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Ministère des Communications

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Le Centre canadien de recherche sur l'informatisation du travail  
Canadian Workplace Automation Research Centre

2/

IMPLEMENTATION OF OFFICE AUTOMATION  
IN A TARGET GROUP

Summary of Research Report

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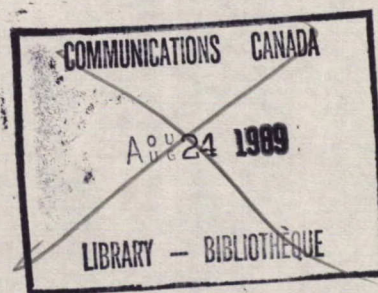
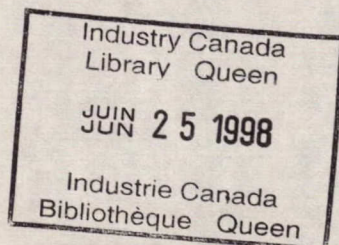
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Canadian Workplace Automation  
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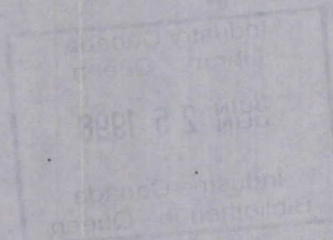
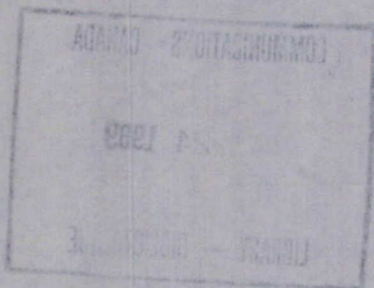
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With the cooperation of the  
Conseil économique du Nouveau-Brunswick  
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## INTRODUCTION

New technology leaves no one indifferent. The computer era has had various impacts on society, and everyone is affected in some way by this new age of electronics and information technology. Access to the many computer systems available may enable organizations to increase their performance and productivity, and yet many people have doubts about automation and its consequences for the world of work.

The Centre de Recherche en Sciences Administratives (C.R.S.A.) de l'Université de Moncton has been studying this question. In May 1986, we submitted a proposal to the Canadian Workplace Automation Research Centre to examine the implementation of office automation in a target group. The object of this project was to measure the impact of computerization on small business. More specifically, our aim was to determine whether these businesses were deriving the maximum benefit from this new technology, and whether the equipment they were using was adequate and enabled them to increase their productivity.

The target group chosen for this study were the members of the Conseil économique du Nouveau-Brunswick (C.E.N.B.). We first sent a questionnaire to all members of the Council in 1986. We received 244 completed questionnaires out of a total of 705 sent. Next we conducted interviews with

30 managers of computerized businesses to obtain a better understanding of the computerization process and its effects on the organization.

In this report, we will first profile the target group by explaining briefly what the C.E.N.B. is, and then establish the respondent group by indicating the percentages of computerized and non-computerized organizations. Next we show how well informed respondents were about computers and what type of training they had received. In the fourth section, we will determine the usefulness of reading in acquiring knowledge about computers. Next we discuss the main reasons certain organizations had for not computerizing, and then we look at the number of organizations that wished to introduce computers. Section 7 lists the sources indicated by respondents as being most useful in choosing a system. In the final section, we look more closely at computerized organizations in order to describe the entire process of computerization, from the needs analysis to the results obtained.

## 1. TARGET GROUP PROFILE

The C.E.N.B. was founded in 1979 and has over 700 members drawn from all sectors of the economy and several locations throughout the province. It is a non-profit organization, with no political or other ties. Its mandate is to promote economic development in the many regions of New Brunswick. It organizes various types of activities to inform its members about economic questions, as well it sponsors studies and prepares briefs for presentation to the Government.



## 2. RESPONDENT POPULATION

The respondent population was made up of 244 managers. Of these, 132 stated that their organization was computerized. This is an interesting proportion when we consider that these respondents were from outlying regions.

The southeastern region had the largest number of computerized organizations, 45 out of 75 (60 percent). This may be due to the urban nature of that region.

In addition, as Table I shows, over half of the respondents were from the sales sector.

The C.E.N.B. reports that 35 of its members are from the industrial sector, and it is thus surprising to see only 3 respondents from this sector.

The institutional sector includes teaching institutions, school boards, organized social groups, chambers of commerce. The C.E.N.B. claims that all these institutions are computerized, and yet only 11 responded to our questionnaire.

TABLE I

Distribution of computerized and non-computerized organizations  
by sector of activity

ORGANIZATIONS	SECTOR OF ACTIVITY						
	SALES	INDUSTRIAL	FINANCIAL	GOVERNMENT	INSTITUTIONS	UNCLASSIFIED	TOTAL %
COMPUTERIZED	73	2	24	14	6	13	54.1
NON- COMPUTERIZED	52	1	7	5	5	42	45.9
NUMBER OF RESPONDENTS	125	3	31	19	11	55	244

### 3. RESPONDENT KNOWLEDGE OF AND TRAINING IN COMPUTERS

Compilation of results revealed that 93.7 percent of respondents whose organizations were not computerized had no knowledge of computers.

It should also be noted that respondents whose organizations were computerized had little or no knowledge of computers before their equipment was acquired.

TABLE II	
Respondent training in computers	
TRAINING	%
FORMAL COURSES	40.1
DAY-LONG INFORMATION SESSIONS	15.2
SEMINARS	14.8
OTHERS (unspecified)	13.5
COMPUTER SHOW, UNIVERSITÉ DE MONCTON (1983)	17.6
COMPUTER SHOW, UNIVERSITÉ DE MONCTON (1984)	16.4
OTHER SHOWS	25.8

We note that 40.1 percent of respondents had taken courses, while others had attended various shows, day-long information sessions or other functions.



These results also revealed that, of the 40.1 percent who had taken courses, 18.8 percent had received 60 hours of instruction or less. In comparison, it might be noted that secondary schools require at least 200 hours of courses and training to teach students to type.

It is also noteworthy that over half the respondents had attended shows outside New Brunswick. These are individuals who live in regions near the Quebec border. As well, these are people whose organizations were computerized prior to 1983.

In Chapter 8, we will look more closely at the training received by employees of computerized organizations.

#### 4. KNOWLEDGE ACQUISITION THROUGH READING

In our research, we wished to determine whether reading brought sufficient knowledge regarding the field of computers in general, as well as on the use of computers.

Our study showed that 50.8 percent of respondents considered that reading gave them enough information about how to operate computers.

We feel we should point out that there are no bookstores specializing in this field in New Brunswick, and sources of information about computers are rare. Moreover, libraries do not have sufficient funds to purchase highly specialized books. In view of all this, we consider the above result surprising to say the least.

## 5. NON-COMPUTERIZED ORGANIZATIONS

TABLE III	
Reasons given by organizations for not computerizing	
REASONS	%
1. NOT CONVINCED OF NEED	49
2. DEVELOPMENT COSTS TOO HIGH	32
3. LACK OF QUALIFIED PERSONNEL	21
4. VARIOUS REASONS	25
Number of respondents: 112	
Note: Respondents could choose more than one reason.	

We observe that 49 percent of managers of organizations that were not computerized are convinced they have no need of this technology.

It should, however, be borne in mind that 93.7 percent of the these respondents stated that they had no knowledge of this field. It would appear, then, that lack of information is likely the main reason why these organizations are not computerized.



It is nevertheless possible that some respondents really have no need for computers due to the small number of transactions handled by their organizations.

In the case of organizations that gave development costs and lack of qualified personnel as reasons, it might wise to analyse this situation with reference to the social, political and economic environment as well as the internal organizational environment.

## 6. RESPONDENT DESIRE TO COMPUTERIZE

Our research enabled us to determine that a third of the respondents intended to acquire a computer during the course of the coming year, while another third did not intend to do so.

Among respondents who stated they wished to acquire a computer, the likelihood of this purchase is nevertheless not very great, since only 78 percent of these respondents estimated the chances of this purchase actually being more than 60 percent.

In the same vein, we wanted to determine whether the existence of a system of grants or other assistance to small business for computerization would be an incentive. The results showed that 60.3 percent of respondents would be prepared to computerize their organization or improve their existing system if they were to receive a grant.

However, 26.2 percent of respondents did not feel they could form an opinion on this, and 13.5 percent still did not want to purchase a computer.

## 7. SOURCES OF REFERENCE FOR CHOOSING A SYSTEM

In the course of our research, we asked respondents to tell us who, in their opinion, were the people who could best help them in choosing a computer system.

The results are shown in Table IV, where we present the perceptions of all respondents regarding sources of reference for choosing a system.

TABLE IV	
Sources of reference for choosing a computer system	
RESPONDENTS' CHOICES	%
CONSULTANT/EXPERT ADVISER	39.9
RESEARCH SERVICE OF L'UNIVERSITÉ DE MONCTON ADMINISTRATION FACULTY	18.4
RESPONDENT'S ACCOUNTANT	16.5
EQUIPMENT SALES REPRESENTATIVE	15.7
OTHERS - HEAD OFFICE	7.1
RESPONDENTS THEMSELVES	1.5
READING (MAGAZINES)	1.1
Number of respondents: 267	
Note: Each respondent could choose two items.	



It thus appears that 40 percent of respondents perceive the consultant or expert adviser as the best choice.

We will see later, however, that suppliers were the main source of information when computerizing organizations, followed closely by consultants and, in third place, employees.

Moreover, while the Université de Moncton ranks quite high in the perception of respondents, it would appear that, in actual fact, it was of very little help to organizations that computerized, as we will see in the chapter that follows.

## 8. COMPUTERIZATION OF ORGANIZATIONS

### 8.1 Implementation of a computer system

The remarks that follow are intended to describe the procedures followed in implementing a computer system. In this section, questionnaire results are compared to information obtained during interviews.

#### 8.1.1 Cost-benefit analysis

Our study showed that 53.8 percent of computerized organizations performed some type of cost-benefit analysis before implementing a computer system, while 27.3 percent did not. It should be pointed out that 18.9 percent of organizations failed to answer this question. We feel it is important to note that 45 percent of organizations which performed analysis nevertheless incurred unexpected costs.

However, information obtained during interviews with 30 managers showed that the majority of them carried out an analysis of systems and software before deciding whether to implement the system.

In 19 cases, the analyses were performed by the managers themselves, with the help of some employees. A total of 11 organizations called on outside consultants, professors or university students to carry out the analysis on their premises and recommend an appropriate system.

## 8.1.2 Objectives

TABLE V	
Objectives of organizations which performed a cost-benefit analysis before implementing a system	
OBJECTIVES	%
MORE RAPID SYSTEM	86
MORE EFFICIENT SYSTEM	85
BETTER INFORMATION SYSTEM	83
ELIMINATE RISK OF ERRORS	68
BETTER QUALITY WORK (layout and cleanliness)	61
COST REDUCTION	52
Number of respondents: 71	

Over 80 percent of the organizations that had done a cost benefit analysis had the following objectives: a more rapid and efficient system and a better information system, while only 52 percent of organizations had as an objective to decrease production costs.



In light of these observations, it would appear that a larger proportion of respondents felt that quality of information was more important than costs.

It is moreover interesting to note that 79 percent of those who had done preliminary analysis attained their objectives.

During the interviews, the 30 managers gave more specific reasons for computerizing. The main reasons which led these various organizations to implement a computer system were the following:

- considerable increase of capacity of work to be completed;
- increase in clientele;
- the desire to facilitate follow-up and control of activities, particularly accounting activities;
- the desire to remain competitive.

#### 8.1.3 Sources of information

Our survey revealed that sales representatives have the most influence in the choice of hardware and software, since 52 percent of respondents were of the opinion that sales representatives represent a good source of assistance in identifying the needs of an organization.

In second place were consultants, the choice of 49 percent of managers. We found that 29 percent of respondents had called in a consultant to study the performance of the computer system.

In third place were employees, with 44 percent. It should be noted, however, that employees do not have sufficient training to assess the needs of the organization, and this is why the organization must often look to sales personnel to determine its needs.

Regarding the installation of the new system, here again sales personnel were most often called upon for assistance, accounting for 57.6 percent of cases. In second place were consultants, with 35.6 percent.

We thus observe that sales personnel and suppliers represent the most influential source of assistance in choosing hardware and software, and for the installation of the new system.

We did note, however, that use of consultants is on the rise among small businesses, whereas only a few years ago these organizations would have hesitated to call upon outside services other than those of accountants and lawyers. The latter two groups, incidentally, were given as sources of assistance or information in only a very small number of cases.

## 8.2 Training

TABLE VI	
Training received by employees	
METHOD	%
TUTORIAL SESSIONS ACCOMPANYING SOFTWARE	66.7
THEORY COURSES	52.3
SELF-INSTRUCTION	54.6
Number of respondents: 132	
Note: Employees may have used more than one method.	

We notice that 66.7 percent of respondents took advantage of the tutorials that came with the software purchased. In addition, 54.6 percent stated that they had learned by themselves, and 52.3 percent attended theory courses. Note that most employees used two or three methods.

We feel it is important to keep in mind that 18.8 percent of the respondent population received 60 hours of training or less.

Let us now look at how employees received their training. Our survey showed that the main outside sources of training were consultants (20.5 percent), community colleges (15.2 percent) and universities (15.1 percent). As well, 9.8 percent of respondents took advantage of training sessions offered by the head office of their organization.

Suppliers were the least frequently used sources of employee training. It will be recalled that suppliers represent the main source of information in the preliminary stages of computerization.

### 8.3 Costs

It would appear from the interviews that hardware and software costs varied considerably from one organization to another. These costs might range from \$10,000 to more than \$100,000 depending on the use each organization intends to make of its system.

As well, some organizations preferred to rent a system rather than buy it in order to eliminate maintenance costs and cash flow impact.

### 8.4 Satisfaction with system

Our survey allowed us to determine that 84.1 percent of respondents are fairly satisfied with their existing system, while 10.6 percent are relatively dissatisfied.

TABLE VII Degree of respondent satisfaction with existing computer system	
DEGREE OF SATISFACTION	%
0%	0
20%	4.0
40%	10.6
60%	24.4
80% AND OVER	61.0
Number of respondents: 123	

As sknown in Table VII, 61 percent of respondents were more than 80 percent satisfied with their system, while only 14.6 percent of respondents were satisfied to a degree of 40 percent or less.

Our survey also showed that the 30 organizations interviewed seemed satisfied with the results obtained using their new computer system. They found that work was done more efficiently and rapidly and with almost no errors, since control was more effective. Moreover, some organizations found that their clientele increased dramatically after acquisition of their computer system.

### 8.5 Causes of dissatisfaction

The main cause of dissatisfaction among respondents was that the system was not sufficiently developed, that is, it did not perform all the work expected.

As well, some respondents found the system too complex, and a smaller number felt that costs were too high in relation to the efficiency obtained.

Of the organizations interviewed, those obtaining unsatisfactory results were convinced that the reason was the inadequacy of their system.

### 8.6 Distribution of work outside the organization

Our results show that 11 percent of respondents used outside services for accounting, 8 percent for word processing, 3 percent for payroll and 2 percent for inventory. We thus see that some firms, although they are computerized, believe it is better to have certain work done by outside specialists.

### 8.7 Effects of computerization on employees

In general, our information indicates that a fair number of employees had some initial apprehensions about computerization of their organization. Some were afraid of losing their jobs, while others were simply frightened of the unknown.



Most employees nevertheless overcame their fears once they had familiarized themselves with the system. They then realized that the computer system made their work easier, and they were also reassured to observe that no jobs were lost.

It should be noted that, in some organizations, employees were enthusiastic from the outset about implementation of the computer system, while in other cases, employee integration was rather difficult to achieve.

#### 8.8 Effects of computerization on the organization

Implementation of a computer system had very little effect on organizational structures. Only two organizations had to modify their structures because they had hired computer specialists to manage and perform certain operations.

The main changes observed following computerization of these organizations had to do with job duties, which had to be reviewed and adapted to the new systems.

### 8.9 Problems encountered

Most of the organizations questioned had some problems to overcome at the time the system was introduced or sometime thereafter.

For some, the problems had to do with use of software, since a number of organizations had difficulty finding a system that suited their operations.

It also appears that some organizations were not using their computer system to full capacity, resulting in unnecessary costs.

### 8.10 Service

The majority of organizations questioned expressed satisfaction with service, but it should be noted that no technical problems had arisen since the systems were implemented.

It would thus appear that organizations are fairly satisfied with their computer system since they have no comments about service. In fact, they state that they are satisfied with the service because they are confident in the availability of the firm that looks after the maintenance of the system.

Only seven organizations out of 30 stated they were not satisfied with the service they received.

### 8.11 Respondent suggestions

We asked respondents to make suggestions for improving their computer system. It was thus found that 38.6 percent of organizations believed that one-day information sessions were the best way of improving their system.

The content of such sessions might be dealt with in a future research project. These day-long sessions could be offered by universities and community colleges.

As well, 26.5 percent of respondents were in favor of forming an internal network of users who could then communicate with others and share resources. This would, however, suggest more extensive use of microcomputers in small businesses.

A small percentage, 5.3 percent, felt that they should change their system, and 1.5 percent thought that the software should be simplified.

### 8.12 Managers' opinions regarding the computer age

The managers interviewed were optimistic about the new climate being created by the use of computers. They were of the opinion that this is necessary given current trends in the business world.

## CONCLUSION

In the light of the results of this survey of 244 members of the C.E.N.B., it would appear that almost half of the respondents represented organizations that are not computerized. Moreover, the majority of these individuals stated that they knew nothing about computers, despite all the publicity this question has received. This would indicate there is still a need for information in this area.

Among the computerized organizations, we observed that computerization had had a rather positive effect. The majority of these computerized organizations are in fact "success stories" and can no longer operate without computers.

Teaching institutions do not appear to have been very active in the computerization process to date, with sales representatives and suppliers playing a leading role in the introduction of systems. This is an abnormal situation which should be corrected.

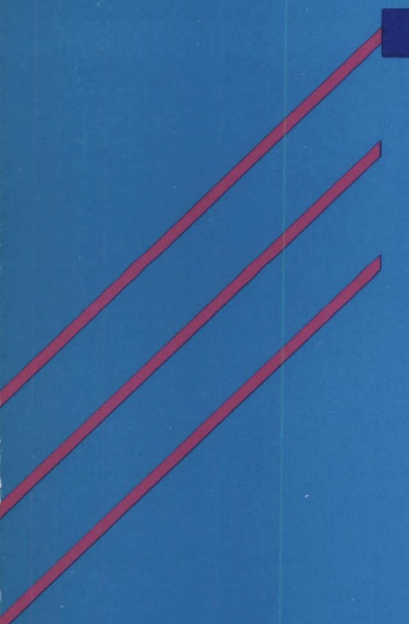
Training services appear to be inadequate and short training periods, in the form of one-day sessions, are often preferred as a means of remedying the lack of training and knowledge about computers.

Given the above observations, it would appear that new technology has not yet become generally accepted among small businesses in New Brunswick.

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