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A FRENCH TEXT

FINAL REPORT

TECHNO-ECONOMIC ANALYSIS
OF COMPUTER/COMMUNICATIONS DEPENDENCY
IN THE ATLANTIC REGION OF CANADA

BY

GEORGE WYBOUW

Associate professor
Faculty of Administration
Université de Moncton

March 30, 1981

FOR: The Department of Communications, Ottawa

UNDER: Contract no. OSU 80-00166

PERIOD: August 22, 1980 - March 31, 1981

ADMINISTRATIVE SCIENCES RESEARCH CENTER
FACULTY OF ADMINISTRATION, UNIVERSITE DE MONCTON

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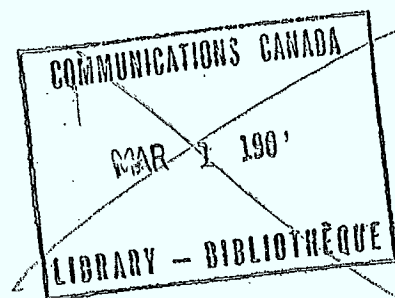
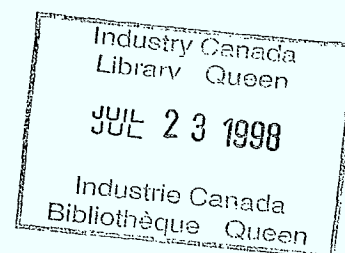
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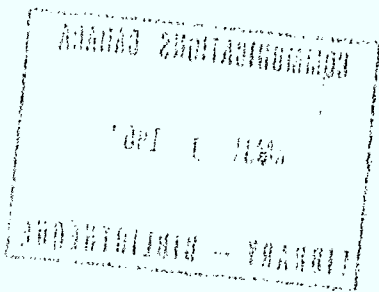
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Forword

With complete sincerity, we wish to express our thanks to the people and institutions that helped us prepare this report.

Messrs Shakelton and Robinson of the Department of Communications in Ottawa, the designated scientific expert, Mr. Roland Richard, and the directors of the Economic Analysis Division and the Regional Office of the Department have supported us throughout this work.

At the regional level, provincial officials of the four Atlantic provinces cooperated, as much as they were able, in this research and showed real interest in the subject under study.

We could not conclude without expressing our thanks to the Dean of Graduate Studies and Research of the Université de Moncton and the directors of the Faculty of Administration of the same institution.

The methodical work and care for detail of our collaborator Ms. Yvette McLaughlin were very helpful to us in our study. The typing and assembling of the report were done by Ms. Gloria Maillet.

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CHAPTER 1

INTRODUCTION

1) Type of problem

In the 1960s we witnessed the integration of computer technology with telecommunications. The two technologies, which had formerly followed different patterns of development, became linked and this amalgamation of telecommunications and data processing created a new science, computer/communications, in which the two original dimensions remained distinct. The computer systems, data bank systems, teleprocessing systems and all the other computer/communications systems use the telecommunication lines and equipment and time-shared operational software to provide business and individuals with data processing services and information where and when they need it.

Computer/communications also replace the energy needed to move people, documents or all other physical objects, with electronic pulses that use little energy. This dimension of computer/communications will accelerate its penetration into Western society during the 1980s, the decade of the energy shortage.

Computer/communications may also be seen as the beginning of the second industrial revolution, in which man adds to his mental strength, as he added to his physical strength during the first industrial revolution.

Computer/communications will therefore allow each individual or each commercial user to make use of an individual calculating capacity corresponding to his immediate needs, whenever it is required, at a fraction of the cost of an individual system. This calculation capacity also includes the storage, collection and distribution of information. Thus computer/communications join the telephone, the television and the printing press in providing man with information power that mankind never had before.

As most other industrialized countries, Canada studied the phenomenon of computer/communications during the 70s. The government of Canada analyzed the effects of computer/communications on the population, on institutions and on industry and issued a policy statement on computer/communications.

The regional aspect of the introduction of computer/communications to Canada unfortunately did not receive much attention in the numerous reports published by various organizations and governments. Canada is made up of several different regions with social, cultural, linguistic and economic disparities. Contrasts between the regions mainly involve industrialization and productivity. One of the reasons for these gaps may be the technological differences in production processes. Several

studies by the Economic Council of Canada lead us to believe that delays in the distribution of innovations, such as the distribution of computers and computer/communications techniques, are the reasons for the considerable variances in productivity. However, we should ask ourselves: "Are computers a condition for development or are they a product of development?" This also applies to computer/communications.

2) Objective of the research

The objective of our study is to analyze the computer-communications phenomenon in the Atlantic region of Canada. Initially, the report was to contain two main sections. The first part would be a factual analysis of computer/communications and data processing in the Atlantic region of Canada, including a study of equipment suppliers, the geographic location of equipment in the region and the geographic distribution of locations where information was processed. The second part was to deal more specifically with the socio-economic, cultural and industrial repercussions of computer/communications in the Atlantic region, as well as the current policies and means of control of the provincial and federal governments and the companies. However, the almost total lack of information on computer/communication in the region and the scattering of this information among various provincial and federal government agencies, professional associations and private companies showed us the importance, for this research and for later work, of a good data base and, consequently, of major information gathering and collection work dealing specifically with data processing and telecommunications in the Atlantic region of Canada.

Our efforts have consequently been mainly concentrated on the first section planned, i.e. the empirical and factual analysis of computer/communications and information in the Atlantic region. The socio-economic, cultural and industrial repercussions of computer/communications have been analyzed but they leave us with more unanswered questions than answers.

Federal and provincial data processing and computer/communications analysis and policy documents are analyzed in detail in regards to the regional aspects of the proposed policies. Through discussions with the officials responsible for telecommunications and computer/communications policies, we have been able to define the explicit and implicit policies of the current governments and discover the real developers of computer-communications policies in the region.

The last chapter of this document contains conclusions, recommendations, and a framework for future research.

1. Including Beaudry, Richard, Les aspects régionaux de la diffusion de la technologie au Canada, Le cas des ordinateurs, (The regional aspects of the distribution of technology in Canada: Computers) document no. 50, Economic Council of Canada.

3) Methodological problem

One problem encountered throughout this study was the fact that it is practically impossible to tell computers used for teleprocessing from other computers and, even if the number of access gates is known, it is not possible, without a more in-depth investigation, to know if these computers are used as computers, satellites or central computers, or both. In addition, no study has been done on terminals. Only terminals linked by leased lines or whose users are subscribers to a digital transmission are identified.

This lack of information and the fact that in 1981 every computer has a communication potential has led us to consider data processing as a whole in this study, expanding the initial scope of our research.

CHAPTER 2

USE OF DATA PROCESSING
IN THE ATLANTIC REGION

1) Introduction

The first commercial computer was installed in Canada in 1956. During the next 25 years, computers became part of all branches of economic activity in Canada and spread to all areas of the country.

However, the distribution of computers was not uniform throughout Canadian territory and this new technology did not grow at the same rate in all the regions.

As the Atlantic region is recognized as being economically disadvantaged, it would be interesting to compare its condition to that of other Canadian regions. We could ask ourselves what the processing capacity of the region is and how it is being used.

For such an interregional comparison, we need to consider two economic aspects of the data processing phenomenon. First of all, there is the use of the computer itself in economic activity. From this point of view, computer technology is an element of the region's productivity.

However, there is also the data processing industry, i.e. the firms that design, build, sell, service or use data processing equipment and parts². We can ask ourselves if there is really a data processing industry in the Atlantic region territory and what are its characteristics?

This chapter deals with the first element, i.e. the use of data processing in economic activity. In chapter three, we will try to define the characteristics of the data processing industry in the Atlantic region. Chapter four will analyze conditions in the Atlantic region.

2) Distribution of data processing

2.1) Number of computers in operation

According to the annual census of the Canadian Information Processing Society (C.I.P.S.)³, there were 8,598 computers operating in Canada in 1979. The distribution by region was the following:

-
2. Computers and related telecommunications equipment, Report by the Tariff Board, Department of Supply and Services, Canada, 1977, p. 8.
 3. The C.I.P.S. data are not official statistics. They are gathered on a voluntary basis and thus have certain weaknesses. Experts agree that these are nevertheless the most reliable data we have.

<u>Table 1</u>		
<u>Region</u>	<u>Number of computers</u>	<u>Region's share</u>
Atlantic	494	5.8%
Québec	1,860	21.6%
Ontario	3,916	45.5%
Prairies	1,370	15.9%
British Columbia	942	11.0%
Yukon and Northwest Territories ⁴	16	.2%
Total	8,598	100.0%

Source: Canadian Information Processing Society, 1979 Census, p. 36.

We see that Ontario has almost half of the computers in the country (45.5%). It is also apparent that Ontario has, on the whole, twice as many as Québec, three times as many as the Prairie provinces, four times more than British Columbia and almost eight times as many as the Atlantic region. Therefore, the Atlantic region is clearly disadvantaged.

This measure of comparison seems to indicate a large regional disparity in the acquisition of computers. It is obvious that these regions differ largely among themselves in regards to the size of their populations and their economic activities and these factors should be taken into consideration. We have therefore weighed these two variables in the following two tables.

We will first give the number of computers by hundred thousand inhabitants per region for 1979.

<u>Table 2</u>	
<u>Region</u>	<u>Number of computers by hundred thousand inhabitants (1979)</u>
Atlantic	22.0
Québec	29.6
Ontario	46.1
Prairies	34.2
British Columbia	36.7
CANADA	36.3

Source: Table 1 and population statistics from Statistics Canada.

Thus the population factor changes the proportions a little. Ontario is still ahead with 46 computers per hundred thousand inhabitants.

-
4. Because of the small number of computers in the Yukon and Northwest Territories, we do not always include them in our interregional comparisons in this chapter.

Québec's position is a bit surprising: British Columbia is in second place (36.7) and the Prairies, in third place (34.2) are ahead of Québec (29.6), which is just above the Atlantic region, still solidly in last place with 26 computers per hundred thousand inhabitants.

Ontario therefore has twice as many computers per inhabitant as the Atlantic region provinces. The disparity is still great.

The following table gives the number of computers by billion dollars of gross regional production (G.R.P.) for 1978 since data for 1979 is not yet available.

Table 3

<u>Region</u>	<u>Number of computers per billion dollars of gross regional production (G.R.P.)</u>
Atlantic	33.3
Québec	33.0
Ontario	41.2
Prairies	28.3
British Columbia	32.1

Source: Table 13, and Statistics Canada, provincial economic accounts.

The province of Ontario still predominates with 41 computers per billion dollars of G.R.P. It is a bit surprising to find the Atlantic region in second place, ahead of, although by a slight margin, the three other regions. In our opinion, this reflects two things. Firstly, that the rate of computer use in relation to economic activity in the Atlantic region is relatively good. Secondly, the fact that the Atlantic region is ahead of three other regions in regards to the number of computers by billion dollars of G.R.P. simply confirms that the regional production by inhabitant in the Atlantic region is the lowest in the country.

We will see further on that other factors must be taken into account in explaining the Atlantic region's position, such as the size of the computers and the type of economic activity.

To summarize this section, let us say that, based on the number of computers, the Atlantic region seems disadvantaged at first glance. It is the region with the smallest number of computers, i.e. only 5.8% of the computers in the country.

Also, when we compare the regions on the basis of computers per hundred thousand inhabitants, the Atlantic region is still far behind.

When we compare the regions in regards to the number of computers per billion of G.R.P., the Atlantic region comes in second, but as we have already mentioned, this situation involves explanations that will be given further on.

One fact that becomes immediately obvious is the predominance of Ontario. No matter what index we use, this region is still ahead of the others.

2.2) Value of facilities

In the previous section, we used the number of computers to compare the processing capacity of the Atlantic region in relation to other Canadian regions.

It must immediately be specified that the number of computers is a very cursory rating: it supposes that all computers are identical. But this is not the case. The central processing unit is constantly being improved and a whole range of peripheral equipment is added, which continually modifies the work capacity of the computers. The computer is assuredly a very complex, varied and diversified product.

A more appropriate indication of the capacity of computers is the value of the facilities, i.e. the rental and/or purchase value of the equipment. However, there is little data on this subject. The C.I.P.S. census does not publish prices for reasons of confidentiality. It only contains aggregate values that only allow for inter-regional comparisons.

We need the number of computers by rental category or the value of the computers by region. We are told that this information will be available in the 1980 C.I.P.S. census.

Fortunately we were able, through an economist from the Department of Communications, to obtain information that was compiled and not published in the C.I.P.S. censuses. It has allowed us to prepare the following table for 1978.

Table 4

<u>Region</u>	<u>Value of computer rentals (1978)</u> (in \$000)	<u>Regional share</u>
Atlantic	27,786	3.3%
Québec	196,589	23.7%
Ontario	419,440	50.5%
Prairies	114,128	13.8%
British Columbia	71,977	8.7%
Yukon and Northwest Territories	168	0.0%
Total	830,088	100.0%

Source: Department of Communications, data not published in 1978 census of the C.I.P.S.

In terms of value of the equipment installed, the Atlantic region's share is still lower than in the preceding section when we used the number of computers as a basis for comparison.

To illustrate the difference, we compared each region's share in regards to the number of computers and the value of their facilities in Table 5 as follows:

Table 5

<u>Region</u>	<u>Number of computers in percentages (1978)</u>	<u>Installed value in percentages(1978)</u>	<u>Variance</u>
Atlantic	5.5	3.3	-2.2
Québec	22.5	23.7	+1.2
Ontario	44.9	50.5	+5.6
Prairie	16.1	13.8	-2.3
British Columbia	10.9	8.7	-2.2
Yukon and Northwest Territories	.1	.0	-.1
	<u>100.0</u>	<u>100.0</u>	<u>0.0</u>

Source: Table 4 and table 15

According to this table, when we consider the value of the computers rather than their number, for 1978, Ontario's share increases by 5.6 percent, up to 50.5%. Québec's share increases by 1.2 percent, up to 23.7%. In the three other regions, the ratio decreases by more than 2 percent. The Atlantic region finishes with only 3.3% of the value of computers throughout the country for that year.

It is obvious that the equipment in Ontario and Québec is relatively larger and more sophisticated compared to the peripheral regions of the east and west.

If we weigh this with the population factor of the different regions, again for the year 1978, we find the following:

Table 6

<u>Region</u>	<u>Value of facilities per thousands of population (1978)</u> (\$000)
Atlantic	12.5
Québec	31.3
Ontario	49.7
Prairie	29.0
British Columbia	28.4

Source: Table 4 and Statistics Canada (population).

According to this table, the Atlantic region is clearly disadvantaged in regards to the processing capacity of the region per inhabitant. Ontario has four times more value in equipment than the Atlantic region, while Québec, the Prairie region and British Columbia have, respectively, 2.5 times, 2.3 times and 2.3 times the capacity of the Atlantic region.

The ratio between the value of the facilities and the gross regional production can also be found. See the following table.

Table 7

<u>Region</u>	<u>Ratio of the installed value to the gross regional product (1978)</u>
Atlantic	.0020
Québec	.0035
Ontario	.0047
Prairie	.0024
British Columbia	.0026
CANADA	.0035

Source: Table 4 and Statistics Canada, provincial economic accounts.

The Atlantic region is still last, in spite of the bias because of the lower gross production by inhabitant we discussed at the end of the preceding section.

In summary: when we use the monetary value of computer facilities, which is a better indication of the processing capacity of a region, the Atlantic regional lags far behind the others and the variance between the Atlantic and other regions is considerable.

3) The size of the computers

With the information at our disposal, we can use two types of data to classify computers in three main categories, according to their size: small, medium and large.

We will first use the capacity of the main memory of each computer. Later we will use the rental cost of the equipment.

3.1) Size according to memory capacity

We are borrowing the classification of the Economic Council of Canada¹. Computers are classified according to the number of K

1. Including Beaudry, Richard, Les aspects régionaux de la diffusion de la technologie au Canada, Le cas des ordinateurs, (The regional aspects of the distribution of technology in Canada: Computers) document no. 50, Economic Council of Canada.

(millions of "bits", characters, words or digital figures) of the main memory. According to this criteria:

- a small computer has less than 32K
- a medium-sized computer has between 32K and 255K
- a large computer has more than 255K

Using information from the 1979 C.I.P.S. census, we have prepared table 8, which follows:

Table 8

Number of computers by memory size category, 1979 (percentage)

	Atl.	Que.	Ont.	Pr.	B.C.	CANADA
Small (32K)	53.0	47.0	46.0	44.4	47.9	46.6
Medium (33-255K)	35.0	36.4	33.9	35.1	36.0	46.6
Large (255K)	12.0	16.6	20.1	20.5	16.1	18.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Compilation from data of C.I.P.S. census.

The first thing we notice is that the Atlantic region has a large proportion of small computers: 53% of its computers are small. The proportion for the country as a whole is 46.6%. The proportion of small computers in the other regions is rather equal and is close to the national proportion (they vary between 44.4% and 47.9%.

In the large computer category, the Atlantic region's situation is the same but in reverse: the Atlantic region stands out because of its low number of large computers. Only 12% of its computers are in this category. Elsewhere, the proportion ranges from 16.1% to 20.5%, relatively close to the national percentage of 18.5%.

However, for the medium-size computers, the Atlantic region comes closer to the national range. The variance is only .1%. In this category, the Atlantic area is in an intermediate position between other regions, as 35% of its computers are medium-sized while elsewhere the percentages are between 33.9% and 36.4%

To better illustrate the marginal situation of the Atlantic region, we have calculated, from the preceding table, the variance of each region in relation to the small-medium-large proportion across the country. The results are given in table 9.

Table 9

Regional variances: small-medium-large categories

	Atlantic	Québec	Ontario	Prairie	B.C.
Small	6.4	.4	.6	2.2	1.3
Medium	.1	1.5	1.0	.2	1.1
Large	6.5	1.9	1.6	2.0	2.4
Total variance	13.0	3.8	3.2	4.4	4.8

Source: Table 8

The Atlantic region sets itself apart here: the total variance of this region regarding small, medium and large computers with the whole of the country is 13 while the other regions have an average variance of 4. The variance for the Atlantic provinces is almost exclusively in the "small" and "large" computer categories, practically in an equal proportion (6.4 and 6.5).

Therefore, inter-regional comparisons based on the size of the computers' memories bring out the rather marginal state of the Atlantic region. This region has proportionally more small computers and less large ones. Consequently, the variance between the Atlantic region and the whole of the country is relatively large.

3.2) Size according to rental cost of equipment

As we have previously mentioned (section 2.2), the rental value of the equipment is a good indication of the work capacity of a computer. It can therefore be used as a measure for its size. By dividing computers according to their rental cost, we still have three categories: small, medium and large, for our inter-regional comparisons.

In the C.I.P.S. census⁶, a computer with a monthly rental value of between \$1,000⁷ and \$5,000 is a small computer; a medium computer has a monthly rental value of \$5,000 to \$50,000; and a large computer is rented at a monthly price of \$50,000 and more.

6. 1979 Computer Census, Canadian Information Processing Society, editorial by L. A. Shackleton, p. 12.

7. Since 1974, the census does not take into consideration computers with a rental value of less than \$1,000 per month.

Chart 10

Number of computers by monthly rental cost category (1978), in percentages

	Atl.	Que.	Ont.	Pr.	B.C.	CANADA
Small (\$1,000-\$5,000)	82.2	72.2	71.7	75.6	77.7	73.7
Medium (\$5,000-\$50,000)	16.5	23.5	23.9	22.2	19.9	22.7
Large (\$50,000 and more)	1.3	4.3	4.4	2.2	2.4	3.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Unpublished data from the 1978 census of the C.I.P.S., obtained from the Department of Communications.

As was to be expected, it is again the Atlantic region that is farthest from national ratios. The Atlantic provinces have a larger proportion of small computers, i.e. those that may be rented at a monthly

cost of \$1,000 to \$5,000: 82.2% of its computers belong to this category. For Canada as a whole, the proportion is 73.7%

As for the two other categories, medium and large, the Atlantic region has less than any other region: 16.5% of its computers have a monthly rental value of \$5,000 to \$50,000 and only 1.3% are rented for more than \$50,000 per month.

Here again, we have calculated the regional variances to obtain a measure of differentiation.

Table 11

Regional variances by monthly rental cost category, 1978

	Atlantic	Québec	Ontario	Prairie	B.C.
Small	8.5	1.5	2.0	1.9	4.0
Medium	6.2	.8	1.2	.5	2.8
Large	2.3	.7	.8	1.4	1.2
Total variance	17.0	3.0	4.0	3.8	8.0

Source: Table 10.

We find that the Atlantic region is subject to even more greater variances when we consider the cost of equipment rental. When we used the size of the memory as a criteria, the total variance of the Atlantic region was only 13. Here it is 17.

Since the Atlantic region has a relatively high number of computers with a monthly rental value of less than \$5,000 and relatively less computers with a rental value of more than \$5,000, we may conclude that the data processing equipment in this region has a reduced work capacity in comparison with other Canadian regions. This is already obvious when we use percentages (tables 10 and 11).

It is even more striking when we compare them in absolute terms, i.e. with the number of computers in each category, and when we sub-divide them into a greater number of categories. Table 12 gives the number of computers for seven rental cost categories.

Table 12

Number of computers by monthly rental cost category (1978)

	Atl.	Qué.	Ont.	Pr.	B.C.	Yukon & N.W.T	CANADA
\$1,000-\$1,999	213	798	1,515	569	377	2	3,465
\$2,000-\$4,999	161	542	1,141	452	319	1	2,616
\$5,000-\$9,999	51	2235	424	140	101	1	952
\$10,000-\$19,999	12	101	233	94	50	-	490
\$20,000-\$49,999	12	100	229	64	27	-	432
\$50,000-\$99,999	6	68	125	25	18	-	242
\$100,000 and more	-	11	36	4	4	-	55
Total	455	1,855	3,703	1,339	896	4	8,252

Source: Unpublished data from 1978 C.I.P.S. census, obtained from the Department of Communications.

We see that in 1978 the Atlantic region had no computers with a value over \$100,000 and only had 6 computers with a value from \$50,000 to \$100,000. We also note that this region only has 30 computers with a monthly rental value of more than \$10,000, i.e. only 6.6% of its computers.

Without going farther in our analysis of this aspect, we can nevertheless point out the conclusions to be drawn from the inter-regional comparison.

Firstly, using the size of the central processing unit memory, we conclude that the Atlantic region has smaller sized computers than other regions of the country.

Secondly, the capacity of the computers used in the Atlantic region is much smaller than those of other regions. Our comparisons, based on the monthly rental cost of a computer, which constitutes an indication of its work capacity, reveal that the Atlantic region has only a small amount of more costly and therefore more sophisticated equipment.

These conclusions are important in that they allow us to weigh the results of other sections. For example, the comparisons we did in section 2.1 using only the number of computers created a bias in favour of the Atlantic region by concealing the disparity in the size of the computers.

In addition, the size of the equipment explains why regional disparities are greater when we compare the value of the equipment (section 2.2).

4) Progress in the distribution of computers

Now we must see how the acquisition of computers developed, i.e. when the regions were equipped with computers and at what rate they were installed.

Here we will retrace the development from two points of view: the number of computers and their size, again comparing the Atlantic region to other regions of the country.

4.1) Progress in the number of computers

Table 13 on the following page shows the progress in the number of computers in each region from 1956, the year the first commercial computer was installed in Canada, to 1979, the last year for which information is available.

The first computers were installed in Ontario and Québec in 1956. The following year, in 1957, the Prairie region had its first computer and then, in 1958, a computer was installed in the Atlantic region. British Columbia began to equip itself two years later, in 1960.

Thus, the Atlantic region had a two year delay in its initial acquisition: when it obtained its first computer in 1958, Ontario already had 13, Québec 9 and the Prairie region had 3.

The first phase of acquisition of the Atlantic region was very slow. From 1958 to 1964, the number of computers in this region went from 1 to 11 while British Columbia, which acquired its first computer two years after the Atlantic region, already has 41 in 1964, almost four times as many as the Atlantic provinces, and in only five years.

However, after 1965 the Atlantic region managed to catch up to some extent. Table 14, gives the annual increase in computers in each region from 1966 to 1979 and the average rate of increase over the period. We see that the number of computers in the Atlantic region increased an average of 21.5% per year between 1965 and 1979, as in British Columbia. In the other regions, the average annual increase in the number of computers over the same period was 18.5% in Québec, 21.0% in Ontario and 22.4% in the Prairie region, the national average being 21%.

The years of most rapid increase for the Atlantic region were 1969, with a 50% increase, 1970 with a 56% increase, and 1973 with 41%. We find few annual increases of this scope during the period studied

Table 13

Progress in the number of computers in Canada (1965-1979)

	Atl.	Québec	Ontario	Prairie	B.C.	Yukon & N.W.T.	CANADA
1956		2	2			-	4
1957		4	5	1			10
1958	1	7	13	3			24
1959	1	11	22	5			39
1960	1	18	35	8	2		64
1961	2	44	73	20	5		144
1962	6	83	146	40	14		289
1963	10	117	239	61	37		464
1964	11	126	257	67	41		502
1965	27	204	330	97	52		710
1966	35	280	443	120	70		948
1967	44	332	644	166	93		1,279
1968	56	410	811	229	107		1,613
1969	84	485	1,045	281	142		2,037
1970	131	603	1,361	381	224		2,700
1971	178	764	1,814	501	290	1	3,548
1972	228	939	2,279	601	358	1	4,406
1973	321	1,271	2,809	833	499	3	5,736
1974	217	879	1,894	573	331	3	3,897
1975	269	1,079	2,400	713	458	6	4,925
1976	317	1,350	2,714	928	621	7	5,937
1977	388	1,456	3,123	1,089	731	12	6,799
1978	455	1,854	3,703	1,331	896	12	8,251
1979	494	1,860	3,916	1,370	942	16	8,598

Source: Canadian Information Processing Society, Computer census

N.B. Refer to table 14 for explanations.

Table 14

Annual increase in the number of computers, in percentages,
by region (1966-1979)

	Atlantic	Québec	Ontario	Prairie	British Columbia	CANADA
1966	30	37	34	24	35	34
1967	26	19	50	38	33	35
1968	27	23	22	38	15	26
1969	50	18	29	23	33	26
1970	56	24	30	36	58	33
1971	36	27	33	31	29	31
1972	28	23	26	20	23	24
1973	41	35	23	39	39	30
1974 ¹	-32	-31	-33	-31	-34	-32
1975	24	23	27	24	38	26
1976	18	25	13	30	36	21
1977	22	8	15	17	18	15
1978	17	27	19	22	23	21
1979 ²	9	0.3	6	3	5	4
1966-1979 Average	25.1%	18.5%	21.0%	22.4%	25.1%	21.0%

Source: Calculated from table 13.

¹ After 1974, computers with a rental value of less than \$1,000 per month are excluded from the Canadian Information Processing Society census.

² In 1979, a special effort was made to eliminate certain duplications of the previous years, giving a lower rate of increase for this year.

(1965-79), except in Ontario in 1967 (50%) and in British Columbia in 1970 (58%). It seems that the Atlantic region greatly benefited after 1968 from the influx of relatively inexpensive mini-computers⁸.

For those who are surprised by the drastic drop (32%) in the number of computers in all the regions in 1974 (see table 14), this drop is not real: it is due to changes in the methods used in the gathering of data. After 1974, computers with a rental value of less than \$1,000 per month are excluded from the C.I.P.S. census.

This break in our series makes chronological comparisons more or less valid, i.e. statistics for after 1974 are not entirely comparable to those of before 1974. However, we should immediately point out that this break does little or nothing to detract from the value of our inter-regional comparisons. Our comparisons still remain valid for a same year; for chronological comparisons, the best thing to do is to retain relative values in relation to the whole of Canada rather than the absolute values.

Table 15 avoids these difficulties. We have calculated the proportion of computers in each region in relation to the total number of computers in Canada for each year after 1965. The Atlantic region slightly and gradually increased its share of computers throughout this period. In the 3% range in the beginning, the Atlantic region's share went rapidly to 4% in 1969-1970, then to 5% in 1971 where it remained.

According to table 15, British Columbia and the Prairie region increased their share to a greater extent than the Atlantic region during the whole of the period, i.e. 3.7% and 2.2% respectively, compared to 1.9% in the Atlantic region.

Once again we have used the simple number of computers as a basis for comparison. We will now analyze their development, taking into account the size of the computers, in order to have a more specific idea of the real progress in the processing capacity in the regions.

4.2) Progress in the size of computers

We will have to base our analysis of this variable on what information was available. Unfortunately, our statistics are not as complete as we would like them to be. We will nevertheless try to bring out the obvious tendencies found in the data.

There is no information available on the size of computers before 1965. In any case, this is essentially an acquisition phase and in many cases there would not be sufficient observations to make comparisons valid.

8. See explanations of this matter in section 4.2.

Table 15

Proportion of computers per region (1965-1979)

	Atl.	Québec	Ontario	Prairie	B.C.	Yukon-& N.W.T.	CANADA
1965	3.8%	28.7%	46.5%	13.7%	7.3%	-	100%
1966	3.7%	29.5%	46.7%	12.7%	7.4%	-	100%
1967	3.4%	26.0%	50.3%	13.0%	7.3%	-	100%
1968	3.5%	25.4%	50.3%	14.2%	6.6%	-	100%
1969	4.1%	23.8%	51.3%	13.8%	7.0%	-	100%
1970	4.9%	22.3%	50.4%	14.1%	8.3%	-	100%
1971	5.0%	21.6%	51.1%	14.1%	8.2%	-	100%
1972	5.2%	21.3%	51.7%	13.6%	8.1%	-	100%
1973	5.6%	22.2%	49.0%	14.5%	8.7%	-	100%
1974	5.6%	22.6%	48.6%	14.7%	8.5%	.1%	100%
1975	5.5%	21.9%	48.7%	14.5%	9.3%	.1%	100%
1976	5.3%	22.7%	45.7%	15.6%	10.5%	.1%	100%
1977	5.7%	21.4%	45.9%	16.0%	10.8%	.2%	100%
1978	5.5%	22.5%	44.9%	16.1%	10.9%	.1%	100%
1979	5.7%	21.6%	45.5%	15.9%	11.0%	.2%	100%
1965- 1979	+1.9%	-7.1%	-1.0%	+2.2%	+3.7%	+ .2%	

Source: Calculated from table 13.

Table 16

Distribution of computers according to size,
by region, 1965-1979

In percentages of total

	1965	1967	1969	1971	1973	1979
<u>Atlantic</u>						
Small (0-31 K)	81.5	84.1	79.8	82.6	84.1	53.0
Medium (32-255 K)	18.5	15.9	19.0	16.3	14.3	35.0
Large (256 K and more)	-	-	1.2	1.1	1.6	12.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
<u>Québec</u>						
Small (0-31 K)	84.3	82.2	71.3	70.5	77.0	47.0
Medium (32-255 K)	15.7	17.5	23.3	24.5	18.2	36.4
Large (256 K and more)	-	.3	5.4	5.0	4.8	16.6
Total	100.0	100.0	100.0	100.0	100.0	100.0
<u>Ontario</u>						
Small (0-31 K)	83.9	78.3	71.8	76.0	80.0	46.0
Medium (32-255 K)	15.8	19.6	22.3	18.4	15.1	33.9
Large (256 K and more)	.3	2.2	5.9	5.6	4.8	20.1
Total	100.0	100.0	100.0	100.0	100.0	100.0
<u>Prairie</u>						
Small (0-31 K)	85.6	72.9	74.7	76.8	80.8	44.4
Medium (32-255 K)	14.4	25.3	20.6	19.4	16.1	35.1
Large (256 K and more)	-	1.8	4.6	3.8	3.1	20.5
Total	100.0	100.0	100.0	100.0	100.0	100.0
<u>British Columbia</u>						
Small (0-31 K)	88.5	81.7	73.3	77.9	80.6	47.9
Medium (32-255 K)	11.5	17.2	19.0	19.0	16.8	36.0
Large (256 K and more)	-	1.1	7.7	3.1	2.6	16.1
Total	100.0	100.0	100.0	100.0	100.0	100.0
<u>CANADA</u>						
Small (0-31 K)	84.5	79.0	72.5	75.4	79.7	46.6
Medium (32-255 K)	15.4	19.5	21.9	19.8	16.0	34.9
Large (256 K and more)	.1	1.5	5.5	4.8	4.2	18.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: For 1965-1967-1969-1971-1973, data was taken from study no. 50 of the Economic Council of Canada: BEAUDRY, Richard, Les aspects régionaux de la diffusion de la technologie au Canada: le cas des ordinateurs (The regional aspects of the distribution of technology in Canada: Computers) February 1976, Table A-2, p. 45

- For 1979, calculations were made with data from the 1979 Computer Census of the Canadian Information Processing Society.

For the period from 1965 to 1973 we have reproduced a table extracted from an Economic Council of Canada study done by Richard Beaudry in 1976.⁹ It shows the distribution of computers according to the size of the central processing unit memory, by region, for two-year periods from 1965 to 1973. (table 16, first five columns.)

We also did the same calculations for 1979, dividing the computers into three categories according to the size of the memory (table 8). We added this information to table 16 for comparison purposes.

Looking closely at the period from 1965 to 1973, we note that progress is somewhat erratic. In all categories there is first a decrease in percentages from one year to the next and then an increase, or vice versa. In the Atlantic region the situation is even more unsettled: the proportion of small computers, for example, shows an increase between 1965 and 1967, a decrease between 1967 and 1969 and another increase in 1969-1971 and 1971-1973.

This unsettled state is due to the appearance of mini-computers whose rapid proliferation, especially after 1970, modified the trend towards larger equipment in most regions. These mini-computers were leased (or sold) at relatively low prices, favoring their popularity.

The small computers category profited the most from this vogue. The A Tariff Board Report (1977) ordered to investigate computers and related telecommunications equipment¹⁰, points out that between 1968 and 1973, 70% of all new computer facilities had a monthly rental value of less than \$2,000. The appearance of inexpensive mini-computers made computers feasible for a category of clients who would perhaps not have acquired them otherwise.

Thus, the mini-computer phenomenon temporarily encouraged the acquisition of small computers while the longer term trend was to acquire proportionally more medium and large sized computers. This can be verified. Author Richard Beaudry compared the proportions of small-medium-large computers with and without mini-computers for the

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9. BEAUDRY, Richard, Les aspects régionaux de la diffusion de la technologie au Canada: le cas des ordinateurs (The regional aspects of the distribution of technology in Canada: Computers), study no. 5, Economic Council of Canada, 1976, table A-2, p. 45.
 10. Report of the Tariff Board: Computers and related telecommunications equipment, inquiry ordered by the Department of Finance, 1977, p. 175.

1965-1973¹¹ period: as was to be expected, when we eliminate the effects of mini-computers, the development of each category's share is steady: constant decrease in the proportion of small computers and constant increase in the two other categories.

The long-term trend is therefore to acquire larger equipment. This trend is evident between 1965 and 1973 in spite of the effect of mini-computers:

- decrease from 5% in 1965 to 79.7% in 1973 in the proportion of small computers across the country,
- increase in the proportion of medium computers from 15.4% in 1965 to 16.0% in 1973, and
- increase in the proportion of large computers from .1% in 1965 to 4.2% in 1973.

This trend is much stronger after 1973. According to our data¹² for 1979:

- the decrease in the number of small computers across the country between 1973 and 1979 is 33%
- the increase in the number of medium-sized computers over this period is of 18%, and
- the increase in the number of large computers is of 14%.

Between 1973 and 1979, all the regions experienced comparable changes within a few percentage points.

And where is the Atlantic region in this computer development?

The Atlantic region mainly follows the general trend but with a few particularities. This region is always behind in following the progress of other regions. For example, while the proportion of small computers

11. BEAUDRY, Richard, op. cit. table 2, p. 14.

12. Our data for 1979 involves computers counted by the C.I.P.S. which have a monthly rental value of more than \$2,000 since they are extracted from the list of computers contained in the 1979 census, pp. 45-138. We are not certain that the data for 1965 to 1973 observed the same rule. If not, the 1979 data are biased in relation to those of previous years, i.e. the ratio of small computers is biased towards the bottom while the two other categories are biased towards the top.

decreases in the four other regions between 1965 and 1967, that of the Atlantic region increases: it is only in the following two-year period, i.e. 1967-1969, that the Atlantic region begins to reduce its share of small computers. The region maintains this delay until 1979, since it always has the highest percentage of small computers.

In the same way, the Atlantic region is the last to acquire large computers, a few years later than the other regions. Its share of large computers remains lower.

The Atlantic region also does not follow the general trend for the 1965-1973 period: while the other regions experience a decrease in the percentage of small computers in 1973 compared with 1965, the Atlantic region's share increases by almost 3%. This anachronism is due to the delay and also to the fact that this region has greatly benefited from the influx of mini-computers. It is also during this period that it experiences its largest annual increases of computers: 50% in 1969, 56% in 1970 and 41% in 1973 (see table 14)

To summarize the Atlantic region's position in the development of the computer industry, we have drawn the following conclusions:

1. The Atlantic region was the last Canadian region to acquire computers: it was two years late in acquiring its first computer and five years in obtaining its second.
2. Its first acquisition phase, from 1958 to 1964, was relatively slow compared to other regions which had also started late, i.e. British Columbia and the Prairie region.
2. The Atlantic region seemed only to enter the mainstream near the mid-1960s. Its best years were 1969 and 1970, during which it doubled, two years in a row, its number of computers. This rapid growth was made possible by the arrival on the market of reasonably priced mini-computers.
4. Throughout its development, the Atlantic region has always had a marked preference for smaller equipment. This region has always has the highest share of small computers.
5. The Atlantic region was the last to equip itself with large computers and has always had a much lower proportion of them than the other regions.
6. In closing, the Atlantic region follows the general trend in regards to progress in the size of its computers but with a few years of delay. This region also increases its share of large and medium-sized computers at the expense of the share of small computers, but it is late in starting and remains behind.

5) Use by industry

We have seen in the preceding sections that the distribution of computers in Canada was not uniform in the different regions. There were delays in the adoption of this technology in certain regions and there are still major variances in regards to the processing capacity of the regions.

It seems that these disparities are mainly due to the economic characteristics of the regions or, more specifically, the type of industry found there. An Economic Council of Canada paper: "The Interregional Diffusion of Innovations in Canada"¹³, which includes the study by R. Beaudry (previously quoted) on computers, contains interesting conclusions. After having discussed other factors such as distance, the urban hierarchy and the concentration of population, the authors declare as follows:

"...Regional economic characteristics, particularly structural differences in terms of industrial and commercial specialization and company size, provide a more fundamental and conclusive explanation for the gaps between regions."¹⁴

They continue as follows:

"...since computer diffusion follows large manufacturing, mining, superior tertiary firms and federal government activities, regions already well endowed with these activities lead in both initial adoption and later diffusion. This is why Ontario is usually first and the Atlantic usually last."¹⁵

The distribution of computers by industry is therefore particularly interesting. Table 17 gives this information for the five regions for 1979. Table 18 gives the same information in percentages.

In the Atlantic region, the sectors using the most computers are, in order of importance:

13. MARTIN, Fernand, BEAUDRY, Richard, et al. The Interregional Diffusion of Innovations in Canada, Economic Council of Canada, 1979.

14. MARTIN, F. op. cit. p. 46

15. MARTIN, F. op. cit. p. 46.

Table 17

Distribution of computers by industry 1979

Industry	Atl.	Qué.	Ont.	Pr.	B.C.	Yukon & N.W.T.	CANADA
Primary or resource (includes agriculture, forestry, fisheries and mines)	21	80	87	51	82	-	321
Construction	9	48	63	21	14	-	155
Manufacturing	48	464	1,013	141	97	-	1,763
Transportation	27	89	105	54	35	1	311
Public Services	34	76	161	99	81	-	451
Communications (includes printing, T.V., radio, newspapers, publi- shing, advertising)	15	64	161	38	17	-	295
Distribution (wholesale, retail, etc)	72	240	453	169	150	2	1,086
Finance (banks, trusts, insurance, brokerage, stock market)	30	112	273	80	59	-	554
Other services (education, hotels, rest- aurants, unions, profess- ions, associations)	86	226	528	206	120	-	1,166
Data processing services (equipment and software)	42	151	382	167	106	4	852
Government (federal, provincial and municipal, but excluding public services and school boards)	87	177	462	138	131	9	1,004
Oil	12	39	100	169	19	-	334
Other	11	94	128	37	31	-	301
Total	494	1,860	3,916	1,370	942	16	8,598

Source: Canadian Information Processing Society 1979 Census, p. 38

Table 18

Distribution of computers by industry 1979 - percentages

Industry	Atl.	Qué.	Ont.	Pr.	B.C.	CANADA
Primary or resource (includes agriculture, forestry, fisheries and mines)	4.3	4.3	2.2	3.7	8.7	3.7
Construction	1.8	2.6	1.6	1.5	1.5	1.8
Manufacturing	9.7	24.9	25.9	10.3	10.3	20.5
Transportation	5.5	4.8	2.7	3.9	3.7	3.6
Public Services	6.9	4.1	4.1	7.2	8.6	5.2
Communications (includes printing, T.V., radio, newspapers, publi- shing, advertising)	3.0	3.4	4.1	2.8	1.8	3.4
Distribution (wholesale, retail, etc)	14.6	12.9	11.6	12.3	15.9	12.6
Finance (banks, trusts, insurance, brokerage, stock market)	6.1	6.0	7.0	5.8	6.3	6.4
Other services (education, hotels, rest- aurants, unions, profess- ions, associations)	17.4	12.2	13.5	15.0	12.7	13.6
Data processing services (equipment and software)	8.5	8.1	9.8	12.2	11.3	9.9
Government (federal, provincial and municipal, but excluding public services and school boards)	17.6	9.5	11.8	10.1	13.9	11.7
Oil	2.4	2.1	2.6	12.3	2.0	3.9
Other	2.2	5.1	3.3	2.7	3.3	3.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Calculations based on table 17.

- the government sector (federal, provincial and municipal) with 87 computers or 17.6%;
- the "other services" sector (education, hotels, restaurants, unions, professions, associations) with 86 computers or 17.4%; and
- the distribution sector (wholesale and retail) with 72 computers or 14.6%.

These three sectors together account for 50% of the computers in the Atlantic region. The next, in order of importance, is the manufacturing sector with 48 computers, i.e. 9.7%.

It should be noted that Ontario has 26% of its computers in the manufacturing sector and Québec has 25%; the three other regions only have 10% of their computers in this category. We know that 80% of all manufacturing activity in the country is concentrated between the city of Québec and that of Windsor: it is not surprising that 75% of all computers in the country are also concentrated in this area¹⁶ and that these two provinces have surpassed the others in the distribution of computers.

The Prairie region has a relatively large number of computers in the oil sector, i.e. 12%, compared to 2 or 3% elsewhere. The region with the computer distribution closest to the Atlantic region is British-Columbia; its three largest sectors are also "distribution" (15.9%), "government" (13.9%) and "other services" (12.7%), which makes 43% of its computers in these 3 categories.

To return to the Atlantic region, we have already mentioned that the sector with the most computers is the government. The authors of "The Interregional Diffusion of Innovations in Canada" mention the following:

"Taking into consideration its endowment in the private industries mentioned above, the Atlantic region should have lagged to a greater extent whereas, in fact, it did not. The reasons are, first, the increase in the variety of sizes of computers (...) and, second, its greater than proportional share of federal government computers."¹⁷

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16. BEAUDRY, Richard, Les aspects régionaux de la diffusion de la technologie au Canada: le cas des ordinateurs (The regional aspects of the distribution of technology in Canada: Computers), Economic Council of Canada, study no. 50, 1976, p. 37.
 17. MARTIN, Fernand, BEAUDRY, Richard, et al. The Interregional Diffusion of Innovations in Canada, Economic Council of Canada, 1979, p. 46.

This says much about the Atlantic region's propensity to use computers. Because of its distribution in industry (type and size of industry) it is not particularly favoured to benefit from this technology as much as more industrialized regions. If we left out the government and university computers, the Atlantic region would show even greater gaps than those we have already indicated.

6) Employment

The use of computers develops certain categories of employment in the regions. Without wishing to enter into the debate on whether the massive distribution of computers will have a positive or negative effect on local employment, we will simply indicate the regional distribution of certain specific categories of employment in the field of data processing.

Table 18 gives the regional distribution of two professional categories:

- 1 - programmers and systems analysts
- 2 - computer operators.

In the programmers and analysts category, the Atlantic region only accounts for 2.5% of manpower. This could indicate under-representation as this region only has .9 persons working as programmers or analysts for every 1,000 working persons. In Québec, this ratio is 2.9, in Ontario it is 3.7, in the Prairies 1.7 and in British Columbia 1.6.

In the other category, that of computer operators, the overall situation is the same, i.e. the Atlantic region, as well as the Prairies and British Columbia, are under-represented in terms of their respective active populations. Thus, the Atlantic region has 1.6 computer operators for every 1,000 working persons, while Québec has 3.0, Ontario has 4.4, the Prairies have 2.8 and British Columbia has 2.5 computer operators.

Table 19

Regional distribution among certain data processing professions, 1971
(number and percentage)

Region	Programmers and analysts		Computer operators	
	Number	Percentage	Number	Percentage
Atlantic	565	2.5	1,010	3.7
Québec	6,475	28.8	6,550	24.1
Ontario	11,690	52.0	13,605	50.0
Prairie	2,405	10.7	3,920	14.4
B.C.	1,350	66.0	2,130	7.8
Yukon & N.W.T.	5	0.0	10	0.0
CANADA	22,490	100.0	27,225	100.0

Source: Statistics Canada, 1971 Canadian Census, Professions, Catalogue 94-717, Table 2.

However, when we compare these two categories to each other, we see that interregional disparities are greater for programmers and analysts than for operators. The peripheral regions have relatively more operators than programmers and analysts in relation to other regions and in absolute figures. The Atlantic region's case is the most striking. This region has almost twice as many operators as programmers and analysts (1,010 compared to 565).

The fact that the Atlantic region uses less programmers and analysts can be explained. This region has smaller computers that are most often used by small firms: it is probably easier to purchase "ready made" programs. In addition, analysis and data processing is often done outside, i.e other towns, other provinces or in the United States (see chapters 3 and 4).

This disparity between the number of programmers-analysts and operators is significant for the region: in addition to not producing local processing material (see chapter 3), the region imports the software needed to operate its computers and transfers programmer-analyst jobs to other regions of Canada, leaving only subordinate operator positions in the region. If this trend continues, the "brain drain" will be the most extensive the region has ever known!

6) Conclusion

In this chapter we have brought out the following facts regarding the Atlantic region:

- 1 - The Atlantic is the Canadian region with the least number of computers (5.8% of the computers in the country) as well as the least number of computers per inhabitant (twice as less as Ontario).
- 2 - When we consider the value of processing facilities, the Atlantic region's share is even smaller, i.e. 3.3% of the national value: the value of computer facilities per inhabitant is four times lower in the Atlantic region than in Ontario.
- 3 - This greater disparity in regards to value can be partly explained by the differences in the sizes of computers. It is the region which has the relatively largest number of small computers. In 1979, 53% of its computers were small-sized (memory with a capacity of less than 32 K), 35% were medium-sized (32 to 255 K) and 12% were large (more than 255 K). In Ontario, the proportions are 46%-34%-20%.
- 4 - We have pointed out the Atlantic region's delay: delay in the initial installation of computers as well as delays in following the trends of other regions, especially in regards to the use of computers with a greater work capacity.
- 5 - In the Atlantic region, the government sector has the largest number of computers, 17.6%, followed closely by the services sector (education, hotels, restaurants, unions, professions, associations) with 17.4%. In contrast, 26% and 25% respectively of Ontario and Québec computers are in the manufacturing sector. The industrial sector in the Atlantic region does not seem to particularly favour the use of data processing.
- 6 - Finally, as could be expected, employment in the field of data processing is low in the region, compared to other areas. And, more important, the job structure varies considerably from the national data, indicating a major transfer of jobs towards central Canada.

According to our analysis, this region is the most disadvantaged in the country in regards to the acquisition of computers.

Data processing is at the forefront of technology and the importance of technology as a productivity factor in Canada has been pointed out by the Economic Council of Canada in a number of studies, the results of which are contained in the document: "Living Together: A Study of Regional Disparities".¹⁸

18. Economic Council of Canada, "Living Together: A Study of Regional Disparities", 1977, chapter 5, pp. 61-98.

The document reveals the following facts. In Canada, disparities in productivity are considerable and the Atlantic region has the lowest level. The variance in manpower productivity in relation to the national average is -21 for the Atlantic region; -7 for Québec; +4 for Ontario; +1 for the Prairie region; and +10 for British Columbia. Part of this variance may be due to the structure of the industry, the quality of the manpower or the available capital. But once these factors have been explained, there is still an unexplained or "residual" variance.

The residual variance is higher in the Atlantic region than elsewhere: it is -13 compared to +1 in Québec; +5 in Ontario; -2 in the Prairie region; and -6 in British Columbia. By establishing the ratio of the residual variances (-13) and the total variance in productivity (-21), we see that more than 60% of the variance in productivity of manpower in the Atlantic region is due to the residual factor. The Economic Council of Canada adds that the two most important residual factors are technology and the quality of management.

No one has been able to prove the quantitative importance of technological delays in regional disparities, but the conclusions of the Economic Council of Canada indicate that they play a role in regards to the Atlantic region.

Our own conclusions seem to imply that the use of computers in the Atlantic region is a good example of technological delay. This quote from the Economic Council of Canada confirms it:

"It should not be concluded,, that regions where technology is less advanced have failed to adopt any technocal innovations, but simply that, in general, new methods of production are adopted later in low-productivity regions. They are adopted eventually, but, in the meantime, other new techniques are being adopted in the high-productivity regions, and the low-productivity regions continue to lag behind. In the technology race, each region runs at about the same speed: but there are persisting leaders and laggards."¹⁹

In regards to data processing in general, Ontario is a "leader" and the Atlantic region is a "laggard", or to use a more common expression, "a tag-along."

19. Ibid, p. 87.

CHAPTER 3

THE DATA PROCESSING INDUSTRY

IN THE ATLANTIC REGION

1) Introduction

With the development of computer/communication and the revolution which is now beginning in the field of information²⁰, the demand for processing material and services is very heavy. The data-processing industry has become, in a short time, a leading industry at the international level.

It is a field that develops rapidly. New products appear continuously and, because of technological progress, prices are increasingly attractive. A number of related services develop, creating new jobs. Competition is fierce since everyone knows the importance of the stakes in the world of tomorrow. It is an industry in full ferment.

According to the weekly Financial Post, the Canadian data processing industry had a revenue of \$3.3 billion in 1980, an increase of 17% over 1979²¹. This represents about 1% of the Gross National Product (GNP). In 1970, the revenue was \$510 million: an increase of over 500% in 10 years.

It is estimated that the Canadian data processing industry will be worth \$4 billion in 1981, \$8 billion in 1985 and \$20 billion in 1990. This industry will therefore be, for the coming years, a source of considerable employment and development.

The processing industry involves a series of activities that may be classified in various ways. For the purposes of this chapter, we will adopt the classification of the Department of Industry, Trade and Commerce since we are using the data on the number of establishments, value of sales and employment that we have obtained from their division in charge of the electronics sector ("Electrical & Electronics Branch").

Its classification contains three main categories:

- 1 - the manufacturing of equipment (hardware);

20. For example, it is predicted that the information industry will be the main element of the G.N.P. of Canada by the middle of the 1990s: it will then surpass the automobile industry.

Source: PRICE, Derek, G. Trends in Computer Servicers, in Datacommunicator, Computer Communications Group (C.C.G.), editorial, vol. 1 no. 2, winter 1980.

21. Financial Post, Rapport spécial sur les ordinateurs, January 24, 1981, p. 54.

- 2 - processing services (including data processing services and rental and consultation services);
- 3 - software services.

In this chapter, we will first discuss the regional distribution of the industry, comparing the number of establishments and the value of sales in the five regions (section 2). In section 3, we will deal with the employment situation. Section 4 is on suppliers of material and services. Finally, we will briefly discuss the Atlantic region's participation in professional data processing associations (section 5) before concluding the chapter.

2) Regional share

2.1) The number of establishments

Table 20 on the following page gives the number of establishments that produce processing goods or services in each region of Canada in 1978, in absolute figures and percentages.

There was a total of 840 establishments (goods or services) in Canada that year: half of them were in Ontario, i.e. 49.8%; 20% were in Québec; 17% were in the Prairie region; 10% were in British Columbia and only 2.5% were in the Atlantic region.

Let us now review each of the major activity categories. In the computer manufacturing category, we note that the number of establishments is greatly concentrated in Ontario, i.e. 63.5% of all Canadian computer manufacturing establishments are located in Ontario. Québec has 23.5%. Thus, between them these two provinces have 87% of all the computer production facilities in the country. The Prairie provinces and British Columbia only have a small number, 7% and 6% respectively. The Atlantic region has none.

In the second activity category, that of processing services (including data processing services and rental and consultation services), Ontario still largely dominates with 47% of all establishments, but the regional distribution is better. Québec has 20% and the Prairie provinces have 19%. We note that for data processing services, the Prairie region exceeds Québec in regards to the number of establishments (83 compared to 73).

The Atlantic region has a few establishments in this second category: 11 establishments provide data processing services and 3 offer rentals or consultation services. This makes for 2.4% of all processing services establishments.

The third category is that of software services. We find 52% of all establishments in Ontario. Here again the Prairie region is ahead of Québec with 17% against 16% in Québec. British Columbia has 10% of the establishments and the Atlantic region has 3.9% (or 7 firms).

Table 20

Number of establishments* per region, 1978

Activity	Atl.	Qué.	Ont.	Pr.	B.C.	Yukon & N.W.T.	CANADA
Computer manufacturing	0	20	54	6	5	0	85
Processing services							
Data processing	11	73	157	83	39	2	365
Rental and consultation	3	44	113	25	24	1	210
Total	14	117	270	108	63	3	575
Software services	7	29	94	31	19	0	180
Total	21	166	418	145	87	3	840

(in percentages, in relation to Canadian production)

Equipment manufacturing	0.0	23.5	63.5	7.1	5.9	0.0	100.0
Processing services							
Data processing	3.0	20.0	43.0	22.7	10.7	0.5	100.0
Rental and consultation	1.4	21.0	53.8	11.9	11.4	0.5	100.0
Total	2.4	20.3	47.0	18.8	11.0	0.5	100.0
Software services	3.9	16.1	52.2	17.2	10.6	0.0	100.0
Total	2.5	19.8	49.8	17.3	10.3	0.3	100.0

* The term establishment includes subsidiaries. Therefore, there are more establishments than companies.

Source: Department of Industry, Trade and Commerce, Analysis and Policy Division, Electronics Branch.

2.2) Sales value

Table 21 gives the value of sales in the industry, by region, again for 1978. As could be expected, this variable accentuates the variances.

In the processing equipment manufacturing sector, we find that 96% of all sales are centralized in Ontario and Québec (67.8% in Ontario and 28.1% in Québec). This means that only 4% of sales originate in other regions. Checking each province, we discover that most of this 4% comes from the province of Manitoba (77%).

In the processing services category, including data processing and rental and consultation services, 74% of the value of sales come from Ontario. The concentration is especially high for rental and consultation services (84.1% for Ontario).

The Prairie provinces' share of the national revenue for data processing services is 25.5%, half that of Ontario and one and a half times that of Québec. We discovered that, by itself, Alberta has data processing services sales slightly higher than Québec (\$52,999,000).

The Atlantic region falls far behind: it only has .8% of processing services revenue, i.e. 2.1% of data processing services revenue and .2% of rental and consultation services.

In the third major category, software services, Ontario's supremacy is evident. It has 77.4% of the revenue of establishments providing software services. All the other regions lag far behind; even Québec, which is second, only has 9.5% of the revenue of the activity category. The Atlantic region has the smallest share with 2.3% of revenues.

In summary, out of the five regions studied, it is obvious that Ontario has the lion's share of data processing activities:

- 50% of all goods and services establishments;
- 71% of the total value of sales of all establishments;
- 68% of computer manufacturing revenue;
- 74% of processing services revenue (involving 84% of rental and consultation services revenue and 50% of data processing services revenue); and, finally
- 77% of software services revenue.

Québec is usually in second place, far behind Ontario. However, in some cases the Prairie provinces overtake Québec. For data processing services, for example, the Prairie region has 83 establishments and 25.5% of sales while Québec has 73 establishments and only 16.2% of sales. We have pointed out that most of the difference is attributable to Alberta which exceeds the revenue of Québec by itself (in spite of a lower number of establishments: 55).

Table 21

Total sales of the industry by region, 1978
(\$000)

Activity	Atl.	Québec	Ontario	Prairie	B.C.	Yukon & N.W.T.	CANADA
Computer manufac- turing	-	348,778	839,983	40,512	9,750	-	1,239,023
Processing services							
Data pro- cessing	6,850	52,160	159,919	82,445	21,237	342	322,953
Rental & consul- tation	1,733	73,135	670,012	22,318	29,206	60	796,464
Total	8,583	125,295	829,931	104,763	50,443	402	1,119,417
Software services	5,791	23,855	193,607	15,970	11,056	-	250,279
Total	14,374	497,928	1,863,521	161,245	71,249	402	2,608,719

(in percentages)

Equipment manufac- turing	0.0	28.1	67.8	3.3	0.8	0.0	100.0
Processing services							
Data pro- cessing	2.1	16.2	49.5	25.5	6.6	0.1	100.0
Rental & consul- tation	0.2	9.2	84.1	2.8	3.7	0.0	100.0
Total	0.8	11.2	74.1	9.4	4.5	0.0	100.0
Software services	2.3	9.5	77.4	6.4	4.4	0.0	100.0
Total	0.6	19.1	71.4	6.2	2.7	0.0	100.0

Source: Department of Industry, Trade and Commerce, Analysis and Policy
Division, Electronics Branch.

Québec is also behind the Prairies in regards to the number of software services establishments, i.e. 31 in the Prairies and 29 in Québec; but Québec has a higher level of sales (9.5% against 6.4%).

The regions at each end of the country, British Columbia and the Atlantic provinces, play a small role in the industry. British Columbia does a bit better than the Atlantic region with 87 firms, compared to 21 in Atlantic Canada. But its share is smaller in terms of revenue: with 10% of the establishments, it only has 2.7% of the total revenue. Its best performance is 6.6% of revenues for data processing services.

The Atlantic region makes a sad showing: with 21 establishments, it only gets .6% of the total revenue. It has no 22 computer manufacturing establishments and only a minimal share of data processing services revenues (.8%) and software services (2.3%).

3) Employment

Table 22, on the next page, gives employment statistics for the activity categories we analyzed in the preceding section, for all regions (for 1978 also).

According to our sources, there are 37,542 jobs in the data processing industry in the country. We find 65.6% of the manpower in Ontario, 21.5% in Québec, 8.4% in the Prairies, 3.5% in British Columbia and only .9% in the four Atlantic provinces, or 334 employees.

The disparity in the field of employment is very great. It corresponds rather closely to the distribution of revenues that we have just analyzed. The jobs are better distributed than the revenues but only slightly.

In the manufacturing category, the distribution of jobs closely follows the distribution of revenue. For data processing services and

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22. In the statistics received from the Department of Industry, Trade and Commerce, the manufacturing of computer parts or related material may be included in another category than the computer manufacturing category we used. For example, the electronic elements manufacturing category may include computer elements. We checked for our own purposes the share of this production that belonged to each region. The Atlantic region has 4 establishments and 2.7% of the revenue. Ontario again had the major share with 72% of the establishments (124) and 67% of the revenue. Québec had 25 establishments and 29% of the revenue. Therefore, 95% of the electronics elements manufacturing revenue belonged to these two provinces.

Table 22

Number of employees per region, 1978

Activity	Atl.	Qué.	Ont.	Pr.	B.C.	Yukon & N.W.T.	CANADA
Computer manufacturing	-	4,518	10,455	537	139	-	15,649
Processing services							
Data processing	165	1,624	4,306	1,835	579	14	8,523
Rental and consultation	57	1,205	6,910	422	304	3	8,901
Total	222	2,829	11,216	2,257	883	17	17,424
Software services	112	717	2,960	374	306	-	4,469
Total	334	8,064	24,631	3,168	1,328	17	37,542

(in percentages)

Equipment manufacturing	-	28.9	66.8	3.4	0.9	-	100.0
Processing services							
Data processing	1.9	19.1	50.5	21.5	6.8	0.2	100.0
Rental and consultation	0.7	13.5	77.6	4.8	3.4	0.0	100.0
Total	1.3	16.2	64.4	13.0	5.1	0.1	100.0
Software services	2.5	16.0	66.2	8.4	6.8	-	100.0
Total	0.9	21.5	65.6	8.4	3.5	0.1	100.0

Source: Department of Industry, Trade and Commerce, Analysis and Policy Division, Electronics Branch.

software services, Ontario has a bit less jobs than revenue, in terms of percentages, in most cases (up to 11 percentage points less) and the other regions gain a few percentage points, especially Québec and the Prairie provinces. British Columbia and the Atlantic region gain little.

Table 22 only gives the number of employees and not the value of the salaries. In its publication: Computer Service Industry, Statistics Canada provides information on employees and salaries and benefits but only for services activities and not for manufacturing activities. In addition, Statistics Canada only considers firms that get three quarters of their income from these services and therefore eliminates firms that offer these services but whose main activity is something else.

In order to verify to what extent Statistics Canada figures on the number of employees compare to those of the Department of Industry, Trade and Commerce, we have prepared table 23 which extracts the employment figures for the services categories only from table 22.

Table 23

Number of employees (and percentages) in data processing services
and software services combined, by region, 1978

	<u>Number of employees</u>	<u>Percentages</u>
Atlantic	334	1.5
Québec	3,546	16.2
Ontario	14,176	64.8
Prairies	2,631	12.0
British Columbia(a)	1,206	5.5
CANADA	21,893	100.0

(a) Includes the Yukon and Northwest Territories.

Source: Table 22.

Table 24 gives the Statistics Canada data. Statistics Canada counted 13,148 employees in the services categories in 1978, while the Department of Industry, Trade and Commerce counted 21,893 (table 23). Therefore, table 24 only represents part of the services activity manpower, i.e. 60%.

By comparing the percentages of employees in tables 23 and 24, we note that the Statistics Canada sampling mainly eliminates Ontario workers. We have calculated that 77% of the employees uncounted by Statistics Canada came from Ontario, 15.3% came from Québec, 5.6% from the Prairie provinces, 1.8% from British Columbia and only .3% from the Atlantic region.

Table 24

Number of employees, salaries and benefits of employees in establishments
where the principal activity¹ is providing data processing services²,
by region, 1978

Region	Employees		Revenues			
	Number	Percentage	Salaries (\$000)	Benefits (\$000)	Total (\$000)	Percentage
Atlantic	304	2.3	4,329	321	4,650	2.2
Québec	2,209	16.8	31,475	1,592	33,067	15.7
Ontario	7,440	56.6	116,772	6,984	123,756	58.8
Prairie	2,144	16.3	32,056	1,912	33,968	16.1
B.C. ³	1,051	8.0	14,349	773	15,122	7.2
CANADA	13,148	100.0	198,981	11,582	210,563	100.0

¹Income from the sale of processing services represents more than two thirds of the total operating revenues.

²Processing services include the processing, input preparation, software and systems-related services, systems design and maintenance services, other services involving software (or programming) and systems, equipment maintenance and other processing services (including computer education services, computer management, feasibility studies, etc.)

³ Including the Yukon and Northwest Territories.

Source: Statistics Canada, Computer Service Industry 1978, catalogue 63-222, table 1, p. 9 and definitions p. 6.

Knowing the level of under-estimation of the number of employees in each region, we decided to extrapolate to find the approximate value of the total salaries paid in each region. The results are the following:

Table 25

	<u>Total salary paid for service activities</u> (\$000)	<u>Percentages</u>
Atlantic	4,756	1.4
Québec	50,525	15.2
Ontario	222,495	66.7
Prairies	39,337	11.8
B.C.	16,465	4.9
CANADA	333,578	100.0

Source: Tables 23 and 24.

Table 25 gives us an indication of the distribution of salaries by region, but for services only and not for manufacturing activities: 6.7% are in Ontario, 15.2% in Québec, 11.8% in the Prairie provinces, 4.9% in British Columbia (included here are the Yukon and Northwest Territories) and, finally, 1.4% only in the Atlantic region.

It should be mentioned, however, that if employment in the manufacturing sector were included, the disparity in salaries would be much greater.

4) Suppliers

The processing products and services market is served by a number of suppliers. The Canadian Data Systems magazine has compiled a list of 2,020 companies supplying the electronic data processing market (EDP) in Canada. This list includes subsidiaries and representatives (see table 26).

Table 26

Geographic distribution of EDP market suppliers - January 1980

	<u>Number</u>	<u>Percentage</u>
Atlantic	103	5.1
Québec	266	13.2
Ontario	1,055	52.2
Prairie	370	18.3
British Columbia	226	11.2
Total	2,020	100.00

Source: List of suppliers in Canadian Datasystems, January 1981, pp. 61-88.

The Atlantic region therefore has 103 suppliers (5.1%). We have noted, however, in reviewing the suppliers one by one, that only four of the 103 suppliers have their head offices in the Atlantic region and operate exclusively in this region. The others are representatives or subsidiaries of outside companies.

Our own list of Atlantic region suppliers, prepared in the fall of 1980 (see annex 3) gives more details on the Atlantic region.

We counted 100 suppliers of equipment, software and data processing services. It would be worthwhile to study the products and services they provide. Of these 100 suppliers:

- 41 provide equipment (hardware),
- 39 distribute word processing equipment (semi-hardware, semi-software),
- 48 distribute commercial application software, and
- 35 provide data processing services.

But when we consider more specialized services or equipment, the number of suppliers is considerably reduced: only 5 firms sold microfilming equipment.

5) EDP associations

The Canadian Datasystems of January 1981 also gave a list of associations involved in electronic data processing (E.D.P.).

It found 12 active associations in Canada, that grouped managers or users of processing systems.

Of these 12 associations, 10 have head offices in Canada; 9 have their head offices in Ontario and the tenth is located in Alberta.

These associations have numerous branches, including 18 in Ontario, 14 in the Prairie provinces and 5 in British Columbia. Québec has 8 branches, 2 of which also represent the Atlantic region.

The Atlantic region has 4 branches. With the 2 shared with Québec, it makes a total of 6.

6) Conclusion

The data processing industry is expected to be a source of revenue and employment and an important development factor in the immediate future. But who will benefit from all this?

The data we have analyzed in this chapter indicate a heavy concentration of the processing industry in Ontario, and, to a lesser degree, in Québec. When we combine the share of these two provinces, whether in regards to the number of establishments, jobs or even salaries, the proportions are troubling: up to 96% for manufacturing activities and almost always over 65% for service activities.

A few pockets are developing outside these two provinces: Alberta is highly rated in regards to data processing services, for example. Manitoba is making an effort in the manufacturing field (see further). The regions at both ends of the country are very marginal, especially the Atlantic area.

The Atlantic region shows a minimal participation in the industry, with its share of data processing industry activities only being 2.5%. It has no computer manufacturing facilities, whereas this activity accounts for 47.5% of revenue for the industry, according to our data.

The manufacturing of computers is associated to the electronics industry in general. This industry is heavily integrated and concentrated geographically. It is generally said that 70% of the Canadian electronics industry is concentrated in Ontario.²³

The concentration is more than provincial. In reality, most of the electronic production in Canada is located in a city at the border

23. WEISMAN, Tom, "It's Time to Start Changing Priorities", in Canadian Datasystems, September 1980, p. 29.

between the two provinces. Ottawa and its surrounding area is the "electronics capital" of Canada. It has been called "Silicon Valley North" after "Silicon Valley" in California. The Ottawa region has 112 high technology companies.²⁴

The city of Winnipeg is trying to compete with Ottawa. A recent article in the Canadian Press: "Winnipeg Shooting To Become Electronics Capital" states that Winnipeg already has 40 high-technology companies.²⁵

The Atlantic region is completely outside the mainstream and nothing in the trends of the last few years seems to indicate that things will change.

The federal government, certain provincial governments, various associations and firms seem very worried by the increased dependence of Canada on the United States. Much has been written on the subject: it is thought that Canada's commercial balance deficit will deepen because of our increasing imports in the field of electronics; the loss of revenue and subsequent jobs is deplored.²⁶ In fact, all of Canada's worries regarding its dependency on the United States could be transposed to the Atlantic region to deplore its increased dependency vis-a-vis central Canada and the resulting loss of revenue and employment.

The data processing industry could be considered the infrastructure of information processing and transfer, in the same way that roads and industrial parks are part of the infrastructure required for economic development. The data having to be processed, it is evident that it will be processed where the processing infrastructure is to be found, in central Canada.

From this viewpoint, the computer/communications revolution could accentuate regional disparities and only governmental policies encouraging the re-deployment of the data processing industry could overturn this trend. As we will see in chapter 5, nothing has been done in this regard in Canada, far from it!

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24. Canadian Press: "Winnipeg Shooting to Become Electronics Capital", in the Moncton Transcript, February 19, 1981, p. 34.
 25. Canadian Press: "Winnipeg Shooting To Become Electronics Capital", in the Moncton Transcript, February 19, 1981, p. 34
 26. Clyne Report: Telecommunications and Canada, Consultative Committee on the Implications of Telecommunications for Canadian Sovereignty, March 1979.

CHAPTER 4

DISPARITIES IN PROCESSING
WITHIN THE ATLANTIC REGION

1) Introduction

This chapter will look more closely at the Atlantic region to see where development is occurring in the field of data processing. With the help of statistics we will verify if any particular pattern can be discerned within the region.

We will follow the same plan as in the comparative analysis of the different regions. First, we will discuss the distribution of computers in each Atlantic province with a comparative study of the number of computers and their size (section 2).

In the following section (section 3) we will deal with the processing industry in the Atlantic region. We have seen in the previous chapter that only a small share of the Canadian data processing industry is located in this region: we will check the number of establishments, the value of sales and employment in each province.

Section 4 contains the conclusions reached from our list of Atlantic region suppliers compiled last fall (1980).

Finally, section 5 will give the results of our survey, also carried out in the fall of 1980, to determine where the processing of data of Greater Moncton firms using computer services was done.

2) Distribution of computers

2.1) Number of computers

Table 27 indicates the number of computers in each Atlantic province from 1965 to 1979.

In 1979, 49% of all regional computers were in Nova Scotia, 29.5% in New Brunswick, 21.7% in Newfoundland and only 2.0% in Prince Edward Island.

Throughout the period, Nova Scotia has the greatest share of computers: its percentage is between 44% (1977) and 57% (1967). New Brunswick is in second place with approximately 30%. Newfoundland follows New Brunswick, but we note that this province's share tends to increase near the end of the period since it has remained in the 20% range since 1974. Prince Edward Island only acquired its first computer in 1979 and its share is still low (no more than 3%): the C.I.P.S. only counted 10 computers²⁷ on the island in 1979.

27. It should be pointed out that the C.I.P.S. limits its census to computers with a monthly rental value of \$1,000 and more only after 1974.

Table 27

Number of computers per province and in the Atlantic region,
1965-1980
(in absolute figures and percentages of Atlantic total)

Year	N. B.		N. S.		P.E.I.		Nfld		ATLANTIC	
	No.	%	No.	%	No.	%	No.	%	No.	%
1965	8	29.6	14	51.9	-		5	18.5	27	100.0
1966	12	34.3	17	48.6	-		6	17.1	35	100.0
1967	13	29.5	25	56.8	-		6	13.7	44	100.0
1968	16	28.6	31	55.4	-		9	16.0	56	100.0
1969	26	31.0	43	51.2	1	1.1	14	16.7	84	100.0
1970	40	30.5	70	53.5	2	1.5	19	14.5	131	100.0
1971	51	28.7	92	51.7	4	2.2	31	17.4	178	100.0
1972	61	26.8	120	52.6	5	2.2	42	18.4	228	100.0
1973	90	28.0	165	51.4	10	3.1	56	17.5	321	100.0
1974 ¹	59	27.2	108	49.8	6	2.8	44	20.2	217	100.0
1975	83	30.9	126	46.8	7	2.6	53	19.7	269	100.0
1976	97	30.6	143	45.1	10	3.2	67	21.1	317	100.0
1977	112	28.9	170	43.8	11	2.8	95	24.5	388	100.0
1978	137	30.1	199	43.7	11	2.4	108	23.8	455	100.0
1979	146	29.5	231	46.8	10	2.0	107	21.7	494	100.0

¹After 1974, computers with a monthly rental value of less than \$1,000 were not included in the census.

Source: Canadian Information Processing Society, 1979 computer census.

The number of computers per inhabitant for each province (table 28) puts Nova Scotia in first place:

Table 28

	<u>Number of computers per ten thousand inhabitants, 1979</u>
New Brunswick	20.8
Nova Scotia	27.2
Prince Edward Island	8.1
Newfoundland	<u>18.6</u>
ATLANTIC	22.0

Source: Table 28 and Statistics Canada population statistics, 1979.

it raises the figures for the Atlantic region. The three other provinces have less than the 22 computers per 10,000 inhabitants calculated for the region as a whole.

Table 29, giving the number of computers per billion dollars of gross interior product (G.I.P.) is interesting since Newfoundland has a better rating here than New Brunswick. Nova Scotia is still in first place and Prince Edward Island is still in last place, far behind the others.

Table 29

	<u>Number of computers per billion dollars in gross interior product, 1978</u>
New Brunswick	33.2
Nova Scotia	41.0
Prince Edward Island	15.8
Newfoundland	<u>35.8</u>
ATLANTIC	33.3

Source: Table 27 and Statistics Canada, provincial economic accounts, 1978.

2.2) Size of computers

When we divide the computers into small-medium-large categories according to the size of the memory, we have the following distribution by province in 1979.

Table 30

Distribution of computers by size, 1979

	N. B.		N. S.		Nfld		P.E.I.	ATLANTIC	
	No.	%	No.	%	No.	%	Number	No.	%
Small (0-31 K)	80	54.8	112	49.6	65	60.8	3	260	53.2
Medium (32-255 K)	52	35.6	80	35.4	36	33.6	5	173	35.4
Large (256 & +)	14	9.6	34	15.0	6	5.6	2	56	11.4

Source: Compilation done from data of 1979 C.I.P.S. census.

The proportion of medium-sized computers is somewhat similar in New Brunswick, in Nova Scotia and Newfoundland (35.6%, 35.4% and 33.6%), but there are considerable differences in the two other categories.

In Newfoundland, 60.8% of the computers are small-sized. The proportion is 54.8% in New Brunswick and 49.6% in Nova Scotia. For large computers, the rating is overturned. In Nova Scotia 15.0% of computers are in the large category; New Brunswick has 9.6% in this category and Newfoundland only has 5.6%.

We chose not to compare Prince Edward Island with the 3 other provinces since the number of computers in each category is too small for the comparison to be valid.

Table 31 gives an indication of the evolution in the size of computers in each province from 1971 to 1979: we have the proportion of each province in relation to the Atlantic region as a whole for each category.

For example, in 1971 New Brunswick has 25.4% of all small computers in the Atlantic region; in 1974, it had 27.9% and, in 1979, 30.8%. Similarly, its share of medium-sized computers decreased (from 36.6% to 30.1%) as well as its share of large computers (from 50.0% to 25.0%). It should be pointed out that in 1971 there were only 2 large computers in the Atlantic region: one in Saint John, N.B. and the other in Saint John's, Nfld, which gave each each of these two provinces 50% of the large-sized computer ratio!

Newfoundland follows the same pattern as New Brunswick, but it is much stronger. Its share of small computers increases considerably from 1971 to 1979: it goes from 16.4% to 25.0%. Its share of medium-sized computers increases slightly. However, its share of large-sized computers goes to 10.7% in 1979, from 50% in 1971 and 16.7% in 1974.

Table 31

Distribution of computers according to size in the Atlantic region, 1971, 1974 and 1979 and percentages in relation to size groups for each year considered.

	1971		1974		1979	
<u>New Brunswick</u>						
Small (0-31 K)	34	25.4	34	27.9	80	30.8
Medium (32-255 K)	15	36.6	14	20.6	52	30.1
Large (256 K and more)	1	50.0	2	33.3	14	25.0
Total	50		50		146	
<u>Nova Scotia</u>						
Small (0-31 K)	76	56.7	57	46.7	112	43.0
Medium (32-255 K)	18	43.9	37	54.4	80	46.2
Large (256 K and more)	0	0.0	3	50.0	34	60.7
Total	94		97		226	
<u>Prince Edward Island</u>						
Small (0-31 K)	2	1.5	3	2.5	3	1.2
Medium (32-255 K)	1	2.4	3	4.4	5	2.9
Large (256 K and more)	0	0.0	0	0.0	2	3.6
Total	3		6		10	
<u>Newfoundland</u>						
Small (0-31 K)	22	16.4	28	22.9	65	25.0
Medium (32-255 K)	7	17.1	14	20.6	36	20.8
Large (256 K and more)	1	50.0	1	16.7	6	10.7
Total	30		43		107	
<u>ATLANTIC</u>						
Small (0-31 K)	134	100.0	122	100.0	260	100.0
Medium (32-255 K)	41	100.0	68	100.0	173	100.0
Large (256 K and more)	2	100.0	6	100.0	56	100.0
Total	177		196		489	

Source: C.I.P.S. censuses, 1971, 1974 and 1979.

In Nova Scotia we find the contrary. In 1971, this province had 56.7% of all small computers in the Atlantic region; in 1979 it only had 43.0%. Its share of medium-sized computers increased by a few percentage points (43.9% to 46.2%) while its share of large computers was 60% in 1979, compared to 0% in 1971 and 50% in 1974.

In summary, up to now we can conclude that Nova Scotia leads in the acquisition of larger equipment. It has the biggest share of large computers, i.e. 60% of large computers in the region, and of its total number of computers, 15% are in the "large" category, which is more than New Brunswick and Newfoundland. In addition, its rate of acquisition of large computers is faster than that of New Brunswick and Newfoundland: between 1974 and 1979, Nova Scotia went from 3 large computers to 34, while New Brunswick went from 2 to 14 and Newfoundland from 1 to 6.

2.3) Distribution in the provinces

Table 32

Distribution of computers within the provinces, 1979

	<u>Number</u>	<u>% of prov. total</u>	<u>% of Atlantic total</u>
New Brunswick			
Northeast	5	3.4	1.0
Northwest	1	0.7	0.2
Saint John	49	33.6	10.0
Fredericton	33	22.6	6.7
Moncton	58	39.7	11.9
	<u>146</u>	<u>100.0</u>	
Nova Scotia			
Dartmouth-Halifax	185	81.8	37.8
Cape Breton	18	8.0	3.7
Other	23	10.2	4.7
	<u>226</u>	<u>100.0</u>	
Prince Edward Island			
Charlottetown	7	70.0	
Summerside	3	30.0	
	<u>10</u>	<u>100.0</u>	2.0
Newfoundland	107		21.9
Total	489		100.0

Source: Compilation done from 1979 census of the C.I.P.S.

Table 33

Distribution of computers according to size by region
within the provinces, 1979

Regions	Small (0 - 31 K)		Medium (32 - 255 K)		Large (256 K and more)	
	No.	%	No.	%	No.	%
New Brunswick						
Northeast	3	1.2	1	0.6	1	1.8
Northwest	0	0.0	1	0.6	0	0.0
Saint John	26	10.0	20	11.6	3	5.4
Fredericton	16	6.2	10	5.8	7	12.5
Moncton	35	13.4	20	11.6	3	5.4
Total	80	30.8	52	30.2	14	25.1
Nova Scotia						
Dartmouth-Halifax	93	35.8	64	37.0	28	50.0
Cape Breton	11	4.2	7	4.0	0	0.0
Other	8	3.1	9	5.2	6	10.7
Total	112	43.1	80	46.2	34	60.7
Prince Edward Island						
Charlottetown	2	0.7	3	1.7	2	3.5
Summerside	1	0.4	2	1.1	0	0.0
Total	3	1.1	5	2.8	2	3.5
Newfoundland	65	25.0	36	20.8	6	10.7
Total	260	100.0	173	100.0	56	100.0

Source: 1979 C.I.P.S. census

According to this source, there are only 21 establishments in the Atlantic region, and none of them are manufacturing facilities. Of this total, 14 provide data processing services and 7 offer software services.

Nova Scotia has the most, 9, followed by Newfoundland with 6. New Brunswick has 5 and Prince Edward Island only has one.

In table 35, we note that 40.4% of all the industry revenue in the Atlantic region goes to Nova Scotia and 36.8% to Newfoundland. New Brunswick is in third place with 22.5%. Prince Edward Island only has .3% of revenues.

In the field of data processing, 66.5% of revenue go to Nova Scotia and 29.9% to Newfoundland. New Brunswick only has 2.9% of sales and Prince Edward Island, .7%.

Table 35

Value of sales, Atlantic provinces, 1978

Activity	N.B.	N.S.	P.E.I.	Nfld	ATLANTIC
Computer manufacturing	-	-	-	-	-
Processing services					
Data processing	200	4,554	50	2,056	6,850
Rental & consultation	130	-	-	1,603	1,733
Total	330	4,554	50	3,649	8,583
Software services	2,900	1,258	-	1,633	5,791
Total	3,230	5,812	50	5,282	14,374

(in percentages)

Computer manufacturing	-	-	-	-	-
Processing services					
Data processing	2.9	66.5	0.7	29.9	100.0
Rental & consultation	7.5	0.0	0.0	92.5	100.0
Total	3.9	53.0	0.6	42.5	100.0
Software services	50.0	21.8	0.0	28.2	100.0
Total	22.5	40.4	0.3	36.8	100.0

Source: Department of Industry, Trade and Commerce

If this data is correct, 92.5% of rental and consultation revenue in the Atlantic region goes to Newfoundland and 7.5% to New Brunswick, while Nova Scotia and Prince Edward Island has none. We think there must be some error in the Department of Industry, Trade and Commerce data here: it seems improbable that there is no rental and consultation service in Nova Scotia, especially in Halifax-Dartmouth.

This table indicates that 50% of software services revenues went to New Brunswick, against 28.2% in Newfoundland and 21.8% in Nova Scotia.

Table 36

Number of employees, Atlantic provinces, 1978

Activity	N.B.	N.S.	P.E.I.	Nfld	ATLANTIC
Computer manufacturing	-	-	-	-	-
Processing services					
Data processing	4	97	3	61	165
Rental & consultation	7	-	-	50	57
Total	11	97	3	111	222
Software services	33	26	-	53	112
Total	44	123	3	164	334

(in percentages)

Computer manufacturing	-	-	-	-	-
Processing services					
Data processing	2.4	58.8	1.8	37.0	100.0
Rental & consultation	12.3	-	-	87.7	100.0
Total	5.0	43.7	1.3	50.0	100.0
Software services	29.5	23.2	0.0	47.3	100.0
Total	13.2	36.8	0.9	49.1	100.0

Source: Department of Industry, Trade and Commerce

Table 36 gives the number of jobs per province, again by activity category. Newfoundland has the greatest number of employees with 164 of the 334 Atlantic region jobs, i.e. 49.1%. Nova Scotia, with 123 employees, has 36.8%, New Brunswick has 44 employees, 13.2%, and finally, with 3 employees, Prince Edward Island has .1% of the industry manpower.

In conclusion, if this data is correct, Nova Scotia has the largest share of the industry, i.e. the greatest number of establishments (8) and the greatest share of revenue, 40.4%. Newfoundland comes in second with 6 establishments and 36.8% of the revenue. In regards to manpower, however, Newfoundland is first and Nova Scotia is second.

New Brunswick is always rated third and Prince Edward Island comes in last. The only field in which New Brunswick seems to have the advantage, according to this data, is the category of software services in which, supposedly, it has 50.0% of revenue.

4) Suppliers

By suppliers we mean the distributors of equipment, software and data processing services counted in a regional census. The C.I.P.S. census showed 103 firms, sales offices and representatives in the Atlantic region of Canada. The survey we carried out by a questionnaire indicated that there were 100 (see annex 3).

Table 37 shows that the distributors are found where the computers are found: the Greater Halifax area contains 41% of the data processing distributors in the region, followed by Moncton, Saint John, N.B., Saint John's, Nfld, and Fredericton. The ratings for other sub-regions are marginal.

In New Brunswick, it is surprising to note that the French-speaking areas only have a single percentage point for a population of 1/3 of the province. This confirms the opinion that advance technology benefits the English-speaking first, but also that advanced technology is above all an urban phenomenon, spread out from the major cities and within these cities to begin with. This is the ever-present problem of distribution, to which is added, in New Brunswick, the language factor.

Table 37

<u>Regions</u>	<u>Number of companies (and percentages)</u>
Northeastern New Brunswick	0
Saint John, New Brunswick	14
Fredericton, New Brunswick	9
Moncton, New Brunswick	16
Northwestern New Brunswick	1
Halifax-Dartmouth, Bedford, Nova Scotia	41
Cape Breton, Nova Scotia	2
Other areas, Nova Scotia	3
Newfoundland	12
Prince Edward Island	2
	<u>100</u>

Table 38 only confirms the trend drawn from table 37. The three urban centers in New Brunswick result in a greater sales percentage for this province, certain firms having offices in Saint John, Fredericton and Moncton. One fact that stands out is the dominance of Moncton: this is not due to governmental influence, the capital being Fredericton, or the influence of N.B. Tel (in Saint John), but rather to the favoured distribution position and infrastructure of the bilingual city, with its university, technological institute, etc. The table also reveals the rise of Halifax as the data processing center of the Maritimes.

Table 38

	<u>Word processing equipment</u>	<u>Software distributor</u>	<u>Data processing services</u>
Northeastern N.B.	0	0	0
Saint John, N.B.	6	6	5
Fredericton, N.B.	5	4	5
Moncton, N.B.	8	8	5
Northwestern N.B.	1	1	1
Halifax-Dartmouth, Bedford, Nova Scotia	10	19	12
Cape Breton, N.S.	0	1	0
Other areas, N.S.	1	1	1
Nfld	6	7	6
P.E.I.	2	1	1
Total	<u>39</u>	<u>48</u>	<u>35</u>

5) Data processing

In November of 1980, we did a survey in the Moncton area to determine where the firms that use processing systems had their data processed. The Greater Moncton Chamber of Commerce provided us with a list of 600 companies. By contacting 486 of these, we found 250 companies that used data processing in one form or another.

Of all these companies, 48 has computer facilities and the other 202 used computer services located outside their own offices.

The 48 who had computer services indicated where their services originated:

- 77.8% used programs obtained in the Atlantic region;
- 16.6% used programs from central Canada; and
- 5.6% used American programs.

All answered that they were able to obtain all necessary maintenance services within the Atlantic region.

The 202 firms using computer services from outside their own offices obtained most of these services from their head offices or another branch.

The forwarding of data of these 202 firms was done by:

- terminal: 51.4% of cases
- mail and courier service: 40.9%
- telephone or telex: 6.3%
- bus and airplane: 1.4%

These statistics reveal that almost half the institutions that use data processing systems have no connections linking them to a system: they forward their data by oral or written means or through postal or telephone systems and receive their results in the same manner.

As for data processing, since it was the purpose of the survey, we obtained the following results. Out of the 202 firms, 65.5% forwarded their data outside the Atlantic region and 34.5% had the data processed within the region. (See table 39 for the summary of results).

We note that more firms have their data processed in Ontario than in the Atlantic region (38.6% against 34.5%). In fact, 55% of the companies have their data processed in central Canada (Ontario and Québec).

We also note that 50% of the firms that have their data processed in the Atlantic region forward them to Halifax-Dartmouth.

Table 39

Geographic distribution of data processing

(in percentages of total of 202 firms)

Outside the Atlantic region			
Ontario			38.6%
Québec			17.3%
United States			7.3%
Western Provinces			<u>2.3%</u>
Total			65.5%
In the Atlantic region			
Nova Scotia			
Halifax-Dartmouth	50.7%		
Other locations	10.6%		
Total	61.3%	61.3%	
New Brunswick			
Moncton	12.1%		
Saint John	21.3		
Other locations	<u>5.3%</u>		
Total		<u>38.7%</u>	<u>34.5%</u>
		100.0%	100.0%

6) Conclusion

The previous chapters clearly showed that in the field of computer/communication and data processing in general, the Atlantic region is to Canada what Canada is to the United State, i.e. a less-developed region dependent on the larger one. And if Canada's dependence on the United States worries many, it would also be quite justified to worry about data processing conditions in the Atlantic region.

However, conditions in the Atlantic region are not the same in all the sub-regions. Nova Scotia has almost 50% of the computer stocks in the region, mostly concentrated in the Greater Halifax area. In fact, Nova Scotia is to the region what Ontario is to Canada! But there are areas in the region that are really disadvantaged: the worst is the Acadian region of New Brunswick which, with 1/3 of the province's population, only has 6 computers, a single sales outlet and no digital transmission system. Governments have attempted, during the last few years, to ensure that the region has a good infrastructure but, evidently, they have forgotten the "information" infrastructure, in spite of the fact that it is one of the most important if not the most important elements. The purpose of the "Moncton survey" was to determine where the firms of a medium-sized city in the region had their data processed. The results were interesting, as shown in section 5 above: almost half the firms have data processed by computer: 19% locally and 81% outside the city. Among the latter, 34.5% have their data processed in the region, half of them in Halifax. Of the remaining 65.5%, more than 80% go to central Canada, with 10% in the United States and less than 5% in western Canada. Here again we note Halifax's major role as the Atlantic area data processing capital and the worrisome employment problem of processing done in central Canada or the United States.

It would take a more detailed study, taking into account the quantity and value of processing, to enable us to draw quantitative conclusions from these facts.

CHAPTER 5

POLICIES AND MEANS OF CONTROL
OF PROVINCIAL AND FEDERAL GOVERNMENTS

1) Introduction

The rapid growth of computer/communications and data processing systems in Canada, as in other industrialized countries, has led governments to pay special attention to the phenomenon of computer-communications. These studies, which began in the late 1960s, were the subject of numerous reports during the first years of the next decade. It is surprising to see that since 1976, computer/communications have been practically ignored by the Canadian federal and provincial governments.

This chapter considers the evolution of computer/communications policies in Canada from their beginnings to 1980, both at the federal and provincial levels. In regards to the latter, an analysis of the Québec government computer/communications policy has been included for comparison with regional and provincial policies in the Atlantic region.

2) Canadian federal government

The federal government of Canada has studied the computer-communications industry since 1969 and, although its major studies were published between 1970 and 1975, the computer/communications task force led by Dr. Peter Robinson is still kept in force by the Department of Communications.

2.1) The Telecommission (1969)

On September 18, 1969, the Honourable Eric Kierans, Minister of Communications, gave a mandate to the Telecommission to study the present state and future prospects of telecommunications in Canada. It was the first major action indicating the Canadian government's awareness of the importance of computer/communications. The Telecommission carried out more than 40 studies dealing with constitutional, legal, economic, international, sociological, technological and institutional aspects, as well as regulations. The final report of the Telecommission, entitled "Instant World" (1971) contained five main sections. The first, called "The problem and the means" dealt with the main telecommunications problems, certain aspects of the policy that be must developed by governments in this field, and a chapter explaining telecommunications techniques. The second part, called "Telecommunications and People" dealt with the requirements of the human environment. With titles such as "Soul in the System", "The Human Goldfish", "Databank Dialogue", this part explained the dangers that telecommunications and computer/communications pose for the right to privacy and literary and artistic property. The third part gave the background on telecommunications in Canada, from its beginnings to 1972. The fourth section, entitled "Telecommunications Tomorrow" could have been of interest to us since, according to its introduction, it described the role of telecommunications in regional development in Canada. The

chapter called "Canada East West North South" dealing with regional development, mainly analyzed the telephone and radio aspects of telecommunications.

It noted the lack of statistics and data on links between telecommunications and regional development. Its hypothesis seems to be that access to efficient communication is an essential factor in the choice of a site for industrial development and that telecommunications are a convenience and everyday amenity for the population. In no way did the report study the regional aspects of computer/communications. The fifth and last part of "Instant World" was entitled "The Public Interest". It analyzed the sharing of telecommunications regulatory duties in Canada, which is based on the constitution of the country, and states the advice given to the Telecommission on the means of improving current regulatory structures and practices. The report's conclusion is clear: the development of telecommunications in Canada requires a clear definition of the national policy in this field, taking into account the human and social values that are the basis for government intervention. The objectives of a national policy should be: equitable and reasonably-priced access to communications by all Canadians, improvement of service in rural areas and the north, maintaining an east-west axis for Canadian circulation, guarantees against the invasion of privacy, Canadian control of telecommunications facilities and public data processing services and expansion of research and the manufacturing capacity of the telecommunications and data processing industry in Canada. We can truthfully say that the Telecommission has ignored the socio-economic impact of the introduction of computer/communications on the peripheral areas of Canada.

2.2) The Canadian Computer/communications Task Force (1970)

A task force on computer/communications was formed in November 1970, its mission being to recommend policies and structures that would ensure an ordered development of computer/communications systems in the public interest. The computer/communications task force published its report, "Branching Out", in May of 1972. Of the 39 recommendations contained in the final report, only the following dealt with the regional aspects of computer/communications:

Recommendation no. 10. Policies in network development should be oriented, in consultation and cooperation with the provinces and the private sector, towards achieving rates for specific services in which the controlling factors may include time, bit rates or other parameters of network utilization but in which geographical distance is of minor or no influence, particularly within regional zones.

Recommendation no. 22. Policies in computer/communications development should be oriented in consultation and cooperation with the provinces, towards improving service availability and reducing costs in Canada in order to offset economic and technical incentives for meeting user needs through facilities outside Canada.

Recommendation no. 28. In government support of projects, priority should be given to those which involve the formation of regional and nation-wide computer systems in the public sector, designed to make available on a shared basis, computer and specialized data bank facilities to public institutions and to the general public.

It seems that the regional aspects of these recommendations are only a consequence of the constitutional distribution of power in the field of telecommunications.

2.3) Studies by the C.C.C.T.F. (1971 to 1973)

The Canadian Computer/communications Task Force, which published the report "Branching Out" in 1972, prepared and requested a series of research papers in support of the report analyzed here. Among the 16 studies carried out, the one that held our attention in relation to our research was no. 6 "Working paper on strategic options". The consultancy firm The Hayward Computer Corporation Ltd was charged with examining the various strategic options available to Canada in regards to the development of the data processing sector. Eleven economic objectives were listed by the consultant: increased market control, domestic control of industry, increase in G.N.P., increased employment, greater access to capital, exports, increased profits, balance of payments, increased taxes, protect the communications monopoly and increase in non-regulated business. Five social objectives were recommended: entrepreneurial opportunities, control of privacy and abuse, social needs, domestic control of data banks, availability of service. The author of the analysis pointed out that the social objectives came after the economic objectives, as they were only possible at a high cost and through a combination of legislative measures and subsidies. Once again, it is impossible to find, throughout the 16 studies, and especially study no. 6, a trace of preoccupation for the economic and social objectives of the regions. The main preoccupation of Canada at the time seemed to be the establishment of east-west national computer/communications networks to prevent any north-south networks that would create a direct data processing dependency on the United States.

2.4) The Green Paper (1973)

In April 1973, the Honourable Gérard Pelletier, minister of Communications, published a Green Paper intitlled "Proposals for a communications policy for Canada". A month later, in May 1973, he signed another Green Paper: "Computer/communications Policy: A position statement by the government of Canada." The government's general evaluation of the objectives of a computer/communications policy could be summarized as follows: "It is important that computer/communications, as they affect both existing services and lead to the development of new ones, be oriented in such a way as to emphasize the national identity, the achievement of major economic and social aims, both national and regional, and the maximization of Canadian influences and control over the key activities and services". In this document, the federal government declared computer/communications to be a key element of economic and social activity and committed itself to the promotion of Canadian ownership and control as well as a balance between the regions and stated its intention to impose specific conditions, in cooperation with the provinces, on data processing systems serving as vehicles for cultural values. In reading the 29 principles contained in this green paper, we only find the word regional once, in principle 24 aimed at developing regional and national computer/communications networks.

2.5) And then ... nothing... or almost

For almost six years now, no federal policies have been established, in spite of the considerable work done, until 1978, by the Interdepartmental Committee and the Computer/communications Secretariat. These two agencies were disbanded in 1978.

The Economic Analysis Division of the Department of Communications has nevertheless identified²⁸, for purposes of analysis, three major spheres of government initiative in the telecommunications field, respectively dealing with communication networks, the terminal and electronic element manufacturing industry and the software and databank industry.

In regards to telecommunications networks, more authority was given to the C.R.T.C., without major benefit for the region studied. Telesat was authorized by the federal government to join with the C.C.G., thereby creating a virtual monopoly for land and "air" broadcasting. The reinforcement of the Computer Communications Group indirectly helps the local telephone companies and the region in general.

28. Economic Analysis Division, Department of Communications, "The Information Revolution and its Implications for Canada" Ottawa, 1979.

Northern Electric's monopoly of terminal manufacturing for the Bell company and its sister companies was in fact broken up by a series of Supreme Court of Canada decisions: users have the right to connect their terminals to the telephone network.

Numerous projects based on computer/communications developments have been studied by the federal government without, however, receiving the necessary legislative support for implementation. Electronic payment systems, electronic mail (Canada Post), Telidon and pay-TV are all prime examples.

Today there are about a dozen information distribution companies "on line" from data banks. None is located in the Atlantic region of Canada. Nevertheless, the information is available in the region as it is elsewhere.

2.6) The Clyne report

A committee was created in November 1978 by the Department of Communications and given the mission to formulate specific recommendations on a restructuration strategy for the Canadian telecommunications system aimed at safeguarding Canadian sovereignty and to formulate recommendations on the future of the Canadian telecommunications system. In March 1979, the Committee, chaired by J.V. Clyne, submitted its report, entitled "Telecommunications and Canada", and made 26 recommendations. The Committee emphasized the fragmentation of the Canadian electronics industry. Speaking of Canadian firms, the report stated³⁰ "The weakness is that most of them are so small that they lack the financial resources and in some cases the managerial skills that would enable them to engage in systems development for larger projects." The report recommends consolidation: "The formation of large firms,... in order to achieve production volume necessary to compete in both domestic and export markets..." (recommendation 25(b), p. 73). Needless to say, the first concern of the Committee was the loss of Canadian sovereignty in the field of communications and it totally ignored the legitimate aspirations of the peripheral regions.

30. Consultative Committee on the Implications of Telecommunications for Canadian Sovereignty, "Telecommunications and Canada", Ottawa, 1979, p. 70.

Conclusion

One conclusion is evident: jurisdiction problems and other government priorities have delayed the development of the telecommunication policy needed by the country and its regions, it being crucial to the ordered development of the country. The uncertainty caused by this lack of leadership is a factor in the slowing down of socio-economic and technological progress during the past few years.

It also seems that the industry and users aspire to take the initiative in the development of computer/communications policies and that the federal government has decided, or simply accepted, in the past few years, to no longer play the leadership role it filled during the first years of the decade in the field of computer/communications. The Clyne report³¹ points that the federal government only followed up four of the thirty-six recommendations made to it in the Canadian Computer/communications Task Force report, "Branching Out" (1972). However, this new orientation of the federal government does not seem to have been unanimously accepted. The Canadian Business Equipment Manufacturers Association, Inc., in a brief to the Tariff Board, states that since the data processing industry is characterized by rapid technological obsolescence and the need of massive capital, risks are considerable and will only be taken in Canada if the government creates a favourable climate. To achieve this, the federal government must adopt a long-term overall industrial plan.

3) Provincial governments in the Atlantic region

It was not easy for us to determine any data processing or computer/communication policies set out by provincial governments in the Atlantic region. For the latter, "telecommunications" essentially mean radio and any activity on this subject is focussed on the constitutional aspect of jurisdictional problems in regards to radio and television broadcasters and cable distributors.

Although the subject involves the two levels of government, there is really no one responsible at the provincial government level for computer/communications.

We were nevertheless able to identify certain attempts to develop data processing or computer/communications policies in the region that are analyzed in greater detail below.

31. Clyne Report, name given to the report of the Consultative Committee on the Implications of Telecommunications for Canadian Sovereignty, the chairman of which was Mr. Clyne, Ottawa, 1977.

3.1) Newfoundland

In 1974, the "Newfoundland Task Force on Computer Communications" was created. The main subjects of research by this group were: 1) regional data centers, 2) software development, 3) education, development of data processing activities, 4) equipment requirements, and 5) telecommunications networks. In September 1975, the group concluded its research by producing the report "Newfoundland Task Force on Computer Communications, Summary and Recommendations", containing eleven recommendations to the provincial government:

- 1) That a Data Processing Planning Group be created, under the leadership of the "Planning and Priorities Secretariat";
- 2) That a regional data center creation plan be established, with computers in Corner Brook, Grand Falls, Gander, Labrador and the Burin Peninsula
- 3) That software capabilities be developed and maintained;
- 4) That data processing training be introduced, beginning in the eleventh grade;
- 5) That the "College of Trades and Technology" prepare a certified two year program;
- 6) That Memorial University also offer a graduate level program in data processing;
- 7) That the Newfoundland and Labrador Computer Services Limited Crown corporation work actively at the training of staff for government and industry;
- 8) That a series of computerization projects be implemented under the leadership of the Computer Communications Task Force;
- 9) that the N.L.C.S. Crown corporation acquire a second large computer;
- 10) that all these recommendations come under Department of Regional Economic Expansion agreements;
- 11) that N.L.C.S. obtain contracts with the federal government, in order to increase provincial revenues and develop data processing capabilities.

It was decided in 1969 to create a Crown corporation to be called Newfoundland and Labrador Computer Services Limited. In 1972, the Newfoundland government, realizing the importance of communications, created the Department of Transportation and Communications. The above report was prepared in 1974 and 1975.

It would be interesting to analyze the follow-up to the recommendations of the 1975 Task Force report: The Data Processing Planning Group was never set up, some people considering that it should come under the Treasury Board. However, the latter did not accept responsibility! The regional data centers were never created. No software specialist training policies were developed by the government. A two year program leading to a certificate in data processing was created at the "College of Trades and Technology" and data processing program has now been extended to the graduate level. Recommendation 7 is partly followed, N.L.C.S. cooperating with the Newfoundland public service in training and development in the field of data processing. N.L.C.S. tenders for federal contracts were not as successful as expected. As for the joint participation of DREE and the province in the funding of a Newfoundland data processing network, involving data centers in Corner Brook, Grand Falls, Gander, Labrador and the Burin peninsula, negotiations never amounted to anything. The end result is not very positive! The current government is even considering changing the Department of Transportation and Communications into the Department of Transportation in the coming weeks³³ and giving the responsibility for communications to the Minister responsible for Intergovernmental Affairs, the latter dealing specifically with jurisdiction and constitution problems.

However, N.L.C.S. and two local telecommunications companies have established telecommunication rate policies favouring data processing within Newfoundland. A preferential rate is applied to Labrador to ensure that the cost of transmitting to Saint John's is lower than the cost of transmissions to Québec. We will see in the following paragraphs that Newfoundland is not the only province in the Atlantic region where communications policies are developed more often by private or Crown companies than by governments and public representatives.

3.2) Nova Scotia

The province of Nova Scotia has no formal data processing policy. It is obvious, however, (see chapter 2) that Halifax-Dartmouth is the main center for data processing activities in the province and even Atlantic Canada. The government of Nova Scotia has played an important role in Halifax's rise to the level of central Canadian cities. Recommendations for telecommunications rate favouring processing in Halifax, pressure to have firms supplying data processing equipment and services to the provincial government establish offices in Halifax, a strong concentration of federal agencies, the presence of a highly-qualified university, are all factors that created a climate favourable to the establishment of a strong processing center in Halifax.

33. This will probably have been done by the time this report is read.

The decision, in May 1975, to withdraw from the A.T.C.O.M.P. project was probably helpful for the province. This project, begun in 1973 by the federal government, regrouped the four Atlantic provinces and was aimed at developing the field of data processing at the regional level, with a potential distribution of processing between the four provinces.

At the university level, Dr. Ronald MacKinnon's³⁴ report also indicated the provincialization of data processing and a refusal to collaborate and rationalize regional networks.

Thus, in spite of the lack of a written data processing policy, Nova Scotia, and Halifax in particular, became the data processing and computer/communication capital of the Atlantic region of Canada.

3.3) New Brunswick

Responsibility for telecommunications rests with the provincial Department of Transportation. But within this department there is no Branch or Office specifically dealing with these problems.

It can be said that there is an almost total lack of computer-communications policies at the governmental level. It is only at the university level that a processing policy has been clearly formulated and applied with the creation of a New Brunswick processing network, to which the University of Prince Edward Island is also linked. Although the central computer of the network is used by governmental agencies, it does not correspond at all to the Newfoundland corporation, the Newfoundland and Labrador Computer Services Limited. In New Brunswick, the central computer is located at the University of New Brunswick in Fredericton, belongs to the University and is operated by University staff. This is far from the Newfoundland concept of a company serving the data processing community!

New Brunswick has nevertheless made considerable efforts in the field of communications in general. The Premier himself has intervened many times before the C.R.T.C. to request the improvement of radio and television broadcasting conditions in the province, the C.B.C. English-language television network only having affiliates in New Brunswick and the Radio-Canada French-language network not reaching the entire francophone community of the Province. The priority and effort given to this matter are probably two of the major, if not the most important, factors explaining the lack of an explicit or implicit policy from the provincial government of New Brunswick regarding data processing or computer/communication.

34. MacKinnon, R., "L'informatique dans les universités de l'atlantique", Department of Communications, Ottawa, 1975.

This lack of interest and absence of processing policies has allowed the NBTel company to set the telecommunications policies for the province. During the last years, the company has visibly neglected the rural areas of the province, where considerable improvements need to be made to telephone systems, to concentrate on communications between urban zones (Saint John, Moncton, Fredericton and Bathurst) and to acquire equipment allowing it to play an equal role within the Computer communications group of the Trans-Canada Telephone System. Unlike the Nova Scotia and Newfoundland telephone companies, New Brunswick has no intra-provincial rate policy favouring processing within the province. On the contrary, the fact that it provides DATAPAC and DATAROUTE communication services at greatly reduced rates encourages companies and organizations to have their data processed or link themselves to computer systems outside the province. The Moncton survey³⁵ clearly shows the two trends in computer/communications in the region; on one hand, processing outside the region through DATAPAC, DATAROUTE and other transmission networks, and, on the other hand, polarization of regional processing in Halifax-Dartmouth.

Because of NBTel policies, New Brunswick has access, at a low price, to distant data banks and computers outside the province, which may improve the competitiveness of local firms but which tends to centralize decision points and cause transfers of advanced technology jobs to other Canadian provinces and the United States.

3.4) Prince Edward Island

As in New Brunswick, communications on Prince Edward Island come under the Department of Transportation.

Prince Edward Island has no data processing or computer-communications policy and largely depends on the rest of Canada. Thus, the island telephone company is M.T.&T., the same as Nova Scotia, and the University of Prince Edward Island is connected to the university data processing network in New Brunswick. Rates for communication with Nova Scotia are lower than with New Brunswick.

4) Québec

Québec has a Department of Communications, which includes a Telecommunications Branch. This indicates the interest shown by this province in telecommunications and computer/communications.

35. See chapter 3.

In 1973, the Québec Department of Communications gave the interdepartmental committee on computer/communications the mandate to develop the main elements of a computer/communications policy for Québec and set up the intra-provincial coordination elements.

In 1976, the report entitled "Dimensions d'une politique de téléinformatique pour le Québec"(A computer/communications policy for Québec)³⁶ conclusively defined Québec's position in regards to computer/communications. The report studies computer/communications' place in the government and several sectors of the Québec economy, examines the Québec computer/communications industry, the government policy and the data transmission services. The document also gives the guiding principles of the computer/communications policy. Annex 2 of our report contains the guiding principles and recommendations of this report. We consider the guiding principles to be particularly relevant for the development and control of computer/communications in the Atlantic region. However, these principles could only apply at the regional level and not the provincial level, which is too small to achieve the large-scale savings necessary in high technology industries.

It can be stated that Québec really has a computer/communications policy, having developed its own provincial computer networks, encouraged its suppliers to create research and production units inside the province, controlled computer transmitters to ensure they provide services to the entire Québec community and actively participated in conferences, seminars and symposiums on computer/communications.

5) Conclusion

As noted for the federal government, few data processing or computer/communications policies were developed by provincial governments in the Atlantic region of Canada during the last few years. An interesting alternative is the "Working Paper on the Communications Objectives of the Maritimes Provinces" of 1975. Prepared by the Secretariat of the Council of Maritime Premiers for the ministers responsible for communications in the three provinces, this document could have been the basis for concerted action by the three governments. Although it appears relatively superficial, disregarding, for example, the socio-economic aspects of computer/communications, it is the government document that shows the most concern for the region. For this reason we have enclosed the document with this study. (See Annex 1).

36. Comité interministériel sur la téléinformatique, "Dimensions d'une politique de téléinformatique pour le Québec", (Inter-departmental committee on computer/communications: A Computer/communications policy for Québec), Québec, Department of Communications, 1976.

It is obvious that the region cannot count on the federal government in regards to the regionalization of data processing and computer/communications. The federal government is concentrating on foreign data transmission problems, transfers of technological jobs and the development of a national industry. To this end, major concentrations of computer specialists, processing equipment manufacturing firms, software and services must be created.

It is Québec that has set out the guidelines that the Atlantic region of Canada and its provincial governments should follow. The Western Canadian provinces have been making efforts and developing computer/communications policies in the last few years, apparently based on the federal government's position regarding the United States and the Québec government's policies. As is the case in many fields, the Atlantic region lags far behind in regards to studies and policies in the field of computer/communications. We think that they should be developed at the regional level, either under the jurisdiction of the Council of Maritime Premiers or on a larger scale with Newfoundland.

CHAPTER 6

TECHNOLOGICAL INNOVATIONS IN COMPUTER/COMMUNICATIONS
AFFECTING THE REGION

1) All is not black

There is no doubt that information technology, i.e. the applications of micro-electronics, telecommunications, data processing, will affect the Atlantic region of Canada. Today the "chip" has memory and calculation capacities that cost a thousand times more 15 years ago. In addition, it is infinitesimally smaller in size than its sister of 15 years ago and may be integrated into a great number of products, from watches equipped with calculators to space satellites and shuttles, including automobiles. It was the use of the "chip" in mini and micro-computers that allowed the expansion of data processing. Because of this, we now have intelligent terminals, satellite computers and terminals in all types in offices, warehouses and production firms.

For the Atlantic region of Canada, as in all peripheral or less developed areas of the world, the era of micro-electronics seems to be a godsend at first view. Thanks to new telecommunications opportunities, the information considered by many firms as the most important raw material can be processed at a small cost by small and medium sized firms as well as large ones. In addition, data banks that were once electronically inaccessible are now available, no matter where one may be. Electronic mail, the electronic transfer of funds and the use of Telidon are already technically possible, but the legal-political-social forces slow down their development. It would also be helpful to provide these various services to firms and people in the region.

The whole of the industrialized world seems to be worrying about employment. In Great Britain, the introduction of micro-electronics, computer/communications and computers could result in several million lay-offs during the decade. The same British economic report mentions a loss, between 1980 and 1983, of 800,000 jobs because of micro-electronics. The Nora-Minc report corroborates the British report concerning the French economy. Prepared in 1973, this report forecasts a decrease in employment in the bank and insurance sector of 30% in ten years. Again in France, word processing would reduce the number of typing jobs from 349,000 to 267,000. In Belgium, as in the Netherlands, a loss of more than 100,000 jobs is expected in ten years. Canada will not be spared by this new technology. Some reports mention a loss of 150,000 jobs up to the year 1985, loss due to the introduction of micro-electronics in our country. The whole of the modern industrial world could thus lose almost 6 million jobs during the 1980s. The most optimistic assessments of jobs created by this new technology are for a million new jobs.

The Atlantic region of Canada will certainly be affected, from the employment point of view, by the new technology, as much as other regions of the industrialized world. However, because of the present structure of employment in the Atlantic region it will probably be less affected by this new phenomenon than the heavily industrialized regions of central Canada. As table 1 clearly shows, the Atlantic region has proportionally

less administrators, office workers, or processing industry workers than the national average. And it is precisely in these categories that the loss of jobs will be the greatest. The lower level of economic development in the Atlantic region will therefore help the region in lessening the blow of job losses in the above sectors.

In examining each sector of the regional economy (see table 2), we see that the primary sector of the region has experienced a considerable loss of jobs since the 1950s. This period corresponds to the introduction of highly technical methods for ore extraction, wood cutting and other sectors of the primary industry. In the secondary sector, processing, manpower has considerably increased during the three last decades. It feels the effects of micro-electronics, but not as much as the central Canadian region, due to the smaller size of firms in the region. As for the tertiary sector, which also experienced a major increase recently, it should stabilize and even decrease, according to analyses done in other countries. However, this decrease or stabilization will affect employment less in the Atlantic area than in central Canada, where the secondary and tertiary sectors are larger.

Table 1

Employment by occupation
(per thousand) 1977

Categories	Canada		Atlantic Provinces		Atlantic Provinces % of difference in relation to the whole of Canada
	No.	%	No.	%	
Administration	2,277	20.97	169	19.23	-1.74
Office work	1,871	17.23	129	14.68	-2.55
Sales	1,138	10.48	87	9.90	-0.58
Services	1,407	12.96	124	14.11	+1.15
Primary production	750	6.91	71	8.08	+1.17
Processing	1,659	15.28	118	13.42	-1.86
Construction	826	7.61	91	10.35	+2.74
Transportation	438	4.03	42	4.78	+0.75
Other	491	4.52	48	5.47	+0.95
Total	10,858	-	879	-	-

Source: Atlantic Canada Today, A.P.E.C., Fredericton, 1977.

Table 2

Employment by sector in the region
(in thousands)

	1951	1971	% of change
Primary sector	167	74	- 44
Secondary sector	50	109	-118
Tertiary and other sectors	313	641	-105
Total	530	824	- 55

Source: Atlantic Canada Today, A.P.E.C. Fredericton, 1977.

2) But....

It is obvious that the Atlantic region of Canada has no choice but to participate, with the rest of Canada and all other industrialized countries, in what could be called the "information revolution". If, theoretically, computer/communications technology allows the re-distribution of regional revenue and employment, it is not evident that this regional re-distribution is occurring in Canada. Telecommunications are a bi-directional means of transmitting data, allowing communication between one region and another. The question we should ask ourselves is: "Do telecommunications lead to the centralization or the decentralization of economic activities?" The answer to this question depends on a series of factors as varied as the educational and health environment of the region, the nature of the economic activity of the firms involved, the availability of staff, or the means of communication. A close examination of all these elements indicates that telecommunications and computer/communications development has a centralizing rather than decentralizing effect on the economic activities of the country. Telecommunications provide the central region with better information on activities occurring in the outskirts, allowing them to centralize the management of their firms by eliminating the managers formerly employed in the peripheral regions. Computer/communications also improves the efficiency of services to peripheral regions from a central office by improving inventory and order systems, thereby eliminating warehouses or sales offices in the peripheral regions. A better knowledge of the regional markets by firms in central Canada will allow them to easily penetrate the peripheral regions, and often eliminate the competition of local firms, which have less information on their own markets and in the past benefited to some extent from a natural protection due to distances and inefficient means

of communication. And, as shown in the Moncton survey³⁷, the improvement in telecommunications allows regional secretarial work to be replaced by computer processing, generally done in the region where the headquarters of the company are located.

3) Conclusion

If, in the primary sector, we have no fears about job creation or maintaining jobs at their current level, our observations lead us to different conclusions in regards to the secondary and tertiary sectors of the economy.

In economic analyses of employment, more and more references are made to the quarternary sector, including all jobs involving the handling, creating, transmitting and recording of information. Today, this sector is larger than the primary, secondary and tertiary employment sectors. However, it should be pointed out that this means the number of persons working in the sector and not the production of the sector or its contribution to the gross national product, of course. In Canada, as in the United States, more than half the jobs can be classified as quarternary sector jobs, consisting of the production, processing or distribution of information. In the 1980s, the industrial society we are living in will improve its productivity essentially by improving the productivity of the quarternary sector. For the Atlantic region of Canada, it is to be feared that large providers of jobs in the quarternary sector, i.e. governments and financial institutions, will use central computers to replace the work done in the branches of the financial institutions or the regional government offices. Even regional institutions, such as Les Caisses Populaires Acadiennes, have their data processed by central computers outside the region, which inevitably results in transfers of jobs to other regions of Canada.

We think that this problem deserves continued attention by provincial and federal government on the basis that the reduction of regional economic disparities will continue to be an objective wished for by these governments. Only a detailed analysis, sector by sector, industry by industry, will allow a systematic review of employment conditions following the introduction of new telecommunications, computer/communications and micro-processor technologies in the Atlantic region of Canada. We believe that such a study would provide a sufficient data base for the development of computer/communications policies in the Atlantic region of Canada.

37. See chapters 3 and 4.

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

1) Conclusions

New technologies, based on the use of silicon and micro-processors, have created an "information" revolution as shattering as the industrial revolution of the 19th century. A spectacular drop in costs has generalized the use of data processing technology in all sectors. In addition, progress in telecommunications technology "unlocalized" data and upset the locally integrated structure of the organizations: the processing of data or information (accounting, inventory, marketing, data banks, etc) no longer need to be done at the same physical location as the basic activities of the organization (sales, production, etc.). The processing of information is being "despatialized".

There is no doubt that the type of impact that computer/communications and data processing in general have on socio-economic development varies from one region to another.

The objective of our analysis was to analyze the dependency of the Atlantic region of Canada vis-à-vis central Canada and United States in regards to computer/communications and data processing, to see what impact these new technologies might possibly have on the socio-economic dimension of the region, to examine the level of awareness and policies of governments in charge of our future and to finally conclude with recommendations that we hope will be pertinent.

It would have been absurd for us to analyze computer/communications and data processing in the Atlantic region only. A country could, to some extent, be studied separately, but a region must necessarily be analyzed in comparison with other regions of the country. We have examined the distribution of data processing technology as an element of productivity and as an industry.

The conclusions of the chapter on the use of data processing are not very encouraging for the region: there are two times less computers in proportion to the population than in Ontario; in regards to value, the Atlantic region's share is 3.3% of the national total; the region has the least memory capacity per computer, the least number of computers in the manufacturing sector and the lowest employment rate of all Canada, with an even greater weakness in the "intellectual" category of programmer-analyst. The low productivity of the region in relation to Ontario (-25%) is due, for 72% of this 25%, to residual factors, the most important being technology and the quality of the management.³⁸ There is no doubt that a percentage of this difference is because the region lags behind in data processing.

38. Economic Council of Canada, "Living Together: A Study of Regional Disparities", 1979, chap. 5, pp. 61-98.

An analysis of data processing industry sectors, i.e. equipment manufacturing, processing services and software services, shows the same pattern as in the use of data processing: most of the industry is located in Ontario (49.8% of establishments and more than 71% of industry sales); Québec and Ontario together practically represent the whole of Canada with more than 69% of establishments and almost 91% of sales; in regards to equipment manufacture, these two provinces end up with 96% of all Canadian sales. Needless to say, the Atlantic region makes a poor showing in the data processing industry: with its 21 establishments (25%) it only gets .6% of the total revenue of the processing industry. The employment level in the processing industry is insignificant in relation to other regions: .9% (see table 22). In view of the population and especially the low number of computers in the region, the number of suppliers seems to indicate a concern to cover the whole region. However, according to our experience, users of computers in the region complain of the low level of service of these small sales offices.

If it is correct to think that information has become the most important product of the firm, in the Atlantic region the "processing" infrastructure (the data processing industry) is practically inexistent and this void is and will be filled by the tele-processing of data outside the region, if nothing is done to create a proper data processing infrastructure.

Although we may complain about the small share of the Atlantic region in the development of the data processing industry, both as a user and as a producer, there are sub-regions in even more tragic positions: the Acadian region of N.B. only has 6 computers, 1 sales office and is not linked to the DATAROUTE and DATAPAC networks. The data processing infrastructure seems to have been ignored in this region. Halifax has become the data processing center of the region, with 50% of the large computers in the region and according to the "Moncton survey", it is also becoming the computer/communications center (see chapter 4). Newfoundland is something of a loner and in N. B., three cities are vying for processing hegemony, with Moncton slightly ahead. The other parts of the Atlantic region lag far behind in all respects.

An analysis of the policies of the governments responsible for the development of the Atlantic region of Canada does not provide any solutions or beginnings of solutions to the delay, if not to say "information" dependence of the Atlantic region of Canada. At the federal level, the Department of Regional Economic Expansion has certainly helped, if not to bring the region up to the level of the rest of the country, at least to narrow the gap. But, on the other hand, we have several Departments and organizations promoting the concentration of processing industry firms, which means, under current industry conditions, a concentration in the metropolitan areas of Ottawa, Toronto and Winnipeg. We therefore have divergent policies within a same government. In addition, we have witnessed a policy of "laissez-faire"

in the field of computer/communications during the last few years. This abdication by leaders is undoubtedly a factor in the slowdown of socio-economic and technological progress. It is only during the last few months that the Department of Communications seems to want to take over the leadership role it had in the early 1970s, by announcing a major support of Telidon and the management sector.

At the provincial level, inconsistency reigns supreme: to our knowledge, no studies on the impact of the new computer/communications technology were ordered by the provincial governments or the Council of Maritime premiers. There are few studies on the use of computer/communications in the region and the major ones were done in Newfoundland more than 5 years ago. It is imperative that provincial governments realize the socio-economic impact of the new technology and assume the responsibility for developing data processing and computer/communications policies to enable the region to have its full share of this technology. These could be inspired from the Québec (see chapter 5) and Manitoba policies.

Analyzing the contribution of the new technology to the regional economy and examining all the aspects studied above, there is reason to be worried for the Atlantic region of Canada. The region already has low manpower productivity (-21% compared to the Canadian average), and does not participate or fully benefit from the growth of the new processing industry which, according to many, will be the biggest contributor to the G.N.P. after 1995. If the Atlantic region does not want to fall back into its position of extreme dependence of the 1960s, it is essential that it come into the "informational society" as an equal partner, with a full share of the computer/communications industry.

2) Recommendations

Recommendations 1 to 6 apply to governmental action.

1. Given the value of the document,

"that the document "A Working Paper on the Communications objectives of the Maritime Provinces" 1975, (see Annex 1) be studied again by the Council of Maritime Premiers or the premiers of the Atlantic provinces and that they come to a decision regarding its recommendations".

2. As the above analysis indicates a lack of information among regional governments,

"that governments in the Atlantic region be made aware of the socio-economic consequences of the introduction of computer-communications in the region."

3. This awareness could only be achieved if,
"an inter-provincial commission on computer/communications is created to analyze current and future conditions in this field, to set up principles on the basis of which it will formulate specific recommendations to federal and provincial governments."

4. Given the scattering of the economy and the scale required for successful data processing undertakings,

"that the region recognize the particular industrial development specializations of its sub-regions. The example of the Prairie region is revealing. Winnipeg has set out to be the micro-electronics and computer/communications leader and this is not disputed by its neighbours. The Ottawa region provides the same specialization for central Canada. In the Atlantic region, the most likely location seems to be Halifax. However, this can only be done if the provincial and federal governments accept the idea of specialization by the sub-regions. The latter government must also modify its assistance programs to take into account the two dimensions suggested: the regional aspect and the type of industry."

5. Given the collective interest in computer/communications,

"that governments and not telephone companies establish the computer/communications policies in the regions under their jurisdiction. It is up to the State to ensure that computer/communications goods and services are available throughout its territory, in order to promote the socio-economic development of the whole of the region."

6. "that a prospective study of the evolution in the demand for regional computer/communications goods and services be carried out to see its impact on the commercial balance of the region."

Recommendations 7 to 9 deal with education and culture.

7. "that provincial governments set up information programs on the current and future applications of the computer for individuals and firms to enable them to make the best possible decisions.

8. "that regional teaching institutions (secondary, technical, university) give the necessary importance to the new micro-electronics and computer/communications technology and their application, in order to lessen the knowledge gap between their graduates and those of other regions."

9. a) "that a regional or provincial data bank supported by a regional computer system and serving as a basis for the Telidon system in the area be created in the Atlantic region."

b) "that the contents of the Telidon data base come under regional or provincial control."

Recommendations 10 to 13 refer to industry.

10. "that a study of the impact of computer/communications and micro-electronics on the region be rapidly carried out to make government decision-makers aware of the series effects of the "information revolution" if it is not controlled." The federal government seems aware of this in regards to Canada vis-à-vis the United States. The regional loss of jobs could be more dramatic than expected for the whole of the country.

11. "that a study be carried out at the Atlantic region level, to determine the impact of the control of data processing services firms by data transmission firms that are members of the C.C.G." Are these restrictive practices or is this a necessary step in the creation of major processing cores benefiting from considerable assistance?

12. "that software production firms be considered as processing firms and be able to benefit from Department of Regional Economic Expansion assistance".

13. "that a study be carried out in conjunction with the governments involved to determine the incentive measures required for the re-deployment of the data processing industry (equipment, software and service) towards the Atlantic region of Canada".

And finally, to arrive at an understanding of the effects of computer/communications on the regional economy,

14. "that a study of the overall macro-economic consequences be done according to the Jouandet-Bernadet³⁹, using an input-output table modified according to the data processing impact."

39. JOUANDET-BERNADAT, R., Macroéconomie de la Société Informatisée, p. 60.

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ANNEX 1

A Working Paper on the Communications
Objectives of the Maritime Provinces, 1975

A WORKING PAPER

ON THE

CONTRIBUTIONS TO THE

OF THE

MARITIME PROVINCES

The Ministers Responsible
for Communications for the
Provinces of:

Nova Scotia
Prince Edward Island
New Brunswick

May 13, 1975

Telecommunications is a vital part of the development of the Maritime Provinces as a vitally important part in ensuring the achievement of economic, social, and cultural objectives. The governments also recognize that telecommunications is a vital component of the national systems and, therefore, essential to the achievement of national economic, social, and cultural objectives.

The governments accept the fact that the complete regulation of telecommunications is the joint responsibility of themselves and the federal government. It is, therefore, appropriate that Maritime regional objectives and policies be formulated in concert with the federal government to ensure the orderly achievement of regional and national goals.

The following terms are used in the objectives:

Telecommunications: meaning the emission, transmission, and reception of signs, signals, writing images or sounds or intelligence of any nature by wire, radio, visual, or other electro-magnetic means, except by broadcasting.

Broadcasting: meaning any radio communication propagated in space and intended for direct reception by the general public.

Objective I

To fulfill the telecommunications requirements of the people and governments of the Region by providing accessibility to a comprehensive range of services of the highest quality at just and reasonable rates consistent with the reasonable financial needs of the providers of those services and with the economy of the Region.

Sub-objectives

- a) To ensure the provision of a telecommunications infrastructure that is economically viable both within the Region and as an integral part of the national telecommunications systems.
- b) To support the development of telecommunications within the Region through the policies of the provincial governments in the procurement of telecommunications services.
- c) To participate with the federal government to encourage development of a viable computer industry to normalize its geographically unbalanced economic structure.

... strictly to the ... of the ... in the ...
 ... to all citizens of the Maritimes a broadcasting service
 that provides a proper balance of information, enlightenment, and
 entertainment, which recognizes and promotes throughout Canada
 the unique culture of the Maritimes and which contributes to the
 development of national unity and of Canadian and regional
 identities.

Sub-objectives

- a) To ensure that federal policies are implemented in harmony
 with provincial and regional policies.
- b) To develop educational broadcasting in each province,
 cooperating with the ... authorities to achieve maximum
 harmonization of the ... of the broadcasting
 objectives of both levels of government.
- c) To ensure the maximum availability of provincial carriers'
 facilities at just and reasonable rates, consistent with the
 appropriate development of all forms of telecommunications,
 in order to achieve regional and national broadcasting
 objectives.

... provide and maintain effective provincial regulation over
 telecommunications carriers whose plant & equipment are located
 entirely within each province.

Sub-objectives

- a) To protect the economic viability of the provincially
 regulated telecommunications carriers so that they can
 continue to offer services that meet provincial priorities.
- b) To ensure the effective integration of the systems of
 provincially regulated carriers to avoid wasteful duplication
 of facilities and services.
- c) To participate with the federal government in ensuring the
 effective integration of the systems of federally regulated
 carriers with those of the provincially regulated carriers to
 avoid wasteful duplication of facilities and services.
- d) To participate effectively with the federal government in
 policy decisions such as interconnection of carriers'
 facilities and competition in the provision of the
 telecommunications services.

... to provide, in concert with the federal government, appropriate mechanisms to achieve harmonization of federal and regional objectives and policies.

Objective IV

To provide, in concert with the federal government, appropriate mechanisms to achieve harmonization of federal and regional objectives and policies.

Sub-objectives

- a) To respect the jurisdiction of the federal government over those carriers whose operations are substantially national in scope and to work with the federal government to harmonize the roles of the federally and provincially regulated carriers.
- b) To promote regional and canadian ownership, wherever possible, in all elements of the telecommunications industry, including manufacturing.
- c) To promote canadian research and development.
- d) To contribute effectively to the development and consistent appraisal of national telecommunications objectives and policies.
- e) To cooperate where appropriate, with the federal government, in relevant aspects of international telecommunications activity.

ANNEX 2

Dimensions d'une politique de la téléinformatique
pour le Québec - Principes directeurs et recommandations,

Ministère des communications, Direction générale des
telecommunications, Québec, 1976

A computer/communications policy for QuébecGuiding principles and recommendations

From the beginning, the Inter-departmental committee on computer/communications has tried to set out a series of principles to guide it in its discussions and the formulation of specific recommendations. The following 10 guiding principles therefore serve as a basis for the computer/communications policy proposed in this report and are consequently an integral part of the report.

Guiding principles

1) Protection of the privacy of citizens

The State must ensure that the use of personal files by any private or public agency does not lead to abuse of the privacy of citizens and is not detrimental to the latter.

2) Preservation and development of the cultural entity of Québec

The State, as representative of the community and guardian of its cultural sovereignty, must take the necessary measures to protect the identity and full development of this community.

3) Regional development

The State must ensure that computer/communications are developed in its territory in such a manner as to ensure the availability of computer/communications goods and services likely to promote the economic, social and cultural development of the different regions of Québec.

4) Freedom of enterprise

The State, while respecting the freedom of enterprise in the economic system, must ensure the private initiatives serve the present and future best interests of the collectivity.

5) Québec manpower

The State must ensure that Québec citizens participate in the development of computer/communications in Québec by promoting their presence in the fields of software, equipment and network design, equipment manufacturing and the administration of all sectors of the Québec computer/communications industry.

6) Québec ownership and management

The State must promote the creation and expansion of Québec computer/communications firms by encouraging the greatest possible participation of Québec citizens in the ownership and management of the companies.

7) Foreign trade

The State must ensure that the computer/communications specializations in Québec that are most likely to attract foreign users are encouraged or developed.

8) Accessibility to computer/communications networks

The State must ensure that the various elements of society have access to the computer/communications networks to be implanted in its territory.

9) Availability of data teletransmission services

The State must ensure that efficient and safe teletransmission services are available to all elements of society on its territory at the lowest possible cost and that they are compatible with all other data teletransmission services offered on its territory.

10) Interfinancing

The State must ensure that rates are such that data teletransmission services are not subsidized by other telecommunication services.

Recommendations

For the development of the Québec computer/communications industry:

- Participation of universities in the data processing services market

- R1 - That commercial data processing services offered to the public by Québec universities:
- a) be directly related to their main objectives, which are research and teaching;
 - b) do not come into conflict with the normal internal requirements of the universities; and
 - c) be provided at competitive prices when equivalent services are available from other commercial sources.
- R2 - That, notwithstanding recommendation (R1), Québec data processing firms take over the commercial operation of data processing systems developed by universities.
- Participation of telecommunications firms in the data processing services market
- R3 - That telecommunications companies or their subsidiaries not be authorized to provide commercial data processing services.
- Participation of financial institutions in the data processing services market
- R4 - that the interdepartmental work group on telepayment in Québec be charged with reviewing the developmet of electronic payment systems, evaluating their impact on the Québec community and advising the government on the measures to be taken to orient this development in accordance with the best interests of Québec.
- Data processing standards
- R5 - That Québec participate in the activities of national and international agencies working on the establishment of data processing and teletransmission standards.
- Assistance to business
- R6 - That the Department of Industry and Commerce:
- a) encourage major Québec electronics manufacturers to take advantage of the North American data processing products market;

- b) support the orientation of companies under Québec control towards the more promising products, taking into account accessible markets, government projects, the capacities and interests of the companies themselves; and
 - c) begin a promotional program among foreign companies wishing to locate, in Québec, complementary technologies to be exploited on North American and world markets.
- R7 - That the Québec Industrial Research Center give a high priority to the industrial sector designated in these recommendations and that it support, by its research, promising innovations from Québec firms.
- R8 - That, given their respective mandates and the risks involved, government financing agencies such as the Société de développement industriel, the Société générale de financement and the Caisse de dépôt utilize part of their investments for the manufacturing of data processing products within the province.
- R9 - That the Department of Industry and Commerce extend its assistance programs to leading sectors to data processing service firms having products likely to find a valid application in Québec and outside.
- Governmental data processing policy
- R10- That the need to ensure the greatest possible consistency with Québec computer/communications policy be recognized in the development of policies governing data processing and teletransmission policies.
- R11- That a data processing services and goods supply policy for public and parapublic agencies be defined and applied, taking into account the need to support the development of Québec industry, especially that under Québec control.
- R12- That the State recognize the importance of having at its service a qualified team of computer specialists and giving them the opportunity to participate in all its data processing activities.
- R13- That the State substantially increase the volume of data processing services provided by private sector firms under Québec control in applying its supply policy in regards to data processing services for government departments and agencies.

R14- That in the application of its data processing policy in regards to departments linked to a network for which communication needs between members of the network and between members and the departments are called upon to increase, the State recognize the value of a computer/communications network to meet these needs in certain cases.

R15- That in acquiring peripheral equipment and standard software, the departments favor Québec firms, particularly those under Québec government control.

- Provision of data processing services to the federal government

R16- That federal administrators be strongly urged to take measures to ensure that Québec data processing services firms get their share of federal orders.

For the consistent development of the computer/communications sector:

- The teletransmission of data

R17- That as long as current companies provide adequate service in accordance with the rules and at reasonable costs, competition in teletransmission be limited to current participants and that the establishment of parallel new systems be avoided.

R18- That the government promote the establishment of a public data teletransmission service available to everyone in Québec.

R19- That the sharing of lines by companies be authorized by the proper regulating agency.

R20- That non-regulated agencies not be authorized to resell data teletransmission circuits without adding processing services.

R21- That national teletransmission standards be developed and that equipment to be connected to private and public networks meet the standards set by the proper regulatory agency.

- Research

R22- That the Department of Education promote greater research into computer/communications through its young researchers training program and joint action and by its graduate students bursary program.

R23- That the Department of Communications of Québec devote the necessary efforts to the development of equipment and software required for future computer/communications networks through its Research Service.

R24- That a graduate and postgraduate computer training program with majors in computer/communications be set up in Québec and adapted to Québec needs.

R25- That the government support the computer/communications research efforts of Québec establishments by favouring international collaboration, especially with France.

- Role of the State

R26- That the responsibility for the follow-up to the Québec computer/communications policy be given to the Department of Communications, which will coordinate the actions of departments and agencies in regards to computer/communications, promote consultation with the private sector and act as a central core for all matters involving computer/communications in Québec.

For the protection of citizens:

- Computer/communications and privacy

- General recommendation

R27- That the following basic principles relating to the protection of personal files be recognized and accepted as the basis of any regulations dealing with personal data banks in Québec.

Principle 1 - Right to privacy

Except when approved by the proper authorities, citizens should have the right to refuse to divulge personal information.

Principle 2 - Ownership of personal information

Citizens should be advised of the contents and current or planned use of their personal files, as well as changes made to the files. Citizens should also be able to contest what is contained in their files.

Principle 3 - Control of distribution

Except when approved by the proper authorities, the transmission of personal data to third parties is subject to the agreement of the person involved.

- Recommendations concerning data banks in the public and parapublic sector
 - R28- That a central agency be charged with setting up mechanisms for the standardization and supervision of operations involving the handling of personal data, especially in regards to:
 - a) methods for the protection of confidentiality of personal information systems and,
 - b) the updating, storage and elimination of files containing personal information.
 - R29- That the government establish mechanisms through which citizens will be assured of their fundamental rights in regards to information that concerns them, i.e.:
 - a) the right to be advised of the existence and distribution of personal files that concern them;
 - b) the right to consult, correct and contest these files.
- Recommendation concerning private company data banks
 - R30- That the State submit all agencies operating personal data banks in Québec to the same conditions as the public and parapublic sector, as soon as possible.
- Recommendation concerning information agencies
 - R31 - That the consumer protection act be revised to require all information agencies:

- a) to register with the proper government agency;
 - b) to reveal the sources of personal information to the people involved in the investigation;
 - c) to allow the people involved to consult their files;
 - d) to allow the people involved to register their disagreement;
- and all businesses:
- a) to reveal the source of personal information that has led to an unfavourable decision regarding the consumer; and
 - b) to obtain the consent of the citizen before carrying out an investigation on him.

- Citizen awareness

- R32 - That research on the social aspects of computer/communications be encouraged.
- R33 - That an information program on current and future applications of computers involving individuals be set up.

ANNEX 3a

List of equipment and software suppliers
in the Atlantic region

In December 1980, a questionnaire was sent to more than 220 firms in the Atlantic region listed in the "Canada Data Systems" (1980) and the "yellow pages" in the Atlantic region.

One hundred firms answered the questionnaire. According to our analysis, very few active firms did not answer our questionnaire: many data processing goods and services firms have disappeared and others never existed (in spite of being listed in the "yellow pages"). Certain firms may also not have been contacted, if they were not mentioned in the "Canadian Data Systems" census or the "yellow pages".

The list of all data processing suppliers is given on the following pages for each sub-region (Northeastern New Brunswick, Saint John, Fredericton, Moncton, Northwestern New Brunswick, Halifax-Dartmouth, Sidney, rest of Nova Scotia, Newfoundland, Prince Edward Island).

LIST OF PRODUCTS AND SERVICES

- 1 EXTERNAL OR INTERNAL ADDITIONAL MEMORY
- 2 CALCULATOR
- 3 BANK TERMINALS
- 4 .CONNECTING EQUIPMENT
- 5 CABINETS
- 6 ELECTRONIC CALCULATORS
- 7 CAMERA DATA RECORDING
- 8 CASH REGISTER
- 9 CLOCK, SHARING OF COMPUTER TIME
- 10 COMMUNICATION CONTROL UNIT
- 11 GRAPHIC, PERIPHERAL, TERMINAL COMPUTER SYSTEMS
- 12 COMPUTER ROOM ENVIRONMENT AND SECURITY
- 13 COMPUTERS
- 14 CONTROL UNITS
- 15 CONVERTERS
- 16 DATA CAPTURE EQUIPMENT
- 17 DATA CAPTURE AND RECORDING SYSTEMS
- 18 DATA COMMUNICATIOIN EQUIPMENT
- 19 CATHODE SCREEN TERMINALS
- 20 DATA RECEIVING TERMINALS
- 21 SECURITY EQUIPMENT
- 22 DATA RECEPTION/TRANSMITTAL TERMINALS
- 23 DATA TRANSMISSION TERMINALS
- 24 DESK
- 25 CONVERTER, CO-ORINDATES READER
- 26 DISK DRIVES
- 27 MAGNETIC DRUM
- 28 ELECTRONIC ACCOUNTING MACHINES
- 29 ELECTRONIC AUDITING EQUIPMENT
- 30 DOCUMENT PROCESSING MATERIAL
- 31 IMPRINTERS
- 32 INTERFACE SYSTEMS
- 33 DISK RECORDERS
- 34 TAPE RECORDING
- 35 LIGHT PEN
- 36 TAPE DRIVE
- 37 MEMORY SYSTEMS
- 38 MAGNETIC CHARACTER READING EQUIPMENT
- 39 MICROFICHE REPRODUCER
- 40 MICROFILM EDITING EQUIPMENT
- 41 MICROFILM EQUIPMENT
- 42 OPTICAL READING SYSTEMS
- 43 PERFORATED TAPE UNITS
- 44 PLOTTERS, GRAPHS
- 45 TAG PUNCH/PRINT MACHINES
- 46 COMPUTER OUTPUT PRINTERS
- 47 PUNCHED CARD MACHINES
- 48 STORAGE SHELVES
- 49 FIRE RESISTANT VAULTS, CARDS, TAPES

50 "TURNKEY" COMPUTER SYSTEMS
51 OPTICAL CHARACTER TYPEWRITERS
52 EDP EQUIPMENT
53 VISUAL CONTROL PANELS
54 AUDIO INPUT SYSTEMS
55 AUDIO RESPONSE SYSTEMS
56 WORD PROCESSING SYSTEMS
57 SOFTWARE - COMMERCIAL APPLICATIONS
58 SOFTWARE - OPERATING SYSTEM MODULES
59 SOFTWARE - SCIENCE AND ENGINEERING
60 SOFTWARE - SYSTEMS
61 ANTI-STATIC COMPOUND
62 COMPUTER OUTPUT SATCHELS
63 BOOKS AND PUBLICATIONS
64 CARBON PAPER
65 CORRECTION SEAL
66 DISK ACCESSORIES
67 MAGNETIC DISK PACK
68 DISKS
69 DISKETTES
70 FILING CABINETS
71 FILE FOLDERS
72 CONTINUOUS FORM PAPER
73 UNIT FORM PAPER
74 MAGNETIC CARDS
75 MAGNETIC TAPES
76 MAGNETIC TAPE ACCESSORIES
77 MICROFILMS
78 PAPER TAPES
79 PAPER TAPE ACCESSORIES
80 PENS
81 PROGRAMMING TOOLS
82 PUNCH CARD ACCESSORIES
83 PUNCH CARDS
84 MACHINE RIBBONS
85 APL SHARED TIME
86 MICROFILM COMPUTER
87 CONSULTATION SERVICES
88 MAINTENANCE CONTRACT
89 DATA COMMUNICATION SERVICES
90 DOCUMENTATION SERVICES
91 EQUIPMENT BROKERS
92 MANAGEMENT SERVICES
93 FORMS SERVICES
94 FACILITIES MANAGEMENT
95 OCR SERVICES
96 REMOTE DATA SECURITY
97 PERFORMANCE ANALYSIS
98 PERSONNEL RECRUITING AND PLACEMENT
99 PROGRAMMING
100 SYSTEMS ANALYSIS
101 WORD PROCESSING
102 SHARED TIME

N.E.

REGION NO 2 SAINT-JOHN

LEA & ASSOCIATES 005 BRUNSWICK SQUARE SAINT JOHN, NB E2L4
 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101

LEA & ASSOCIATES 1000 RIVER STREET SAINT JOHN, NB E2K1
 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120
 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139
 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158

LEA & ASSOCIATES LTD 221 PRINCE WILLIAM SAINT JOHN, NB E2L4
 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177

LEA & ASSOCIATES LTD 100 RIVER STREET SAINT JOHN, NB E2K1
 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196
 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215

LEA & ASSOCIATES LTD 100 RIVER STREET SAINT JOHN, NB E2K1

LEA & ASSOCIATES LTD 100 RIVER STREET SAINT JOHN, NB E2K1
 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234
 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253
 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272

LEA & ASSOCIATES LTD P. O. BOX 490 SAINT JOHN, NB E2L1
 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291
 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310

LEA & ASSOCIATES LTD SAINT JOHN, N.B.
 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329

BURROUGHS BUSINESS MACHINES LTD 110 CROWN STREET SAINT JOHN, NB E2L1
 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348
 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367
 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386

LEA & ASSOCIATES LTD SAINT JOHN, N.B.
 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405
 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424

LEA & ASSOCIATES LTD 100 RIVER STREET SAINT JOHN, N.B. E2K1
 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443

A. B. DICK COMPANY OF CANADA, LTD. 92 PRINCE WILLIAM ST SAINT JOHN, N.B.
39 41 56 69 77 101

THE MOORE COMPANY SAINT JOHN, N.B.
17 72 73 93

WILSON & S. FREDERICTON

R. L. GORDON INC. P. O. BOX 1135 FREDERICTON, N.B.
30 56 72 73 93 100

DATA ENTER CORPORATION LTD 555 PEACOCK RD. FREDERICTON, N.B.
1 4 5 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42
43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62
63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

ATLANTIC ELECTRIC LIMITED 509 PEACOCK RD. FREDERICTON, N.B.
5 13 15 16 17 18 24 30 31 33 41 48 49 53 55 62 66 67
68 69 70 71 75 76 77 82 87 88

IRM CANADA LTD 458 YORK STREET FREDERICTON, N.B.
3 8 10 11 13 14 16 17 18 19 20 21 22 23 26 27 33 35
36 37 38 42 43 46 47 50 51 56 57 58 59 60 64 67 68 69
72 73 74 75 76 81 82 83 84 85 87 89 94 97 99 100 102

ATLANTIC ELECTRIC LTD 418 YORK STREET FREDERICTON, N.B.
83

TELDATA FREDERICTON, N.B.
8 9 10 11 12 13 14 18 19 20 21 22 23 24 25 26 30 35
36 37 42 43 44 46 50 51 52 54 55 56 57 59 60 66 67 68
69 78 84 87 88 89 90 91 92 94 96 97 98 99 100 101 102

A. B. DICK COMPANY OF CANADA, LTD. WILSEY ROAD FREDERICTON, N.B.
39 41 56 69 77 101

KODAK CANADA INC. 764 CHARLOTTE STREET FREDERICTON, N.B.
7 7 27 41 72 96

ACK CANADA LTD FREDERICTON, N.B.
8 13 14 16 17 18 19 20 22 23 26 28 33 34 36 38 39 42
46 50 54 57 58 60 86 89 97 100 101

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

WATSON & SONS SYSTEMS MONCTON 177 367 FORD STREET MONCTON, N.B. E1E1
1 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

N.C.R. CANADA LTD 120 KIDEOUT STREET MONCTON, N.B. E1E1
1 3 6 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
27 28 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 50 52
54 57 58 59 60 63 64 67 68 69 72 73 74 75 76 77 78 79
81 84 85 86 87 88 89 93 94 95 96 97 98 99 100 101 102

KIDDO SHACK MONCTON MALL MONCTON, N.B.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

WATSON & SONS SYSTEMS LTD R. R. 1 MONCTON, N.B. E1E1
13 22 23 24 25 27 28 29 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

MONARK DATA SCIENCES R-R 9, SCOTH SETT. MONCTON, N.B. E1E2
13 16 17 18 19 22 23 26 33 34 35 36 43 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

SMITH-SALLY LIMITED 293 PACIFIC AVENUE MONCTON, N.B. E1E2
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

120 KIDEOUT STREET MONCTON, N.B. E1E1
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

SYSTEMS MANAGEMENT LTD 1072 ST. GEORGE BLVD MONCTON, N.B. E1E2
57 87 90 92 99 100 101 102

AES DATA LTEE/LTD 567 ST. GEORGE BLVD MONCTON, N.B. E1E2
1 10 18 19 20 23 24 26 32 42 43 46 56 60 69 74 84 98
95 101

120 KIDEOUT STREET MONCTON, N.B. E1E1
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

R. L. CRAIG LTD 120 LOTUS STREET MONCTON, N.B.
30 31 62 72 73 93 100

ILLUATA MONCTON, N.B.
8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102

120 KIDEOUT STREET MONCTON, N.B.
4 69 74 75 76 84

PETER HENDERSON LTD.

211 GUYARD STREET

HALIFAX, N.S. B3L1C5

PETER HENDERSON LTD.

6041 BRIDGEMOOR ROAD

HALIFAX, N.S. B3L1L7

13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102
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SIC COMPUTER SALES LTD.

6061 YOUNG STREET

HALIFAX, N.S. B3N2A3

2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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SIC COMPUTER SALES LTD.

6100 YOUNG STREET

HALIFAX, N.S. B3N2A4

SIC COMPUTER SALES LTD.

SIC COMPUTER SALES LTD.

1001 BARRINGTON ST.

HALIFAX, N.S. B3J2A1

SIC COMPUTER SALES LTD.

3400 DEPT. ROAD

HALIFAX, N.S. B3L1X0

SIC COMPUTER SALES LTD.

6000 YOUNG STREET

HALIFAX, N.S. B3N2E2

SIC COMPUTER SALES LTD.

SIC COMPUTER SALES LTD.

451 BARRINGTON ROAD

HALIFAX, N.S. B3L1J9

SIC COMPUTER SALES LTD.

P. O. BOX 880

HALIFAX, N.S. B3L1M9

SIC COMPUTER SALES LTD.

P. O. BOX 880

HALIFAX, N.S. B3L1M9

MINICOMP SYSTEMS LIMITED

5846 STANLEY ST.

HALIFAX, N.S. B3N2G1

13	26	32	46	50	56	57	63	68	69	84
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H.J. HANSEN ASSOCIATES, LTD.

812 COGSWELL TOWER

HALIFAX, N.S. B3J3K1

87	88	89	90	92	97	99	100
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MINICOMP SYSTEMS LIMITED

5 GOSNEY STREET

BEDFORD, N.S. B4A1G4

MINICOMP SYSTEMS LIMITED

UNAC CANADA INC.

2 FLEWATER ROAD

BEDFORD, N.S. B4B1C0

5	7	39	41	77	96
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PERRY UNIVAC COMPUTER SYSTEMS

1909 BARRINGTON ST.

HALIFAX, N.S. B3J3N3

10	13	14	16	18	19	26	27	33	36	46	57	58	59	63	67	81	85
87	88	97	100														

SIC COMPUTER SALES LTD.

1660 BULLIS ST.

HALIFAX, N.S. B3J1V7

11	43	19	25	26	44	46	47	50	57	58	59	60	87	91	94	99	100
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H.J. HANSEN ASSOCIATES

P. O. BOX 2244

HALIFAX, N.S. B3J3C0

27	58	59	60	87	90	92	94	97	99	100	101
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ELECTRONIX CANADA INC.

10 ABERLEY BLVD

DARTMOUTH, N.S. B3B1L

1 10 11 13 19 20 25 26 29 32 44 46 57 58 59 69 81 89
100

VICTOR CANADA LIMITED

1000 WINDMILL ROAD

DARTMOUTH, N.S.

1 6 8 22 23 49 60 74 78 84 88 99

EURETT FACKARD CANADA LTD.

900 WINDMILL ROAD

DARTMOUTH, N.S. B2Y3Z

1 6 10 11 13 14 15 16 17 18 19 20 22 23 25 26 28 29
32 33 34 35 36 37 43 44 46 47 50 54 57 58 59 66 66 67
68 69 75 76 80 100 101

DATACOR SYSTEMS LTD

1867 BRIDLEWAY STREET

HALIFAX, N.S. B3J2L

1 7 13 17 44

CANADA LTD

3600 STRAWBERRY HILL

HALIFAX, N.S. B3K5F

7 10 11 13 14 16 17 18 19 20 23 26 28 30 31 33
34 37 39 42 46 47 50 52 57 58 62 67 68 69 72 73 74
75 76 81

ELECTRONIX CANADA LTD

10 ABERLEY BLVD.

DARTMOUTH, N.S. B3B1L

1 10 11 13 14 16 17 18 19 20 23 26 28 30 31 33

ELECTRONIX CANADA LTD

10 ABERLEY BLVD.

DARTMOUTH, N.S. B3B1L

1 10 11 13 14 16 17 18 19 20 23 26 28 30 31 33

ST. ROBERTSON BUSINESS EQUIPMENT LTD

5114 CONRAD STREET

HALIFAX, N.S. B3K1H

2 5 6 8 24 48 49 84

PURROUGHS BUSINESS MACHINES LTD

900 WINDMILL PL.

DARTMOUTH, N.S. B3B1F

2 3 6 10 12 13 14 16 17 18 19 20 21 22 23 26 28 30
31 32 33 34 37 38 39 41 42 46 47 52 56 57 66 66 67 69
69 72 73 74 75 76 78 79 81 82 83 86 86 87 88 89 94

FEDERAL MARKETING ASSOCIATES LTD

1551 BIRMINGHAM ST.

HALIFAX, N.S. B3J2L

6 25 29 87

SEAMAN-CROSS LIMITED

46 WRIGHT AVENUE

DARTMOUTH, N.S. B2Y4I

2 5 6 8 9 24 48 49 62 70 71 84

DIGITAL EQUIPMENT OF CANADA LIMITED

800-A WINDMILL ROAD

DARTMOUTH, N.S. B3B1H

1 8 9 10 11 13 14 16 17 18 19 20 21 22 23 24 25 26
27 28 31 32 33 34 35 36 37 43 44 45 46 47 48 50 52 53
54 57 58 59 60 63 66 67 68 69 71 72 73 74 78 79 81 82
83 84 87 88 90 92 94 97 99 100 101

ANALOG DIBIT PROCESSING SUPPLIES

P.O. BOX 9301

HALIFAX, N.S. B3K5H

5 6 24 30 49 63 62 65 66 67 68 69 70 71 74 75 76

84

A. B. DICK COMPANY OF CANADA, LTD

100 WRIGHT AVENUE

DARTMOUTH, N.S. B3B1H

59 61 66 69 77 101

HALIFAX, N.S.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102

BUFILE ATLANTIC LIMITED

1657 HARRINGTON ST.

HALIFAX, N.S. B3J2G1

13 15 16 17 18 24 30 31 33 41 48 49 53 58 62 66 67

69 70 71 75 76 77 82 87 88

CANADO LTD

P. O. BOX 517

HALIFAX, N.S.

8 10 11 13 14 16 17 18 19 20 21 22 23 26 27 33 35

37 38 42 43 46 47 50 51 56 57 58 59 60 64 67 68 69

72 73 75 76 81 82 83 84 85 87 89 94 97 99 100 102

ALLEN COMPANY

HALIFAX, N.S.

721-1111

CANADIAN SAILOR

ST. JOHN'S

53 INGLIS STREET

ST. JOHN'S, N.S. A1A 1A6

ST. JOHN'S

P. O. BOX 1445

ST. JOHN'S, N.S. A1A 1A6

2 3 4 5 6 13 14 15 22 24 26 30 31 32 34 35 36 37 38 39

54 55 57 58 60 61 62 63 64 65 66 67 68 69 70 71 72 73

74 75 76 77 78 79 80 81 82 83 84

REGION NO 8 TRENTON, TEBRO, WOLFVILLE

ACINTOSH BUSINESS SYSTEMS

P. O. BOX 123

TEBRO, N.S. B2N5B6

5 24 30 36 48 49 62 66 67 68 69 70 72 73 74 75 76 82

83 84 93

GOLD'S LIMITED

561 PRINCE STREET

TEBRO, N.S. B2N1G3

2 4 5 6 8 9 24 25 31 40 49 52 53 60 71 72 80 84

LEE SISTERS LTD

P. O. BOX 1

WOLFVILLE, N.S. B0P1X0

11 13 18 25 26 28 35 44 46 50 55 57 65 69 72 84 87

98 99 100 101

ST. JOHN'S, NEWFUNDLAND

THE LEAR INC.

P. O. BOX 1444

ST. JOHN'S, Nfld

36 37 64 72 73 93 95

BLUETTI CANADA LTD

74 O'LEARY AVENUE

ST. JOHN'S, Nfld

1 2 3 6 13 17 18 19 28 37 51 56 57 58 59 60 64 69
74 78 79 84 100 101

ELION DATA SYSTEMS

P. O. BOX 9233

ST. JOHN'S, Nfld

37 39 76 99 100 102

THE ROYAL TELECOMMUNICATIONS INC.

3 PERMA BOX DRIVE

SANDER, Nfld. 6192K

1 19 20 22 23 24 37 43 56 88 89

WILSON, LEO

427 JAMES STREET

ST. JOHN'S, Nfld

1 5 6 1 13 24 26 32 57 63 69 70

THE MOIRE COMPANY

P. O. BOX 1011

ST. JOHN'S, Nfld

17 72 73 93

ELION DATA SYSTEMS LTD

P. O. BOX 9310

ST. JOHN'S, Nfld

1 13 17 18 19 20 21 23 24 25 26 28 39 44 45 50 52 53 54
57 59 66 67 69 75 76 85 87 88 89 91 92 99 100 101

ELION DATA SYSTEMS LTD

329 KENNEDY ROAD

ST. JOHN'S, Nfld

1 13 14 15 19 20 22 23 24 26 28 30 36 37 41 44
45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74
75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94
95 96 97 98 99 100 101 102

AMR AND ASSOCIATES

HARVEY ROAD

ST. JOHN'S, Nfld

57 58 59 60 87 90 92 94 97 99 100 101

AMR CANADA LTD

P. O. BOX 5966

ST. JOHN'S, Nfld

1 9 10 11 13 14 15 17 18 19 20 21 22 23 26 27 33 35
36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69
70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102

A. E. DICK COMPANY OF CANADA, LTD.

21 PIPPEY PLACE

ST. JOHN'S, Nfld

39 41 56 69 77 101

THE MCBEE COMPANY

CORNER BROOK, Nfld.

17 72 73 93

ANNEX 3b

Number of suppliers for each data processing product

1) by region

2) by sub-region

NUMBER OF SUPPLIERS IN THE ATLANTIC REGION
NO. PRODUCTS AND SERVICES

22	EXTERNAL OR INTERNAL ADDITIONAL MEMORY
15	CALCULATOR
12	BANK TERMINALS
8	CONNECTING EQUIPMENT
25	CABINETS
24	ELECTRONIC CALCULATORS
3	CAMERA DATA RECORDING
23	CASH REGISTER
11	CLOCK, SHARING OF COMPUTER TIME
25	COMMUNICATION CONTROL UNIT
26	GRAPHIC, PERIPHERAL, TERMINAL COMPUTER SYSTEMS
17	COMPUTER ROOM ENVIRONMENT AND SECURITY
47	COMPUTERS
30	CONTROL UNITS
11	CONVERTERS
26	DATA CAPTURE EQUIPMENT
33	DATA CAPTURE AND RECORDING SYSTEMS
39	DATA COMMUNICATIOIN EQUIPMENT
42	CATHODE SCREEN TERMINALS
34	DATA RECEIVING TERMINALS
18	SECURITY EQUIPMENT
32	DATA RECEPTION/TRANSMITTAL TERMINALS
33	DATA TRANSMISSION TERMINALS
25	DESK
13	CONVERTER, CO-ORINDATES READER
42	DISK DRIVES
13	MAGNETIC DRUM
23	ELECTRONIC ACCOUNTING MACHINES
8	ELECTRONIC AUDITING EQUIPMENT
27	DOCUMENT PROCESSING MATERIAL
14	IMPRINTERS
19	INTERFACE SYSTEMS
22	DISK RECORDERS
13	TAPE RECORDING
17	LIGHT PEN
26	TAPE DRIVE
27	MEMORY SYSTEMS
14	MAGNETIC CHARACTER READING EQUIPMENT
18	MICROFICHE REPRODUCER
6	MICROFILM EDITING EQUIPMENT
19	MICROFILM EQUIPMENT
22	OPTICAL READING SYSTEMS
18	PERFORATED TAPE UNITS
16	PLOTTERS, GRAPHS
1	TAG PUNCH/PRINT MACHINES
41	COMPUTER OUTPUT PRINTERS
14	PUNCHED CARD MACHINES
16	STORAGE SHELVES
16	FIRE RESISTANT VAULTS, CARDS, TAPES

33 "TURNKEY" COMPUTER SYSTEMS
12 OPTICAL CHARACTER TYPEWRITERS
16 EDP EQUIPMENT
7 VISUAL CONTROL PANELS
9 AUDIO INPUT SYSTEMS
10 AUDIO RESPONSE SYSTEMS
39 WORD PROCESSING SYSTEMS
48 SOFTWARE - COMMERCIAL APPLICATIONS
33 SOFTWARE - OPERATING SYSTEM MODULES
31 SOFTWARE - SCIENCE AND ENGINEERING
40 SOFTWARE - SYSTEMS
5 ANTI-STATIC COMPOUND
16 COMPUTER OUTPUT SATCHELS
13 BOOKS AND PUBLICATIONS
15 CARBON PAPER
2 CORRECTION SEAL
25 DISK ACCESSORIES
40 MAGNETIC DISK PACK
37 DISKS
46 DISKETTES
14 FILING CABINETS
12 FILE FOLDERS
30 CONTINUOUS FORM PAPER
23 UNIT FORM PAPER
23 MAGNETIC CARDS
32 MAGNETIC TAPES
27 MAGNETIC TAPE ACCESSORIES
19 MICROFILMS
18 PAPER TAPES
12 PAPER TAPE ACCESSORIES
4 PENS
18 PROGRAMMING TOOLS
16 PUNCH CARD ACCESSORIES
15 PUNCH CARDS
40 MACHINE RIBBONS
12 APL SHARED TIME
7 MICROFILM COMPUTER
37 CONSULTATION SERVICES
33 MAINTENANCE CONTRACT
23 DATA COMMUNICATION SERVICES
12 DOCUMENTATION SERVICES
7 EQUIPMENT BROKERS
18 MANAGEMENT SERVICES
16 FORMS SERVICES
23 FACILITIES MANAGEMENT
4 OCR SERVICES
10 REMOTE DATA SECURITY
18 PERFORMANCE ANALYSIS
10 PERSONNEL RECRUITING AND PLACEMENT
35 PROGRAMMING
35 SYSTEMS ANALYSIS
27 WORD PROCESSING
20 SHARED TIME

NUMBER OF SUPPLIERS IN REGION NO. 1 - NORTHEASTERN N.B.
NO. PRODUCTS AND SERVICES

0 EXTERNAL OR INTERNAL ADDITIONAL MEMORY
0 CALCULATOR
0 BANK TERMINALS
0 CONNECTING EQUIPMENT
0 CABINETS
0 ELECTRONIC CALCULATORS
0 CAMERA DATA RECORDING
0 CASH REGISTER
0 CLOCK, SHARING OF COMPUTER TIME
0 COMMUNICATION CONTROL UNIT
0 GRAPHIC, PERIPHERAL, TERMINAL COMPUTER SYSTEMS
0 COMPUTER ROOM ENVIRONMENT AND SECURITY
0 COMPUTERS
0 CONTROL UNITS
0 CONVERTERS
0 DATA CAPTURE EQUIPMENT
0 DATA CAPTURE AND RECORDING SYSTEMS
0 DATA COMMUNICATIOIN EQUIPMENT
0 CATHODE SCREEN TERMINALS
0 DATA RECEIVING TERMINALS
0 SECURITY EQUIPMENT
0 DATA RECEPTION/TRANSMITTAL TERMINALS
0 DATA TRANSMISSION TERMINALS
0 DESK
0 CONVERTER, CO-ORINDATES READER
0 DISK DRIVES
0 MAGNETIC DRUM
0 ELECTRONIC ACCOUNTING MACHINES
0 ELECTRONIC AUDITING EQUIPMENT
0 DOCUMENT PROCESSING MATERIAL
0 IMPRINTERS
0 INTERFACE SYSTEMS
0 DISK RECORDERS
0 TAPE RECORDING
0 LIGHT PEN
0 TAPE DRIVE
0 MEMORY SYSTEMS
0 MAGNETIC CHARACTER READING EQUIPMENT
0 MICROFICHE REPRODUCER
0 MICROFILM EDITING EQUIPMENT
0 MICROFILM EQUIPMENT
0 OPTICAL READING SYSTEMS
0 PERFORATED TAPE UNITS
0 PLOTTERS, GRAPHS
0 TAG PUNCH/PRINT MACHINES
0 COMPUTER OUTPUT PRINTERS
0 PUNCHED CARD MACHINES
0 STORAGE SHELVES
0 FIRE RESISTANT VAULTS, CARDS, TAPES
0 "TURNKEY" COMPUTER SYSTEMS

0 OPTICAL CHARACTER TYPEWRITERS
0 EDP EQUIPMENT
0 VISUAL CONTROL PANELS
0 AUDIO INPUT SYSTEMS
0 AUDIO RESPONSE SYSTEMS
0 WORD PROCESSING SYSTEMS
0 SOFTWARE - COMMERCIAL APPLICATIONS
0 SOFTWARE - OPERATING SYSTEM MODULES
0 SOFTWARE - SCIENCE AND ENGINEERING
0 SOFTWARE - SYSTEMS
0 ANTI-STATIC COMPOUND
0 COMPUTER OUTPUT SACHELS
0 BOOKS AND PUBLICATIONS
0 CARBON PAPER
0 CORRECTION SEAL
0 DISK ACCESSORIES
0 MAGNETIC DISK PACK
0 DISKS
0 DISKETTES
0 FILING CABINETS
0 FILE FOLDERS
0 CONTINUOUS FORM PAPER
0 UNIT FORM PAPER
0 MAGNETIC CARDS
0 MAGNETIC TAPES
0 MAGNETIC TAPE ACCESSORIES
0 MICROFILMS
0 PAPER TAPES
0 PAPER TAPE ACCESSORIES
0 PENS
0 PROGRAMMING TOOLS
0 PUNCH CARD ACCESSORIES
0 PUNCH CARDS
0 MACHINE RIBBONS
0 APL SHARED TIME
0 MICROFILM COMPUTER
0 CONSULTATION SERVICES
0 MAINTENANCE CONTRACT
0 DATA COMMUNICATION SERVICES
0 DOCUMENTATION SERVICES
0 EQUIPMENT BROKERS
0 MANAGEMENT SERVICES
0 FORMS SERVICES
0 FACILITIES MANAGEMENT
0 OCR SERVICES
0 REMOTE DATA SECURITY
0 PERFORMANCE ANALYSIS
0 PERSONNEL RECRUITING AND PLACEMENT
0 PROGRAMMING
0 SYSTEMS ANALYSIS
0 WORD PROCESSING
0 SHARED TIME

NUMBER OF SUPPLIERS IN REGION NO. 2 - SAINT JOHN, N.B.
NO. PRODUCTS AND SERVICES

1	EXTERNAL OR INTERNAL ADDITIONAL MEMORY
1	CALCULATOR
2	BANK TERMINALS
0	CONNECTING EQUIPMENT
4	CABINETS
1	ELECTRONIC CALCULATORS
0	CAMERA DATA RECORDING
3	CASH REGISTER
1	CLOCK, SHARING OF COMPUTER TIME
5	COMMUNICATION CONTROL UNIT
3	GRAPHIC, PERIPHERAL, TERMINAL COMPUTER SYSTEMS
6	COMPUTER ROOM ENVIRONMENT AND SECURITY
5	COMPUTERS
6	CONTROL UNITS
1	CONVERTERS
4	DATA CAPTURE EQUIPMENT
5	DATA CAPTURE AND RECORDING SYSTEMS
6	DATA COMMUNICATIOIN EQUIPMENT
6	CATHODE SCREEN TERMINALS
6	DATA RECEIVING TERMINALS
6	SECURITY EQUIPMENT
6	DATA RECEPTION/TRANSMITTAL TERMINALS
6	DATA TRANSMISSION TERMINALS
4	DESK
2	CONVERTER, CO-ORINDATES READER
5	DISK DRIVES
2	MAGNETIC DRUM
3	ELECTRONIC ACCOUNTING MACHINES
0	ELECTRONIC AUDITING EQUIPMENT
5	DOCUMENT PROCESSING MATERIAL
1	IMPRINTERS
1	INTERFACE SYSTEMS
3	DISK RECORDERS
2	TAPE RECORDING
2	LIGHT PEN
5	TAPE DRIVE
4	MEMORY SYSTEMS
3	MAGNETIC CHARACTER READING EQUIPMENT
2	MICROFICHE REPRODUCER
0	MICROFILM EDITING EQUIPMENT
2	MICROFILM EQUIPMENT
4	OPTICAL READING SYSTEMS
2	PERFORATED TAPE UNITS
2	PLOTTERS, GRAPHS
0	TAG PUNCH/PRINT MACHINES
5	COMPUTER OUTPUT PRINTERS
3	PUNCHED CARD MACHINES
3	STORAGE SHELVES
3	FIRE RESISTANT VAULTS, CARDS, TAPES
5	"TURNKEY" COMPUTER SYSTEMS

2 OPTICAL CHARACTER TYPEWRITERS
2 EDP EQUIPMENT
2 VISUAL CONTROL PANELS
2 AUDIO INPUT SYSTEMS
2 AUDIO RESPONSE SYSTEMS
6 WORD PROCESSING SYSTEMS
6 SOFTWARE - COMMERCIAL APPLICATIONS
5 SOFTWARE - OPERATING SYSTEM MODULES
5 SOFTWARE - SCIENCE AND ENGINEERING
6 SOFTWARE - SYSTEMS
2 ANTI-STATIC COMPOUND
3 COMPUTER OUTPUT SATCHELS
1 BOOKS AND PUBLICATIONS
2 CARBON PAPER
1 CORRECTION SEAL
3 DISK ACCESSORIES
7 MAGNETIC DISK PACK
5 DISKS
6 DISKETTES
3 FILING CABINETS
2 FILE FOLDERS
5 CONTINUOUS FORM PAPER
5 UNIT FORM PAPER
3 MAGNETIC CARDS
5 MAGNETIC TAPES
4 MAGNETIC TAPE ACCESSORIES
3 MICROFILMS
2 PAPER TAPES
1 PAPER TAPE ACCESSORIES
1 PENS
3 PROGRAMMING TOOLS
4 PUNCH CARD ACCESSORIES
2 PUNCH CARDS
6 MACHINE RIBBONS
1 APL SHARED TIME
1 MICROFILM COMPUTER
5 CONSULTATION SERVICES
4 MAINTENANCE CONTRACT
3 DATA COMMUNICATION SERVICES
2 DOCUMENTATION SERVICES
1 EQUIPMENT BROKERS
4 MANAGEMENT SERVICES
3 FORMS SERVICES
5 FACILITIES MANAGEMENT
0 OCR SERVICES
1 REMOTE DATA SECURITY
4 PERFORMANCE ANALYSIS
2 PERSONNEL RECRUITING AND PLACEMENT
5 PROGRAMMING
5 SYSTEMS ANALYSIS
4 WORD PROCESSING
2 SHARED TIME

NUMBER OF SUPPLIERS IN REGION NO. 3 - FREDERICTON, N.B.
NO. PRODUCTS AND SERVICES

1	EXTERNAL OR INTERNAL ADDITIONAL MEMORY
0	CALCULATOR
1	BANK TERMINALS
1	CONNECTING EQUIPMENT
3	CABINETS
1	ELECTRONIC CALCULATORS
1	CAMERA DATA RECORDING
3	CASH REGISTER
2	CLOCK, SHARING OF COMPUTER TIME
3	COMMUNICATION CONTROL UNIT
3	GRAPHIC, PERIPHERAL, TERMINAL COMPUTER SYSTEMS
2	COMPUTER ROOM ENVIRONMENT AND SECURITY
5	COMPUTERS
4	CONTROL UNITS
1	CONVERTERS
4	DATA CAPTURE EQUIPMENT
4	DATA CAPTURE AND RECORDING SYSTEMS
5	DATA COMMUNICATIOIN EQUIPMENT
4	CATHODE SCREEN TERMINALS
4	DATA RECEIVING TERMINALS
3	SECURITY EQUIPMENT
3	DATA RECEPTION/TRANSMITTAL TERMINALS
4	DATA TRANSMISSION TERMINALS
3	DESK
1	CONVERTER, CO-ORINDATES READER
4	DISK DRIVES
1	MAGNETIC DRUM
2	ELECTRONIC ACCOUNTING MACHINES
0	ELECTRONIC AUDITING EQUIPMENT
4	DOCUMENT PROCESSING MATERIAL
1	IMPRINTERS
1	INTERFACE SYSTEMS
3	DISK RECORDERS
1	TAPE RECORDING
2	LIGHT PEN
3	TAPE DRIVE
3	MEMORY SYSTEMS
2	MAGNETIC CHARACTER READING EQUIPMENT
3	MICROFICHE REPRODUCER
0	MICROFILM EDITING EQUIPMENT
4	MICROFILM EQUIPMENT
3	OPTICAL READING SYSTEMS
2	PERFORATED TAPE UNITS
2	PLOTTERS, GRAPHS
0	TAG PUNCH/PRINT MACHINES
4	COMPUTER OUTPUT PRINTERS
1	PUNCHED CARD MACHINES
2	STORAGE SHELVES
2	FIRE RESISTANT VAULTS, CARDS, TAPES
5	"TURNKEY" COMPUTER SYSTEMS

2 OPTICAL CHARACTER TYPEWRITERS
1 EDP EQUIPMENT
1 VISUAL CONTROL PANELS
1 AUDIO INPUT SYSTEMS
1 AUDIO RESPONSE SYSTEMS
5 WORD PROCESSING SYSTEMS
4 SOFTWARE - COMMERCIAL APPLICATIONS
4 SOFTWARE - OPERATING SYSTEM MODULES
3 SOFTWARE - SCIENCE AND ENGINEERING
4 SOFTWARE - SYSTEMS
1 ANTI-STATIC COMPOUND
2 COMPUTER OUTPUT SATCHELS
0 BOOKS AND PUBLICATIONS
2 CARBON PAPER
0 CORRECTION SEALS
3 DISK ACCESSORIES
4 MAGNETIC DISK PACK
4 DISKS
5 DISKETTES
2 FILING CABINETS
2 FILE FOLDERS
3 CONTINUOUS FORM PAPER
2 UNIT FORM PAPER
1 MAGNETIC CARDS
3 MAGNETIC TAPES
3 MAGNETIC TAPE ACCESSORIES
4 MICROFILMS
1 PAPER TAPES
0 PAPER TAPE ACCESSORIES
0 PENS
1 PROGRAMMING TOOLS
2 PUNCH CARD ACCESSORIES
2 PUNCH CARDS
3 MACHINE RIBBONS
1 APL SHARED TIME
1 MICROFILM COMPUTER
4 CONSULTATION SERVICES
5 MAINTENANCE CONTRACT
3 DATA COMMUNICATION SERVICES
1 DOCUMENTATION SERVICES
1 EQUIPMENT BROKERS
1 MANAGEMENT SERVICES
1 FORMS SERVICES
2 FACILITIES MANAGEMENT
0 OCR SERVICES
2 REMOTE DATA SECURITY
2 PERFORMANCE ANALYSIS
1 PERSONNEL RECRUITING AND PLACEMENT
4 PROGRAMMING
5 SYSTEMS ANALYSIS
4 WORD PROCESSING
3 SHARED TIME

NUMBER OF SUPPLIERS IN REGION NO. 4 - MONCTON, N.B.
NO. PRODUCTS AND SERVICES

6	EXTERNAL OR INTERNAL ADDITIONAL MEMORY
2	CALCULATOR
2	BANK TERMINALS
0	CONNECTING EQUIPMENT
2	CABINETS
3	ELECTRONIC CALCULATORS
0	CAMERA DATA RECORDING
3	CASH REGISTER
1	CLOCK, SHARING OF COMPUTER TIME
4	COMMUNICATION CONTROL UNIT
5	GRAPHIC, PERIPHERAL, TERMINAL COMPUTER SYSTEMS
4	COMPUTER ROOM ENVIRONMENT AND SECURITY
9	COMPUTERS
5	CONTROL UNITS
2	CONVERTERS
6	DATA CAPTURE EQUIPMENT
6	DATA CAPTURE AND RECORDING SYSTEMS
7	DATA COMMUNICATIOIN EQUIPMENT
8	CATHODE SCREEN TERMINALS
7	DATA RECEIVING TERMINALS
3	SECURITY EQUIPMENT
7	DATA RECEPTION/TRANSMITTAL TERMINALS
7	DATA TRANSMISSION TERMINALS
4	DESK
2	CONVERTER, CO-ORINDATES READER
9	DISK DRIVES
3	MAGNETIC DRUM
6	ELECTRONIC ACCOUNTING MACHINES
2	ELECTRONIC AUDITING EQUIPMENT
4	DOCUMENT PROCESSING MATERIAL
2	IMPRINTERS
5	INTERFACE SYSTEMS
4	DISK RECORDERS
3	TAPE RECORDING
4	LIGHT PEN
5	TAPE DRIVE
4	MEMORY SYSTEMS
2	MAGNETIC CHARACTER READING EQUIPMENT
3	MICROFICHE REPRODUCER
2	MICROFILM EDITING EQUIPMENT
3	MICROFILM EQUIPMENT
5	OPTICAL READING SYSTEMS
4	PERFORATED TAPE UNITS
3	PLOTTERS, GRAPHS
0	TAG PUNCH/PRINT MACHINES
7	COMPUTER OUTPUT PRINTERS
1	PUNCHED CARD MACHINES
1	STORAGE SHELVES
1	FIRE RESISTANT VAULTS, CARDS, TAPES
5	"TURNKEY" COMPUTER SYSTEMS

2 OPTICAL CHARACTER TYPEWRITERS
3 EDP EQUIPMENT
0 VISUAL CONTROL PANELS
3 AUDIO INPUT SYSTEMS
4 AUDIO RESPONSE SYSTEMS
8 WORD PROCESSING SYSTEMS
8 SOFTWARE - COMMERCIAL APPLICATIONS
5 SOFTWARE - OPERATING SYSTEM MODULES
6 SOFTWARE - SCIENCE AND ENGINEERING
8 SOFTWARE - SYSTEMS
0 ANTI-STATIC COMPOUND
1 COMPUTER OUTPUT SATCHELS
3 BOOKS AND PUBLICATIONS
1 CARBON PAPER
0 CORRECTION SEAL
4 DISK ACCESSORIES
8 MAGNETIC DISK PACK
8 DISKS
10 DISKETTES
0 FILING CABINETS
0 FILE FOLDERS
4 CONTINUOUS FORM PAPER
3 UNIT FORM PAPER
5 MAGNETIC CARDS
4 MAGNETIC TAPES
4 MAGNETIC TAPE ACCESSORIES
3 MICROFILMS
3 PAPER TAPES
2 PAPER TAPE ACCESSORIES
0 PENS
3 PROGRAMMING TOOLS
0 PUNCH CARD ACCESSORIES
1 PUNCH CARDS
7 MACHINE RIBBONS
2 APL SHARED TIME
1 MICROFILM COMPUTER
5 CONSULTATION SERVICES
6 MAINTENANCE CONTRACT
3 DATA COMMUNICATION SERVICES
2 DOCUMENTATION SERVICES
1 EQUIPMENT BROKERS
3 MANAGEMENT SERVICES
3 FORMS SERVICES
4 FACILITIES MANAGEMENT
2 OCR SERVICES
3 REMOTE DATA SECURITY
2 PERFORMANCE ANALYSIS
2 PERSONNEL RECRUITING AND PLACEMENT
5 PROGRAMMING
5 SYSTEMS ANALYSIS
5 WORD PROCESSING
3 SHARED TIME

NUMBER OF SUPPLIERS IN REGION NO. 5 - NORTHWESTERN N.B.
NO. PRODUCTS AND SERVICES

0	EXTERNAL OR INTERNAL ADDITIONAL MEMORY
1	CALCULATOR
0	BANK TERMINALS
1	CONNECTING EQUIPMENT
0	CABINETS
1	ELECTRONIC CALCULATORS
0	CAMERA DATA RECORDING
0	CASH REGISTER
0	CLOCK, SHARING OF COMPUTER TIME
0	COMMUNICATION CONTROL UNIT
1	GRAPHIC, PERIPHERAL, TERMINAL COMPUTER SYSTEMS
0	COMPUTER ROOM ENVIRONMENT AND SECURITY
1	COMPUTERS
0	CONTROL UNITS
0	CONVERTERS
0	DATA CAPTURE EQUIPMENT
0	DATA CAPTURE AND RECORDING SYSTEMS
1	DATA COMMUNICATIOIN EQUIPMENT
1	CATHODE SCREEN TERMINALS
1	DATA RECEIVING TERMINALS
0	SECURITY EQUIPMENT
0	DATA RECEPTION/TRANSMITTAL TERMINALS
0	DATA TRANSMISSION TERMINALS
0	DESK
0	CONVERTER, CO-ORINDATES READER
1	DISK DRIVES
0	MAGNETIC DRUM
0	ELECTRONIC ACCOUNTING MACHINES
0	ELECTRONIC AUDITING EQUIPMENT
0	DOCUMENT PROCESSING MATERIAL
1	IMPRINTERS
0	INTERFACE SYSTEMS
0	DISK RECORDERS
1	TAPE RECORDING
1	LIGHT PEN
0	TAPE DRIVE
1	MEMORY SYSTEMS
0	MAGNETIC CHARACTER READING EQUIPMENT
0	MICROFICHE REPRODUCER
0	MICROFILM EDITING EQUIPMENT
0	MICROFILM EQUIPMENT
1	OPTICAL READING SYSTEMS
0	PERFORATED TAPE UNITS
0	PLOTTERS, GRAPHS
0	TAG PUNCH/PRINT MACHINES
1	COMPUTER OUTPUT PRINTERS
0	PUNCHED CARD MACHINES
0	STORAGE SHELVES
0	FIRE RESISTANT VAULTS, CARDS, TAPES
1	"TURNKEY" COMPUTER SYSTEMS

0 OPTICAL CHARACTER TYPEWRITERS
0 EDP EQUIPMENT
0 VISUAL CONTROL PANELS
0 AUDIO INPUT SYSTEMS
0 AUDIO RESPONSE SYSTEMS
1 WORD PROCESSING SYSTEMS
1 SOFTWARE - COMMERCIAL APPLICATIONS
0 SOFTWARE - OPERATING SYSTEM MODULES
0 SOFTWARE - SCIENCE AND ENGINEERING
1 SOFTWARE - SYSTEMS
0 ANTI-STATIC COMPOUND
1 COMPUTER OUTPUT SATCHELS
0 BOOKS AND PUBLICATIONS
0 CARBON PAPER
0 CORRECTION SEAL
1 DISK ACCESSORIES
1 MAGNETIC DISK PACK
1 DISKS
0 DISKETTES
0 FILING CABINETS
0 FILE FOLDERS
0 CONTINUOUS FORM PAPER
0 UNIT FORM PAPER
0 MAGNETIC CARDS
0 MAGNETIC TAPES
0 MAGNETIC TAPE ACCESSORIES
0 MICROFILMS
0 PAPER TAPES
0 PAPER TAPE ACCESSORIES
0 PENS
0 PROGRAMMING TOOLS
0 PUNCH CARD ACCESSORIES
0 PUNCH CARDS
1 MACHINE RIBBONS
1 APL SHARED TIME
0 MICROFILM COMPUTER
1 CONSULTATION SERVICES
0 MAINTENANCE CONTRACT
1 DATA COMMUNICATION SERVICES
0 DOCUMENTATION SERVICES
0 EQUIPMENT BROKERS
0 MANAGEMENT SERVICES
0 FORMS SERVICES
0 FACILITIES MANAGEMENT
0 OCR SERVICES
0 REMOTE DATA SECURITY
0 PERFORMANCE ANALYSIS
0 PERSONNEL RECRUITING AND PLACEMENT
1 PROGRAMMING
0 SYSTEMS ANALYSIS
1 WORD PROCESSING
1 SHARED TIME

NUMBER OF SUPPLIERS IN REGION NO. 6 - HALIFAX, DARTMOUTH, BEDFORD
NO. PRODUCTS AND SERVICES

9	EXTERNAL OR INTERNAL ADDITIONAL MEMORY
7	CALCULATOR
4	BANK TERMINALS
3	CONNECTING EQUIPMENT
10	CABINETS
13	ELECTRONIC CALCULATORS
2	CAMERA DATA RECORDING
9	CASH REGISTER
5	CLOCK, SHARING OF COMPUTER TIME
10	COMMUNICATION CONTROL UNIT
9	GRAPHIC, PERIPHERAL, TERMINAL COMPUTER SYSTEMS
3	COMPUTER ROOM ENVIRONMENT AND SECURITY
19	COMPUTERS
12	CONTROL UNITS
5	CONVERTERS
10	DATA CAPTURE EQUIPMENT
11	DATA CAPTURE AND RECORDING SYSTEMS
13	DATA COMMUNICATIOIN EQUIPMENT
16	CATHODE SCREEN TERMINALS
11	DATA RECEIVING TERMINALS
4	SECURITY EQUIPMENT
10	DATA RECEPTION/TRANSMITTAL TERMINALS
11	DATA TRANSMISSION TERMINALS
8	DESK
7	CONVERTER, CO-ORINDATES READER
16	DISK DRIVES
4	MAGNETIC DRUM
7	ELECTRONIC ACCOUNTING MACHINES
6	ELECTRONIC AUDITING EQUIPMENT
8	DOCUMENT PROCESSING MATERIAL
5	IMPRINTERS
8	INTERFACE SYSTEMS
10	DISK RECORDERS
5	TAPE RECORDING
5	LIGHT PEN
9	TAPE DRIVE
10	MEMORY SYSTEMS
4	MAGNETIC CHARACTER READING EQUIPMENT
7	MICROFICHE REPRODUCER
2	MICROFILM EDITING EQUIPMENT
6	MICROFILM EQUIPMENT
7	OPTICAL READING SYSTEMS
7	PERFORATED TAPE UNITS
6	PLOTTERS, GRAPHS
1	TAG PUNCH/PRINT MACHINES
18	COMPUTER OUTPUT PRINTERS
8	PUNCHED CARD MACHINES
6	STORAGE SHELVES
6	FIRE RESISTANT VAULTS, CARDS, TAPES
12	"TURNKEY" COMPUTER SYSTEMS

3 OPTICAL CHARACTER TYPEWRITERS
7 EDP EQUIPMENT
3 VISUAL CONTROL PANELS
1 AUDIO INPUT SYSTEMS
1 AUDIO RESPONSE SYSTEMS
10 WORD PROCESSING SYSTEMS
19 SOFTWARE - COMMERCIAL APPLICATIONS
14 SOFTWARE - OPERATING SYSTEM MODULES
11 SOFTWARE - SCIENCE AND ENGINEERING
15 SOFTWARE - SYSTEMS
1 ANTI-STATIC COMPOUND
5 COMPUTER OUTPUT SATCHELS
5 BOOKS AND PUBLICATIONS
5 CARBON PAPER
0 CORRECTION SEAL
9 DISK ACCESSORIES
13 MAGNETIC DISK PACK
13 DISKS
16 DISKETTES
4 FILING CABINETS
4 FILE FOLDERS
6 CONTINUOUS FORM PAPER
4 UNIT FORM PAPER
8 MAGNETIC CARDS
14 MAGNETIC TAPES
10 MAGNETIC TAPE ACCESSORIES
5 MICROFILMS
6 PAPER TAPES
5 PAPER TAPE ACCESSORIES
0 PENS
7 PROGRAMMING TOOLS
6 PUNCH CARD ACCESSORIES
6 PUNCH CARDS
14 MACHINE RIBBONS
4 APL SHARED TIME
3 MICROFILM COMPUTER
15 CONSULTATION SERVICES
12 MAINTENANCE CONTRACT
7 DATA COMMUNICATION SERVICES
5 DOCUMENTATION SERVICES
2 EQUIPMENT BROKERS
7 MANAGEMENT SERVICES
1 FORMS SERVICES
8 FACILITIES MANAGEMENT
0 OCR SERVICES
2 REMOTE DATA SECURITY
6 PERFORMANCE ANALYSIS
3 PERSONNEL RECRUITING AND PLACEMENT
13 PROGRAMMING
12 SYSTEMS ANALYSIS
7 WORD PROCESSING
6 SHARED TIME

NUMBER OF SUPPLIERS IN REGION NO. 7 - SYDNEY
NO. PRODUCTS AND SERVICES

1	EXTERNAL OR INTERNAL ADDITIONAL MEMORY
1	CALCULATOR
0	BANK TERMINALS
1	CONNECTING EQUIPMENT
1	CABINETS
1	ELECTRONIC CALCULATORS
0	CAMERA DATA RECORDING
0	CASH REGISTER
0	CLOCK, SHARING OF COMPUTER TIME
0	COMMUNICATION CONTROL UNIT
0	GRAPHIC, PERIPHERAL, TERMINAL COMPUTER SYSTEMS
0	COMPUTER ROOM ENVIRONMENT AND SECURITY
1	COMPUTERS
0	CONTROL UNITS
1	CONVERTERS
0	DATA CAPTURE EQUIPMENT
1	DATA CAPTURE AND RECORDING SYSTEMS
0	DATA COMMUNICATIOIN EQUIPMENT
1	CATHODE SCREEN TERMINALS
0	DATA RECEIVING TERMINALS
0	SECURITY EQUIPMENT
1	DATA RECEPTION/TRANSMITTAL TERMINALS
0	DATA TRANSMISSION TERMINALS
1	DESK
0	CONVERTER, CO-ORINDATES READER
1	DISK DRIVES
0	MAGNETIC DRUM
0	ELECTRONIC ACCOUNTING MACHINES
0	ELECTRONIC AUDITING EQUIPMENT
1	DOCUMENT PROCESSING MATERIAL
1	IMPRINTERS
1	INTERFACE SYSTEMS
0	DISK RECORDERS
0	TAPE RECORDING
0	LIGHT PEN
0	TAPE DRIVE
0	MEMORY SYSTEMS
0	MAGNETIC CHARACTER READING EQUIPMENT
0	MICROFICHE REPRODUCER
0	MICROFILM EDITING EQUIPMENT
1	MICROFILM EQUIPMENT
0	OPTICAL READING SYSTEMS
0	PERFORATED TAPE UNITS
0	PLOTTERS, GRAPHS
0	TAG PUNCH/PRINT MACHINES
1	COMPUTER OUTPUT PRINTERS
0	PUNCHED CARD MACHINES
1	STORAGE SHELVES
1	FIRE RESISTANT VAULTS, CARDS, TAPES
0	"TURNKEY" COMPUTER SYSTEMS

0 OPTICAL CHARACTER TYPEWRITERS
0 EDP EQUIPMENT
0 VISUAL CONTROL PANELS
1 AUDIO INPUT SYSTEMS
1 AUDIO RESPONSE SYSTEMS
0 WORD PROCESSING SYSTEMS
1 SOFTWARE - COMMERCIAL APPLICATIONS
1 SOFTWARE - OPERATING SYSTEM MODULES
0 SOFTWARE - SCIENCE AND ENGINEERING
1 SOFTWARE - SYSTEMS
1 ANTI-STATIC COMPOUND
1 COMPUTER OUTPUT SATCHELS
1 BOOKS AND PUBLICATIONS
1 CARBON PAPER
1 CORRECTION SEAL
1 DISK ACCESSORIES
1 MAGNETIC DISK PACK
1 DISKS
1 DISKETTES
1 FILING CABINETS
1 FILE FOLDERS
2 CONTINUOUS FORM PAPER
2 UNIT FORM PAPER
1 MAGNETIC CARDS
1 MAGNETIC TAPES
1 MAGNETIC TAPE ACCESSORIES
1 MICROFILMS
1 PAPER TAPES
1 PAPER TAPE ACCESSORIES
1 PENS
1 PROGRAMMING TOOLS
1 PUNCH CARD ACCESSORIES
1 PUNCH CARDS
1 MACHINE RIBBONS
0 APL SHARED TIME
0 MICROFILM COMPUTER
0 CONSULTATION SERVICES
0 MAINTENANCE CONTRACT
0 DATA COMMUNICATION SERVICES
0 DOCUMENTATION SERVICES
0 EQUIPMENT BROKERS
0 MANAGEMENT SERVICES
1 FORMS SERVICES
0 FACILITIES MANAGEMENT
0 OCR SERVICES
0 REMOTE DATA SECURITY
0 PERFORMANCE ANALYSIS
0 PERSONNEL RECRUITING AND PLACEMENT
0 PROGRAMMING
0 SYSTEMS ANALYSIS
0 WORD PROCESSING
0 SHARED TIME

NUMBER OF SUPPLIERS IN REGION NO. 8 - TRENTON, TRURO, WOLFVILLE
NO. PRODUCTS AND SERVICES

0	EXTERNAL OR INTERNAL ADDITIONAL MEMORY
1	CALCULATOR
0	BANK TERMINALS
1	CONNECTING EQUIPMENT
2	CABINETS
1	ELECTRONIC CALCULATORS
0	CAMERA DATA RECORDING
2	CASH REGISTER
1	CLOCK, SHARING OF COMPUTER TIME
0	COMMUNICATION CONTROL UNIT
1	GRAPHIC, PERIPHERAL, TERMINAL COMPUTER SYSTEMS
0	COMPUTER ROOM ENVIRONMENT AND SECURITY
1	COMPUTERS
0	CONTROL UNITS
0	CONVERTERS
0	DATA CAPTURE EQUIPMENT
0	DATA CAPTURE AND RECORDING SYSTEMS
1	DATA COMMUNICATIOIN EQUIPMENT
0	CATHODE SCREEN TERMINALS
0	DATA RECEIVING TERMINALS
0	SECURITY EQUIPMENT
0	DATA RECEPTION/TRANSMITTAL TERMINALS
0	DATA TRANSMISSION TERMINALS
2	DESK
1	CONVERTER, CO-ORINDATES READER
1	DISK DRIVES
0	MAGNETIC DRUM
2	ELECTRONIC ACCOUNTING MACHINES
0	ELECTRONIC AUDITING EQUIPMENT
1	DOCUMENT PROCESSING MATERIAL
1	IMPRINTERS
0	INTERFACE SYSTEMS
0	DISK RECORDERS
0	TAPE RECORDING
1	LIGHT PEN
1	TAPE DRIVE
0	MEMORY SYSTEMS
0	MAGNETIC CHARACTER READING EQUIPMENT
0	MICROFICHE REPRODUCER
1	MICROFILM EDITING EQUIPMENT
0	MICROFILM EQUIPMENT
0	OPTICAL READING SYSTEMS
0	PERFORATED TAPE UNITS
1	PLOTTERS, GRAPHS
0	TAG PUNCH/PRINT MACHINES
1	COMPUTER OUTPUT PRINTERS
0	PUNCHED CARD MACHINES
1	STORAGE SHELVES
2	FIRE RESISTANT VAULTS, CARDS, TAPES
1	"TURNKEY" COMPUTER SYSTEMS

0 OPTICAL CHARACTER TYPEWRITERS
0 EDP EQUIPMENT
0 VISUAL CONTROL PANELS
0 AUDIO INPUT SYSTEMS
0 AUDIO RESPONSE SYSTEMS
1 WORD PROCESSING SYSTEMS
1 SOFTWARE - COMMERCIAL APPLICATIONS
0 SOFTWARE - OPERATING SYSTEM MODULES
0 SOFTWARE - SCIENCE AND ENGINEERING
0 SOFTWARE - SYSTEMS
0 ANTI-STATIC COMPOUND
2 COMPUTER OUTPUT SACHELS
1 BOOKS AND PUBLICATIONS
1 CARBON PAPER
0 CORRECTION SEAL
1 DISK ACCESSORIES
1 MAGNETIC DISK PACK
1 DISKS
2 DISKETTES
2 FILING CABINETS
1 FILE FOLDERS
3 CONTINUOUS FORM PAPER
1 UNIT FORM PAPER
1 MAGNETIC CARDS
1 MAGNETIC TAPES
1 MAGNETIC TAPE ACCESSORIES
0 MICROFILMS
0 PAPER TAPES
0 PAPER TAPE ACCESSORIES
1 PENS
0 PROGRAMMING TOOLS
1 PUNCH CARD ACCESSORIES
1 PUNCH CARDS
3 MACHINE RIBBONS
0 APL SHARED TIME
0 MICROFILM COMPUTER
1 CONSULTATION SERVICES
1 MAINTENANCE CONTRACT
0 DATA COMMUNICATION SERVICES
0 DOCUMENTATION SERVICES
0 EQUIPMENT BROKERS
0 MANAGEMENT SERVICES
1 FORMS SERVICES
0 FACILITIES MANAGEMENT
0 OCR SERVICES
0 REMOTE DATA SECURITY
0 PERFORMANCE ANALYSIS
0 PERSONNEL RECRUITING AND PLACEMENT
1 PROGRAMMING
1 SYSTEMS ANALYSIS
1 WORD PROCESSING
0 SHARED TIME

NUMBER OF SUPPLIERS IN REGION NO. 9 - ST. JOHN'S, GANDER, CORNER BROOK
NO. PRODUCTS AND SERVICES

3	EXTERNAL OR INTERNAL ADDITIONAL MEMORY
1	CALCULATOR
2	BANK TERMINALS
0	CONNECTING EQUIPMENT
2	CABINETS
2	ELECTRONIC CALCULATORS
0	CAMERA DATA RECORDING
1	CASH REGISTER
0	CLOCK, SHARING OF COMPUTER TIME
2	COMMUNICATION CONTROL UNIT
3	GRAPHIC, PERIPHERAL, TERMINAL COMPUTER SYSTEMS
1	COMPUTER ROOM ENVIRONMENT AND SECURITY
5	COMPUTERS
1	CONTROL UNITS
0	CONVERTERS
1	DATA CAPTURE EQUIPMENT
5	DATA CAPTURE AND RECORDING SYSTEMS
5	DATA COMMUNICATIOIN EQUIPMENT
5	CATHODE SCREEN TERMINALS
4	DATA RECEIVING TERMINALS
1	SECURITY EQUIPMENT
4	DATA RECEPTION/TRANSMITTAL TERMINALS
4	DATA TRANSMISSION TERMINALS
3	DESK
0	CONVERTER, CO-ORINDATES READER
4	DISK DRIVES
1	MAGNETIC DRUM
2	ELECTRONIC ACCOUNTING MACHINES
0	ELECTRONIC AUDITING EQUIPMENT
2	DOCUMENT PROCESSING MATERIAL
1	IMPRINTERS
1	INTERFACE SYSTEMS
1	DISK RECORDERS
0	TAPE RECORDING
2	LIGHT PEN
2	TAPE DRIVE
4	MEMORY SYSTEMS
2	MAGNETIC CHARACTER READING EQUIPMENT
2	MICROFICHE REPRODUCER
0	MICROFILM EDITING EQUIPMENT
2	MICROFILM EQUIPMENT
1	OPTICAL READING SYSTEMS
2	PERFORATED TAPE UNITS
2	PLOTTERS, GRAPHS
0	TAG PUNCH/PRINT MACHINES
3	COMPUTER OUTPUT PRINTERS
1	PUNCHED CARD MACHINES
1	STORAGE SHELVES
1	FIRE RESISTANT VAULTS, CARDS, TAPES
3	"TURNKEY" COMPUTER SYSTEMS

2 OPTICAL CHARACTER TYPEWRITERS
2 EDP EQUIPMENT
0 VISUAL CONTROL PANELS
1 AUDIO INPUT SYSTEMS
1 AUDIO RESPONSE SYSTEMS
6 WORD PROCESSING SYSTEMS
7 SOFTWARE - COMMERCIAL APPLICATIONS
3 SOFTWARE - OPERATING SYSTEM MODULES
5 SOFTWARE - SCIENCE AND ENGINEERING
4 SOFTWARE - SYSTEMS
0 ANTI-STATIC COMPOUND
1 COMPUTER OUTPUT SATCHELS
1 BOOKS AND PUBLICATIONS
3 CARBON PAPER
0 CORRECTION SEAL
2 DISK ACCESSORIES
3 MAGNETIC DISK PACK
3 DISKS
5 DISKETTES
1 FILING CABINETS
1 FILE FOLDERS
5 CONTINUOUS FORM PAPER
4 UNIT FORM PAPER
3 MAGNETIC CARDS
3 MAGNETIC TAPES
3 MAGNETIC TAPE ACCESSORIES
2 MICROFILMS
3 PAPER TAPES
2 PAPER TAPE ACCESSORIES
1 PENS
2 PROGRAMMING TOOLS
2 PUNCH CARD ACCESSORIES
2 PUNCH CARDS
3 MACHINE RIBBONS
2 APL SHARED TIME
0 MICROFILM COMPUTER
4 CONSULTATION SERVICES
3 MAINTENANCE CONTRACT
5 DATA COMMUNICATION SERVICES
2 DOCUMENTATION SERVICES
2 EQUIPMENT BROKERS
3 MANAGEMENT SERVICES
4 FORMS SERVICES
3 FACILITIES MANAGEMENT
1 OCR SERVICES
1 REMOTE DATA SECURITY
3 PERFORMANCE ANALYSIS
1 PERSONNEL RECRUITING AND PLACEMENT
5 PROGRAMMING
6 SYSTEMS ANALYSIS
4 WORD PROCESSING
4 SHARED TIME

NUMBER OF SUPPLIERS IN REGION NO. 10 - CHARLOTTETOWN, SUMMERSIDE
NO. PRODUCTS AND SERVICES

1	EXTERNAL OR INTERNAL ADDITIONAL MEMORY
1	CALCULATOR
1	BANK TERMINALS
1	CONNECTING EQUIPMENT
1	CABINETS
1	ELECTRONIC CALCULATORS
0	CAMERA DATA RECORDING
2	CASH REGISTER
1	CLOCK, SHARING OF COMPUTER TIME
1	COMMUNICATION CONTROL UNIT
1	GRAPHIC, PERIPHERAL, TERMINAL COMPUTER SYSTEMS
1	COMPUTER ROOM ENVIRONMENT AND SECURITY
1	COMPUTERS
2	CONTROL UNITS
1	CONVERTERS
1	DATA CAPTURE EQUIPMENT
1	DATA CAPTURE AND RECORDING SYSTEMS
1	DATA COMMUNICATIOIN EQUIPMENT
1	CATHODE SCREEN TERMINALS
1	DATA RECEIVING TERMINALS
1	SECURITY EQUIPMENT
1	DATA RECEPTION/TRANSMITTAL TERMINALS
1	DATA TRANSMISSION TERMINALS
0	DESK
0	CONVERTER, CO-ORINDATES READER
1	DISK DRIVES
2	MAGNETIC DRUM
1	ELECTRONIC ACCOUNTING MACHINES
0	ELECTRONIC AUDITING EQUIPMENT
2	DOCUMENT PROCESSING MATERIAL
1	IMPRINTERS
2	INTERFACE SYSTEMS
1	DISK RECORDERS
1	TAPE RECORDING
0	LIGHT PEN
1	TAPE DRIVE
1	MEMORY SYSTEMS
1	MAGNETIC CHARACTER READING EQUIPMENT
1	MICROFICHE REPRODUCER
1	MICROFILM EDITING EQUIPMENT
1	MICROFILM EQUIPMENT
1	OPTICAL READING SYSTEMS
1	PERFORATED TAPE UNITS
0	PLOTTERS, GRAPHS
0	TAG PUNCH/PRINT MACHINES
1	COMPUTER OUTPUT PRINTERS
0	PUNCHED CARD MACHINES
1	STORAGE SHELVES
0	FIRE RESISTANT VAULTS, CARDS, TAPES
1	"TURNKEY" COMPUTER SYSTEMS

1 OPTICAL CHARACTER TYPEWRITERS
1 EDP EQUIPMENT
1 VISUAL CONTROL PANELS
0 AUDIO INPUT SYSTEMS
0 AUDIO RESPONSE SYSTEMS
2 WORD PROCESSING SYSTEMS
1 SOFTWARE - COMMERCIAL APPLICATIONS
1 SOFTWARE - OPERATING SYSTEM MODULES
1 SOFTWARE - SCIENCE AND ENGINEERING
1 SOFTWARE - SYSTEMS
0 ANTI-STATIC COMPOUND
0 COMPUTER OUTPUT SATCHELS
1 BOOKS AND PUBLICATIONS
0 CARBON PAPER
0 CORRECTION SEAL
1 DISK ACCESSORIES
2 MAGNETIC DISK PACK
1 DISKS
1 DISKETTES
1 FILING CABINETS
1 FILE FOLDERS
2 CONTINUOUS FORM PAPER
2 UNIT FORM PAPER
1 MAGNETIC CARDS
1 MAGNETIC TAPES
1 MAGNETIC TAPE ACCESSORIES
1 MICROFILMS
2 PAPER TAPES
1 PAPER TAPE ACCESSORIES
0 PENS
1 PROGRAMMING TOOLS
0 PUNCH CARD ACCESSORIES
0 PUNCH CARDS
2 MACHINE RIBBONS
1 APL SHARED TIME
1 MICROFILM COMPUTER
2 CONSULTATION SERVICES
2 MAINTENANCE CONTRACT
1 DATA COMMUNICATION SERVICES
0 DOCUMENTATION SERVICES
0 EQUIPMENT BROKERS
0 MANAGEMENT SERVICES
2 FORMS SERVICES
1 FACILITIES MANAGEMENT
1 OCR SERVICES
1 REMOTE DATA SECURITY
1 PERFORMANCE ANALYSIS
1 PERSONNEL RECRUITING AND PLACEMENT
1 PROGRAMMING
1 SYSTEMS ANALYSIS
1 WORD PROCESSING
1 SHARED TIME

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