{1,100} = 1.729 \text{ (n.s.)} \\
 R^2 &= 34.22\% \quad r = .2917
 \end{aligned}$$

Case 3: Non confidential information, required

$$\begin{aligned}
 N = 167 \quad \text{Access} &= -.462 * \text{retrieval} - .146 * \text{use} \\
 F_{1,166} &= 32.085 \quad F_{1,165} = 3.226 \text{ (n.s.)} \\
 R^2 &= 30.44\% \quad r = .6122
 \end{aligned}$$

Case 4: Non confidential information, not required

$$\begin{aligned}
 N = 142 \quad \text{Access} &= -.537 * \text{retrieval} - .111 * \text{use} \\
 F_{1,141} &= 46.795 \quad F_{1,140} = 1.994 \text{ (n.s.)} \\
 R^2 &= 35.10\% \quad r = .5025
 \end{aligned}$$

Case 5: Own personal details

$$\begin{aligned}
 N = 163 \quad \text{Access} &= -.535 * \text{retrieval} - .047 * \text{use} \\
 F_{1,162} &= 47.885 \quad F_{1,161} = .037 \text{ (n.s.)} \\
 R^2 &= 26.23\% \quad r = .4797
 \end{aligned}$$

Case 6: Subordinates' personal details

$$\begin{aligned}
 N = 159 \quad \text{Access} &= -.502 * \text{retrieval} - .019 * \text{use} \\
 F_{1,158} &= 43.000 \quad F_{1,157} = .064 \text{ (n.s.)} \\
 R^2 &= 24.43\% \quad r = .4185
 \end{aligned}$$

Case 7: Other managers' personal details

$$\begin{aligned}
 N = 68 \quad \text{Access} &= -.599 * \text{retrieval} - .228 * \text{use} \\
 F_{1,67} &= 30.645 \quad F_{1,66} = 4.430 \text{ (sig. } p < .05) \\
 R^2 &= 32.09\% \quad r = .3316
 \end{aligned}$$

For all but case seven, the Betas for use were not significant at the .05 level. For all cases, the Betas for retrieval were highly significant ($p < .001$). The Pearson product-moment intercorrelations between

retrieval and use are given as 'r'. For all but case 7, the R^2 is presented for the retrieval variable and does not include the contribution from use.

Discussion: For six of the seven cases it is possible to "explain" from 24% to over 35% of access using just the single composite variable for retrieval. Once again, here is further evidence that access is perceived by managers as being governed largely by the problems of retrieving the information. Only for the seventh case did the variable use enter significantly into the regression equation. Secondly, access is better explained by retrieval for those types of information that the managers have no need for or have no rights to (Cases 2, 4, and 7). For each of these cases, R^2 exceeds 30%. This suggests that the problems of retrieval are brought more sharply into focus for those types of information to which access is not needed. One can also suggest that for information required for the job, managers have learned how to reduce the barriers ("costs") of retrieval and use.

Summary

The results presented in section III can be summarized as follows:

1. Access to information is inversely related to the problems of retrieval and is almost independent of the difficulties in using information.
2. General access, retrieval, and use are only moderately related to the authority to access each type of information.
3. General access is "explained" better by the measure for retrieval for those types of information managers do not need to know than for those types of information that are needed for the job.

IV. The Determinants of Access

In the previous chapter, relationships were hypothesized connecting access (direct and indirect regulation) to its determinants. The findings for each variable are presented below together with any appropriate material from the interviews. Unless otherwise stated, the correlations are all Kendall's τ and are significant at the .05 level.⁴

Before the detailed findings are given, the results of the study are presented in summarized form in table VI. This shows each hypothesis and an assessment of the support it received based on the findings.

⁴ For authority and access a positive sign represents an increasing relationship. For individual barriers and retrieval and use, a positive sign means increasing barriers or more inconvenient access.

Table VI
Summary of Results

<u>Hypothesis</u>	<u>Result</u>
<u>Structural Variables</u>	
H ₁ : The "costs" of access to information in larger companies/departments are higher than those experienced in smaller companies/departments.	Some support. There was some indication that access was slightly worse in larger organizations.
H ₂ : A manager's authority to access non job-related information is lower in larger companies/departments than in smaller units.	Some support. For confidential information authority to access information not required for the job was lower in larger companies.
H ₃ : A manager's authority to access information is higher in those companies with greater decentralization of authority.	Some support. For information about other managers there was an increase in authority; for non confidential information not required for the job there was a decrease.
H ₄ : A manager's "costs" of access to information are lower where authority is decentralized compared with those cases where authority is not decentralized.	Some support. Some procedural barriers to access were reduced. Cost of non confidential information was significantly higher.
H ₅ : A manager's "costs" of using information are greater in companies with greater vertical differentiation.	Not supported. Barriers to using information were lower in organizations with greater vertical differentiation,
H ₆ : For managers performing non-routine jobs in companies with high horizontal differentiation the "costs" of access to job-related information are higher.	Not supported.
H ₇ : A manager who performs more routine tasks faces lower "costs" of access to information required for the tasks and higher "costs" to access information not required for the tasks.	Substantial support. There is a lowering of "costs" of access to non confidential information but an increase in "costs" for confidential information. Information not required for the job has higher barriers to access.

Table VI (cont'd)

<u>Hypothesis</u>	<u>Result</u>
<u>Attitudes to data sharing</u>	
H ₈ : Managers in departments where the norm of data sharing is high face lower "costs" to the retrieval of job-related information and have higher authority to access this information.	Supported. There is a decrease in the authority to other managers' details (case 7), otherwise this hypothesis is strongly supported. Many barriers to using information are also lower.
H ₉ : Managers in departments where the attitude to data sharing is characterized by trust and openness, face lower costs to the retrieval and use of all types of information and have higher authority to access this information.	Strongly supported. Only in the case of authority to access other managers' information was there a result that did not support the hypothesis.
<u>Technology of access</u>	
H ₁₀ : Managers who perform routine jobs and have a high percentage of computer use face lower "costs" of access to information.	Not supported.
H ₁₁ : Managers who use computers frequently for their jobs have lower authority to access information not required for their jobs and face higher "costs" for the retrieval of such information.	Supported. However, authority to access information not required for the job was not affected by the use of computer technology.
H ₁₂ : Managers in companies where the computerized information system is immature but where their work demands frequent computer use face higher "costs" of access to job-related information.	Not supported. Strong support was found, however, for the assertion that more mature systems provide better managerial access to information.
<u>Other determinants</u>	
H ₁₃ : Managers from data processing departments face lower costs of retrieval to all types of information compared with managers from other departments.	Not supported.
H ₁₄ : Managers with greater experience have lower "costs" of access to all types of information.	Substantial support.

1. Size of Company/Department

(i) Company size

a. Access

There were no significant relationships between size and the general question on access.

b. Specific barriers

Case 1: Confidential Information, required

None

Case 3: Non confidential, required

Jargon +.1198

Existence not known -.1202

Case 5: Own personal details

Jargon +.1304

Existence not known -.1275

Cost +.1406

Case 7: Other managers' details

Jargon +.2141

Cost +.2449

Case 2: Confidential, not required

None

Case 4: Non confidential, not required

Jargon +.1405

Existence not known -.1303

Case 6: Subordinates' personal details

Jargon +.1662

Existence not known -.1379

Cost +.1708

c. Authority

Case 2: Confidential information not required. -.1218

(ii) Department size

a. Access

No significant findings.

b. Specific barriers

Case 1: Confidential information, required

None

Case 3: Non confidential, required

None

Case 5: Own personal details

None

Case 7: Other managers' details

Cost +.2089

Case 2: Confidential, not required

Existence not known -.1410

Case 4: Non confidential, required

Existence not known -.1610

Cost +.1288

Case 6: Subordinates' personal details

None

c. Authority

None.

Discussion: Generally the relationships between the two size variables and direct and indirect access provide only modest support for the first and second hypotheses. The Bacharach and Aiken study of communication behaviour and size found a similar lack of results for managers (Bacharach and Aiken, 1977). It was also expected that the work-unit size would be more strongly related to access than the size for the whole company. The results indicate that this is not so and that the reverse may be the case.

Specifically, for the first hypothesis (H_1), the results indicate that for larger companies, access to non-confidential information may be slightly worse than in smaller firms. For the second hypothesis (H_2) there is some support showing that a manager's authority to access confidential information not required is significantly lower in larger companies.

A common element in the specific barriers that did relate to size seems to be formalization. Large companies may tend to develop formal costing systems, including the chargeback of information costs. Size of the company is also strongly related to the number of departments ($\tau = .5052$) which may explain the increase in jargon. Each department is likely to develop its own specialist language. A decrease in the authority to access confidential information not required for the job is another indication that more formal rules of access exist in larger companies. It is interesting to note, however, that the decrease in authority was not paralleled by a decrease in access ability for confidential information not required by the managers.

Size of the organization was mentioned twice in the interviews as having a direct impact upon the policy of access. In both cases the

companies had experienced rapid growth during which many policies had not been established. The growth from small, informal firms to medium-sized ones was accompanied by the companies gradually developing formal policy statements including those relating to access to information. Another result of size was the increased reliance placed upon formal documents for providing information.

It would appear, therefore, that the size of a company and formalization have some association with respect to access. However, some of the more physical barriers to access such as location problems were not significantly related to size, contrary to expectations.

2. Decentralization of authority

a. Access

Case 4, non confidential information not required, had higher barriers to Retrieval ($\tau = +.1588$).

b. Specific barriers

Case 1: Confidential information, required	Case 2: Confidential, not required
Failure of authority -.1315	None
Case 3: Non confidential, required	Case 4: Non confidential, not required
Cost +.1703	Difficult procedures +.1497
	Location +.1478
	Jargon +.1343
	Cost +.1908
Case 5: Own personal details	Case 6: Subordinates' personal
Difficult procedure -.2108	details
Cost +.1184	Difficult procedures =.1311
Case 7: Other managers' details	
None	

c. Authority

Case 4: Non confidential information not required	-.1498
Case 7: Other managers' job performance	+.1265
Case 7: Other managers' general correspondence	+.1357

d. Further results

Those who could not get confidential information when it was not required for their jobs were from organizations that had significantly more centralized decision-making networks than those with good access to the same information.

Discussion: For confidential information, decentralized decision making is associated with easier retrieval procedures. Also managers who find it relatively easy to access confidential information when it is not required, frequently have authority over several decision areas.

For non confidential information not required for the job, the situation is reversed. Access is generally less authorized and retrieval is more inconvenient. A common finding for non confidential information is the increased cost awareness (also for case 5) for those managers with higher decision-making authority. This result would be consistent with the use of cost centres or profit centres in decentralized organizations where the cost of information is charged to the centre (Turney, 1977).

In the interviews only two of the companies were found to be extensively decentralized. For one of these companies, the decentralization of authority enabled the managers to exercise considerable autonomy over access to information of all types. A drawback to such an arrangement occurs when information needs to be gathered centrally. This led to problems of incompatibility in one company because of the variations in information formats used by different branches.

For personal information, there are modest increases in authority over other managers' information and some reductions in the procedural difficulties in accessing the managers' own records and those of their subordinates. These findings are consistent with the two hypotheses.

In one decentralized firm visited, the senior managers were also given the authority to organize the personal record-keeping system and this clearly produced better access to these records for managers.

Generally, there is some support in these findings for hypotheses three and four. The one type of information that contradicts these results is non-confidential information where it is not required for the job. One possible explanation for this anomaly is that in decentralized organizations decision territories are separable and visible. The autonomy of one manager over the territory means the exclusion of others. Confidential information is often managed centrally for security reasons and is less prone to balkanization. A result that was not expected but which is nonetheless plausible is the increasing awareness of information costs in decentralized organizations.

4. Shape of the organization

(i) Vertical differentiation (Number of levels)

a. Access

No significant findings.

b. Specific barriers

Case 1: Confidential, required
Permission of supervisor -.1308

Case 2: Confidential, not required
Missing details -.1691
Bias -.1856

Case 3: Non confidential, required
Comparison problems -.1338
Missing details -.1295
Existence not known -.1891

Case 4: Non confidential, required
Comparison problems -.1544
Location -.1488
Missing details -.1549
Widely known -.1763

Case 5: Own personal details
None

Case 6: Subordinates' personal
details
None

Case 7: Other managers' details
None

c. Authority

Case 7: Other managers' details -.1374

(ii) Horizontal differentiation (Number of departments)

a. Access

No significant findings.

b. Specific barriers

None

c. Authority

No significant findings

d. Further Results

For non confidential information not required for the job, better access is associated with those companies with more departmentalization. After a suitable division of the distributions for high and low number of departments and high and low routineness of technology, an ANOVA was performed using authority, retrieval and use as dependent variables. No significant interactions were found.

Discussion: It would appear from the results that greater vertical differentiation is positively related to lower barriers to access of work-related information. Furthermore, a substantial proportion of the significant barriers are those related to the use of information (comparison problems, missing details, and bias). Both of these results are contrary to expectations.

Two opposing arguments can be identified concerning the effect of the number of levels of authority upon managerial access. The first states that more levels of authority lead to greater distortion and omission of information as it passes up the hierarchy from level to level (Wilensky, 1967; March and Simon, 1958; Rosen and Tesser, 1970; Berry and Otley, 1975). This leads to higher barriers to access particularly

those relating to the use of the information. The second, opposing argument, emphasizes the limitations of human information processing (Simon and Newell, 1971). This argument would claim that without the filtration of information by lower level employees the manager would be deluged by too much raw data (Ackoff, 1967; Chervany and Dickson, 1974; but cf. Sorter, 1969).

The hypothesis tested assumed that the effects described by the first argument were more important than the effects discussed in the second. On balance, however, it would appear that access is improved where more filtration of information is likely to occur, i.e. where there are more levels of authority. The problems of processing biased, summarized information still remain for managers in hierarchies with many levels of authority. This may further suggest that counterbiasing is a feasible option for many managers facing this situation (Cyert and March, 1963; Simon et al., 1954).

5. Routineness of technology

a. Access

Case 2: Confidential information, not required	+ .1552
Case 6: Subordinates' details	- .1556
Case 3: Use of non confidential information, required	- .1075

b. Specific barriers

Case 1: Confidential, required	Case 2: Confidential, not required
Errors +.1757	Authority failure +.2139
Medium of presentation -.1195	
Authority failure +.1181	
Case 3: Non confidential, required	Case 4: Non confidential, required
Irrelevant details -.1357	Authority failure +.1379
Case 5: Own personal details	Case 6: Subordinates' personal details
Permission of superior +.1283	Difficult procedures +.1496
Errors +.1357	Authority failure +.2086
Authority failure +.1529	

Case 7: Other managers' details
None

c. Authority

Case 3: Non confidential information, required	-.1808
Case 6: Subordinates' details	-.1398
Case 7: Other managers' details	+.1203

d. Further results

For non confidential information that is not required by managers for their jobs, low access is significantly associated with high routineness of technology.

Discussion: Overall the evidence supports the seventh hypothesis. Access to non confidential information is slightly improved where it is needed for the job. There is a suggestion in the results that the problems of information overload have been resolved (Ackoff, 1967). Access is made more difficult, though, where the non confidential information is not needed. For confidential information the picture is not so clear. Where the information is not required for the job then there is some increase in authority failure but a possible increase in overall access. If the information is required then the managers performing more routine tasks seem to face higher barriers to retrieving and using it. For those managers who perform routine tasks it is conceivable that their authority to access confidential information might be questioned by others even if the information is required. This also reflects the greater care that appears to be taken with handling confidential information. A similar pattern is found for personal information (cases 5 and 6) where even greater procedural barriers are found for those performing more routine tasks.

6. Attitudes to data-sharing

(i) Norms

a. Access

Case 1: Confidential information, required

Access	+.2018
Retrieval	-.2074
Use	-.1865

Case 2: Confidential information, not required

Access	+.2863
Retrieval	-.1693
Use	-.2011

Case 3: Non confidential, required

Retrieval	-.1492
Use	-.1405

Case 4: Non confidential, not required

None

Case 5: Own personal details

Access	+.1902
Retrieval	-.1239
Use	-.1302

Case 6: Subordinates' personal details

Access	+.2915
Retrieval	-.1602
Use	-.1694

Case 7: Other managers' details

None

b. Specific barriers

Case 1: Confidential information, required

Difficult procedures	-.2256
Embarrassment	-.1421
Permission of superior	-.2465
Errors	-.2555
Missing details	-.1770
Layout	-.1467
Jargon	-.2265
Authority failure	-.2278
Timing	-.1531

Case 2: Confidential, not required

Difficult procedures	-.1794
Errors	-.2404
Missing details	-.2012
Jargon	-.2482
Authority failure	-.1807
Irrelevant details	-.1983

Case 3: Non confidential, required

Embarrassment	-.1764
Permission of superior	-.2153
Location	-.1740
Layout	-.1610
Jargon	-.1961
Authority failure	-.1509
Widely known	-.1312

Case 4: Non confidential, not required

Embarrassment	-.1735
Permission of superior	-.1626

Case 5: Own personal details

Missing details	-.1749
Layout	-.1880
Authority failure	-.1851
Timing	-.2208

Case 6: Subordinates' personal details

Difficult procedures	-.1975
Permission of superior	-.1902
Errors	-.1961
Comparison	-.1575
Missing details	-.2343
Location	-.1300
Layout	-.1964

Case 7: Other managers' details
Errors -.2660

Case 6: Subordinates personal
details (cont'd)
Authority failure -.2837
Timing -.2400
Irrelevant details -.1326

c. Authority

Case 1: Confidential information, required +.1344
Case 4: Non confidential information, not required +.1491
Case 5: Own personal details +.1435
Case 6: Subordinates' personal details +.2492
Case 7: Others managers' personal details -.2556

d. Further results

Those managers who had good access to confidential information not required for their jobs tended to be from departments where the norms of data sharing were high.

(ii) Trust and openness

a. Access

Case 1: Confidential information,
required
Access +.2378
Retrieval -.2410
Use -.3066

Case 2: Confidential, not required
Access +.1450(p=.05)
Use -.2789

Case 3: Non confidential, required
Access +.2004
Retrieval -.2774
Use -.2406

Case 4: Non confidential, not
required
Access +.1833
Retrieval -.2612
Use -.2083

Case 5: Own personal details
Access +.2840
Retrieval -.2821
Use -.2835

Case 6: Subordinates' details
Access +.3127
Retrieval -.2988
Use -.3164

Case 7: Other managers' details
Access n.s.
Retrieval -.2966
Use -.2412

b. Specific barriers

Case 1: Confidential information, required

Difficult procedures	-.1631
Embarrassment	-.2348
Permission of superior	-.1584
Errors	-.3284
Comparison	-.2747
Missing details	-.1658
Layout	-.3073
Jargon	-.2839
Authority failure	-.3191
Timing	-.1598
Irrelevant details	-.2686
Cost	-.1399

Case 2: Confidential, not required

Errors	-.2738
Comparison	-.2926
Layout	-.2138
Jargon	-.2541
Timing	-.2225
Irrelevant details	-.2865

Case 3: Non confidential, required

Difficult procedures	-.2236
Embarrassment	-.2057
Errors	-.2469
Comparison	-.2563
Location	-.2054
Widely known	-.1322
Missing details	-.2282
Layout	-.1765
Jargon	-.1801
Authority failure	-.2588
Timing	-.1785
Irrelevant details	-.1905
Cost	-.1423

Case 4: Non confidential, not required

Difficult procedures	-.2048
Embarrassment	-.1976
Permission of superior	-.1407
Errors	-.2100
Comparison	-.2511
Widely known	-.1770
Missing details	-.2056
Jargon	-.1587
Authority failure	-.1666
Timing	-.1699
Irrelevant details	-.1627
Cost	-.1720

Case 5: Own personal details

Difficult procedure	-.2489
Embarrassment	-.1574
Permission of superior	-.1452
Errors	-.2965
Comparison	-.3465
Location	-.1236
Missing details	-.2658
Layout	-.2172
Jargon	-.2762
Authority failure	-.2580
Timing	-.2282
Irrelevant details	-.1682

Case 6: Subordinates' personal details

Difficult procedures	-.3000
Embarrassment	-.1415
Permission of superior	-.1806
Errors	-.2977
Comparison	-.3656
Location	-.1453
Missing details	-.2652
Layout	-.2355
Jargon	-.2638
Authority failure	-.3406
Timing	-.2319
Irrelevant details	-.1864

Case 7: Other managers' details

Errors	-.3419
Comparison	-.3442
Existence not known	-.2277
Missing details	-.2399
Layout	-.1891
Jargon	-.2568

Case 7: Other managers' details (cont'd)

Authority failure	-.4031
Timing	-.2082

c. Authority

Case 1: Confidential information required	+.1618
Case 5: Own personal details	+.1739
Case 6: Subordinates' personal details	+.1674
Case 7: Other managers' details	-.1630

d. Further results

Managers who had good access to confidential information when it was not required came from departments with significantly higher trust and openness than those who could not access this information at all.

Discussion: Generally, hypotheses eight and nine are substantially supported. All but two of the relationships are in the hypothesized direction.

In the case of access, both the norms of data-sharing and an attitude of trust and openness are influential in improving the manager's view of access. There is also some support for the assertion that when norms of data-sharing are considered alone, the effect is confined to job-related (needed) information but even where the information is not needed for the job there is some lowering of barriers. For the second variable (trust and openness), the effect of increased access is even greater and is extended to all types of information, even to the access of other managers' details which was hardly related to increased norms of data-sharing. For all but information about other managers the barriers affected cover both retrieval problems and difficulties in using information, strongly supporting the work of other writers (Zand, 1972; O'Reilly and Roberts, 1976; Dewhirst, 1971). Although it is not possible to tell from this

study the direction of causation, it is expected that the attitude of trust and openness and good access are mutually supportive.

There was also a considerable impact upon the authority measures for both norms and trust and openness. For all but information about other managers, the direction was as hypothesized. A better attitude to data sharing increased the managers' perceptions of how much authority they had over the majority of information types. In the case of other managers' information (Case 7) it is interesting to note that authority is reduced when attitudes are better. This may result from the strengthening of privacy rights which result from higher interpersonal trust. Managers who are more open and trustful are conscious of the need to protect the privacy of other managers' details. However, the actual access to this information is somewhat improved in spite of the apparent reduction in authority.

During the interviews the topic of attitudes to data sharing frequently arose. Eighteen of the managers indicated that their own preferences and attitudes and those of top management had a significant influence on the policy and practice of access to information. These preferences for certain procedures and practices formed part of management's "style" of information although management "style" in a general sense is a much wider topic than the subject of access to information (Nord, 1972: 538-544; Learned and Sproat, 1966:61ff).

Eleven subjects mentioned the importance of the company executives in the determination of access patterns in their company. Five chief executive officers were perceived as encouraging an open attitude to information sharing at the level of middle management and above. This attitude manifested itself through the encouragement of development courses

for managers, open formal and informal meetings for managers and executives, and through giving more autonomy to managers, all of which were cited by subjects.

This open style was used by one manager to explain why security in the company was not high. In fact, although a rule prohibited access to some confidential information, it could be obtained informally with little difficulty. Again, this practice seemed to result from the open style of top management. In four other companies the executive style was to discourage open access to information. In one of these companies the executives were perceived by managers as promoting an atmosphere of secrecy, which resulted in tightly controlled access to information.

This closed style of management was demonstrated in the restrictions placed on unionized office workers, who were kept strictly to information required for their tasks even if the information was not confidential. This stemmed partly from management's experience with the union. A copy of the month-end statements containing details of payments to non-union personnel found its way from the unionized typists to the union leaders and was subsequently used in negotiations with management. The company, no longer able to trust union employees to type sensitive information without leaking it, began using non-union staff for such work.

Other managers commented on the changes in access "style" which occurred when top management changed. In all these cases the old style of management was associated with secrecy and strict control of information. The new style of top management provided middle managers with greater authority and more opportunities to participate in decision-making and, consequently, more open access to information.

Five of the managers interviewed claimed that they also had a style of management that influenced access to information within their departments. One manager asserted that he was very trustful of his subordinates. He would leave confidential information on his desk and would often inform his subordinates of details that, strictly speaking, they did not need to know. Another manager encouraged a "family" type atmosphere in his department where information was shared freely with subordinates. A manager in another department claimed that the only reason she received some confidential information was her head of department's open style of management. Several other similar examples were given to the researchers.

7. Technology of access

An analysis of the use of computers by management showed that over fifty percent of managers used computer technology either not at all or only very occasionally. The median value for the percent frequency of use of computers was less than 10%. It would appear that a substantial proportion of managers are not affected directly by computers, a result which supports a much earlier finding by Brady (1967). It also shows that the prediction given by early researchers of how computers were going to have an impact upon middle management's decision-making were over stated, certainly for this sample (Brady, 1967; Simon, 1965). This lack of computer use by management was also apparent in the interview sample. However, the distribution of responses for computer use was sufficiently broad to enable the tests to be made. The findings are presented below.

Computer Use

a. Access

Case 2: Confidential information, not required - Retrieval +.1990

b. Specific barriers

Case 1: Confidential information, required		Case 2: Confidential, not required	
Cost	+.1274	Permission of superior	+.1900
		Cost	+.1531(p=.053)
		Existence not known	+.1753
Case 3: Non confidential, required		Case 4: Non confidential, not required	
Cost	+.1183 (p=.053)	Comparison	+.1372
		Embarrassment	+.1550
		Permission of superior	+.1712
Case 5: Own personal details		Case 6: Subordinates' personal details	
Layout	+.1614	Layout	+.1727
Case 7: Other managers' details			
Layout	+.2388		

c. Authority

Case 7: Other managers' job status	+.1389
Case 7: Other managers' biographical details	+.1523

d. Further evidence

An ANOVA was run for high and low frequency of computer use and high and low routineness of technology. There were no significant interaction effects.

There was a significant increase in their authority to access non confidential information for those who used manual technology to access work-related information a great deal. The specific barriers that were affected by telephone use are presented below.

Telephone Use

Case 1: Confidential information, required		Case 2: Confidential, not required	
Errors	-.1294	None	
Embarrassment	-.1568		
Existence not known	-.1542		
Irrelevant details	-.1547	Case 4: Non confidential, not required	
Case 3: Non confidential, required		Permission of superior	-.1783
Permission of superior	-.1637	Authority failure	-.1917
Authority failure	-.1583	Jargon	-.1405

Case 5: Own personal details
None

Case 6: Subordinates personal details
Authority failure -.1391

Case 7: Other managers' details
Difficult procedures +.3539
Embarrassment +.1974
Permission of superior +.2654
Jargon +.2018
Cost +.2212
Location +.2844
Retrieval +.3473

Finally, the use of face-to-face contact (no technology) for retrieving information had almost no significant impact upon either authority or the barriers to access.

Discussion: There was no support for the hypothesis that those managers who used computer technology in performing routine tasks faced lower barriers to access. In fact, higher barriers were experienced by managers who used computers frequently. This may just indicate the higher expectations of improved performance on the part of managers who use computers. As a contrast, in the interview sample there was clear evidence (13 cases) of improved performance available using computers, although this was generally for operational level data. In one firm, the use of an online/realtime computer system to process bookings and inquiries had resulted in measurable improvements in service. In another company, on-line access to customer files meant that a branch office in a distant part of the province had as convenient access to the data files as the head office. If access can be improved directly by the use of computer technology, there were seven examples given of where the lack of an appropriate technology hindered access. In a health care organization, where the access technology was largely manual, it was impossible for managers to know at any one time the level of inventory. This could clearly have

been improved by the use of a more appropriate technology to store and access this information. A very similar situation occurred in another organization where branch offices would not tell what was stored at headquarters and vice versa. This meant that large volumes of inquiries were sent by mail and resulted in delays and frustrations.

For hypothesis eleven there was good support. The "costs" of accessing information not required for the job (cases 2 and 4) were significantly higher for those who used computers extensively. In particular, it was the barriers to retrieval that were increased, as hypothesized. This was, however, no support for the assertion that managers' authority to these types of information would be reduced. The interview sample generally supports the finding of increased "costs" for computer users to information that is not required for the job. Seven of the companies visited used computer systems that had built-in facilities for restricting certain files and programs from unauthorized use. These systems use special terminals, passwords, and levels of authority in various combinations to restrict access. The companies were exploiting the new capability by using the systems to keep employees to what information they "need to know". Indeed, for two of the firms, the introduction of the capability had precipitated the discussion among managers of what rules of access should be implemented. Each case demonstrated the influence of the new technology in being able to support and enforce predetermined access patterns. As one manager noted, computers can be very effective in sealing off access to information from those who do not need it.

The evidence from the interviews concerning the effect of computer systems on access to information for most workers was clearly to restrict them to what is needed for the job. However, the evidence is ambiguous

for managers. First of all, many of the managers interviewed were not users of computer systems. Secondly, where they used computer systems some found improved access to all information while others found reduced access. As examples, one manager indicated that computer access had reduced his ability to retrieve information he could once get informally. In direct contrast, another manager found that his informal access to information had improved with computerization, largely as a result of the easy availability of passwords to him. The company did not enforce the access rules for people at his level whereas access patterns for administrative workers were strictly adhered to.

Some of the data also indicate findings beyond those hypothesized. Cost (\$) is positively related to increased use of computer access for work-related data. This suggests that managers who use computers frequently become conscious that the information produced is costly. Indeed, if the interview sample is taken as representative then many of the managers operate in environments where the cost of computerized information is charged back to the department. To illustrate this, in one of the companies visited the data processing department tried to make managers aware of the cost of printouts by printing the cost in dollars in a prominent position on the front page of each report.

Those managers who frequently used the telephone to access work related information indicated that their barriers of access to work-related information were significantly reduced. At the same time, their barriers of access (particularly retrieval) to other managers' personal details were much greater. Specifically, for non confidential information the results seem to signify that the use of the telephone is effective in bypassing some of the more formal channels to this information.

8. Maturity of information system

a. Access

Case 3: Non confidential information, required	+ .1646
Case 4: Non confidential information, not required	+ .1663
Case 5: Own personal details	+ .1619
Case 6: Subordinates' personal details	+ .1797
Case 1: Confidential information, required - Use	- .1406
Case 3: Non confidential information, required - Use	- .1278
Case 5: Own personal details - Retrieval	- .1436
Case 6: Subordinates' personal details - Retrieval	- .1625

b. Specific barriers

Case 1: Confidential information required	Comparison	- .1704	Case 2: Confidential, not required	Comparison	- .2825
Embarrassment	- .1419				
Presentation problems	- .1438				
Case 3: Non confidential, required	Errors	- .1444	Case 4: Non confidential, not required	Errors	- .1596
Location	- .1300		Bias	- .1506	
Bias	- .1610				
Case 5: Own personal details	Cost	+ .1240 (p=.054)	Case 6: Subordinates personal details	Cost	+ .1269 (p=.052)
Location	- .1383		Embarrassment	- .1477	
Existence not known	- .1593		Existence not known	- .1954	
Timing	- .1349		Bias	- .1386	
Case 7: Other managers' details	Cost	+ .2404			

c. Authority

Case 7: Other managers' job status (salary)	- .1720
Case 7: Other managers' general information	- .1641
Case 6: Subordinates' general information	+ .1413

d. Further results

An ANOVA was run using high and low maturity and high and low computer use but no significant interaction effects were found. The main effect for maturity supported one of the above results that high maturity is associated with lower retrieval problems for the manager's own details

(case 5).

Discussion

There was no support for the interaction effect between the maturity of the computer system and the frequency of computer use of the managers. In general, however, the results do indicate good support for the assertion that more mature information systems do provide better managerial access to information. Access ability was significantly higher for four types of information (cases 3, 4, 5, and 6). Better retrieval was provided to personal information (cases 5 and 6) and better use of information was available where it is needed for the job (cases 1 and 3). For authority there appears to be higher ratings over information about subordinates and lower ratings for information concerning other managers in companies with more mature information systems. This signifies a growing formalization in companies with more mature information systems. Access to personal information about employees is authorized if you need it (case 6) but is not authorized if it is not required (case 7).

An analysis of the specific barriers shows that for work-related information, mature systems are associated with lower barriers to access. Furthermore, most of the lower barriers are concerned with the ease of processing the information (comparison with other information, errors, bias and presentation problems) which is only to be expected in systems where most of the computer problems have been solved. This supports the current wisdom in the MIS implementation literature (Lucas, 1978; Bjorn-Anderson and Hedberg, 1977).

Finally, there is some evidence of increased cost awareness with more mature information systems. The relationships are nearly significant in two cases. When similar analyses of the results are conducted for the

age of the information system, the cost barriers do become significant. In the case of non-confidential information, not required for the job, cost of information also begins to show some importance ($\tau = +.1267$; $p = .059$). It is to be expected that the age of the system is a better indicator of the chargeback of information costs rather than the maturity of the system. This would then be in accord with those who claim that chargeback systems are a feature of the later stages in computer systems development (Gibson and Nolan, 1974; Nolan, 1975; Nolan, 1979).

9. Departmental affiliation

The data processing managers were selected as a group ($n = 14$) and compared with the remainder of the sample using a Mann-Whitney U test (1-tailed). The aggregate measures for Retrieval and Use were used as independent variables in the test.

The analysis revealed no significant findings in the hypothesized direction that managers would have lower costs of access to information. In fact, in using personal information about themselves or their subordinates, they faced significantly higher barriers. This may be an indication of the problems of using information over which the data processing managers have no control as it is usually kept in a centralized personnel department.

In contrast to the above finding, all of the data processing managers interviewed generally had more extensive access to more information than most other managers at a comparable level. Although they did not normally have greater authority over all of the computer-stored information, in practice their access and that of some other employees in the data processing department was unrestricted. Of course, much of the data

that passes through the d.p. department is of no interest to its employees. However, one would have to conclude from the interviews that d.p. managers, as information experts in the organizations, have more privileged access to information than comparable managers from other departments.

10. Experience

(i) General experience (age)

a. Access

Case 5: Own personal details	+ .1393
Case 5: Own personal details - Retrieval	- .2071

b. Specific barriers

Case 1: Confidential information, required None	Case 2: Confidential, not required None
Case 3: Non confidential, required Layout - .1310 Errors - .175	Case 4: Non confidential, not required None
Case 5: Own personal details Difficult procedures - .1211 Permission of superior - .1525 Failure of authority - .1356 Embarrassment - .1760 Location - .1321 Timing - .1708	Case 6: Subordinates' personal details Embarrassment - .1420 Location - .1224
Case 7: Other managers' details None	

c. Authority

Case 4: Non confidential, not required	+ .1420
Case 5: Own personal details	+ .1530
Case 7: Other managers' biographical details	- .1365

(ii) Specific Experience

a. Access

Case 2: Confidential information, not required - Use	- .1416
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b. Specific barriers

Case 1: Confidential information, required	Case 2: Confidential, not required
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Location	-.1527	Irrelevant details	-.2256
		Timing	-.1527
Case 3: Non confidential, required		Case 4: Non confidential, not	
Location	-.1322	required	
Jargon	-.1575	Jargon	-.1705
Case 5: Own personal details		Case 6: Subordinates' personal details	
Embarrassment	-.1487	None	
Timing	-.1387		
Case 7: Other managers' details			
Missing details	-.2057		

c. Authority

No significant findings.

Discussion: In general, hypothesis fourteen is supported. Managers with greater experience (general and job specific) face lower "costs" of access to most types of information. For each result the direction of the relationship is as hypothesized.

For increased general experience, the barriers to access personal information were substantially reduced. In particular, the barriers to retrieving personal details (cases 5 and 6) were significantly lower for those with more experience. This may be explained by the relatively stable nature of the procedures which are used to access this information. In contrast, access to job-related information is more dependent on job-related experience. Experienced managers also had more authority of access over their own records but less authority over other managers' details suggesting that general experience demonstrates to managers that other managers' personal details are very sensitive in most organizations. General experience also gives the manager some advantage over others in the processing of non confidential information required for the job (case 3). Both layout problems and errors were significantly reduced with general

experience for this type of information.

In the case of job-specific experience there are again reductions in access barriers to personal information. More significantly, however, job specific experience reduces some of the barriers to job-related information. In particular, problems of the location of required information are significantly reduced with on-the-job experience. It was previously shown that good location was very important for the accessibility of information (Appendix IV). Also, for non confidential information there are significant reductions in the number of problems with jargon for this kind of experience. Both of these points support the notion of high start-up "costs" of access in any new job (Arrow, 1974; Mechanic, 1962). Those who have had substantial job-specific experience have largely overcome them.

11. Other determinants

In addition to those mentioned above the interviews suggested that other factors were influential in determining the direct and indirect regulation of access to information. These factors and their influence on access are summarized below.

(i) Competitive environment

Evidence gathered from the interviews seems to indicate that the competitive environment of a company has a systematic impact upon access policies and practices. Generally, a company operating in a highly competitive market has more internal regulation of access to information. Such companies tend to keep managers to information that is needed for their jobs.

In three of the companies where the markets were highly competitive, information access was handled carefully and throughout these companies

managers were supplied information on a "need to know" basis. In all other companies visited, only certain areas of the business used information valuable to competitors and applied strict rules of access restricting its use. For instance, in a large crown corporation visited certain costing information was very valuable to commercial competitors. This information was treated with greater security internally. Access was given to managers on a "need to know" basis. However, this rule did not apply with the same strictness to other internal information. In another company the divisions faced different levels of competition in the market place. For a highly competitive part of the business this meant that pricing information was very valuable and was treated accordingly. The company applied a level of regulation that was appropriate to each market. In a regulated monopoly the opposite situation was found for information about new product development. Whereas in a competitive market access to information about new products would be kept secure until the last moment, when there was no competition, the information was freely available both internally and externally. In another regulated industry, where, until recently, prices for services had been fixed and competition between companies had been conducted largely on the basis of service, the new price system was expected by several managers to produce a more careful attitude towards information access internally.

Another market factor influencing the internal access to information is the type of business being conducted. Firstly, the nature of the business influences the time period for which information has to be kept confidential internally. It also determines the level of profit margins available to the company. In the real estate industry the time span for confidential information is often quite small as contracts can be signed

quickly. Additionally, the scope for huge profits for all the firms in the same real estate market creates little incentive to poach confidential information. Problems with unauthorized access were not found in the firm visited. Internally, managers had good access to valuable information even if it was not strictly required for their jobs. As a contrast, in the food industry where competition is fierce and profit margins are low, and the time span for confidential information is longer, security was found to be high internally. Managers were often restricted to information required for their jobs. Several cases of industrial espionage were reported in the company suggesting that stricter regulation of access may be justified in such companies.

(ii) External constraints

Several companies visited operated with certain informational constraints imposed upon them from outside. These constraints were reflected in the internal policy and practice of access to information.

The five organizations that come under the Public Bodies Act are required by law to publish annual financial figures on expenses and salaries paid to employees. This means that salary information, at least retrospectively, was available internally to those organizations, in direct contrast to commercial companies where salary details of other managers were kept from their peers. However, access to the document on salaries and expenses was not promoted by any of the organizations concerned and in practice an interested manager had to overcome considerable barriers to obtaining the information. Similarly, a regulated monopoly visited is required by law to publish its operating procedures. Although the public as well as the government is supposed to be given access to the document,

in practice the public must visit the offices of the company to see them. These were examples of indirect regulation of access, or regulation by inconvenience. In another regulated monopoly, projects conducted by the company tended to be long-term ones because of the nature of the business. During the lifetime of such projects demands are made upon the company by various external groups seeking what the company considers to be confidential information. These demands, coupled with the complex nature of the work, produce a large amount of documentation for each project resulting in some of this information being leaked to unauthorized persons.

External regulations can also act as constraints upon commercial companies in Canada. For example, recent provincial regulations require companies to practice careful, progressive grievance procedures when dealing with their employees. In the view of one manager this has forced companies to become bureaucracies. Not only must records be kept but they must be made available to those who need them when a dispute arises.

(iii) Industry standards

In four of the companies in which managers were interviewed, the internal handling of information was influenced by standards that prevailed in the industry. For example, in a branch of the transport industry there has been a long tradition of sharing information of a technical nature and information concerning the market place. However, the marketing information falls short of providing detailed information concerning routes as this is considered highly confidential to the companies. Nonetheless, the industry standard is clearly reflected in the way that access to these types of information was relatively easy for managers internally.

Two examples were found showing that industrial ethics can also influence the handling of confidential information. In one case a manager

was offered confidential promotional information about the major competitor but he would not take advantage of this access. It is a tradition among advertising personnel to refuse illicit access to advertising information.

(iv) Union agreements

In most cases examined, the collective agreement between the union and the company covered the general area of wages and benefits. However, for two organizations, the agreement also covered access to information. This clearly acted as a constraint upon the personnel and payroll systems. For instance, one agreement requires that grievance material be discarded after one year if no further incidents arise. It also restricts the amount of information that may be collected and prohibits the keeping of informal personnel records. Employees' rights of access to the files are also written into the agreement. Interestingly, it seemed that the rules of access for non-unionized management were identical to those used by the unionized employees. In companies where employees were covered by a collective agreement, the details of the agreement were often available only to those who needed them and access was sometimes restricted for some managers. For example, in one company the published agreement could be obtained if you were a member of the union but the payroll department would not release the details in the agreement to most managers.

(v) Specific incidents

Cyert and March (1963:48) documented a significant incident in a factory which led to changes in equipment and procedures in the work place. In this study ten significant incidents were recorded where information was leaked internally and externally causing embarrassment or economic loss to the company involved. These incidents led to changes in

the policies, practices, or both, of providing access to information. The changes recorded were always in the direction of greater control.

In eight of the cases the leak involved confidential information and the recipient was a major competitor. The companies discovered the incident had taken place because the competition was using the leaked information to their advantage. In one company, the advertising department was losing price information to a competitor before the official day of release. This was apparent in the competitor's advertising. To combat this, the company tried several changes in procedure. Firstly, false data were released occasionally but this proved ineffective. Secondly, the release of the confidential information was only allowed at the last moment. Lastly, the physical area of the department was restricted to authorized employees only. In the same company, the research and development group was moved out of the main building after research details were leaked and filing cabinets were burgled.

Internally, the leaking of sensitive information to employees can be an embarrassment to a company. A copy of a report on cost savings including planned redundancies was obtained by one of the office workers in a company (cf. Mechanic, 1962). This resulted in the company being picketed by the workers in protest against the recommendations of the report. This and other incidents led to a much more careful attitude on the part of management in providing of access to information for office workers. For example, the company began using non-union employees for typing sensitive or confidential reports in an effort to tighten the control of access to this information.

Several companies employ one person or a group of people especially to provide an outside channel for official statements from the company.

The establishment of two of these positions was in direct response to problems experienced after employees had given conflicting statements to the press or the public. In such situations, it is also necessary for the top management to ensure that all employees are told about the new policy for it to have any chance of being effective.

The use of the latest computer technology to store and access information had caused five of the companies to review their policy on access. In each case the new systems triggered a more formal approach to regulating access to information as the possibility of enforcing predetermined access patterns became a reality. In one company the policy of enforcing access on a need to know basis is being implemented even though with the old system additional information was available to employees informally. In another company the computerization of personnel records forced the management to state a formal access policy for this information and a management committee was established for this task.

Summary

1. The results of testing specific hypotheses are summarized in table VI.
2. Further determinants of access were suggested by the interviews:
 - (i) Competitive Environment
 - (ii) External Constraints
 - (iii) Industry Standards
 - (iv) Union Agreements
 - (v) Specific Incidents

V. Facilities and Strategies to Promote Access to Information

The emphasis so far has been on the impediments to the access of information. It is of interest, however, to identify facilities and strategies used by companies and individuals to promote access. For this purpose, questions were included in the questionnaire and evidence was gathered through the interviews. The results are presented below.

1. Organizational promotion of Access

The responses made to the questions about the facilities to promote access (section III of the questionnaire) were used in two ways. Firstly, the number of facilities was summed for each subject giving the values 0-5, and six or more. This number was used to investigate the relationships with the independent variables and with the questions on authority and access. Secondly, the analysis was repeated for each of the effectiveness measures of the facilities used to promote access.

(i) Independent variables

a. Number of facilities used to promote access (median = 3.792)

Size of company	+.2828
Size of department	+.2186
Number of levels	+.2332
Age of information system	+.2110

b. Effectiveness of each facility

Newsletters (n = 134, median = 4.621)	Staff meetings (n = 152, median = 5.547)
Norms of data sharing +.1762	Norms of data sharing +.1988
Age of information system +.1803	Routineness -.2308
Routineness -.1263(p=.050)	Trust and openness +.1946
Trust and openness +.1628	
Management meetings (n = 161, median = 5.600)	Technical advisory (n = 100, median = 5.350)
Trust and openness +.1782	Trust and openness +.2196
	% use of computers +.1837
Liaison personnel (n = 67, median = 4.765)	
Trust and openness +.2437	

Discussion: The number of facilities is significantly related to three measures of size for the organizations. This suggests that larger organizations can provide more facilities because of the greater resources they have (money and manpower) and because they can exploit the economies of scale that would not be available to smaller firms. Furthermore, in larger organizations there is evidence that indicates a greater need for these facilities. Firstly, in larger organizations, the barriers to access are somewhat greater (see results in section IV). Secondly, other researchers have found that communication is positively related to the number of employees (Bacharach and Aiken, 1977). The increased use of facilities to encourage access would be consistent with both these findings.

The age of the formal information system is also positively related to the number of facilities. This may be a result of the increased demand for facilities to promote the use of computerized systems. In three of the companies visited, internal technical advisory services were provided to help managers develop skills to improve their access to computerized information. One of these companies had organized a special information centre. The centre trains managers in simple programming languages that enable them to write quick programs to extract special reports from the data files. The effect of this and similar facilities in other companies is also supported by a strong positive relation between the effectiveness of technical advisory facilities and the percentage use of computer facilities.

By analysing the results for the effectiveness of each facility, several consistent relationships can be seen. Firstly, trust and openness is positively related to the effectiveness of every facility. Of course,

there is no suggestion of causality here and in fact trust and effectiveness may be related by mutual causality. Secondly, norms of data-sharing is positively related to the effectiveness of newsletters and staff meetings. Again, the same argument relating trust and openness to effectiveness may apply here. Finally, those whose jobs are more routine generally see less effectiveness in two of the facilities to promote access to information. A possible explanation for this result is that managers whose information requirements are reasonably predictable or stable do not value facilities that promote access to information (Comstock and Scott, 1977:171).

(ii) Authority and access

a. Number of facilities used to promote access

Authority to access own personal details	+ .1724
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b. Effectiveness of facilities

Management meetings

Authority to access confidential information, not required	+ .1664
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Access to confidential information, required	+ .2050
--	---------

Access to confidential information, not required	+ .1827
--	---------

Access to non confidential information, not required	+ .1924
--	---------

Technical advisory

Access to confidential information, required	+ .1946
--	---------

Access to confidential information, not required	+ .1872
--	---------

Access to own personal details	+ .1849
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Discussion: In those companies where there are more facilities to promote access to information there tends to be higher authority given to managers to access their own records. This has at least two possible explanations. Firstly, the more facilities used by an organization to promote access could indicate a desire to improve the attitudes to data sharing. This is supported by the previous finding that trust and open-

ness is positively related to the authority to access the manager's own records. Secondly, because size and the number of facilities are strongly positively related, the increase in authority might be due to the size of the company and the accompanying formalization of rights of access for employees. However, size was not found to be related to the authority of managers to access their own records (section IV). Thus, the overall evidence seems to favour the first argument.

The other main findings show a general increase in access to confidential information (required or not for the managers' jobs) is positively related to the effectiveness of management meetings and technical advisory services. There is also an increased authority to access confidential information not required for the job where the effectiveness of management meetings is judged to be high. Again, the provision of effective management meetings and technical advisory services indicate a genuine objective of executives to provide a better "atmosphere" for information access. This is reflected in the kind of good access that is available to managers to confidential information even if it is not required for their jobs. This is supported by the strong relationships reported previously between trust and openness and access to confidential information.

In the interview sample, executives in at least three of the firms used management meetings to promote information exchange. The president of one company meets with all his managers three times a year. At each meeting he promises to answer all questions, which are submitted anonymously. The president was clearly in favour of a more open approach to information handling and this open "style" was apparent from the comments of middle managers in the firm.

Many of the companies visited used at least one facility to promote access to company information besides the regular information given to managers to perform their jobs. As the above example demonstrates, some of these facilities and their effectiveness were a direct result of a style of top management in exercising control over information flows (Forrester, 1965).

Six of the companies visited used special units to handle internal access, external access, or both. Such groups as public relations, corporate communications, and information services were found in several of the larger firms. One of the functions of these groups is to promote access to specific and general company information. The main tool for doing this internally was often the company newsletter or a similar publication.⁵ These contain such details as general performance figures and articles often highlighting the human interest. Another large company used a series of movies to keep managers informed. However, newsletters were often judged to be of only modest value to managers. This is reflected in the lower general effectiveness ratings that were given to this facility.

Four specific cases were mentioned in the interviews in which the company promoted access to information for motivational purposes. As one manager expressed it, "if top management want managers to know something, they (the managers) get it". In two of the companies, managers were encouraged to access relative performance figures as a means to promote competition among them. In another firm, a manager received a special

⁵ In a large communications company a special telephone number was set aside by which employees could access the latest company information.

report that others at his level did not normally have access to. The manager's access to the report seemed to signify a reward from top management.

2. Individual coping strategies

The major thrust of this study has been organizational regulation of access to information. In addition, some evidence was gathered on the ways in which individual managers develop strategies to cope with the problems of access they face.

(i) Developing interpersonal contacts among managers

Apart from the information that they receive automatically, managers are left largely to their own devices to uncover the system of access to information when they first join a company. Companies rarely supplied any procedural manuals to the newly-arrived managers. In the two cases where the manuals were available, the managers had not found them helpful in discovering what information was available to them.

One typical manager noted that access is governed in his company by the position the manager has (his authority) and the network of contacts which has been developed. One short-cut in this process is for managers to seek out the opinion-leaders (Rogers and Agarwala-Rogers, 1976). Three managers, each with a long record of service for their company, reported that junior managers often used them to find out if information exists and how it can be retrieved. The senior managers' expertise, authority, and contacts give them a clear advantage in accessing information compared to other managers (Mechanic, 1962; Crozier, 1964).

Many of the interpersonal contacts that managers had developed were exchange relationships where information was exchanged for other

benefits. In one company, the finance department was given extensive cooperation by another department with the collection and interpretation of information. This was done so that the second department could ensure that the information was not misinterpreted by the first department. In another situation, one manager passed information to another manager that he thought should have been using it. The hope of the first manager was that he would eventually receive other, useful information in return. Two cases were cited by different managers showing that access to confidential information held by others occasionally has to be "earned". That is, the managers had to demonstrate that they would not abuse the information obtained before further access to that source could proceed.

(ii) Use of subordinates

In addition to developing contacts among other managers, relationships were often developed by managers with subordinates or other employees inside and outside their department. One manager reported that he could by-pass the formal barriers to detailed information by using fairly low-level contacts that he had developed in another department. In two companies, both operating in competitive markets, information was obtained about competitors informally from the central distributors. The salespersons from the distributors are questioned informally to extract information concerning "specials" that are being planned by the competition. The following comment from one of the questionnaires exemplifies the use of subordinates to overcome access problems:

"In our company we have an unofficial policy of secrecy. It is possible to obtain information from other people providing you can convince them that you need it (peers and superiors). People do not readily volunteer information. Superiors in possession of information vital to my own job do not, as a matter of course, pass it

along unless I specifically become aware that they have it and ask for it. As a result an informal information system is in place based, in part, on personnel relationships. i.e. My friends at lower levels pass on information if their superior (my peer) is reluctant to do so!"

(iii) Informal record-keeping systems

As well as using informal contacts to obtain information, there were strong indications in many companies visited that managers had constructed their own informal system of personnel record-keeping. This was found in all companies except those using decentralized personnel record-keeping. It seems that managers seek alternative paths of access to important information when the "costs" of official access become too high to bear. The most frequently mentioned causes of managers using their own "illicit" record-keeping were the inconvenient location of the personnel department, the amount of "red tape" to overcome, and the lack of relevant information in the files. It is also a good indication that if information access alternatives are available in other, work-related areas, the managers might choose to develop their own systems with access tailored to their needs.

(iv) Information filtration

The major complaints from managers about using the information once it has been retrieved were about the high volume of the reports produced by computers (three examples) and the problems associated with interpreting them (two examples). One manager rarely used the large computer reports that were sent to him. He would examine certain key figures to see if any further investigation were necessary but otherwise he would file them without looking further. In his case the reports were largely peripheral to his tasks and so his solution was to ignore them and not

process the bulk of material they contained (cf. Churchman and Schainblatt, 1965; Simon et al., 1954).

Summary

The results presented in section V can be summarized as follows:

1. Trust and openness is positively related to the effectiveness of every facility to promote access.
2. Managers performing more routine tasks believe that the effectiveness of newsletters and staff meetings is lower than managers who perform less routine tasks.
3. The size of the organization/department is positively related to the number of facilities to promote access.
4. General access to confidential information is positively related to the effectiveness of management meetings and technical advisory services.
5. Four individual coping strategies were identified:
 - (i) Development of Interpersonal Contacts
 - (ii) Use of Subordinates as Intelligence Sources
 - (iii) Use of Informal Record-keeping Systems
 - (iv) Information Filtration.

CHAPTER FIVE

PRESCRIPTIONS FOR DESIGN AND FUTURE RESEARCH

I. Designing Organizations and Information Systems for Improved Managerial Access

Table VII contains a summary of design prescriptions based on the findings of the study.¹ While the prescriptions may improve managerial access to information, they may also have negative side effects that are costly to the organization. It is suggested that the balance of costs and improvements depends on the organization and the portfolio of changes that is being contemplated. Specific organizational differences are not treated explicitly in the detailed discussion which follows.

1. General prescriptions

Some of the findings can be used to suggest general improvements to organizations and information systems that lead to better managerial access. The prescriptions are general in the sense that they may be applied to all types of information. Specific prescriptions for different types of information are presented under part 2.

(i) Direct and indirect regulation of access

Apart from personal information, there was very little direct regulation of managerial access in the form of rules or policy documents. The widespread use of the rule that allows access to information on a "need to know" basis was the major exception.

¹ The prescriptions are presented as if the directions of causality are known. The problems associated with the research methodology and the limitations of correlational studies are discussed in the next section.

Table VII

Designing Organizations and Information Systems for Improved Managerial Access

Summary

1. General Prescriptions

Area	Findings	Prescriptions
Direct and indirect regulation of access	Regulation of access is largely by indirect means except for "need to know" rule.	Regulate access directly wherever possible. Make managers aware of their authorization to access information
Access, retrieval, and use	Access is inversely related to the problems of retrieval and is almost independent of the difficulties in using information. Cost of information was not related to access.	Concentrate on improving the convenience of retrieving information (location, timing, difficult procedures, authority failure, permission of superior, and embarrassment). Cost of information should not be used as an instrument to deter access to information.
Structural impact upon access	Access is somewhat poorer in larger organizations. Better access was found in organizations with more levels of authority.	To compensate, provide more and better facilities to promote access to information. Volumes of report outputs should be kept to the minimum in organizations with few levels of authority.
Technology of access	Policy on access is made more explicit where computer retrieval is employed.	Policy of access should be decided by management. Those managers affected should be involved in the policy setting where possible
Attitudes to data sharing	In organizations where it is normal to share information or where an attitude of trust and openness is developed, managers have improved access to information	Use organizational development techniques to improve managers' "styles" of data sharing. To improve trust and openness, facilities to promote access to information should

Table VII (cont'd)

Area	Findings	Prescriptions
Individual coping strategies	(direct and indirect regulation).	be made available to managers. Make managers aware of their authorization to access information.
	Development of informal networks among managers.	If they are important, try to formalize the informal channels.
	Frequent use of informal record-keeping systems.	Decentralize the record-keeping function wherever possible.
2. Specific Prescriptions		
Confidential information	Access to confidential information needed for the job is generally more difficult than access to non confidential information needed for the job.	Regulate access directly rather than indirectly. Attempt to match the direct and indirect regulation of access to confidential information by reducing the inconveniences of access for those who need confidential information for their jobs.
Non confidential information	Managers had better authorization and access to non confidential information when it was needed for the job compared with when it was not needed.	Managers should be authorized to access any non confidential information within their department. Access should be made more convenient when the information is needed for the job. Use several facilities to promote access to this information.
Personal information	Managers' access to their own files and those of their subordinates is generally regulated in organizations like access to non confidential information.	Access to information about subordinates and other managers should be regulated on a "need to know" basis only. Information gathering should be restricted to what is reasonably necessary for personnel tasks. Location and procedural barriers should be reduced for those with legitimate needs.

Table VII (cont'd)

Area	Findings	Prescriptions
a) Managers' own details	Managers had limited rights of access.	Managers should be allowed to see their own personal details and be given the right to rebut them.
	Some ignorance of access rights was found.	Knowledge of these rights of access should be promoted among managers.
b) Subordinates' details	Inconvenient access to centralized records was found.	Decentralize the record-keeping function but ensure that adequate security is available for the decentralized records.
	Inadequate records were often maintained.	Conduct an information requirements analysis to determine what the managers need to perform their personal functions.
c) Other managers' details	<p>This information is treated with greater care than confidential information.</p> <p>Generally, managers are in favour of the secrecy that surrounds salary information.</p>	<p>Generally, maintain the status quo as a formal access policy.</p> <p>Ensure that the grading and evaluation procedures are well known by the managers.</p>

It is generally suggested that organizations should use more formal rules to regulate access. The use of formal rules to regulate access to information may be economical and effective especially if they are supported by organizational sanctions. One must also recognize that regulating access informally is a less precise form of control as it is often accompanied by spillover "costs" in other areas of access. Access may also be encouraged among managers by using explicit rules of access and making them known to the managers concerned. In the interviews there was a significant number of managers who did not know what their rights of access were. By helping managers to understand what information they are entitled to, organizations can help solve two problems of access. Firstly, the use of rules will help new managers to eliminate some of the start-up "costs" they face. Secondly, some of the barriers to access experienced by managers having to justify their legitimate claims to information will be reduced.

As a cautionary note, it is further suggested that the use of explicit rules to prevent managerial access to information has to be applied carefully and must be varied according to the type of information. The implementation of complex rules of formal access requires the managers to be familiar with those rules and it is also likely to promote a "climate" that is contrary to trust and openness. In the case of non confidential information, not required for the job, where the demand from managers is probably low, it is suggested that direct regulation or rules of access should not be used to deter access.

(iii) Access, retrieval, and use

In the MIS literature there has been an emphasis on the use of information and the matching of individual "styles" of processing and reports

(Ackoff, 1967; Mason and Mitroff, 1973; Sorter, 1969; Benbasat and Taylor, 1978).. However, a consistent finding of the study was that a manager's ability to access information is governed largely by the difficulty of retrieving information not by the difficulty of using it. Explicitly, access ability was found to be inversely related to the barriers to retrieval. Therefore, in order to improve managerial access to information, the information system designer should concentrate on making the retrieval of information more convenient (Forrester, 1965).

The following barriers to retrieving information were significantly and negatively related to the managers' access abilities: location; timing; difficult procedures; authority failure; permission of superior; and embarrassment (Appendix V). It is suggested that reducing these inconveniences will bring significant improvements to the ability of managers to access information. It is interesting to note that several of the barriers are in administrative areas which information systems designers have traditionally avoided (authority failure, permission of superior, embarrassment). The study indicates that these administrative barriers to information access may be of greater significance than many of the barriers to using information. Access to computer-based information can be improved by the use of intermediaries (i.e. retrieval experts) or by the provision of technical advisory services which train managers to use retrieval languages themselves (Keen and Scott Morton, 1978; Zloof and de Jong, 1977). A second point of interest to note is the lack of importance of cost as a barrier to the retrieval of information.¹ Although

¹ The variable measuring cost was independent of most other barriers to access (Appendix III). The highest correlation ($\tau = .258$) was with the barrier that measures comparison problems.

both high maturity of the information system and decentralization were associated with an increase in awareness of information costs, it would appear that cost plays only a minor role in the managers' perceptions of their access abilities. One manager, who was charged for his reports, told the researchers "if that is what information costs then that is what it costs". He had discounted the amount he was charged for information. Cost was treated as a fixed component in his formula for accessing information.

(iii) Structural impact upon access

Generally the results support the Bacharach and Aiken (1977) findings for communication. Structural variables have only a limited impact upon the access to information of managers. Additionally, as many of these variables are normally fixed, at least in the short run, the system designer normally has no control over them.

Even if we accept that these variables are fixed, it is still possible to suggest ways of improving managerial access to compensate for their effects. For example, in larger organizations there are significant increases in some of the barriers to using information, as hypothesized. One way to reduce some of these barriers is to promote the access of information by the provision of facilities such as newsletters, meetings, technical advice, etc. A second finding from the study suggests that information pathologies caused by tall hierarchies may not be as problematic as has been suggested (Wilensky, 1967). Furthermore, the study indicates that managerial access to information is somewhat improved by the absorption of uncertainty that takes place in hierarchies (March and Simon, 1958). One conclusion from this is that filtration of informa-

tion is helpful to managers in hierarchies. Therefore, in hierarchies with few levels of authority, systems designers can take advantage of this finding by designing outputs that can be processed by the manager (Ackoff, 1967). Even if the level of detail in a report is reduced so as to limit its apparent usefulness, the designer must be aware that managers frequently have alternative sources from which to gather and compare information (Simon et al., 1954).

(iv) Technology of access

Where computer technology is used extensively to retrieve information the findings indicate a trend to increasing formalization of access policies (see also Stewart, 1971:259). This often results in greater restrictions placed on information access leading to access on a "need to know" basis. This has several implications for the design of information systems. Firstly, the designers need to be aware of the potential impact upon access patterns that their computer-based information systems can have. Generally, it is suggested that changes in access policy should not be decided by systems designers alone (Hedley, 1970). Policies concerning access should be decided at a suitably high level of managerial decision-making. In at least one company visited, a management committee had been formed to address this issue and to make recommendations. This would appear to be a reasonable procedure. Secondly, it is also suggested that those managers whose access patterns are influenced by such changes should be involved in the design process. This follows the general wisdom in MIS which advocates "user involvement" as a means to improve information systems designs (Swanson, 1974; Keen and Scott Morton, 1978; Bjorn-Anderson and Hedberg, 1977).

Another related aspect of the impact of computer technology upon access is the increasing use of database management systems to administer information. The rationale behind these systems is the belief that information is a corporate asset that can and should be made available to those who need it regardless of where it originated (Everest, 1974). However, in several of the interviews it was clear that the originators of data were not always prepared to pool information because by doing so they perceived a lessening of their control of it (Argyris, 1971; Wilensky, 1967:182). This suggests that designers need to be aware of this problem as well. In fact, the ability of computers to prevent unauthorized access to information may be helpful to designers here. New systems can be created that maintain traditional access patterns while taking advantage of the data base concept.² Once more, the cooperation of those departments who "own" the data should be considered as an essential part of any changes that are contemplated.

Finally, the maturity of the computerized information system was reflected in the better access afforded to management. It would appear that when major systems problems have been resolved and a period of stability ensues, a genuine improvement in access is possible. Designers of systems should therefore concentrate their efforts on those areas which are judged to have major problems (see (ii), for example).

² Date (1975:288ff) demonstrates that certain database designs can even apply access control at the level of individual "fields". Previously, the designer of file-based systems was restricted to controlling access to whole records of data. This change in capability may also have implications for departmental control of access.

(v) Attitudes to data sharing

One of the strongest findings of the study was the positive effect of accepting "norms" of data sharing and of more trust and openness on the direct and indirect regulation of access to information. Where managers normally shared information or where managers were trustful and open about information, there were significant improvements in both managers' authority and managers' abilities to access information.

To improve access to information, therefore, it would seem desirable to improve and sustain a positive attitude towards sharing information. Eleven of the managers interviewed indicated that in their organizations it is the executives who often set the "style" of sharing data. In some cases this style was one of encouragement which pervaded the whole of the organization. In other cases, top management discouraged data sharing and applied rules strictly to prevent managers accessing information not required to perform their tasks. To encourage data sharing implies that both the attitudes of chief executive officers and those of managers below may need to be changed. Clearly, many systems designers would not be competent in this area. It would require the use of organizational specialists, perhaps working in a team with systems designers (Bjorn-Anderson and Hedberg, 1977). These specialists could employ some of the techniques used in organizational development (Miner, 1973:275ff). Additionally, more facilities to promote access to information could be installed or improved if they already exist. Using direct regulation to support managerial access is also suggested as a way to encourage managers to exercise their rights of access. Because access and trust and openness are thought to be related by mutual causality, by improving access to information as specified above, benefits of higher trust and

openness should accrue to the organization.

(vi) Individual coping strategies

The study uncovered some of the coping strategies employed by individual managers in order to overcome access deficiencies. They included the development of informal networks, the use of lower-level employees to collect information, and the use of personal record-keeping systems. A fourth strategy, involving the filtering of information, has already been dealt with above. Although in any social system there will always be informal access to information (Downs, 1967), an excessive use of informal channels is an indication of information pathologies (Wilensky, 1967). The unavailability of information because of a manager's lack of authority or because of the inconvenience of access can result in a "loss of energy consumed in the struggle for information. Time is occupied by attempts to obtain and to hide information" (Forrester, 1965). In the case of informal record-keeping, there is a clear duplication of effort on the part of the managers which results from the poor availability or low relevance of the formal system to provide the needed information. All of these points imply that where the formal information system is rigid in its patterns of access or inadequate in its content or convenience then managers will expend time and resources in the pursuit of the information that they believe is required.

Some of these pathologies can be reduced by the careful design of the formal information system. For example, one of the major reasons that managers used their own record-keeping systems was the inconvenience of using the centralized records. Where possible, central records should

be decentralized either physically³ or through the use of an appropriate electronic communications system.⁴ Prescriptions for reducing some of the other types of pathologies include reducing inconveniences to access, particularly retrieval, and authorizing access to a wider selection of information sources. Again any changes should be designed with the cooperation of those managers who will be affected. If informal channels of access are determined to be important then an additional strategy is to make them part of the formal system (Forrester, 1965).

2. Specific prescriptions

Prescriptions are now presented from the findings according to the type of information. The types of information are those used throughout the study; confidential, non confidential, and personal.

(i) Confidential information

Three preliminary remarks need to be made. Firstly, the amount of confidential information and the value ascribed to it varies with the type of enterprise that is being pursued and the competitive nature of the market place the company operates in. Secondly, there appears to be justification in classifying some other types of information as confidential even when, strictly speaking, they are not. For example, in several cases internal reports or organizational information concerning redundancies were leaked to unions which exploited the information to

³ Simon et al. (1954:7) came to essentially the same conclusion in their study of controllers. "The most important consequences of centralization or decentralization of the records function have to do with the accessibility of the documents and the reliability of the source records. Both of these criteria point in the direction of relatively great geographic decentralization." (their emphasis)

⁴ There are important cost/benefit considerations when computer data bases are distributed. See Champine (1977) for a good discussion of these.

their own advantage. It is suggested that such sensitive information should be classified as confidential. Thirdly, the study indicates that confidential information that a manager requires for his job has poorer access than non confidential information even when the latter type of information is not required for the job. This demonstrates the greater security and possibly the greater centralization afforded to confidential information.

It appears that companies have some justification in protecting confidential information from unauthorized internal access and supplying it to most managers on a "need to know" basis. In general, this protection currently takes the form of indirect regulation as can be seen from the discrepancy in the results of the study between the orderings for authority and the orderings for the ability to access confidential information. Unfortunately, making information inconvenient to access in order to keep it from those who do not need it is often reflected in the difficulty of access for those who do need it. It is suggested therefore that access to confidential information should be regulated directly rather than indirectly, and that access should be made more convenient for those who do need it for their jobs. Additionally, it is suggested that much confidential information can be made available to all managers simply by changing its form (e.g. by summarizing information or using special codes) or by releasing it after a critical date has passed. In this way the organization can protect confidential information from external leakage while encouraging an open attitude to information sharing.⁵

⁵ This does not go as far as Forrester (1965) has advocated. He claims that "information is withheld from individuals inside the organization on the excuse that this keeps information from outsiders" and suggests that wider access should be available to employees. However, some information is very valuable to organizations. It is reasonable that organizations treat it with special care. The problems arise when too much information is incorrectly classified as confidential.

Furthermore, it is suggested that information system designers should periodically re-evaluate the classification of information in an organization. In this way the organization can avoid the unnecessary "costs" of access associated with information being misclassified as confidential.

(ii) Non confidential information

The findings indicate that non confidential information is both more authorized and easier to access when it is required for the job compared with when it is not. These distinctions may just reflect the fact that managers have overcome many of the problems of access for non confidential information they need for their jobs. They have learned how to minimize the "costs" of accessing this information. Nonetheless, it was clear from the interviews that many organizations do make distinctions between information needed and not needed and provide access to non confidential information using the "need to know" formula.

In contrast to this attitude, it is suggested that no distinctions should be made for non confidential information. It should be made available to managers regardless of whether they need it for their work or not. Clearly, where non confidential information is needed for the job then access should be made as convenient as possible for the managers. This can be done by the use of different facilities to promote access to information and by the designer concentrating on reducing the larger barriers to access, particularly retrieval. While it is not suggested that such good access be given to non confidential information that managers do not require, it should not be withheld from them if they want it. They should be both authorized to access it and it should be made available to them (Forrester, 1965). This should result in two advantages to organizations.

Firstly, by cutting down on unnecessary restrictions, the organizational attitude to data sharing should improve. Secondly, the greater freedom of access provides managers with greater scope for improving their decision-making (Pounds, 1969; Mintzberg, 1973).

The one exception to the above suggestions is where interdepartmental access to information is concerned. Although some might advocate greater access as a general rule (Forrester, 1965), others have recognized some of the problems of allowing unlimited interdepartmental access (Ackoff, 1967; Argyris, 1971). This problem was confirmed several times in the interviews. However, apart from the problems of database design (see (iii) above), it is suggested that departments form natural "walls" to the access of detailed information, particularly if departments are rewarded for competing with one another (Ackoff, 1967). An effective way of removing these walls is for organizations to foster an attitude of trust and openness between departments and to stress the benefits of data sharing. At the same time a change in the incentive structure is also needed if it is not compatible with the sharing of data (Forrester, 1965).

(iii) Personal information

The study showed that managers' own personal details and those of their subordinates were treated as non confidential information with respect to the direct and indirect regulation of access. Personal details about other managers, in contrast, were treated even more carefully than confidential information not required for the managers' jobs. Access to personal information should in general be carefully regulated not because the information would be damaging to an organization if it were leaked outside but because of the damage it might cause to individual employees.

The employees' needs for privacy of their personal information must be considered along with the needs of the organization to gather and use such information (Sieghart, 1976; Great Britain, Parliament, 1972). Although in Canada there is no legislation to govern the collection and access of personal information on employees it is suggested that companies should consider the restriction of personal information gathering to what is reasonably necessary and adopt access procedures similar to those used by I.B.M. (U.S.) (Cary, 1976; Great Britain, Parliament, 1972). Personal information would then be made available to those who have a legitimate need for it. Although currently there are few incentives to change, it is suggested that improvements in access rights will also be accompanied by a better "climate" of data-sharing (Zand, 1972).

Changes in direct regulation of access to personal information must be matched by improvements in the convenience of access. The barriers that were associated with poor access to personal information were largely of the physical and attitudinal type (location, embarrassment, permission of superior, etc.). This was borne out by the interviews where the inconvenience of location and the need for managers to justify their legitimate requests for information were mentioned frequently. It is suggested therefore that these barriers should be reduced wherever possible. Specific prescriptions are now presented for each of the categories of personal information.

a) Managers' own details

Managers generally appear to have good authority to access their own files. There were, however, greater problems in obtaining the information. In that respect this type of information was treated as confidential informa-

tion when it is required for the job. The discrepancy between authority and access ability is thought to be caused partly by the inconvenience of accessing such information (see above) and partly by the assumption of some managers that they have a right to access their own files. In the interviews, several managers had never tried to access their own files and assumed that they had the necessary authority. To clarify the position of those in this situation it is suggested that managers be given the right to see their own files and rebut them if necessary and that this right of access should be promoted in organizations. Again, this is another move towards improving the attitude of data-sharing in a company.

(b) Subordinates' details

Managers often need information about subordinates on a daily basis for performing a variety of personnel tasks (interviewing, evaluations, grading changes, etc.). If access to personnel records is made too inconvenient or if the content is inadequate, then managers will create their own record-keeping systems on subordinates. Both of these problems were frequently mentioned in the interviews. It is suggested, therefore, that wherever possible the personnel records should be decentralized to the departments and that a careful requirements analysis be undertaken to determine what information managers need for these tasks (Bariff, 1975). Some sensitive, personal information (e.g. medical records) can be retained by the personnel department. This department should also be used to ensure that the decentralized records are being administered in accordance with the rights of access given to employees or negotiated by unions (Cary, 1976; Forrester, 1965).

(c) Other managers' details

Because personal information should generally be available only on a "need to know" or "right to know" basis the prevailing practice of restricting access to information on other managers is reasonable. It is acknowledged that organizations do profit from the current secrecy that surrounds middle managers' salaries (Forrester, 1965). However, it would appear from the findings that many managers prefer the established system. Nonetheless, some of the mysteries that currently surround salaries, grades, and evaluation procedures could be removed economically and effectively by releasing explicit statements on these subjects and by publishing statistical analyses on salaries by grade, for example.

II. Prescriptions for Future Research

1. Methodological overview

The research methodology adopted in this study has been the sample survey or correlational design (Campbell and Stanley, 1966) where the object is to measure behaviours or perceptions in a "natural" setting (Runkel and McGrath, 1972). As with every design, there are drawbacks as well as advantages to this methodology. Firstly, there is the problem with causal ambiguity (Bouchard, 1976). Strictly relational studies cannot answer the questions of causality. There may always be other, uncontrolled conditions that were responsible for the relationships observed. Campbell and Stanley note, however, that these studies are useful in "exposing hypotheses to disconfirmation" (Campbell and Stanely, 1966:64). Secondly, to what degree is the sample of managers selected representative of all managers? The more external validity that can be claimed for the sample selection procedures the greater the possibility of generalizing the results (Kerlinger, 1967). Unfortunately, there are several factors that limit external validity in this study. The managers were chosen in one province of Canada. It may therefore be possible to say that the results are useful to managers in that province as a whole or to managers in similar provinces of Canada. However, because of the lack of heavy industry and the high frequency of company branch offices in British Columbia it would be premature to generalize the findings to Canada as a whole. The remoteness of branch offices from headquarters may have a significant impact upon internal access to information. Furthermore, by dealing with one province it was possible to control the differences in law that exist between provinces and, further afield, between countries. However, it is

likely that the results of a similar study of access in some Scandinavian countries, for example, would reflect the different "climate" concerning rights of workers found in those countries (Sieghart, 1976). Finally, the study concentrated largely upon the perceptions of the managers and not their behaviour. Managers' perceptions of access regulation may or may not resemble the real situation. It was assumed, however, that such perceptions are important to any subsequent choice of access a manager might make and this was confirmed somewhat by the interviews. Furthermore, the questionnaire was designed to allow the managers the opportunity to indicate those types of information they are barred from. It is suggested that this prevention of access is not just a perception of managers but indicates an organizational reality. The subsequent analysis of the access of these managers compared with the ratings of other managers who perceived their access as high, revealed distinct differences in some of the independent variables (Chapter four).

In a preliminary study such as this one the research methodology chosen seems appropriate (Campbell and Stanley, 1966:64). It enabled the collection of data that was broad in scope and high in complexity. While much research literature is relevant to access no attempt has been made to systematically investigate the topic. Therefore, the literature enabled hypotheses to be suggested but the study required a broad range of potentially relevant variables to reflect our current state of knowledge concerning access to information. The use of both a survey instrument and interviews allows the results to be stated with more confidence than would be possible using a single methodology (Bouchard, 1976). Although the "costs" of the study were considerably increased by the use of dual methodologies, the benefits of such an approach were considered to easily

outweigh these. In retrospect, the interviews were invaluable for interpreting many of the findings.

2. Prescriptions for research

The findings of the study indicate that access to information is a fruitful area for research that has application in several related disciplines. The following suggestions for further research of access to information are made partly to overcome some of the methodological weaknesses of the study that were discussed above. In addition, the interview findings produced a number of potentially valuable factors which may be influential in determining access. These are also mentioned.

By using alternative designs such as the naturally occurring field experiment (Runkel and McGrath, 1972) it should be possible to explore the effects of changes in an organization upon the regulation of access to information. For example, access to information could be measured before and after the implementation of a new information system. Similarly, the effects of implementing employee rights of access regulation could be studied using the same methodology. The change in access would at least partly indicate the effectiveness of the implementation. Further longitudinal field studies could be effective in revealing the organizational processes that employees use to control the access to information for others (e.g. Pettigrew, 1973; Mechanic, 1962).

Studies similar to the current one could be conducted for managers in companies across Canada and in other countries. Such studies would increase the representativeness of the sample. Additionally, the subject domain could be extended to include other groups of employees such as executives, unionized and non-unionized employees as well as middle managers.

Finally, the structure for the study of access could be modified to incorporate variables potentially important to access. For example, variables to measure the competitive nature of the company's enterprise and managerial "style" could provide additional explanatory power for the regulation of access. Furthermore, a contribution to the study of organizations could be made if companies or departments could be classified according to their regulation of access. Perrow, for example, has dichotomized organizations as mechanistic or human-relations (Perrow, 1973). Are such classifications reflected in the way organizations regulate access? (cf. Athanassiades, 1973). At a department level, are the categories 'X' and 'Y' developed by McGregor (1960), useful in describing the different "styles" of regulating access to employees used by managers? This study has emphasized access as the dependent variable and the prescriptions have concentrated on suggesting ways of improving managerial access to information. From an organization's perspective the effect of more or less access to information upon a manager's performance is an equally important question. Does better access always lead to improved performance? (Forrester, 1965; Ackoff, 1967). Unfortunately it is often difficult to obtain meaningful performance measures that can be related to the regulation of access. There would normally be many competing hypotheses that the relationship between access and performance could support. However, if such measures were available then they should be incorporated into the structure as dependent variables wherever possible.

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SECTION I - QUESTIONS ABOUT THE RULES OF ACCESS TO INFORMATION

In the first section we would like to assess what authorization your company gives managers in your position to access certain types of information.

Firstly, to allow us to focus on particular types of information, we would like you to indicate, with a tick in each case, which of the following types of information are considered confidential by your company. For this questionnaire, confidential information is information which if released to other companies (or interested parties) would prove harmful to the performance of your company (or, in the case of government agencies or utilities, would be an embarrassment to them).

Some of the following examples may not apply to your company. If you cannot find one type of information on the list that would be considered confidential by your company, please use an example that is appropriate to your company and enter it under the line marked "other".

Please tick
if confidential

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

Production figures
Technological processes
Chemical formulae
Customer lists
Pricing formulae
Inventory levels
Supplier details
Research and development reports

Please tick
if confidential

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

Market research reports
Detailed sales reports
Minutes of board meetings
Sales invoices
Minutes of managers' meetings
Machine service reports
Other (specify) _____

Select one of the above examples of confidential information that you are familiar with and that you believe is of most concern to your company. Please enter it below:

Example of confidential information

--

Using this example of confidential information, read the following two statements and circle one of the numbers provided to indicate your assessment from: strongly disagree (1) to strongly agree (7).

1. In this company, managers in my position are authorized to get this type of information as long as they believe it is needed for the performance of their job

Strongly Disagree circle one
(1 2 3 4 5 6 7) Strongly Agree

2. In this company, managers in my position are authorized to get this type of information even though they believe it is not needed for the performance of their job.

Strongly Disagree circle one
(1 2 3 4 5 6 7) Strongly Agree

Next, assess the degree to which you think the following two statements apply to your company for one of the types of information you have not ticked (i.e., non-confidential information) and with which you are familiar. If you cannot find a suitable example from the list, please use a more appropriate one. Enter your choice below:

Example of non-confidential information

--

3. In this company, managers in my position are authorized to get this type of information as long as they believe it is needed for the performance of their job

Strongly Disagree circle one
(1 2 3 4 5 6 7) Strongly Agree

4. In this company, managers in my position are authorized to get this type of information even though they believe it is not needed for the performance of their job

Strongly Disagree circle one
(1 2 3 4 5 6 7) Strongly Agree

Rules Concerning Personnel and Payroll Information

Companies collect and maintain varying amounts of information concerning their employees. For the following items of personnel and payroll information we would like you to indicate if managers in your position can see these items where they concern:

5. themselves
6. their subordinates
7. other managers (peers)

Please read the items and for each case circle one of the numbers provided to indicate your assessment from: strongly disagree (1) to strongly agree (7).

MANAGERS IN MY POSITION ARE AUTHORIZED TO:

Item	5. SEE OWN?		6. SEE SUB-ORDINATES?		7. SEE OTHER MANAGERS?	
	Strongly Disagree	Strongly Agree	Strongly Disagree	Strongly Agree	Strongly Disagree	Strongly Agree
Job Status (salary, grade, job history)	circle one (1 2 3 4 5 6 7)		circle one (1 2 3 4 5 6 7)		circle one (1 2 3 4 5 6 7)	
Job Performance and Evaluations (test results, evaluations, interview details, references)	circle one (1 2 3 4 5 6 7)		circle one (1 2 3 4 5 6 7)		circle one (1 2 3 4 5 6 7)	
General Correspondence and Comments (letters of commendation, complaint, etc.)	circle one (1 2 3 4 5 6 7)		circle one (1 2 3 4 5 6 7)		circle one (1 2 3 4 5 6 7)	
Biographical Details (address, telephone number, medical details, marital and family details, qualifications, etc.)	circle one (1 2 3 4 5 6 7)		circle one (1 2 3 4 5 6 7)		circle one (1 2 3 4 5 6 7)	

SECTION II - THE PRACTICE OF ACCESS IN YOUR COMPANY

In the previous section we asked you about your company's rules of access to information. In this section we would like you to assess your company's practice of access for each of the different types of information. The types of information are mentioned in the same sequence as Section I.

In your company there may be certain features that enhance or hinder access to information for managers in your position. Many of these features are represented by the statements below. Please read each statement and for each case circle one of the numbers provided to indicate your assessment of how well it represents the current practices of your company for managers in your position, from: strongly disagree (1) to strongly agree (7).

Cases 1,2 CONFIDENTIAL INFORMATION, where confidential information is information which if released to other companies would be harmful to the performance of your company. Please use the same example you used on page 1 and enter it in the box provided:

Example of confidential information

Can this type of information be obtained?	Case 1. Where it is needed for the managers' job		Case 2. Where it is <u>not</u> needed for the managers' job	
	circle one		circle one	
Statements	Strongly Disagree	Strongly Agree	Strongly Disagree	Strongly Agree
Difficult or lengthy access procedures are required to get it	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
He never feels embarrassed getting this type of information	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
He has to get the permission of his superior before he can get this type of information	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
The information contains too many errors	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
It is difficult to compare it with other information (e.g. 4-weekly reports when other reports are monthly)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
An effort is made to locate it in a position that is normally convenient for the manager	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
The existence of this type of information is made widely known by the company	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
Important details are missing	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
An effort has been made to remove any heavy bias from it	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
The medium of the presentation is normally matched with the preferences of the manager (e.g. typed rather than computer printout is used if preferred)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
The information is badly laid out (e.g. graphical when tabular is preferred)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
Difficult language, symbols, or jargon is present	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
Others fail to recognise the manager's legitimate authority to get this information	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
The company makes sure this information is always available on time	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
Most of the irrelevant details have been eliminated	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
Getting this type of information is costly (in \$)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
Generally, it is easy to get and use this type of information	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)

If you circled NO, leave that column blank

Cases 3,4 NON-CONFIDENTIAL INFORMATION. Please use the same example you used on page 1 and enter it in the box provided:

Example of non-confidential information

Can this type of information be obtained?	Case 3. Where it is needed for the managers' job		Case 4. Where it is not needed for the managers' job		If you circled NO, leave that column blank
	Strongly Disagree	Strongly Agree	Strongly Disagree	Strongly Agree	
Statements					
Difficult or lengthy access procedures are required to get it	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	
He never feels embarrassed getting this type of information	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	
He has to get the permission of his superior before he can get this type of information	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	
The information contains too many errors	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	
It is difficult to compare it with other information (e.g. 4-weekly reports when other reports are monthly)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	
An effort is made to locate it in a position that is normally convenient for the manager	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	
The existence of this type of information is made widely known by the company	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	
Important details are missing	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	
An effort has been made to remove any heavy bias from it	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	
The medium of the presentation is normally matched with the preferences of the manager (e.g. typed rather than computer printout is used if preferred)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	
The information is badly laid out (e.g. graphical when tabular is preferred)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	
Difficult language, symbols, or jargon is present	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	
Others fail to recognise the manager's legitimate authority to get this information	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	
The company makes sure this information is always available on time	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	
Most of the irrelevant details have been eliminated	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	
Getting this type of information is costly (in \$)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	
Generally, it is easy to get and use this type of information	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	

Cases 5,6,7 PERSONNEL and PAYROLL INFORMATION

	Case 5. Personnel and Payroll infor- mation about himself	Case 6. Personnel and Payroll infor- mation about his subordinates	Case 7. Personnel and Payroll infor- mation about other managers
	circle one YES/NO	circle one YES/NO	circle one YES/NO
Can at least some of this type of information be obtained by mana- gers in your position?	Where you answered NO, leave the whole column blank		
Statements	Strongly Disagree	Strongly Agree	Strongly Disagree
	circle one (1 2 3 4 5 6 7)	circle one (1 2 3 4 5 6 7)	circle one (1 2 3 4 5 6 7)
Difficult or lengthy access procedures are required to get it	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
He never feels embarrassed getting this type of information	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
He has to get the permission of his superior before he can get this type of information	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
The information contains too many errors	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
It is difficult to compare it with other information (e.g. 4-weekly re- ports when other reports are monthly)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
An effort is made to locate it in a position that is normally convenient for the manager	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
The existence of this type of infor- mation is made widely known by the company	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
Important details are missing	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
An effort has been made to remove any heavy bias from it	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
The medium of the presentation is normally matched with the prefer- ences of the manager (e.g. typed rather than computer printout is used if preferred)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
The information is badly laid out (e.g. graphical when tabular is preferred)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
Difficult language, symbols, or jargon is present	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
Others fail to recognise the mana- ger's legitimate authority to get this information	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
The company makes sure this infor- mation is always available on time	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
Most of the irrelevant details have been eliminated	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
Getting this type of information is costly (in \$)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)
Generally, it is easy to get and use this type of information	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)	(1 2 3 4 5 6 7)

SECTION III - GENERAL QUESTIONS ABOUT ACCESS TO INFORMATION

1. The amount of confidential information

We would like to find out how much work-related information is confidential to your company. Please read the following statement and circle one of the numbers provided to indicate your assessment from: strongly disagree (1) to strongly agree (7).

A significant proportion of information related to the work of managers in my position is classified as confidential in this company (where, as before, confidential information is information which if released to other companies would be harmful to the performance of your company).

Strongly Disagree circle one
(1 2 3 4 5 6 7) Strongly Agree

2. Facilities to promote access to information

The following is a list of facilities to promote access to information which may be provided by your company. Please tick the ones your company uses (if any), and for each one so marked, indicate its effectiveness in promoting access to information for its current level of use.

Circle one of the numbers provided to indicate your assessment from: low (1) to high (7).

Tick if it exists	Features	Effectiveness in promoting access low high
<input type="checkbox"/>	Newsletters	(1 2 3 4 5 6 7)
<input type="checkbox"/>	Meetings with your staff	(1 2 3 4 5 6 7)
<input type="checkbox"/>	Management meetings . .	(1 2 3 4 5 6 7)
<input type="checkbox"/>	Technical Advisory (e.g. statistics) . .	(1 2 3 4 5 6 7)
<input type="checkbox"/>	Liaison personnel . . .	(1 2 3 4 5 6 7)
<input type="checkbox"/>	Other (specify) _____	(1 2 3 4 5 6 7)

SECTION IV - QUESTIONS ABOUT YOUR COMPANY, YOUR JOB, AND YOURSELF

As well as questions on access to information we would also like to know some of the more important features of your company, your job, and yourself. The questions asked in this section are extremely important because they allow us to study access to information in comparative terms. Complete data are required in order to make the most meaningful interpretations of the other responses you have given us.

1. Size of your company

Estimate the number of employees working in your local company. If you work in a subsidiary or a division of a larger corporation, your answer should reflect the subsidiary or division, not the whole organization.

Tick one box only Number of Employees

<input type="checkbox"/>	Up to 200
<input type="checkbox"/>	201-400
<input type="checkbox"/>	401-600
<input type="checkbox"/>	601-800
<input type="checkbox"/>	801-1000
<input type="checkbox"/>	1001 or more (specify) _____

Estimate the number of employees in your department:

The number of employees is _____

2. Shape of your company

Give the number of departments in your company, subsidiary, or division, where a department consists of at least two persons and two levels.

The number of departments is:

circle one

1 2 3 4 5 6 7 8 9 10 _____ more than 10 (specify)

Give the number of levels of authority in your department by counting from the department head to the lowest category of workers.

The number of levels of authority in my department is:

circle one

1 2 3 4 5 6 7 8 9 10 _____ more than 10 (specify)

2. Shape of your company (continued)

The number you have circled on the last page corresponds to the number of levels in your department. Using the number "1" to correspond to the department head, circle which number applies to your level. If you are head of your department or at a higher level, circle the number "1".

My level in the department is:

circle one

1 2 3 4 5 6 7 8 9 10

3. Routineness of manager's work

Read the following six statements and for each statement assess the degree to which you think it applies to the work of managers in your position in your department.

Circle one of the numbers provided to indicate your assessment from: strongly disagree (1) to strongly agree (7)

- (i) There is something different to do every day

Strongly Disagree (1 2 3 4 5 6 7) Strongly Agree

- (ii) Managers in my position do the same job in the same way every day

Strongly Disagree (1 2 3 4 5 6 7) Strongly Agree

- (iii) In my company we need to learn more than one job

Strongly Disagree (1 2 3 4 5 6 7) Strongly Agree

- (iv) The same steps must be followed in processing every piece of work

Strongly Disagree (1 2 3 4 5 6 7) Strongly Agree

- (v) For almost every job a manager in my position does there is something new happening almost every day

Strongly Disagree (1 2 3 4 5 6 7) Strongly Agree

- (vi) The work of a manager in my position is very routine

Strongly Disagree (1 2 3 4 5 6 7) Strongly Agree

4. Decentralization of Authority

Please read the following statements and for each one indicate whether or not you can usually make decisions in these areas without reference to a superior.

Circle one

Decision

YES/NO	The promotion of lowest-level supervisors
YES/NO	Promotion of nonsupervisory staff
YES/NO	Disciplining of lowest-level supervisor
YES/NO	Disciplining of nonsupervisory staff
YES/NO	Decisions about whether or not people work overtime
YES/NO	Procedures used in personnel selection
YES/NO	Determination of the number of lowest-level supervisory positions
YES/NO	Determination of the number of nonsupervisory positions
YES/NO	Decisions about budget allocations
YES/NO	Determination of the budget for your department
YES/NO	Determination of new programs and activities
YES/NO	Determination of new objectives and projects
YES/NO	Creation of new sections or departments
YES/NO	Creation of new positions
YES/NO	Handling of public relations outside the company
YES/NO	Giving official information to someone or a group outside the company
YES/NO	Choosing suppliers for materials
YES/NO	Decisions about accounting procedures

5. Retrieval Technology

In this part we would like you to assess what types of technology are most frequently used by managers in your position in obtaining information to do with their job (confidential or non-confidential information).

The following statements refer to the direct use of a particular retrieval technology. If managers typically use their secretaries to retrieve computer stored data then effectively the managers obtained the data through the indirect use of technology. The managers' direct use was their secretaries (i.e. they used no technology to retrieve the information).

Read the four statements below and for each statement circle one of the numbers provided to indicate your assessment from: strongly disagree (1) to strongly agree (7).

- (i) In this department, a manager in my position often uses computer technology (e.g. computer terminals) to retrieve job-related information

circle one
Strongly (1 2 3 4 5 6 7) Strongly
Disagree Agree

- (ii) In this department, a manager in my position often uses manual technology (e.g. mailing system, manual filing system, journals, newspapers) to retrieve job-related information

circle one
Strongly (1 2 3 4 5 6 7) Strongly
Disagree Agree

- (iii) In this department, a manager in my position often uses electromechanical technology (e.g. telephones, conference calls, microfilm) to obtain job-related information

circle one
Strongly (1 2 3 4 5 6 7) Strongly
Disagree Agree

- (iv) In this department, a manager in my position often uses no technology (face-to-face personal contacts, meetings, use of secretarial or clerks) to obtain job-related information

circle one
Strongly (1 2 3 4 5 6 7) Strongly
Disagree Agree

Estimate the percentage frequency of direct use for the above categories of technology for job-related information (to nearest 10%)

Computer Technology %
Manual Technology %
Electromechanical Technology . . . %
No Technology %

100%

6. Attitudes towards data sharing

We would also like your view on how easy it is generally to obtain information of any type in your department.

Read the following five statements and for each statement circle one of the numbers provided to indicate your perception of what you think the attitude towards data sharing is in your department from: strongly disagree (1) to strongly agree (7).

- (i) It is normal in this department for people to share information with one another

circle one
Strongly (1 2 3 4 5 6 7) Strongly
Disagree Agree

- (ii) The information a manager in my position receives is often inaccurate

circle one
Strongly (1 2 3 4 5 6 7) Strongly
Disagree Agree

- (iii) It is often necessary for a manager in my position to go back and check the accuracy of the information he has received

circle one
Strongly (1 2 3 4 5 6 7) Strongly
Disagree Agree

- (iv) It is easy to talk openly with most members of this department

circle one
Strongly (1 2 3 4 5 6 7) Strongly
Disagree Agree

- (v) It is easy to ask advice from most members of this department

circle one
Strongly (1 2 3 4 5 6 7) Strongly
Disagree Agree

7. Maturity of the Information System

Estimate the number of years that computers have been used in your company for technical or administrative purposes:

Tick one

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

Up to 5 years (specify) _____
6-10 yrs
11-15 yrs
16-20 yrs
21 or more years (specify) _____

7. Maturity of the Information System (cont'd)

Estimate the number of years since most of the original problems of computer usage were overcome and the computer was accepted into the normal procedures of your company.

Tick one

<input type="checkbox"/>	Still major problems
<input type="checkbox"/>	Up to 5 years (specify) _____
<input type="checkbox"/>	6-10 yrs
<input type="checkbox"/>	11-15 yrs
<input type="checkbox"/>	16-20 yrs
<input type="checkbox"/>	21 or more years (specify) _____

(vii) Indicate with a tick your type of company

<input type="checkbox"/> Manufacturing	<input type="checkbox"/> Forestry
<input type="checkbox"/> Service	<input type="checkbox"/> Mining
<input type="checkbox"/> Government	<input type="checkbox"/> Financial
<input type="checkbox"/> Educational	<input type="checkbox"/> Realty
<input type="checkbox"/> Voluntary	<input type="checkbox"/> Engineering
<input type="checkbox"/> Distributor	<input type="checkbox"/> Department Store
<input type="checkbox"/> Public Utility	<input type="checkbox"/> Fisheries
<input type="checkbox"/> Other (specify) _____	

Thank you for your time. If you have any further comments on access to information not covered by the questionnaire, please use the space below.

8. Biographical Details

In this last part of Section IV we ask you to supply us with some information about yourself. These questions allow us to compare your data with those of other respondents.

NOTE: Your answers to this questionnaire will not be seen by anyone except the researchers. Please do not sign the questionnaire.

(i) What is your present age in years? _____

(ii) What is your sex?

_____ Male _____ Female

(iii) Indicate your highest attained level of formal education

<input type="checkbox"/> some high school
<input type="checkbox"/> high school graduation
<input type="checkbox"/> some college
<input type="checkbox"/> college degree
<input type="checkbox"/> some graduate study
<input type="checkbox"/> advanced degree

(iv) Job Title _____

(v) Number of years in present position _____

(vi) Indicate with a tick your present departmental affiliation

<input type="checkbox"/> Marketing	<input type="checkbox"/> General Administration
<input type="checkbox"/> Sales	<input type="checkbox"/> Building
<input type="checkbox"/> Finance	<input type="checkbox"/> Real Estate
<input type="checkbox"/> Accounting	<input type="checkbox"/> Law
<input type="checkbox"/> Purchasing	<input type="checkbox"/> Actuarial
<input type="checkbox"/> Personnel	<input type="checkbox"/> Medical
<input type="checkbox"/> Customer Service	<input type="checkbox"/> Computers/D.P.
<input type="checkbox"/> Engineering	<input type="checkbox"/> Transportation
<input type="checkbox"/> Labour Relations	<input type="checkbox"/> Other (specify) _____



THE

UNIVERSITY OF BRITISH COLUMBIA

FACULTY OF COMMERCE AND BUSINESS ADMINISTRATION

July 22, 1980

Dear :

We would like to invite you to participate in a research study we are conducting at the Faculty of Commerce.

As you can see from the enclosed questionnaire, we are looking at how a manager such as yourself sees access to information within his/her company. Your answers to the questions will help us to understand how and why access to information varies across departments and companies.

Your name is one of only 200 that has been selected from a list of managers in British Columbia. As our sample is designed to include a variety of companies and departments, we would very much appreciate your responses as they will help to provide a comprehensive picture of access to information. The members of the research team are the only people who will see your responses. Any reports produced from the study will be in an aggregated form in which there will be no way of identifying an individual or a company.

The questionnaire takes between 25-35 minutes to complete and a return envelope is enclosed for your convenience. We would like to send you the final report comparing access across companies. Please include this letter with the completed questionnaire if you would like to receive a copy.

Thank you for your cooperation.

Ilan Vertinsky
Professor and Chairman, Policy Division
Faculty of Commerce and
Business Administration

Michael Newman
Project Director, Access
Study

EP EXECUTIVE PROGRAMMES

Faculty of Commerce and Business Administration
Room 103 — 2053 Main Mall
The University of British Columbia

July 30, 1980

Dear

As you know, Executive Programmes works closely with the Academic Divisions within the Faculty of Commerce and Business Administration. This close working relationship results in challenging and informative seminars delivered by highly competent Faculty. From time to time, Executive Programmes is approached by one of our Faculty to co-operate in another important aspect of executive education — doing research.

Attached to this letter you will find a questionnaire that relates to such a piece of research. Dr. Vertinsky and Mr. Newman are investigating the question of managerial access to company information. On reviewing this research, I felt that the study might be of interest to many managers who have participated in Executive Programmes seminars. Therefore, I have authorized the selection of approximately 300 managers from our mailing list as potential participants in the study. I hope you agree with me that the subject under investigation is important to the management process and on that basis will agree to co-operate in providing the information requested.

The 300 managers selected have been chosen to represent a variety of organizations in order to provide a comprehensive picture of the managerial problems in access to information. The researchers have given me their assurances that they will be the only people to see your individual responses (as you will note on the enclosed return envelope, the completed questionnaire is returned directly to the research group). The researchers further assure me that any reports produced from this study will contain only aggregate data in which there will be no means of identifying individual respondents or even individual companies.

I am informed that the enclosed questionnaire takes about 25 to 35 minutes to complete depending upon the nature of your individual situation with respect to access to managerial information. As implied above a

Appendix II

	<u>Barriers to Access (Medians)</u>						
	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7
Difficult Procedures	1.688	3.385	1.348	1.447	1.465	1.333	4.833
Embarrassment	1.375	3.192	1.305	1.682	1.673	1.458	4.571
Permission of Superior	1.632	3.136	1.203	1.355	1.262	1.187	5.125
Errors	1.374	1.350	1.444	1.435	1.284	1.303	1.405
Comparison of Difficulties	1.925	2.143	1.992	1.900	1.364	1.415	2.429
Location Problems	3.083	4.083	2.383	3.596	4.025	3.500	6.000
Ignorance of Existence	5.344	4.850	3.227	3.620	4.417	4.024	5.792
Missing Details	1.976	1.850	1.776	1.760	1.595	1.500	1.944
Biased	3.516	3.375	3.150	3.222	2.773	2.955	3.300
Presentation Problems	4.615	5.000	4.150	4.367	4.538	4.607	4.412
Layout Problems	2.069	2.176	1.696	1.711	2.265	2.222	2.500
Jargon	1.438	1.500	1.523	1.806	1.476	1.464	1.719
Authority Failure	1.465	2.269	1.303	1.479	1.431	1.408	3.222
Timing	2.893	3.667	2.556	3.357	2.636	2.250	4.455
Irrelevant Details	2.611	2.682	2.337	2.429	3.139	2.864	3.633
Cost (\$)	2.426	2.875	2.842	2.921	1.897	1.850	3.536

Appendix III

Intercorrelations of Barriers for Case 3 (significant at $p < .05$)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Difficult Procedures		.233	.453	.456	.399	.275	.167	.415	.121	.207	.287	.234	.428	.216	.139	.166
2. Embarrassment			.250	.229	.197	.162	.126	.233				.180	.227	.165	.165	
3. Permission				.341	.315	.268	.230	.266	.239	.157	.209	.168	.470	.255		
4. Errors					.526	.170		.550	.164		.412	.294	.307	.271		.233
5. Comparison						.196	.205	.496			.450	.345	.404	.243	.171	.258
6. Location							.383	.249	.171	.275	.192	.220	.232	.313	.165	
7. Ignorance								.189	.160	.204		.150	.217	.250		
8. Missing details									.146		.505	.412	.367	.240	.167	.266
9. Bias										.148	.151			.166	.258	
10. Presentation											.139					
11. Layout												.507	.262	.198	.197	.197
12. Jargon													.256	.193	.246	.189
13. Authority failure														.238		.162
14. Timing															.279	
15. Irrelevant details																
16. Cost (\$)																

Appendix IV

Kendall's Coefficient of Concordance¹

<u>Variable</u>	<u>W</u>	<u>Significance</u>
Decentralization	.219	.000
Routineness of Technology	.030	.000
Trust	.356	.000
Retrieval: Case 1	.136	.000
Case 2	.054	.000
Case 3	.161	.000
Case 4	.123	.000
Case 5	.140	.000
Case 6	.147	.000
Case 7	.077	.000
Use: Case 1	.154	.000
Case 2	.184	.000
Case 3	.106	.000
Case 4	.125	.000
Case 5	.243	.000
Case 6	.256	.000
Case 7	.213	.000
Case 5: Authority	.077	.000
Case 6: Authority	.051	.000
Case 7: Authority	.079	.000

¹ "A high or significant value of W may be interpreted as meaning that the observers or judges are applying essentially the same standard in ranking the N objects under study" (Siegel, 1956:237).

Appendix V

Access and the Barriers to Access²
(Kendall correlations)

Case 1: Confidential information required

R	1. Location	-.3957
R	2. Timing	-.3652
R	3. Difficult pro- cedures	-.3468
R	4. Authority failure	-.3262
R	5. Embarrassment	-.3165
U	6. Missing details	-.2180
R	7. Permission of superior	-.2134
U	8. Errors	-.2081

Case 2: Confidential information not required

R	1. Permission of superior	-.4272
R	2. Difficult procedures	-.4059
U	3. Presentation	-.3241
R	4. Location	-.2770
R	5. Timing	-.2180
R	6. Embarrassment	-.2127
R	7. Existence not known	-.2026
R	8. Authority failure	-.2003

Case 3: Non confidential, required

R	1. Difficult pro- cedures	-.4093
R	2. Location	-.4021
R	3. Timing	-.3830
R	4. Existence not known	-.3509
U	5. Missing Details	-.3457
U	6. Jargon	-.3288
U	7. Comparison	-.3255
R	8. Authority failure	-.2911

Case 4: Non confidential, not required

R	1. Difficult procedures	-.4532
R	2. Location	-.4007
R	3. Permission of superior	-.3795
R	4. Existence not known	-.3688
R	5. Timing	-.3329
U	6. Missing details	-.3237
R	7. Authority failure	-.3222
U	8. Comparison	-.3067

Case 5: Own personal details

R	1. Timing	-.3892
R	2. Embarrassment	-.3137
R	3. Difficult pro- cedures	-.2983
R	4. Authority failure	-.2655
R	5. Permission of superior	-.2401
U	6. Bias	-.2170
R	7. Location	-.2143
R	8. Costly	-.1743

Case 6: Subordinates' personal details

R	1. Timing	-.3709
R	2. Authority failure	-.3607
R	3. Difficult procedures	-.3194
R	4. Location	-.2792
R	5. Embarrassment	-.2608
U	6. Comparison	-.2141
R	7. Permission of superior	-.2064
U	8. Missing details	-.1994

Appendix V (cont'd)

Case 7: Other managers' details

R	1. Permission of superior	-.4659
R	2. Difficult procedures	-.3771
R	3. Embarrassment	-.3598
R	4. Location	-.2880
R	5. Failure of authority	-.2773
R	6. Timing	-.1934

² "R" is used to indicate a barrier that signifies retrieval while "U" signifies the use of the information.

Appendix VI

Techniques to Prevent Access

There were several techniques employed by the companies in the interview sample to regulate access directly and indirectly. In some cases the techniques were only used to prevent unauthorized access to confidential information. In other situations the control would apply to both confidential and non confidential information. Techniques used to regulate access are accompanied by certain benefits and costs to the companies. These are discussed for each technique.

1. Direct regulation

(i) Directives from management

Three cases were found in which management's policy was to issue directives concerning the access to confidential information. One manager told employees that what they see and hear while at work has to remain in the building. They are also required to sign a waiver that notice has to be given if they wish to perform transactions related to the business. This is done in order to prevent a conflict of interest arising where an employee might exploit their inside knowledge or early notice of materially valuable information. In another, privately held company, the staff are instructed on arrival that because of the special status of private companies they are not allowed to disclose company information to outsiders, particularly where it concerns financial details. In two other cases, top management issued statements to the effect that no manager could discuss company information with the public or press. Managers in these cases are required to channel requests from the public or press for information to the public relations group (see below).

This method is an example of companies making their policies on access to information quite explicit for employees. It was not clear how effective it was in preventing leaks of confidential information. In one case the policy was reinforced by disciplinary measures.

(ii) Channeling of external statements

In six of the companies visited a policy was in effect that restricted public statements to one department, usually public relations. In at least one organization this was clearly done in order to present a consistent voice to the outside world. Five incidents were related to the researchers demonstrating that conflicting statements had been made in the past leading to an embarrassing situation for top management. Both newspaper reporters and politicians had telephoned employees (not always managers) directly to seek internal information or opinions. In one crown corporation, most of the attempts to stop leaks of internal information failed apparently because of the political affiliations of some of the employees who were willing to leak unfavourable information. Using a single voice to broadcast company information to the press and public can only be effective, of course, if the employees are made aware of the policy normally through a directive issued from above (see (i) for a discussion of this point).

(iii) Use of sanctions

In companies, the policy of access to confidential information can be used to convey a reward or a punishment to managers. In other situations threats can be used against employees to deter them from breaking the rules of access.

In one company the manager seemed to be in possession of a special

report that other managers at a similar level did not receive. The implication seemed to be that his access to this report was granted as a special favour from the managers above (the executives in this case). This impression was reinforced by the fact that some of the other managers thought he should not receive it. In the same company those workers who have at least twenty five years service are part of a special "club". The club is occasionally addressed by the president who reveals to them some of the plans of the company, information that would not normally be available to other employees.

Another subject interviewed related that the company she worked in emphasizes loyalty in its employees. When an employee resigns they are normally asked to leave immediately, partly to prevent leaking of information to competitors, particularly if the employee is moving within the industry. After one employee refused a move to another city the person was ostracized by the company. The employee was left off mailing lists and memos were not answered. Although the employee was not fired and the problem turned out to be a misunderstanding, it demonstrates the effectiveness of using access to information as a deliberate weapon for punishing an employee. Examples are also available in the literature on the use of organizational gatekeepers who control the access of information for others (e.g. Pettigrew, 1973).

Lastly, an example was given to the researchers where employees were threatened by management with disciplinary action if they were caught accessing information outside their functional area. This applied to office workers in the case cited and the information was largely computerized and operational. No examples were given where managers had been threatened with similar sanctions if they strayed outside their functional

areas and accessed information that was not needed for their jobs.

(iv) Special markings

Eight managers in five companies in the sample gave examples of the use of special markings when confidential information was being sent from one part of the company to another. Usually the documents would be sent in sealed envelopes stamped "private and confidential" or just simply "confidential". In one case, different coloured folders were used by a company to distinguish between publicly available information and internal, confidential information.

Although the practice of putting special markings on documents is not very expensive it does have at least two drawbacks. Firstly, it tends to be abused by those who control it. Three cases were cited where the managers thought that too much information was stamped confidential and that much of the information was in practice readily available in the company. This leads to the term "confidential" being devalued. Secondly, stamping documents in special ways tends to draw attention to their potential value rather like postal thieves are attracted to registered mail.

2. Indirect regulation

Retrieval

(i) Keeping managers ignorant

A manager's lack of knowledge about information available in the organization is a natural by-product of the "need to know" formula for determining access. For example, in one company, information about promotional items required two to three months of confidentiality during which time the discussions were confined to executives and the marketing managers on the basis of their "need to know". The material was kept in the heads

of those involved and not recorded on paper. Other managers and employees were formally excluded from the discussion and did not know that the meetings were taking place. In another company one group of managers in a functional area had their salaries tied to those of the unionized maintenance workers. This resulted in generally higher salary levels compared with other managers. The policy was not well known within the company. Another effect of the "need to know" rule concerning access is that managers may not be aware of what others are doing in the company. This can result in a duplication of effort, a situation recounted by two managers in different companies. Three cases were found in companies where the policy of ignorance was applied by managers to their subordinates and to unions. In one industrial board, reorganization plans were kept from the employees until the last moment. This was done to reduce the speculation and anxiety over redundancies that might follow if an early announcement was made. Other cases involved unions in two of the companies. In the accounting department of one of these companies, it was standard policy to keep cost accounting information from the union if the information concerned the subcontracting of non-union staff.

Clearly, many companies use ignorance as a method of restricting access, intentionally or otherwise. Ten of the managers sampled gave explicit examples of its use. For confidential information it forms a cheap means of security as long as trusted people are involved. If the information is not documented but is retained and verbally communicated by those entrusted with it, then the risk of unauthorized access is further reduced. When the information requires documentation at an early stage, as is the case for complex projects or studies, for example, then the risk of leakage is higher. Documents tend to be copied and leaked.

Several examples of this latter situation were related to the researchers, one of which ended with a company being picketed by the workers after a consultant's report on staffing was leaked to the union. However, if the method of keeping managers and others "in the dark", as one manager put it, is applied to non-confidential information then the result may be the duplication of effort that was found in several situations. Additionally, it may result in the promotion of a negative attitude to information sharing.

(ii) Non-recorded information

Nine cases were cited by managers where information was not recorded in document form. In each case the information was of a confidential nature. For instance, one manager noted that most information of a confidential nature is given in his company by word of mouth only. The executives had learned through experience not to put confidential information on paper. In another company, policy information was afforded the same treatment in that it was not committed to paper but was retained in the heads of those few people concerned with the discussion.

For low volume information, verbal access to data would seem particularly effective in the treatment of highly confidential information for short time periods. The method does not require elaborate security as the information is not kept in document or computerized form. It would seem to find particular application in the preliminary discussion of strategic planning questions or promotional issues, and situations related to the researchers verify this. Of course, the lack of documents concerning policies could be disconcerting to those middle managers seeking direction from top management, but that is another issue.

The method of not recording information breaks down under several related conditions. Firstly, the volume of information could be so high or the content so complex that the people concerned could not reasonably be expected to recall the details with any accuracy without the support of documentary evidence. Secondly, the time of discussion could be sufficient to preclude the sole reliance on the memories of the people concerned. Lastly, the project may involve relationships outside the company that cannot be totally controlled. In one very large company the time span of any project was measured in years, the issues were highly complex, and they had to keep several diverse external groups supplied with information about the project. Clearly, in these circumstances the company had to document the project extensively in order to meet these criteria alone, besides the more technical ones.

(iii) Visual access to information

Only one example of this method was found during the interviews. As a way of protecting confidential, five-year plans from unnecessary copying, the executives circulated it to middle management with the instructions that no copying was allowed.

This is an indirect way of restricting access to confidential information, employing the assumption that the fewer copies made the less likely unauthorized access will occur. It is an effective method of keeping managers informed of highly confidential information. At the same time it demonstrates a certain trust in managers not to abuse their access to highly confidential information. It also implies a higher status for those on the circulation list.

(iv) Physical security

The use of physical security to protect confidential and non-confidential information varies not only between companies but between different functions within companies.

For visitors to the companies the physical barriers faced in seeing personnel ranged from high security, involving guards, signing in, and the issuing of passes, to no security whatsoever. In some cases the high degree of physical security was associated with the value of the equipment being maintained and in other cases it resulted from the value of the information being kept in the building.

Inside the companies there were usually one or more areas to which special physical security was applied. In one company visited, the advertising department was a "secure" area with a sign warning that only authorized staff were allowed to enter. This restriction on entry was established as a direct result of information leaks to competitors. In the same company, the research department had been moved to another location outside the main building in order that special security could be applied to the information contained within the group. Another special area of high security was the computer operations room in many of the companies visited. Security was usually accomplished by the use of keys and/or magnetic badges. In one installation, staff wore badges with different coloured dots to distinguish between the different areas of security within the computer department. It is standard practice in most computer departments to keep copies of important data files at a separate location. In the case of theft, fire or other damage, the files can be recovered. In this way, many computer installations are better protected than those using manual records for their operational data.

As an illustration of the contrast, an industrial board maintains manual records for part of its operational information on clients. There is no protection from loss in the case of fire or theft. No back-up copies are taken of current records.

Most of the physical security found in companies applies to the bulk of operational information, including some of a confidential nature. However, as most of it is not confidential, the security is largely to protect the company from a total or partial loss of records which might occur in the case of a computer room fire, for example. In the case of most management or executive offices, where much of the information used is confidential, however, the security is normally much less rigorous. In several cases in the study confidential information was clearly left on managers' desks and sometimes was not even locked away at night. Although executives were not part of the study, they too would seem to have a similar attitude towards information security. However, although their offices are not usually protected by security systems, executives are normally located in a special suite of rooms with a separate secretary to screen visitors. In this way they have better protection from theft of information than most middle managers.

Physical security of information can be a very expensive form of protection and most companies visited have seen fit to apply it to special, largely operational, areas of information handling only. Generally computer records are better protected from unauthorized access than manual records. It was found in the study that most information used by managers did not have great security applied to it and where security was used it was in the form of locked drawers or office doors.

It is not clear that most managers would be willing to change the way they handle information, in which case other methods of protecting confidential information from unauthorized access might need to be examined.

(v) Difficulty of retrieval

One way organizations can make confidential information secure from unauthorized access is to ensure that it is difficult to obtain, and several examples of this were given during the interviews. Some of these problems of retrieval follow from the level of security applied to certain kinds of data. The need for employees to surmount physical obstacles to gain access to data is an effective barrier for most workers. In other cases, the information was not necessarily well secured; it was just held in a location at a distance that ensured limited access. One company had set up a separate firm, off premises, partly to restrict employees from gaining access to confidential information. In a different example, the confidential information was held locally in the accounting department without much security but it was so scattered throughout the department that the physical difficulty of assembling all of the pieces would prevent unauthorized persons from accessing it. This is an example of what someone has called administrative inefficiencies and their impact upon access (Canadian Task Force, 1972).

Seven other examples given by managers concerned their need to justify to other employees why they should have the information. Often the information was confidential. In one company the board minutes are kept in the president's office. In order to get them the manager had

to justify his need for them. If others do not recognize managers' authority to access the information then they may have to call on a higher authority to obtain them and three examples of this were related to the researchers. In one situation the manager was refused access to technical information on the grounds that he might misinterpret it. He had to negotiate with those who held the information until a compromise solution was found. In the computer department of one company, one person was given charge of the administration of passwords. When an employee requests a password, the request is verified by the person in charge to make sure that the employee's need is legitimate. In all of these cases the need to justify a request for information was an effective barrier to unauthorized access. But in any company the method can be taken to extremes. For example, one manager had to justify to an employee why he should have access to five years of financial data even though the same information was publicly available.

The creation of inconvenient procedures of access is usually not difficult to implement and from the comments made by managers they seemed to be quite effective in preventing access to information. In companies where the need to protect confidential information is acute the limited use of physical barriers or, alternatively, "gatekeepers" who administer such information, seems justified. However, for information that is non-confidential, erecting unnecessary barriers and making it awkward and time-consuming to retrieve needed information could seriously inhibit a manager's performance. In addition, the need to justify a request for access to another employee is subject to the vagaries of the employee's interpretation of the manager's rights of access. A widespread use of this method in a company to control access

to non confidential information would be an indication of a poor attitude to information access and the sharing of data.

(vi) The use of technology to restrict access patterns

Almost all of the companies studied had been using computer technology to store and process vast quantities of operational data for several years. Seven of the companies used systems that have built-in facilities for restricting certain files and programs from unauthorized use, employing special terminals, passwords, or both. These companies were exploiting the new capability by using it to keep employees to data that they "need to know".

This method of protecting information, confidential or non-confidential, is a by-product of the technological facilities available with modern computer systems. For confidential or sensitive information, such as payroll, the method is an effective means of protecting it from unauthorized access as long as the administration of passwords etc. is also carefully handled. For non-confidential operational information the enforced access patterns could also be helpful in overcoming some fears expressed by different departments concerning the ownership of data. Some managers were reluctant to pool information with other departments: if the system could support the traditional patterns of access some of this reluctance may be overcome.

(vii) Timing of release

In four of the companies, policies were used which governed the timing of release of confidential or sensitive information. In some cases it was done to maintain a competitive advantage; in other cases it was used for organizational reasons.

An example of the first kind was found in one company where advertising details were considered confidential but were finding their way into the competition. In order to combat this leakage the timing of release of the advertisement was left until the last moment. The same was true in the transportation industry where schedules of departure times were not released until it was absolutely necessary. One company involved in property deals only makes the information available to managers not involved after the contract has been agreed upon. Two examples of the second type were found where companies would keep reorganization plans from those to be affected until the last moment.

The judicious use of timing of release is a very effective way of protecting some confidential information from unauthorized access. For certain types of information where an important decision is to occur or a deadline has been set, it can defuse some of the problems associated with the early release of confidential information while still allowing interested parties to be informed of the post-decision results.

Use

(i) Coding of information

Four instances were recorded where confidential information was coded. In some cases this was a deliberate policy of the company to protect confidential information from being leaked. In other cases it appeared to be more of a by-product of the information and not part of the company's policy.

An example of the first kind was given in a company which had acquired land for future development of a commercial enterprise. As the item was an asset of the company it had to be shown in the accounting

figures, but in order to prevent the competition from finding out the location of the site, it was given a code that is known only to a few senior managers in the company. The second use of coding was found at a branch office of a large company. Planning information was not given any special security by the manager concerned even though it was confidential as he believed that it would require about ten years experience to read and understand the information. He was the only one in the office who had that experience.

Coding is a cheap and generally effective method of protecting confidential information. It does not require special security and it can be used for high volumes of data. It has the potential disadvantage that should the information find its way into the possession of unauthorized persons it could be misinterpreted. In practice it would seem that few companies employ coding as a deliberate policy to protect confidential information.

(x) Use of summarized or interpreted information

In order to protect confidential information, companies or departments within companies sometimes employed summarized or interpreted information. The detailed information is retained by the originator, and the recipient gets a summarized or interpreted version. Nine examples of this method were given by different managers.

Recorded confidential information can be protected within and outside the company simply by removing some of the sensitive detail thus making it non-confidential. Minutes of meetings are a typical example of this process. One manager commented that although he receives minutes of board meetings they are so summarized that many of the important (useful) details are missing. The same manager repeated the process when he sent memos to

his staff to inform them of on-going activities raised in the board minutes. Sensitive material was removed before the information was circulated. Often financial documents are summarized before being made readily available internally. Because detailed cost and sales figures are confidential in many companies they are often condensed to the next or higher levels of generality. An example of this was found within a large company where one division was limited to the access of summary costing information of another division. In another large company broad cost figures were widely available internally. In fact they were shared with their main competitor. However, detailed cost figures were neither available to the competition nor to the majority of managers internally. In a health care organization, the budget was often unknown well into the fiscal year. This was one reason that led the finance department to be very cautious about releasing detailed costing statements internally. As another manager in the same organization put it; the finance department practices selective dissemination of information in summarized form. In another case, a manager requested from another department a quotation for a particular service. The manager was given the quotation but he was not allowed access to the detailed methodology by which the quotation was determined, ostensibly because the department thought he might misinterpret the procedure.

The use of summaries and interpretations is a widely used method of protecting confidential information and some examples have been presented. For non-confidential information the method is also applicable in reducing the volume of documents sent to a manager (e.g. exception reporting). However, the technique does have some drawbacks as Sorter (1969) has indi-

cated. One of the main disadvantages of the method is that summarized or interpreted information is prone to misinterpretations. As one manager interviewed noted, the problem in his company was not retrieving information, but interpreting it.