The telecommunications equipment demand of the Canadian telecommunications carriers, 1981-1984

COMMUNICATIONS

Canada

Government of Canada
Department of Communications

Gouvernement du Canada
Ministère des Communications

THE TELECOMMUNICATIONS EQUIPMENT DEMAND OF THE CANADIAN TELECOMMUNICATIONS CARRIERS, 1981-1984

Prepared by:

Economic and Marketing Analysis
Division
Industry and Economic
Development Branch
October 1983

TABLE OF CONTENTS

LIST OF TABLES

1. INTRODUCTION

On November 12, 1981, the Treasury Board authorized the Department of Communications to establish a data base on "telecommunications equipment supply and demand in Canada" in order to appraise the competitive position of the Canadian telecommunications industry at national and international levels in the areas of product development, prices and services, quality and marketing effort. During the summer of 1982 we collected the information for the creation of this data base, which covers the period from January 1, 1980 to December 31, 1984.

The department judged it fitting to publish part of the survey data so as to afford Canadian suppliers of telecommunications goods and services a better understanding of the domestic market, with particular emphasis on the growing requirements of the country's telecommunications enterprises. This report concerns the telecommunications subsector and forms part of a series of departmental publications, including the 1979 Green Paper titled The Principal Canadian Telecommunications Carriers: Expenditures on Telecommunications Equipment 1973-1982. That particular report presented for each product category, the labour and equipment expenditures made by Canada's eighteen leading telecommunications carriers during the period 1973-1977 as well as anticipated outlays for 1978-1982. The survey questionnaire used in connection with our project is similar to the one used for the 1979 study.

Since participation in this survey was strictly voluntary, the department ensured that the relevant industrial enterprises, as well as the federal departments of Industry, Trade and Commerce, Regional Economic Expansion and Statistics Canada and the provincial ministries of communications, were well informed of the study objectives. These departments and agencies expressed immediate approval of the project. Furthermore, we are highly pleased at the strong participation of telecommunications equipment users and suppliers, which testifies to their interest in the project.

One objective of the study is to establish a link between Canadian manufacturers' perception of the domestic telecommunications equipment market and the users' evaluation of anticipated equipment expenditures. The questionnaire mailed to manufacturers solicited information on total sales and the specific share of total sales earmarked for export.[1] We took the opposite approach with users, asking them to determine what proportion of their total outlays went to imported products. By comparing for each product category the volume of equipment that Canadian manufacturers intend to sell to Canadian enterprises against the volume that Canadian users intend to purchase from these sources, we can determine whether manufacturers have correct or erroneous perceptions of the various market segments. The observations are all the more interesting as our survey period extends up to 1984.

---

[1] Our definitions of imported and exported products are found in the survey instructions in the appendix.

This report will not broach the matter of equipment supply. Indeed, there are relatively few telecommunications equipment manufacturers in Canada, and the department could not divulge such information without breaching its promise to safeguard the identity of the respondents. Our discussion therefore concentrates on evaluating the demand for telecommunications equipment. After explaining the methodology employed to collect the information, we present a discussion of the tables and graphs derived and conclude with the trends observed.

This report does not necessarily represent the views of the Department of Communications or of the federal government, and no commitment for future action should be inferred from this report.

2. METHODOLOGY

2.1 REPRESENTATIVENESS OF SAMPLE

The target population of the survey comprises all users of telecommunications equipment. We divided the user group into three subgroups: (1) common carriers, (2) private networks and (3) interconnect firms. We first selected the 67 carriers that represent 99 per cent of Canadian telephone companies (see Table 1).

To assess the private networks, we focused our attention on the five hydroelectric companies operating in Quebec, Ontario, Manitoba and Alberta, for they constitute a representative sample of such networks. The interconnect firms were regarded as users of products for resale purposes. Using directories published in late 1981, we selected about 150 interconnect firms. Due to the relative volatility of this industry sector, certain new firms escaped our attention at the time of the survey, while others that were selected had gone out of business. We mailed questionnaires to an estimated 90 per cent of the interconnect firms in business at the time.

2.2 SURVEY QUESTIONNAIRE

In drawing up the survey questionnaire we kept in mind the traditional classification of the telephone sector, the new switching and transmission technologies and the structure used in the 1979 study. A draft version of the questionnaire was mailed out for comment by the relevant industrial associations, various federal and provincial departments, and about fifteen users. A number of revisions were subsequently made in accordance with suggestions proposed by these experts. After this pretest phase, the survey notice and instructions were prepared. The questionnaire, which covers the four calendar years from 1981 to 1984, includes a forecasting component.

We mailed the questionnaires on May 12, 1982, and follow-up notices went out on June 15, 1982. Seeking to improve the response rate, we called on the co-operation of the department's regional offices to make 30 field trips, including 15 to carriers and 10 to private network users. By late October 1982 most of the 89 duly completed questionnaires had been returned. The last ones arrived early in 1983.

Overall, we encountered very few problems with the questionnaire, although some carriers misconstrued our term "new investments." They supplied figures that included, over and above equipment costs, all other outlays made to put the equipment in service. We singled out a number of inaccuracies and adjusted the figures by applying the index of correction provided by each firm.

Table 1

LIST OF ENTERPRISES CANVASSED

Firm or Firm Group	Number
- Corporate members of Telecom Canada	10
- Teleglobe Canada	1
- CNCP Telecommunications	1
- Enterprises regulated by the Régie des services publics du Québec (1981 annual report)	21
- Enterprises regulated by the Ontario Telephone Service Commission (1981 annual report)	31
- edmonton tel	1
- Terra Nova Telecommunications	1
- NorthwesTel	1
Total	67

With regards to the interpretation of the questionnaire (see appendix), we ran into only one problem, involving items 3.3 and 3.4 (radio and mobile telephones). Our survey was confined to the equipment connected to the public network. Consequently, we had no direct interest in private mobile radio networks. To our mind, a "mobile telephone" is an item of equipment that provides direct access to the telephone system without the need for operator assistance to dial the number. A "radio telephone" is a similar instrument but requires operator assistance to make the connection. Some carriers associated one of these categories with the communications equipment they lease to private networks (taxi, police and construction companies). Because of this misunderstanding, the major portion of investments in this sector were attributed to private systems. In spite of our attempts at clarification, we have been unable to pinpoint the proportion that goes to the public network. Nevertheless, we decided to incorporate this information in our tables because it does constitute an expenditure made by the carriers.

At the end of the investment section, we provided for each equipment category a subcategory headed "Other" under which the respondents were asked to list any other investments. Examination of the completed questionnaires shows that some participants included specific equipment in this catch-all category, whereas most respondents made no mention of such plant. Therefore we will deal with these figures only when required by the analysis of the equipment categories.

2.3 PROCESSING OF SURVEY DATA

In each case, the responses to the questionnaire were coded according to the originating province, size of firm (three classes) and type of activity (carrier, private network, interconnect firm). We purged the survey data in stages.[2] Numerous telephone calls were made to clarify and precisely determine the figures. We were particularly attentive to responses containing statistics that did not cover the entire survey period or failed to specify import values.

Thirty-five of the 89 questionnaires returned came from carriers, 4 from private networks, 14 from interconnect firms, and 36 from manufacturers. Interpretation of this response rate must be weighted by the respondents' relative importance within the industry. The carrier response

---

[2] We ran three data audits. We first scanned each questionnaire to check whether the figures reflected an acceptable order of magnitude. The second audit was run upon data input. The third audit consisted of comparing the data from respondent firms of similar size.

rate in terms of telephones in service stands at about 99 per cent.[3] The 32 carriers that did not respond are small firms, 12 located in Quebec and 20 in Ontario.

Four out of five firms in the private network sector responded to the questionnaire. Since our survey was confined to the principal public utility companies (electricity and gas), we believe that interpretation of the statistics should apply only to these firms. Very few interconnect firms returned the questionnaire. Given a response rate of less than 10 per cent, we find it difficult to derive any pertinent conclusions regarding this group. Admittedly, however, we expected this low response rate. This is a burgeoning industry in the throes of development, competition is fierce, and at the time of our June 1982 mailing, certain doubts about regulatory control still prevailed. That uncertainty was dissipated in November 1982 after the publication of the CRTC's final decision on the connection of terminal equipment (CRTC 82-14).

In short, our interpretation of the survey results will bear primarily on the common carriers. Only their data can be used without problems of representativeness or jeopardizing our commitment to preserve the confidentiality of the respondents.

2.4 WEIGHTING FACTOR

Our study resembles a census more than a sampling survey. This approach was made imperative by the relatively small size of the target population (less than 300) and the fact that random sampling methods are unsuitable in such cases. We ran into a major problem in determining a method for developing a weighting factor.

We explored different avenues (e.g. the ratio of the number of long-distance calls, of capital expenditures, or of the number of telephones) to find a correction factor that could be applied to our figures so as to approximate the values of the Canadian telecommunications equipment market estimated by various studies. Considering that our respondents represented virtually the entire Canadian network and that our results fell 15 to 25 per cent below the values put forth by other sources, we decided not to apply any correction factors to the figures.

Furthermore, we had to contend with responses that did not provide any projections for 1984. In the case of small firms we made no corrections; for their purchasing profile is situational, making it risky to forecast their expenditures. For medium-size firms we simply worked on the assumption that their spending in 1984 would match the 1983 rate. In our opinion, this admittedly conservative premise is a reasonable one, and enables us to correct the 1984 total by reducing the non-response bias.

---

[3] Statistics Canada (Publication No. 56-203, 1981) reports that 14 of Canada's 153 telephone systems account for 98 per cent of telephone activity in Canada. Our survey group compares with this list.

The final element that we corrected for was a lack of response to the section on percentage of imported plant. Upon analyzing the totals provided, we noticed a major divergence between the total demand and the combined demands for domestic and imported equipment. This disparity stems from the fact that the total demand is derived by simple addition of the figures in the directory. The demands for Canadian products and imports, however, are derived by a more complex operation wherein the percentage of imports determines the share of the demand for imported products. We singled out three questionnaires that omitted this information. To narrow the data gap, we contacted these enterprises, which provided the details needed to adjust the figures.

2.5 COMPARISON WITH PRIOR STUDY

As was mentioned in the introduction, this study is a revised and enlarged version of the department's 1979 Green Paper titled The Principal Canadian Telecommunications Carriers: Expenditures on Telecommunications Equipment 1973-1982. Our study differs on several counts.

First, the figures gathered in the 1979 survey covered both plant and the costs of the labour necessary to bring the equipment into operation. This study is confined to equipment expenditures.

Second, this study makes use of a more detailed classification of the equipment categories, differentiating for example between the digital and analog transmission systems and fibre optics technology. This level of detail complicates comparison of the two studies in terms of product categories.

Third, the 1979 paper claimed that the electronic switching sector had benefited from a remarkable injection of funds that would not recur. Our study indicates that these impressive investments are far from depleted and that nothing points to a slowdown. As for the geographical distribution of investments, our study confirms the trends observed in 1979. Quantitatively, the 1979 forecasts of spending in 1981 and 1982 are compatible with our observations. For purposes of comparison, it should be noted, we reduced the 1979 forecasts by 25 per cent in order to delete the component attributable to labour costs (as suggested by that study).

2.6 PRESENTATION OF RESULTS

The information collected through our survey lends itself to a number of different presentations. Indeed, the format of our questionnaire allows for presentation by particular type of equipment, specific technology (analog, digital), geographical region or relative weight of Canadian-made products in the purchasing profile. Needless to say, our commitment to preserve the confidentiality of the information rules out presentation at all possible levels of disaggregation. It is therefore our intention to honour this constraint and present our findings in three forms. We will deal first with the general statistics gathered according to source, then look at the composition of the equipment demand, and conclude by analyzing the demand regionally.

3. RESULTS

3.1 TOTAL DEMAND FOR TELECOMMUNICATIONS EQUIPMENT BY TELECOMMUNICATIONS CARRIERS

3.1.1 Total Demand by Telecommunications Carriers: Source and Evolution

In 1981 the Canadian telecommunications carriers spent close to $1.37 billion on the acquisition of new equipment. By the end of 1984, these same carriers will have allocated about $1.75 billion to this expenditure. Average annual growth should stand at 9.2 per cent, although we observe a fluctuation in the annual growth rates, which fall off as the period progresses.

Canadian manufactured products account for virtually all purchasing by the carriers. The respective evolutions of Canadian and imported product purchasing show opposing trends. Table 2 breaks down the equipment demand by source of supply. Purchasing of Canadian products increases steadily over the period, from 91 per cent in 1981 to 95 per cent in 1984, which puts the average annual growth of the demand for Canadian products higher than that of the total demand (10.81 per cent compared with 9.20 per cent).

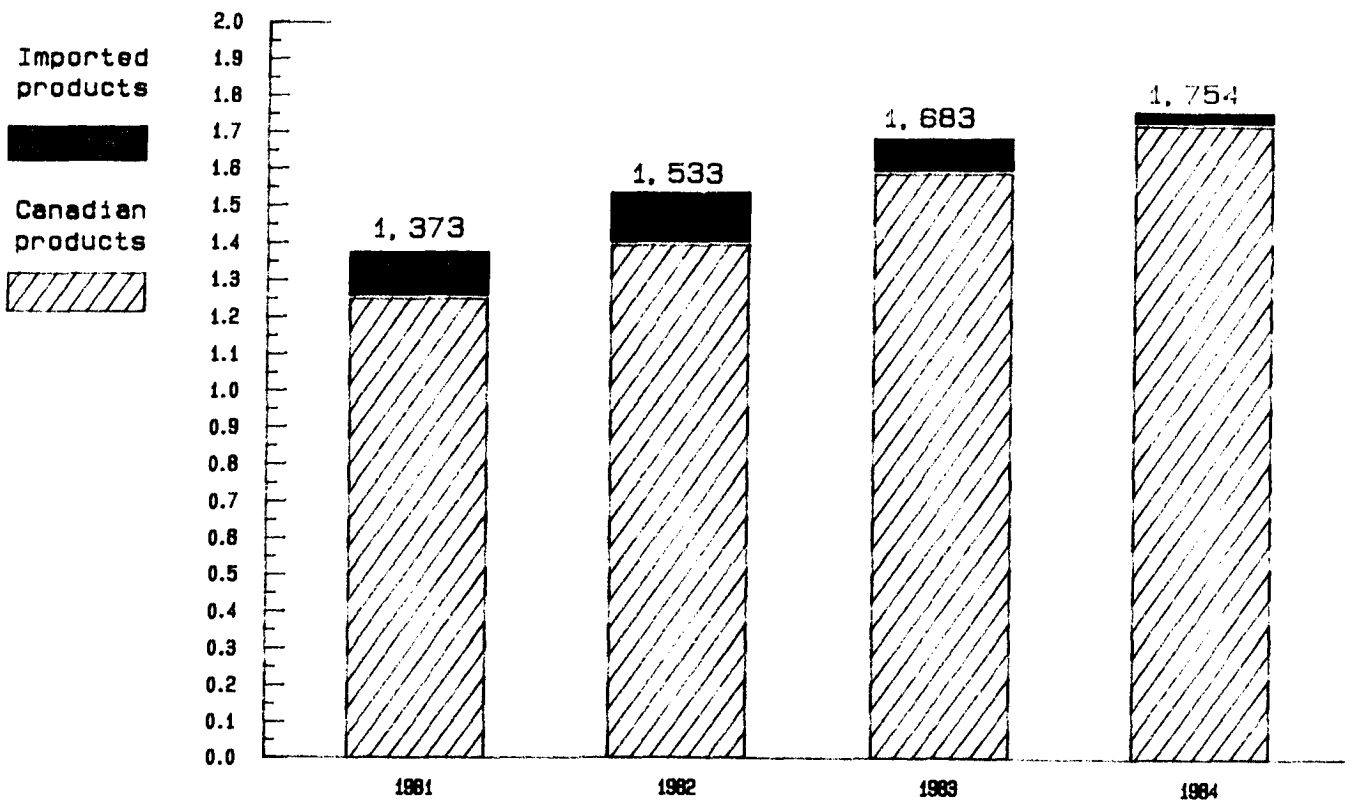
3.1.2 Composition of Total Demand for Telecommunications Equipment

On examining the composition of the demand for telecommunications equipment in accordance with the categories listed on the questionnaire, we observe that, averaged over the entire period, switching equipment accounts for 26.4 per cent of total purchasing, transmission equipment for 24.7 per cent, station apparatus for 24.8 per cent and outside plant for 24.0 per cent. Table 3 graphs some of the annual variations in these percentages.

Switching equipment claims a growing share of total annual investment over the period (moving from 24.1 per cent to 27.4 per cent). The evolution of transmission plant investment is fairly irregular. Indeed, we observe a major increase in investments in 1982 (27.81 per cent), which will carry over into 1984 (23.40 per cent). Investments in station apparatus and outside plant fluctuate, hovering some 2.5 per cent above or below the average for the period. However, as Table 3 indicates, the range between the categories is minimal.

Table 2

Total demand by the Canadian telecommunications carriers
Distribution by source of supply
(in millions of $)



Rates of Growth

	Total demand %	Canadian product demand %	Imported product demand %
1981-1982	11.5	11.3	16.6
1982-1983	9.8	13.6	-10.0
1983-1984	4.2	5.2	-10.0

Table 3

Percentage weight of equipment categories by year, 1981-1984

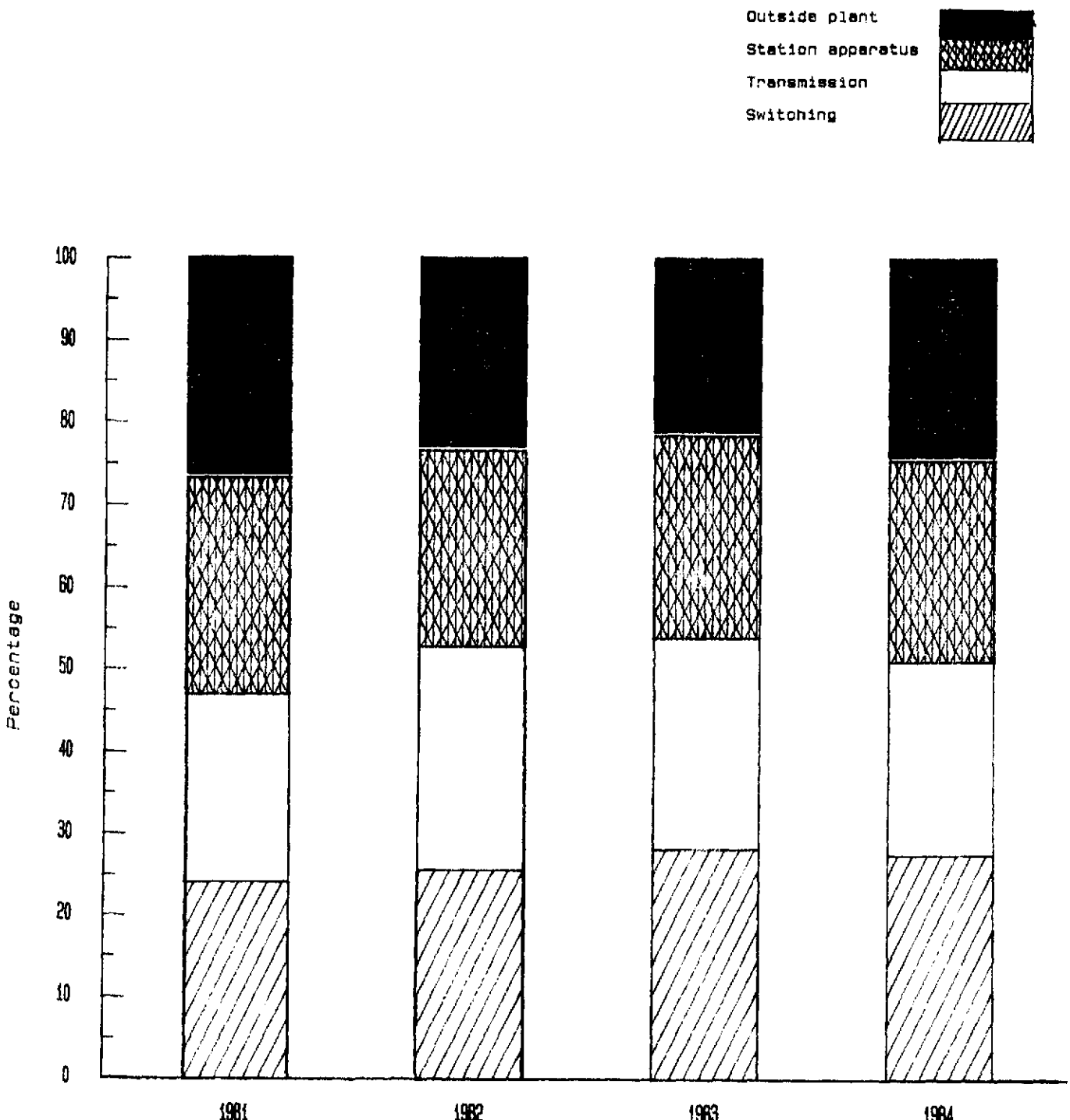
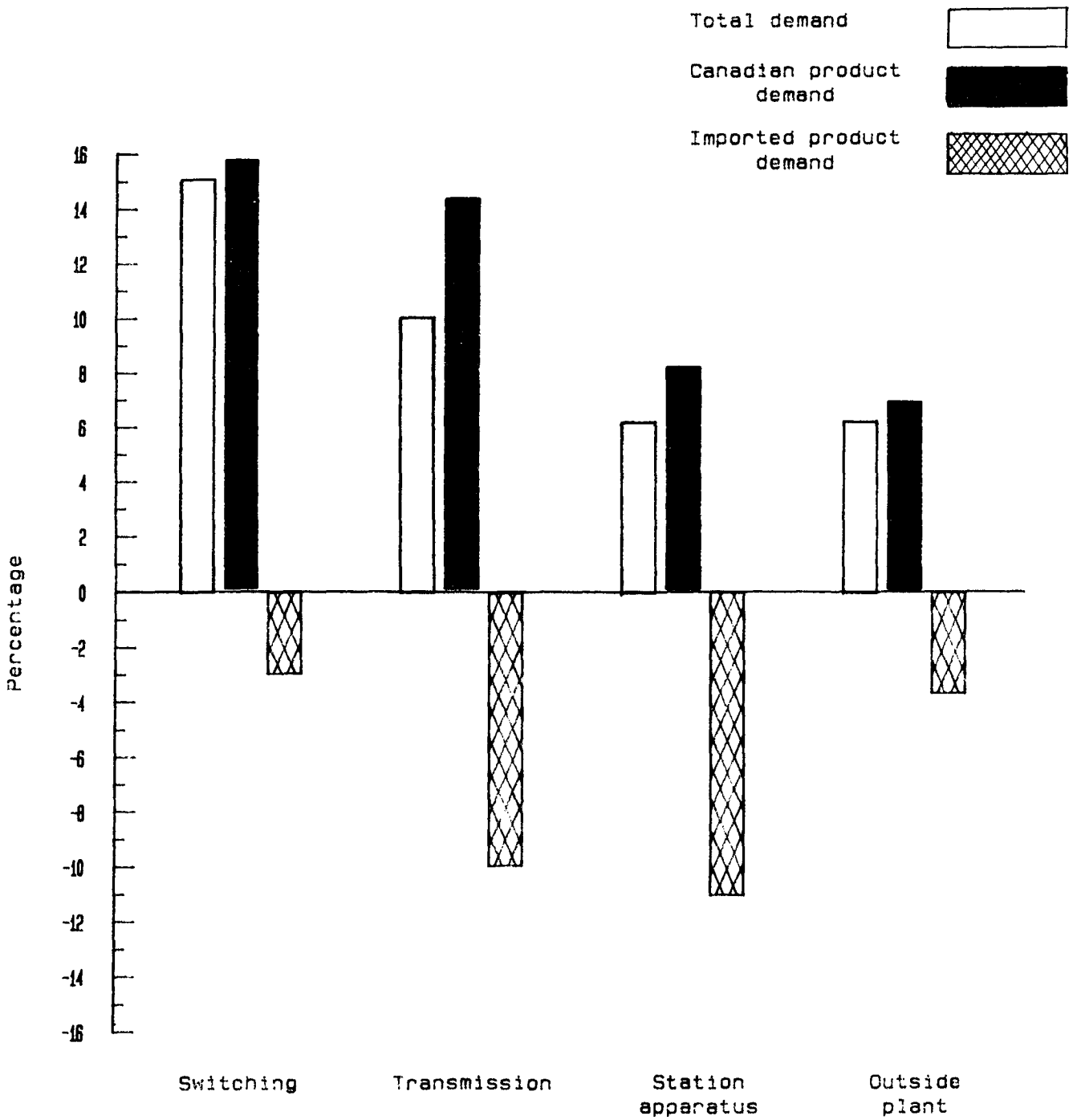


Table 4

Average annual growth rates by equipment category and source of supply
(1981-1984)



3.2 EVOLUTION OF TOTAL DEMAND BY EQUIPMENT CATEGORY

Analysis of the average annual growth rates of the different equipment categories bears out our earlier observations on the average annual rate of growth of total demand (9.2 per cent) and of the demand for Canadian products (10.8 per cent). The rates for the switching and transmission categories, 15.1 per cent and 10.1 per cent respectively, far exceed the rates observed for the other two categories (6.10 per cent for station apparatus and 6.26 per cent for outside plant).

Indeed, the average annual growth rates of demand for Canadian products in each equipment category are higher than the average annual growth rates of the total demand. The demand for imported products, in contrast, is declining.

According to the comparisons given in Table 2, indicating that Canadian product purchases account for 91 per cent to 98 per cent of total purchasing from 1981 to 1984, there was reason to expect that the reduction in sales of imports would have little impact on the total growth rate for each category.

3.2.1 Switching

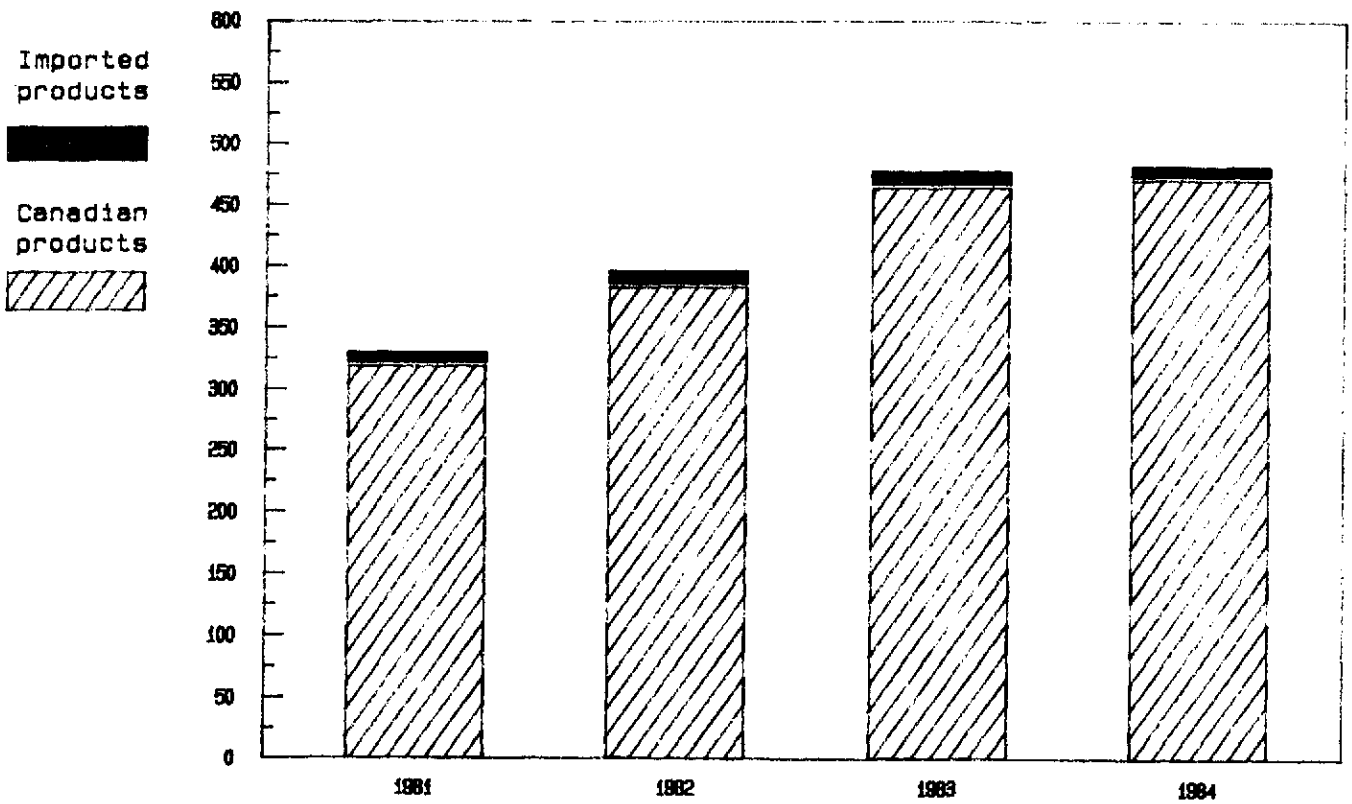
Over the study period the switching category registers substantial average annual growth (15.1 per cent). Overall, there is increasing investment in Canadian equipment, which in 1984 will account for nearly 98 per cent of total purchases (compared with 96 per cent in 1981). Switching equipment purchases will increase from $331 million in 1981 (24 per cent of total equipment investment) to a projected $481 million in 1984 (or 27.4 per cent of the total).

The digital switching category accounted for 52 per cent of total 1981 investment in switching equipment; in 1984 this share will reach 70 per cent. In terms of absolute values, carrier outlays in 1984 ($340 million) will be almost twice their investment at the beginning of the period. Investment in analog stored program control (SPC) switching will remain at around $72 million during the period, closing with a net decline of $5 million from 1981. Investment in conventional switches, i.e. step-by-step and crossbar, will play a part in maintaining and extending the useful life of existing equipment.

This equipment accounted for 22.3 per cent of switching expenditures in 1981, whereas in 1984 its share will be only 13.0 per cent. Average annual investment in this type of equipment is nearly $68 million, or the equivalent of spending on analog SPC switching. The "Other" category declined from 4.63 per cent of switching investment in 1981 to 2.70 per cent in 1984. This category comprises operator stations, transmission plant for switch decentralization and other equipment not specified by the respondents.

Table 5

Switching equipment
Total demand by the Canadian telecommunications carriers
by source of supply
(in millions of $)



Rates of Growth

	Total demand %	Canadian product demand %	Imported product demand %
1981-1982	19.3	19.7	8.7
1982-1983	21.0	21.1	17.6
1983-1984	0.6	1.6	-29.3

An important point in this analysis is the growing importance of digital switching. Contrary to forecasts in the earlier Green Paper, this technology has by no means reached its peak.[4] It is becoming as accessible to small carriers as to medium-size and large enterprises. Indeed, the small carriers are exploiting the possibilities of decentralization of digital switches so as to use them in urban and rural areas. This enhances the profit-earning capacity of the equipment and allows these carriers to dispense with traditional equipment, which is costly to maintain. Owing to an average annual growth rate of more than 15.1 per cent, the switching sector will tap a large portion of the carriers' financial resources by the end of 1984. Table 5 gives some idea of the evolution of switching expenditures for each year under review.

The annual growth rates observed in 1981-82 and 1982-83 (19.3 per cent and 21.0 per cent) raise the level of expenditures from $331 million to a new high of $481 million. As for the source of supply, Canadian products capture the lion's share (97 per cent), whereas imports register more pronounced fluctuation in growth rates, which have little effect on the total demand. Indeed, in 1984 carriers will spend $10 million on imported switching equipment, while the outlay at the start of the period stood at $11 million.

3.2.2 Transmission Equipment

Demand for transmission equipment displays an average annual growth profile of 10.1 per cent during the period. Purchases of Canadian products generally increase at a faster pace than those of imports. Moreover, major sustained growth is observed throughout the digital transmission sector, whereas growth rates for analog transmission are fairly variable. Satellite equipment investment also vacillates, in line with spending on the space program (Anik C-1 and D-1).

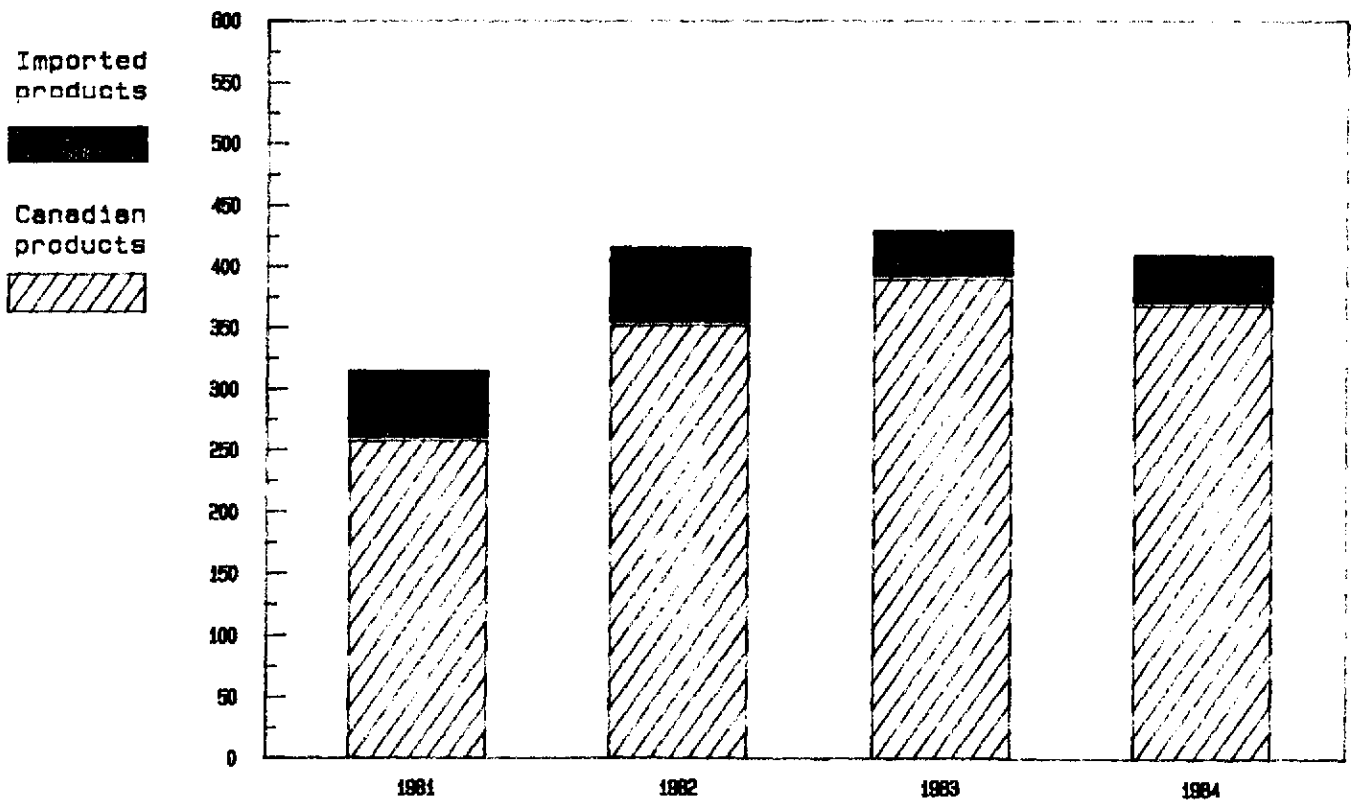
Table 6 shows the evolution of total demand for transmission equipment. There is a remarkable upswing from 1981 to 1982 (32.5 per cent), attributable in large part to an increase of more than $30 million in space equipment expenditures and of $35 million in digital multiplexors. Over the next year (1982-83) the demand registered slight growth (2.8 per cent), but will decrease in 1983-84 by 4.3 per cent.

---

4 The Principal Canadian Telecommunications Carriers: Expenditures on Telecommunications Equipment 1973-1982, Department of Communications, 1979, 25 pp.

Table 6

Transmission equipment
Total demand by the Canadian telecommunications carriers by source of supply
(in millions of $)



Rates of Growth

	Total demand %	Canadian product demand %	Imported product demand %
1981-1982	32.5	37.2	11.4
1982-1983	2.8	10.5	-39.5
1983-1984	-4.3	-5.4	5.7

During the study period Canadian transmission equipment enjoys strong popularity (investment gains of 82 per cent in 1981 and 90 per cent in 1984), while imports drop by 30 per cent. Analog microwave equipment (which averages 7.5 per cent of total transmission demand) experiences 16 per cent growth in 1981-82, a 9.7 per cent decline in 1982-83 and another decline of 15.3 per cent in 1983-84. The carriers' analog microwave investment in 1984 will be $3.2 million less than in 1981. Analog multiplexors (averaging 12.8 per cent of total transmission investment) register growth rates of 13.8 per cent in 1981-82 and 9.6 per cent in 1982-83, but a decline of 13.8 per cent in 1983-84. At the close of the study period this net balance translates into an investment of $3.3 million more than in 1981. To summarize, analog transmission equipment ends the period at an investment level comparable to that observed for 1981, although its relative weight in the transmission equipment category declined over that time from 23.5 per cent to 18.0 per cent.

In the satellite sector (including earth stations), which averages 16.1 per cent of total transmission investment, we see an increase of 56.0 per cent in 1981-82, followed by declines of 30.0 per cent in 1982-83 and 37.5 per cent in 1983-84. This pattern translates into a net deficit of $18.7 million for the 1981-84 period. The "Other" category (averaging 12.8 per cent of total transmission investment) scores an increase of 27.0 per cent in 1981-82, a decline of 3.8 per cent in 1982-83 and a recovery of 12.5 per cent in 1983-84. This gives a 1984 improvement of $15.5 million relative to 1981.

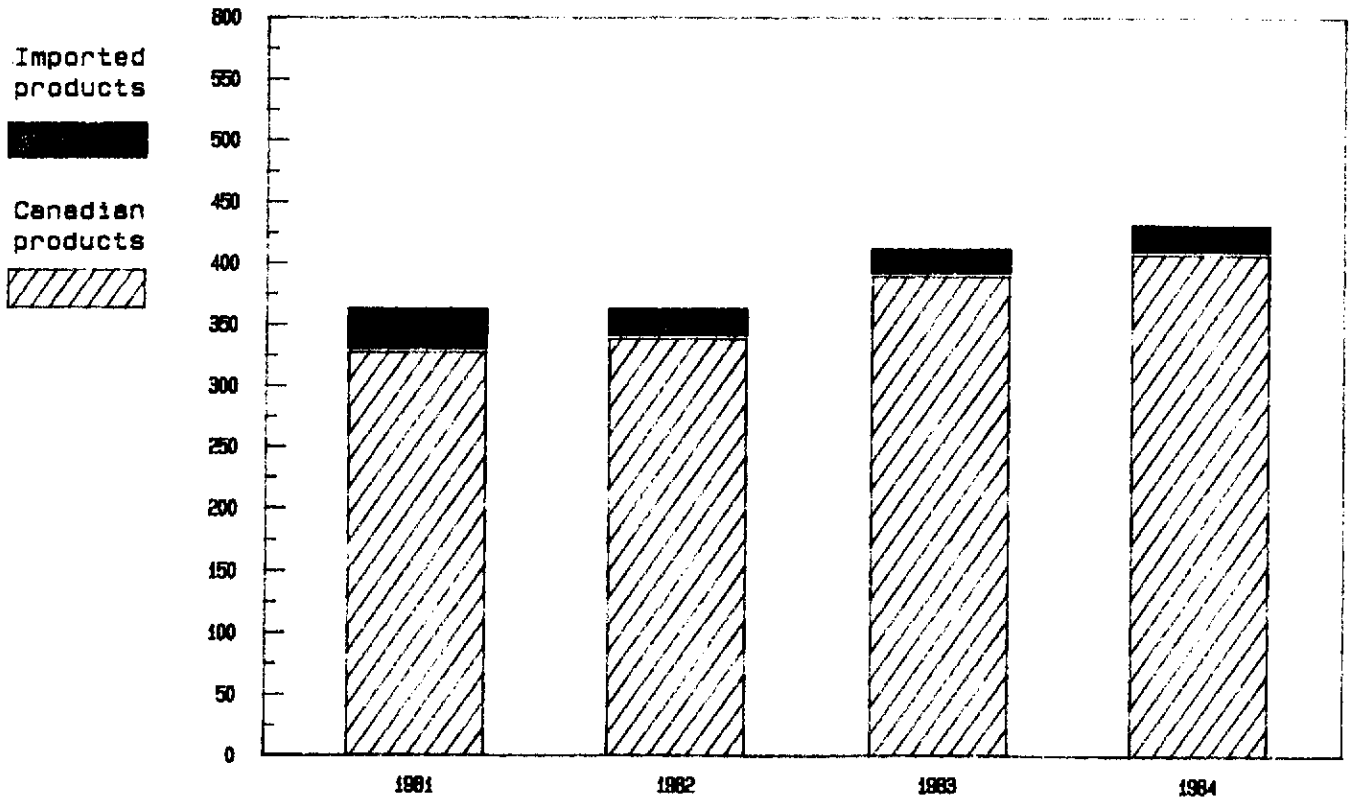
Digital microwave equipment (which averages 14.6 per cent of total transmission investment) displays growth rates of 39.3 per cent in 1981-82 and 69.6 per cent in 1982-83, then a decline of -2.6 per cent in 1983-84. Digital multiplexors (averaging 36.2 per cent of total transmission investment) register three successive growth rates of 31.9 per cent, 6.0 per cent and 8.8 per cent. From 1981 to 1984 the positive deviations between digital microwave and multiplexor expenditures are $42 million and $56.5 million. In 1981 digital plant expenditures comprised 44.8 per cent of transmission equipment outlays; in 1984 this share will rise to 58.0 per cent. Large and medium-size enterprises account for a major proportion of this investment. The TCTS (Telecom Canada) project and CNCP's TransCanada digital network project have contributed greatly to these expenditures. Analog equipment is more popular for average and low density networks, which explains the stability of the investment levels. The satellite equipment sector presents no surprises, given that the introduction of new satellites has upset the profile of these expenditures.

3.2.3 Station Apparatus

This category comprises all equipment installed at customer locations. The survey respondents' confusion about what was to be included in the mobile and radio telephone equipment categories forces us to deal with values that far exceed what we could reasonably have expected.

Table 7

Station apparatus
Total demand by the Canadian telecommunications carriers by source of supply
(in millions of $)



Rates of Growth

	Total demand %	Canadian product demand %	Imported product demand %
1981-1982	0.0	3.7	-32.0
1982-1983	13.2	14.6	-6.0
1983-1984	4.6	4.6	4.3

Investment in the station apparatus sector registers an average annual growth rate of 6.10 per cent during the study period (compared with 8.95 per cent for total demand). Station apparatus spending is virtually uniform over the four years, in spite of a general 1981-84 rise in demand of more than 18.6 per cent.

Telephones average about 40 per cent of total annual investment in station apparatus. The only year in which this share dropped to 30 per cent was 1982; telephone purchases fell to $130 million from $143 million the previous year. Telephone growth rates stand at -9.0 per cent in 1981-82, 29.9 per cent in 1982-83 and 6.0 per cent in 1983-84. In dollar terms, the carriers invested $143 million in 1981; it is expected that 1984 outlays will be close to $179 million.

PBXs of 100 lines and more comprise the second largest equipment group. For the entire period, investment in this type of equipment claims 19.9 per cent of the total station apparatus outlay. Observed annual growth shows a downward trend, from 8.0 per cent in 1981-82 through 4.6 per cent in 1982-83 to 3.8 per cent in 1983-84. At the beginning of the study period, investment totalled $71 million; it should reach close to $83 million in 1984.

Branch equipment accounts for an average 16.7 per cent of the investment in this sector. Its growth rate has varied over the period, standing at 8.6 per cent in 1981-82, 28.5 per cent in 1982-83 and 2 per cent in 1983-84. In dollar terms, the carriers will spend close to $76 million in 1984, whereas 1981 outlays came to $54 million.

Data communications equipment (averaging 9 per cent of station apparatus investment) shows an impressive performance early in the period - $37 million in 1981 and $39 million in 1982 - then drops beneath the 1981 level to $31 million in 1983 and $33 million in 1984. This performance contradicts observations for the status apparatus category as a whole.

Mobile and radio telephone equipment (6.3 per cent of total station apparatus investment) exhibits fairly variable growth. Our interviews revealed that the radio telephone plant category is associated with public network equipment, while mobile radio serves private networks. Our findings suggest that the radio telephone sector is not growing, for investment here is languishing at around $6.5 million per annum. The mobile radio sector is far more dynamic, improving from $15 million in 1981 to more than $20 million in 1984. The installation of cellular radio telephone networks will entail heavier outlays after 1985 in the radio telephone sector.

The category comprising teletypewriters, cathode ray display units and similar devices accounts for an average 7.3 per cent of total investment in station apparatus. The evolution of these expenditures resembles that observed for data communications equipment: a strong early period ($32 million), followed by a 1983 decline ($26 million) and a recovery ($28 million) in 1984.

The "Other" category is relatively unimportant, accounting for less than 1.2 per cent of total investment. In addition, investment patterns for this sector run counter to the general trend. Expenditures amounted to $4.2 million in 1981 and $6.7 million in 1982, whereas in 1983 and 1984 they total $3.8 million and $4.3 million respectively.

The major portion of these investments goes to Canadian-made products. For the telephone and PBX categories the proportion is particularly high - close to 95 per cent; these equipment categories also score a higher average rate of growth than do imports. In fact, although the investment level for this category is practically identical in 1981 and 1982, the demand for Canadian plant rose 3.7 per cent while import demand declined by 32.0 per cent. The trend continues up to 1984.

The salient points in this analysis are that voice equipment claims the major portion of investment and that the radio telephone sector is stagnant, while the mobile radio sector shows firm growth.

3.2.4 Outside Plant

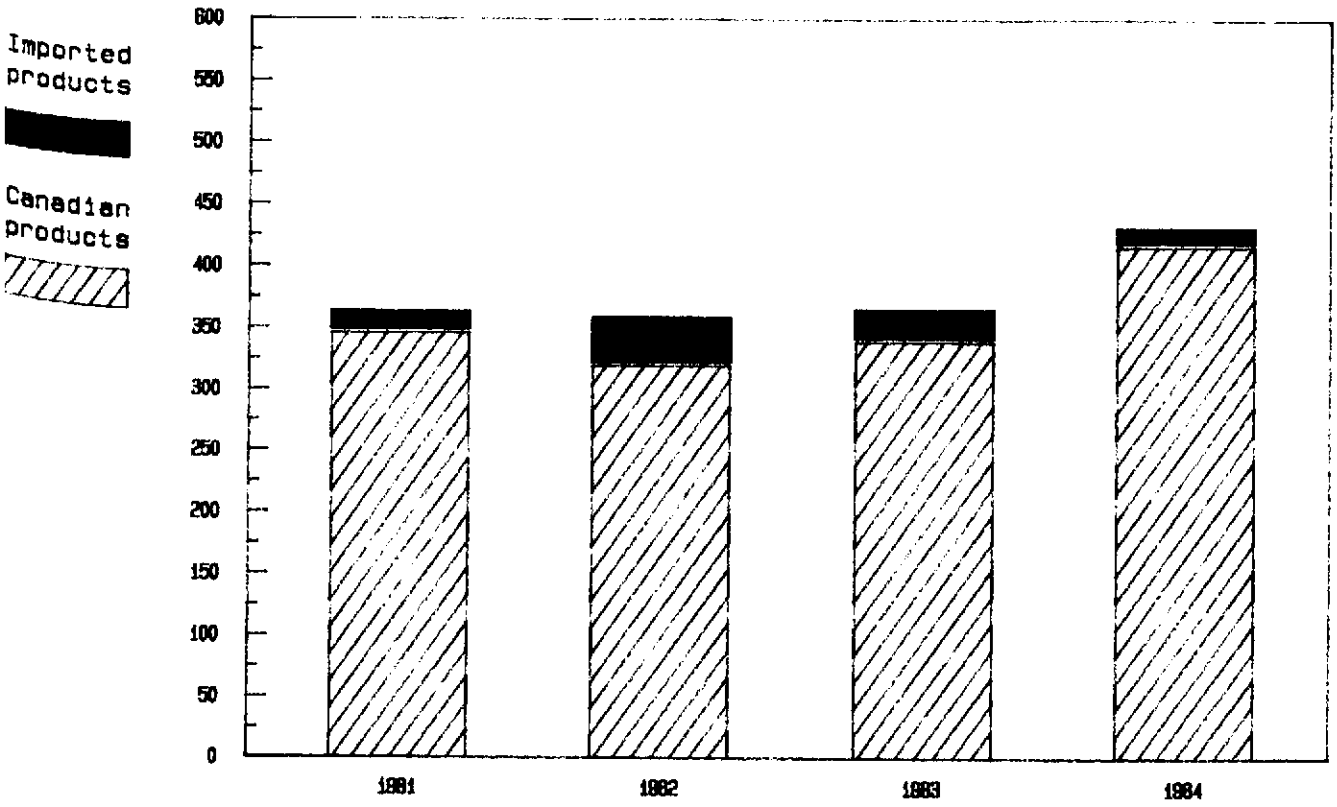
This final category, which accounts for about 24 per cent of total investment, is characterized by its steady performance across the board. It registers an average annual growth rate of 6.2 per cent. Although purchasing declined by 1.4 per cent between 1981 and 1982, it rose 1.8 per cent the next year, so that the 1981 level of $360 million was reattained in 1983. An 18.3 per cent improvement is projected for 1984, boosting investment to $432 million. This $67 million increase is explained largely by fluctuations in the copper cable and underground cable categories, which stand at $50 million and $11.1 million respectively.

The copper cable category is by far the most important, representing about 75 per cent of new investment in this sector. From a level $281 million in 1981, spending in this category declines to $268 million in 1983. The recovery commences in 1984 with a sudden 18.8 per cent jump to a peak of $318 million. Underground cables put in much the same performance, starting the period at $53 million, dropping to $50 million in 1982 and recovering to more than $63 million in 1984. These purchases, which account for approximately 14.5 per cent of total outside plant investment, are similar to spending levels in the copper wire sector. In all, these two categories account for more than 89.5 per cent of total outside plant investment, which explains their predominant influence on the average rates of growth of the sector.

Pole wires experience very moderate growth: down by 3.4 per cent in 1981-82, then up by 13.4 per cent in 1982-83 and 9.6 per cent in 1983-84. Investment is steady at 6.5 per cent of total outside plant investment - $23 million in 1981 and $27.6 million in 1984.

Table 8

Outside plant
Total demand by the Canadian telecommunications carriers by source of supply
(in millions of $)



Rates of Growth

	Total demand %	Canadian product demand %	Imported product demand %
1981-1982	-1.4	-7.9	125.0
1982-1983	1.6	6.1	-35.8
1983-1984	18.4	22.7	-38.5

The growing popularity of fibre optics has produced remarkable growth rates. Bear in mind that when the questionnaire was mailed out, Bell Canada had not yet announced its intention to use only optical fibres for the new trunks between central offices. In 1981, investment in this sector comprised 1.8 per cent of total outside plant investment, whereas in 1983 that share rose to 5 per cent. Notwithstanding the 1984 increase of more than 18.6 per cent in copper wire and underground cable investment (88 per cent of total outside plant investment), investment in optical fibre have been maintained (5.3 per cent of total sector investments). The comparable dollar values are $6.7 million in 1981, $13.7 million in 1982, $18.3 million in 1983 and $22.7 million in 1984. These figures represent progressive gains of 104 per cent, 34 per cent and 24 per cent for the period and an average annual increase of 80 per cent.

In 1981 investments by the medium-size and large carriers (7 out of 34) accounted for nearly 95 per cent of outlays for this equipment. The growth in spending is remarkable: from 6.7 million in 1981, it rises to 22.7 million in 1984. Nonetheless, in 1984 purchases by the medium-size and large carriers make up only 85 per cent of optical fibre investment.

As for outside plant imports, the values and ratios are somewhat distorted by the payments that Teleglobe Canada will make in connection with the ANZCAN project.[5] This explains the major fluctuations in outside plant growth rates. Overall, Canadian carriers buy more than 95 per cent of their plant from Canadian sources. The plateau of $16 million seems to reflect the normal level of outside plant imports. The growth in demand for Canadian equipment has held firm at an average of 6.7 per cent throughout the period, as compared with 6.2 per cent for outside plant on the whole.

3.3 REGIONAL EVOLUTION OF TOTAL DEMAND

In order to highlight the distribution of investment, we divide Canada into three regions:

- Atlantic region: New Brunswick, Prince Edward Island, Nova Scotia and Newfoundland
- Central region: Quebec and Ontario
- Western region: Manitoba, Saskatchewan, Alberta, British Columbia, the Yukon and the Northwest Territories

Our analysis seeks to define the evolution of regional demands. We will attempt to explain the disparities and similarities observed during the study in order to set the carriers' total demand in a regional context. The distribution of investments evolves over the years, as illustrated in Table 9.

---

5 Undersea telephone link between Canada, Australia and New Zealand.

Table 9

Distribution of annual expenditures by region

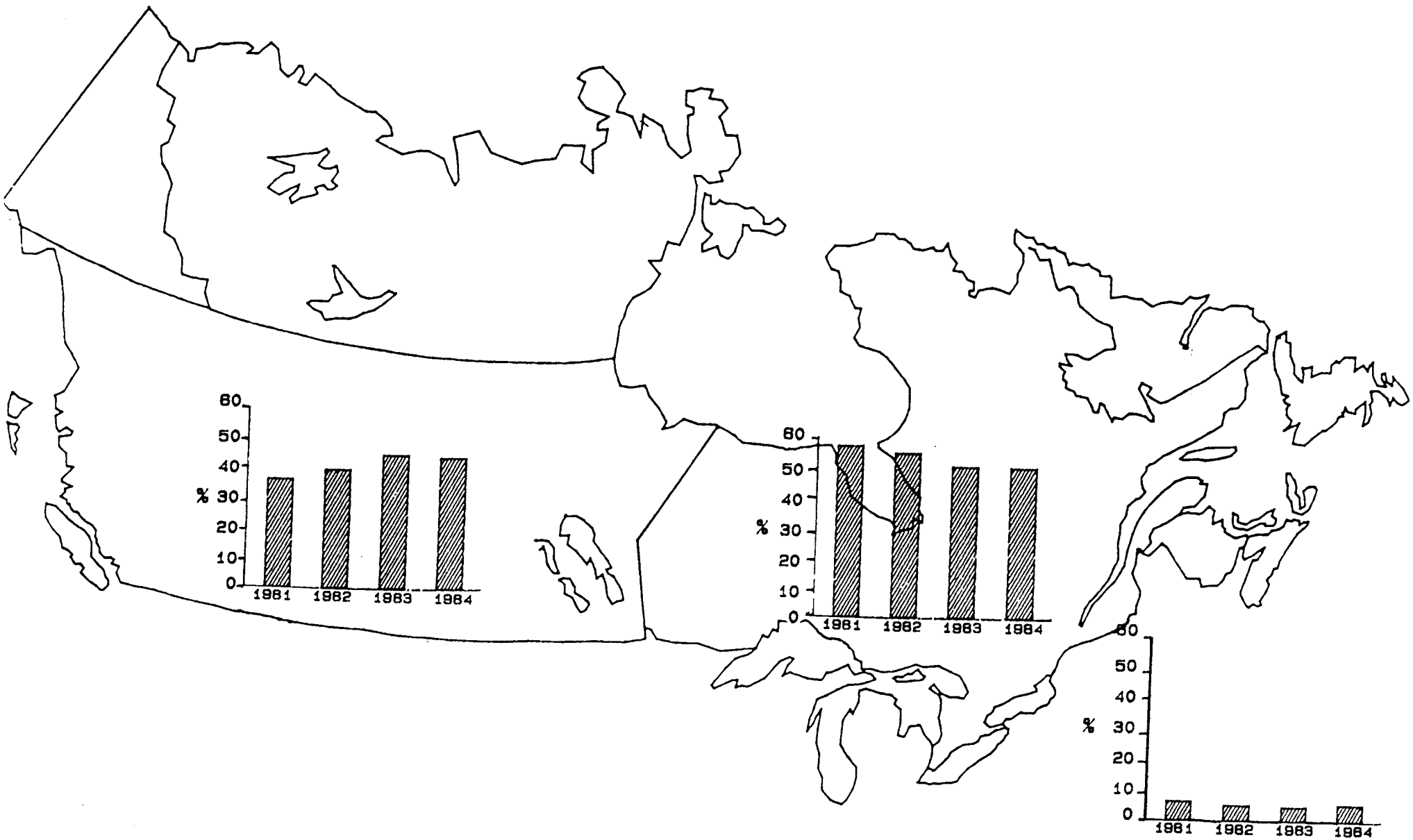
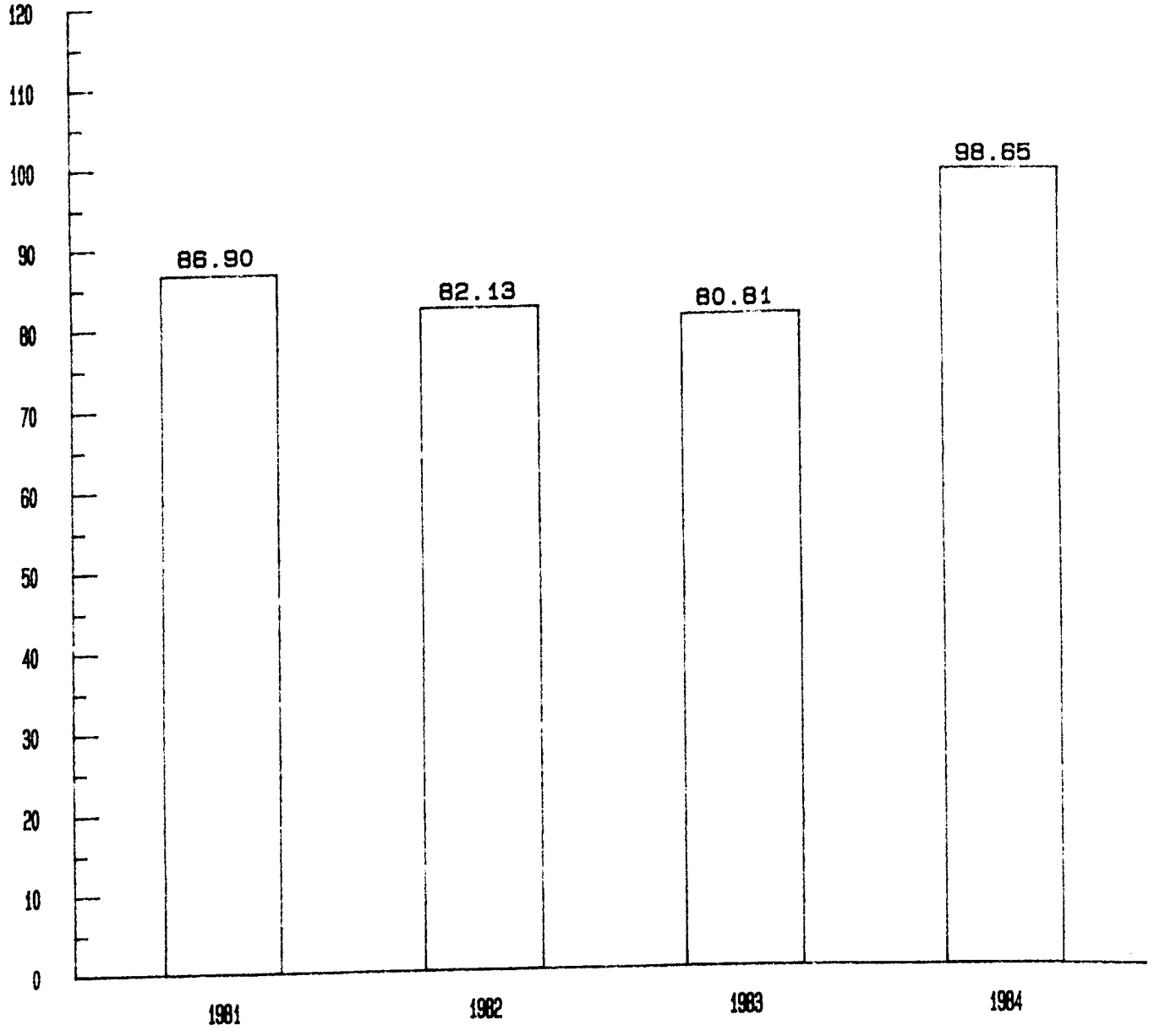


Table 10

Evolution of demand in the Atlantic region

(in millions of $)



3.3.1 Atlantic Region

In Atlantic Canada, which claims 9.2 per cent of the Canadian population and close to 7.4 per cent of the telephones in service, telecommunications equipment expenditures average roughly 5.5 per cent of the national demand (1981: 6.3 per cent; 1982: 4.8 per cent; 1983: 5.0 per cent; 1984: 5.6 per cent). At the regional level, demand fluctuates a great deal. Since the Atlantic region was particularly hard hit by the economic recession, the carriers have had to postpone certain expenditures scheduled for 1982 and 1983. Table 10 graphs the evolution of demand in this region.

The carriers in Atlantic Canada purchase more than 98 per cent of their equipment from Canadian sources, whereas the national average is 92 per cent.

Owing to the size of operations in this region, the introduction or cancellation of an investment program alters all the tables. Thus, it should come as no surprise if the distribution of purchasing by equipment categories differs from the national average.

In the switching sector, there is uniform investment for the maintenance of existing plant (step-by-step, crossbar, analog program), while the introduction of digital switches is subject to fluctuations in construction programs. In 1981 digital switching accounted for 66.9 per cent of purchasing, however, in 1982 it was 42.2 per cent, rising to 65.6 per cent in 1983 and dropping to 57.7 per cent in 1984.

The transmission sector exhibits a fairly wide deviation from the national average (17.2 per cent compared with 24.7 per cent). There are several factors at work here. First, the distances between major centres have always prompted the carriers to equip themselves with a radio and wire network that is vast considering the volume of calls, which entails only moderate use of these installations. Second, we noted a decline in growth of the demand for services during the period, with the carriers attempting to maintain and enhance the capacity of the existing transmission networks. With this in mind, they opted for digital technology, a decision that produced a sharp technological shift from 1981 to 1984. The share of analog microwave and multiplexor equipment plummets from 62.2 per cent to 23.7 per cent of transmission investments, whereas digital microwave and multiplexor equipment investment soars from 37.7 per cent to 72.2 per cent.

The station apparatus sector (32.1 per cent of total investment) displays similar fluctuations in regional demand. The share of investments in receivers, key stations and PABXs compares with our observations on the national share, which is 60 per cent. As with the other categories, uniform distribution is observed.

In the outside plant sector (which represents 27.1 per cent of total investment) 95 per cent of expenditures go to the pole line and copper cable categories.

Table 11

Percentage distribution of expenditures by equipment category Comparison of Atlantic region and Canada (1981-84)

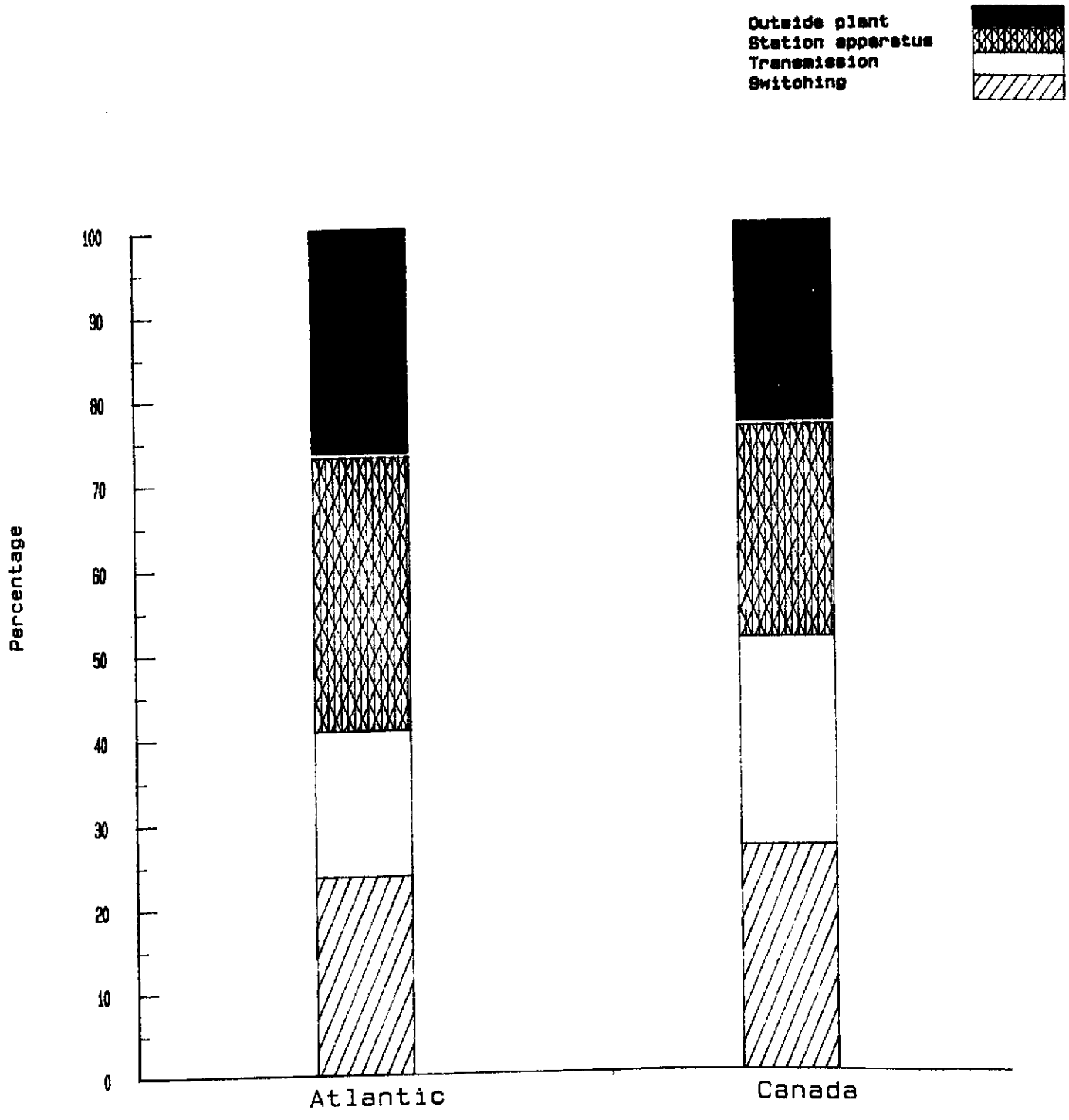
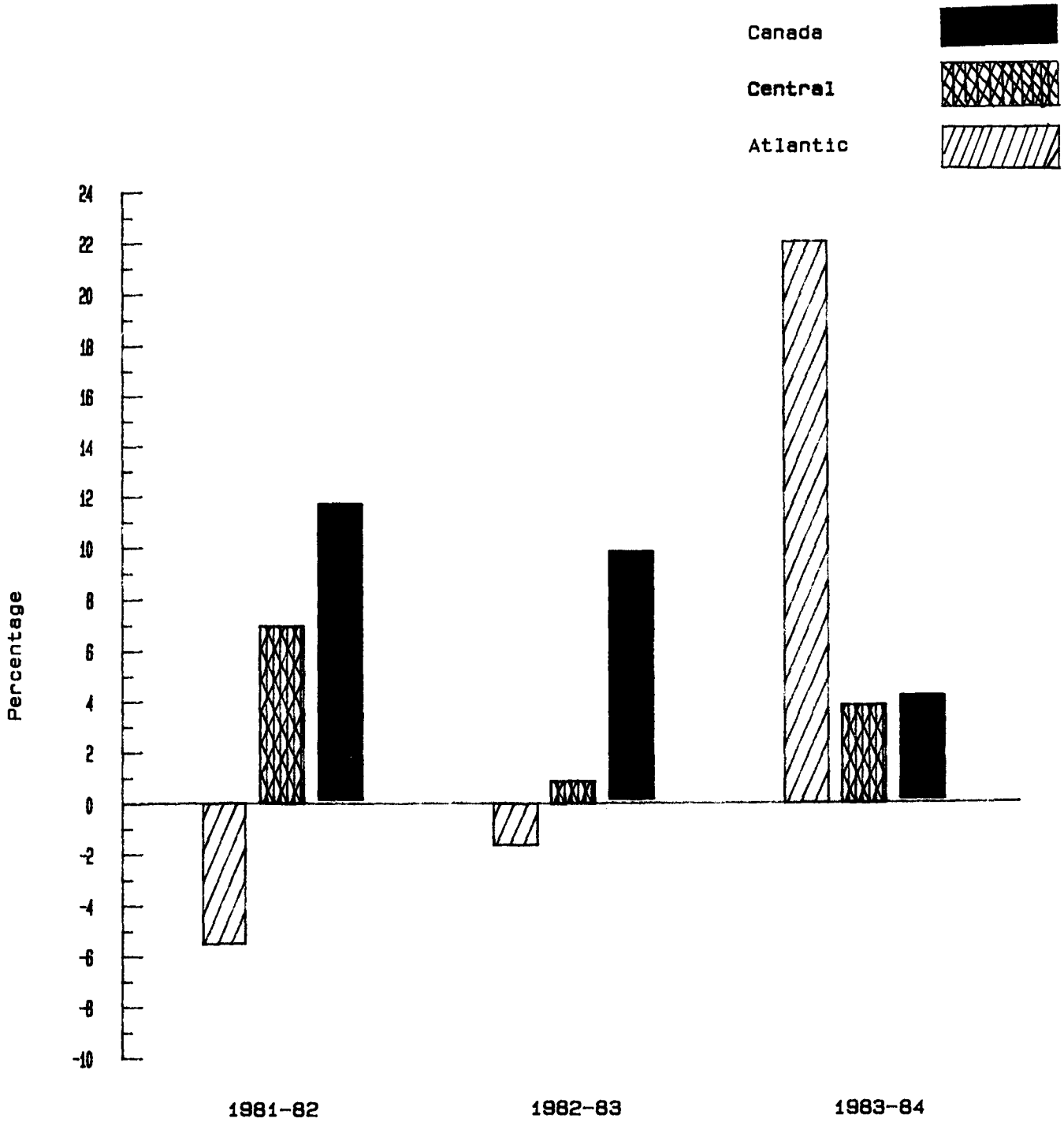


Table 12

Evolution of growth rates of the total demand: Comparison of Atlantic and Central regions and Canada



To summarize, Atlantic region carriers had to cut their construction budgets in 1982 and 1983, a decision that forced them to postpone certain expenditures in the digital switching sector. However, they apparently wish to improve transmissions by opting for digital technology. The carriers maintain their investments in station apparatus and outside plant.

3.3.2 Central Region

In Central Canada, which comprises 61.9 per cent of the Canadian population and nearly 61.3 per cent of the telephones in service, total telecommunications equipment expenditures average 53.0 per cent of the national demand (1981: 57.3 per cent; 1982: 55.0 per cent; 1983: 50.5 per cent; 1984: 50.3 per cent). The increases in demand are lower than those observed on the national scale for 1981-82 and 1982-83.

Although purchasing did not actually decline, it is acknowledged that the economic recession and regulatory constraints have led the carriers to reduce their construction budgets.

On average the carriers in this region purchase nearly 90 per cent of their equipment from Canadian sources. Unlike our observations for the Atlantic region, they import up to 13.79 per cent of their transmission equipment and outside plant, depending on the year. Ten per cent of station apparatus is imported, whereas in the switching sector the import level drops to 5 per cent. Overall, the carriers imported 12.89 per cent of their equipment in 1981, while this share is only 7.4 per cent in 1984.

The distribution of purchasing by equipment type compares with the national situation observed (see Table 14).

In the switching sector, the size of investments aimed at the maintenance of conventional technologies (manual, step-by-step, crossbar) declines over the period from almost 28 per cent in 1981 to 18 per cent in 1984. Analog SPC switching outlays also decline in relative importance in this sector. From more than 18.2 per cent in 1981, they will sink to only 14.0 per cent in 1984. Digital SPC switching benefits from the enthusiastic favour of the carriers. Over four years the relative share of these switches rises from roughly 51.2 per cent to more than 67.3 per cent of investments. More than 95 per cent of the equipment purchased over the entire period is Canadian made.

The transmission sector in Central Canada accounts for about 27.5 per cent of the total investment, or two percentage points more than switching and three more than the national average for transmission spending. Imports vary between 10 per cent and 22 per cent of equipment purchases, depending on the year. This sector registered an increase of more than 32 per cent in 1981-82, followed by declines of 3 per cent in 1982-83 and 9 per cent in 1983-84. Telesat Canada's 1981 and 1982 investments in the space communications sector unbalance the values. It is no surprise to see the share of this sector dropping from 45 per cent to 31 per cent during the period.

Table 13

Evolution of demand in the Central region

(in millions of $)

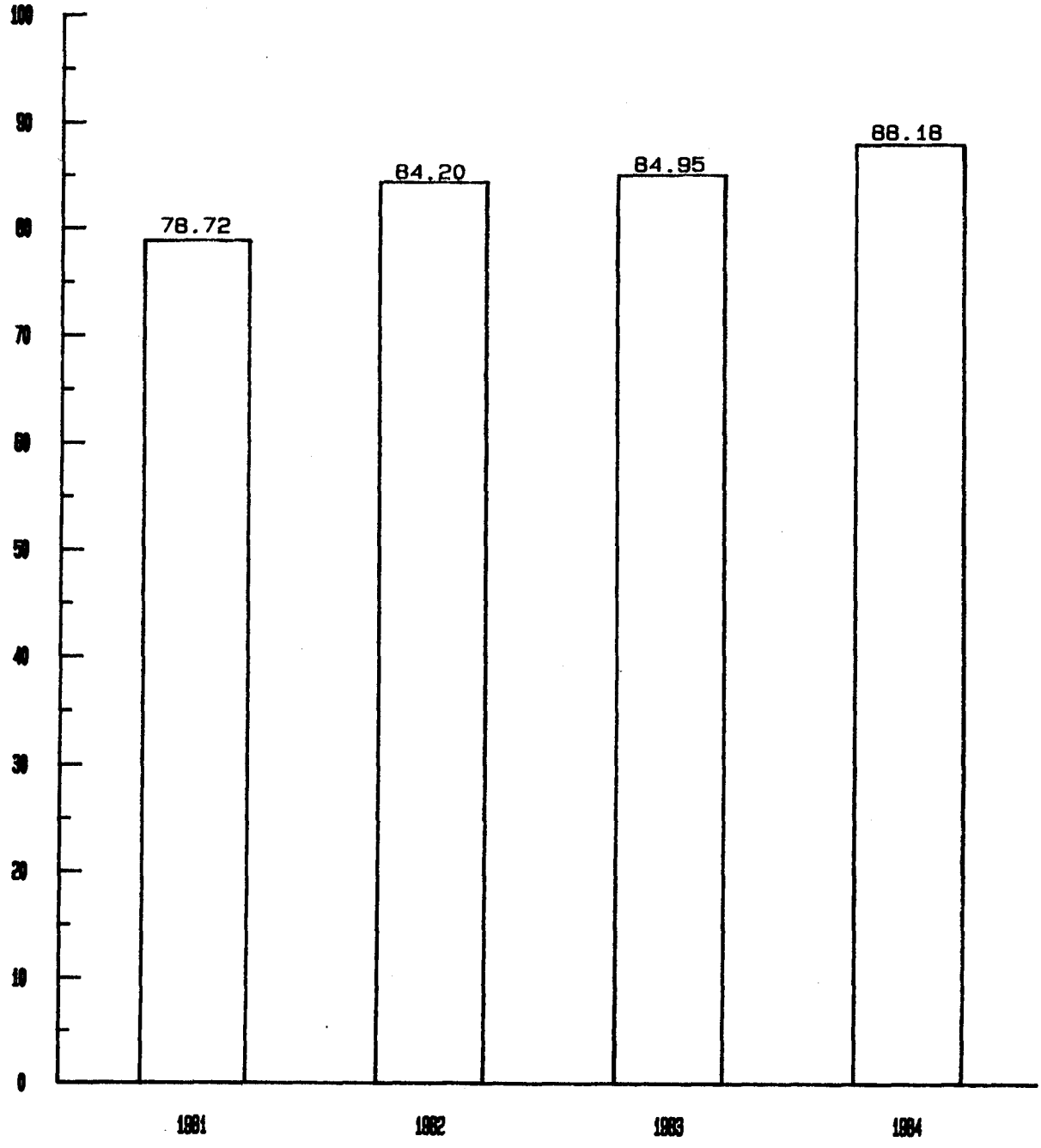
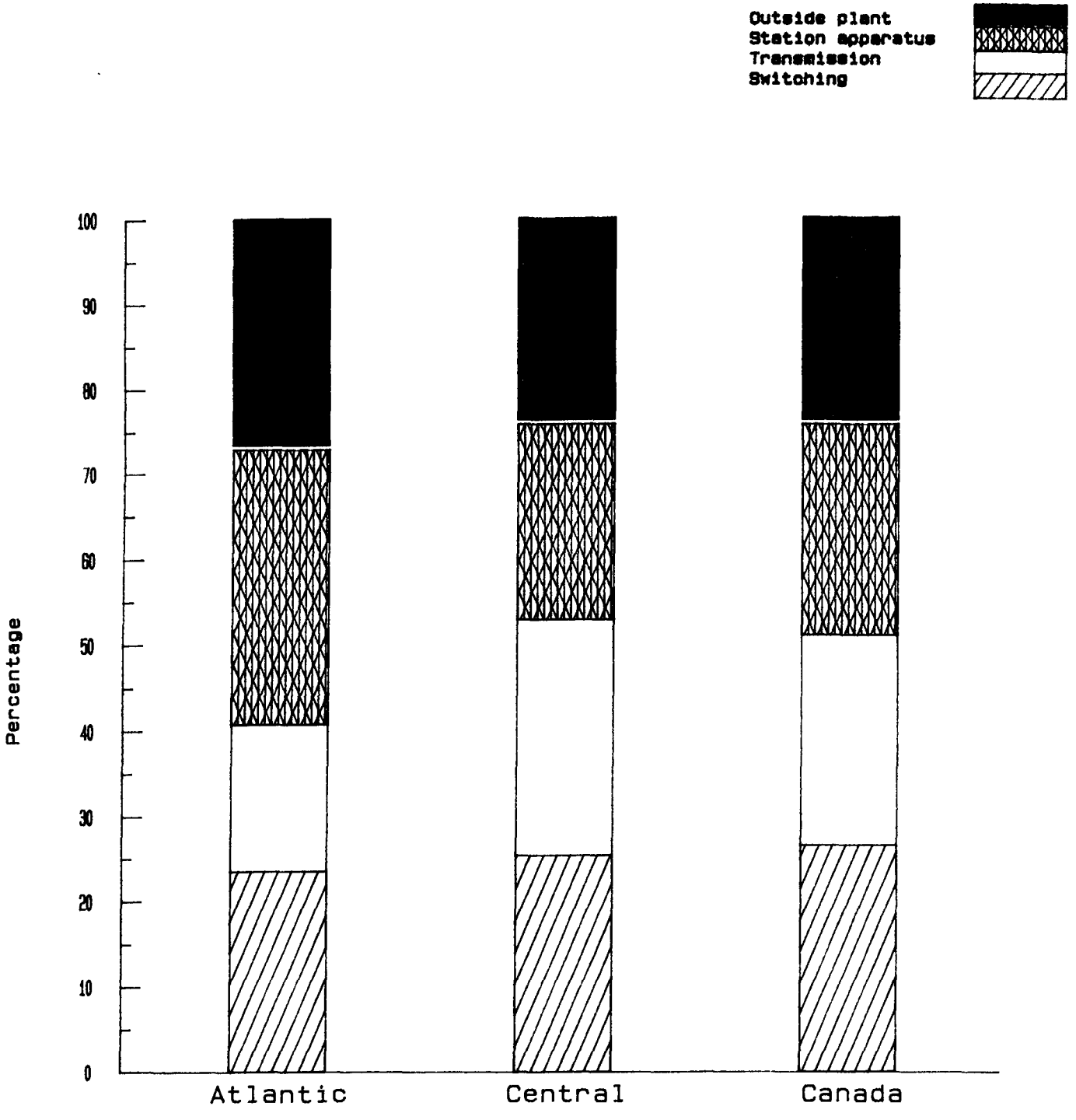


Table 14

Percentage distribution of expenditures by equipment category Comparison of Atlantic and Central regions and Canada (1981-84)



We note furthermore that analog microwave and multiplexor plant claims only 12 per cent to 14 per cent of investments, depending on the year, whereas similar equipment incorporating digital technology accounts for a far larger investment share (46 per cent to 56 per cent). While the volume of investments peaked in 1982 and then declined, the volume of digital plant purchases holds firm throughout the period, whereas analog technology peaked in 1983. The need to improve the use of existing networks translates into a substantial demand for digital multiplexors, which exceeds in volume the combined demand for analog and digital microwaves and analog multiplexors.

The station apparatus sector records a good year in 1981, followed by a 9 per cent decline in 1982. Owing to two slight improvements, station apparatus investment in 1984 will match the 1981 level. Telephone equipment, key stations and PBXs account for an average 61 per cent of the investment in station apparatus, slightly above the national average of 60 per cent. The mobile and radio telephone sectors range around 2.5 per cent, whereas data terminal and telex drops from 26.0 per cent in 1981 to 17.5 per cent at the close of the period. Imports are losing ground; they decline from 15 per cent in 1981 to 6 per cent in 1984.

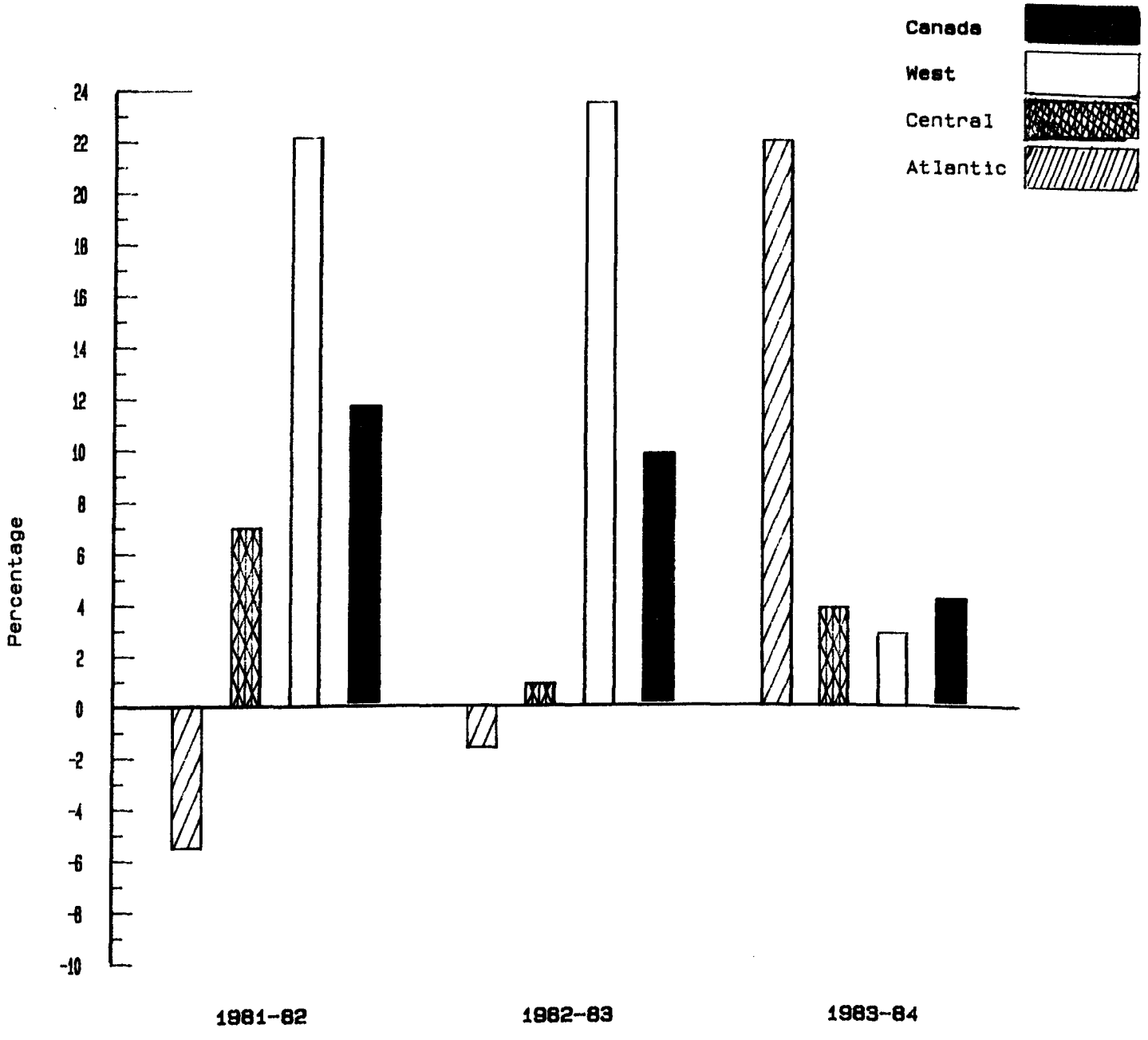
Finally, the outside plant category averages 24.1 per cent of total regional investment, which is similar to the share observed nationwide. The evolution of this demand is characterized by successive declines of 11.8 per cent in 1981-82 and 7.5 per cent in 1982-83, followed by a recovery of 26.7 per cent in 1983-84. This translates into a slight increase in investment over the study period. Teleglobe Canada's commitments at the beginning of the period may explain why imports claim a larger share when total demand is smaller.

Comparing the data on a product basis, we note that pole lines and copper cables account for 85 per cent of the demand for outside plant. Underground cables consistently make up 13.5 per cent of the demand, whereas the optical fibre demand is growing, up from a meager 0.7 per cent to more than 1.8 per cent of the investment. In 1984 investment in optical fibre will be 1.6 times more than in 1981.

Central Canada has been hit by the economic recession, and growth of its telecommunications equipment demand is below the national average. Given the presence of specialized carriers and the predominance of another carrier, it is difficult to draw any general conclusions. Still, we have observed several shifts in equipment category trends, with digital technology clearly seen as having a strong hold on the switching sector. In addition, there is extensive investment in the digital transmission sector. Copper still predominates over optical fibre, and investment in telephones and PBXs remains firm throughout the period.

Table 15

Evolution of growth rates of the total demand: Comparison between the regions and Canada



3.3.3 Western Region

This region includes 28.9 per cent of the Canadian population in 1981 and roughly 31.3 per cent of the telephones in service. As regards growth of carrier demand for telecommunications plant, we observe increases of 22.2 per cent and 23.5 per cent for 1981-82 and 1982-83 respectively, followed by a 1983-84 decline stabilizing around 2.5 per cent. These are undoubtedly exceptional rates of growth that result from major infrastructure investments.

As a rule, the carriers purchase more than 95 per cent of their equipment from Canadian sources. In the switching and outside plant sectors, this share hovers around 98 per cent, whereas it stands at 90 per cent for transmission equipment and 94 per cent for station apparatus. The distribution of investments differs from that observed nationwide insofar as the pressure is felt on station apparatus and switching equipment.

Investment in the switching sector exhibits strong growth from 1981 to 1983 and then stabilizes in 1984 (1981-82: 26.8 per cent; 1982-83: 35.4 per cent; 1983-84: 1.4 per cent). See Table 18 for the distribution of investment in this sector.

The transmission sector displays slightly slower growth than does switching (1981-82: 32 per cent; 1982-83: 17 per cent; and then declines by 0.16 per cent in 1983-84. Technologically, investment in analog microwaves and multiplexors holds throughout the period at growth rates averaging 4 per cent, which is below the national average of 18 per cent. The analog transmission mode, which claimed 38 per cent of investment in 1981, accounts for only 25 per cent in 1984.

As for digital microwaves and multiplexors, their share of total investment rises from 42 per cent in 1981 to more than 60 per cent in 1984. Investment in satellite equipment grows by an average of 19 per cent per annum.

This analysis reveals that the carriers in this region invest heavily in digital technology with a view to increasing their network capacity. Early in the period the ratio of investment in digital multiplexors is three times the amount allocated to digital microwave systems. By the end of the period this ratio is only 1.22 to 1. Digital microwave will be the preferred transmission mode in 1984.

Station apparatus investment evolves at an average annual rate of 16 per cent, slightly less than the regional average growth rate (18.4 per cent). This category's relative share of total investment thus holds at about 26 per cent, which is above the national average. Receivers, key telephones and PBXs claim between 53 per cent and 60 per cent of investment. Outlays for mobile and radio telephones range around 8.7 per cent, telex and data terminal equipment around 13.0 per cent.

By comparison with the data collected for the Central region, the mobile radio category is four times larger in Western Canada, whereas data communications and telex purchases are four times less.

Table 16

Evolution of demand in the Western region

(in millions of $)

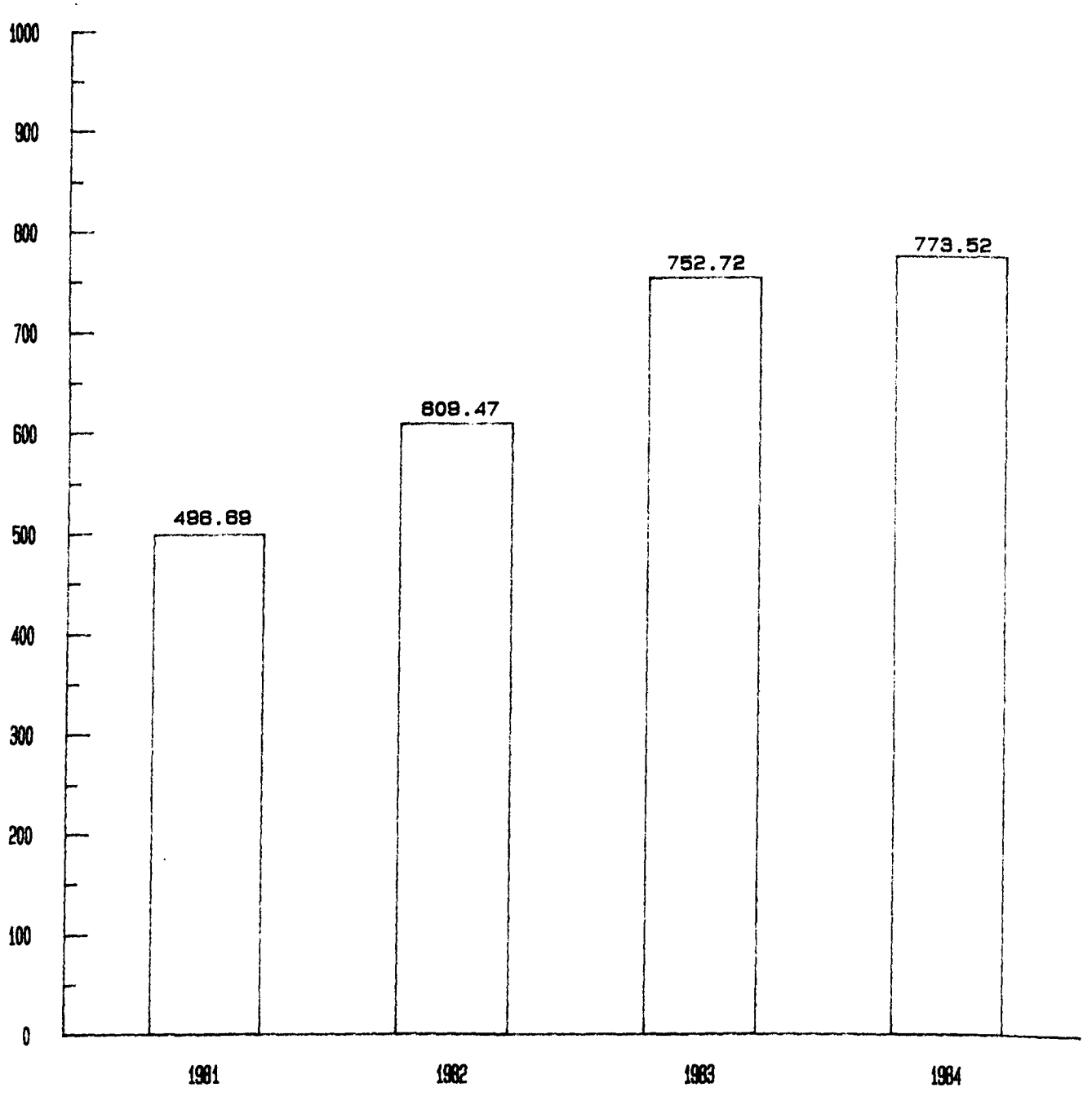


Table 17

Percentage distribution of expenditures by equipment category Comparison between the regions and Canada (1981-84)

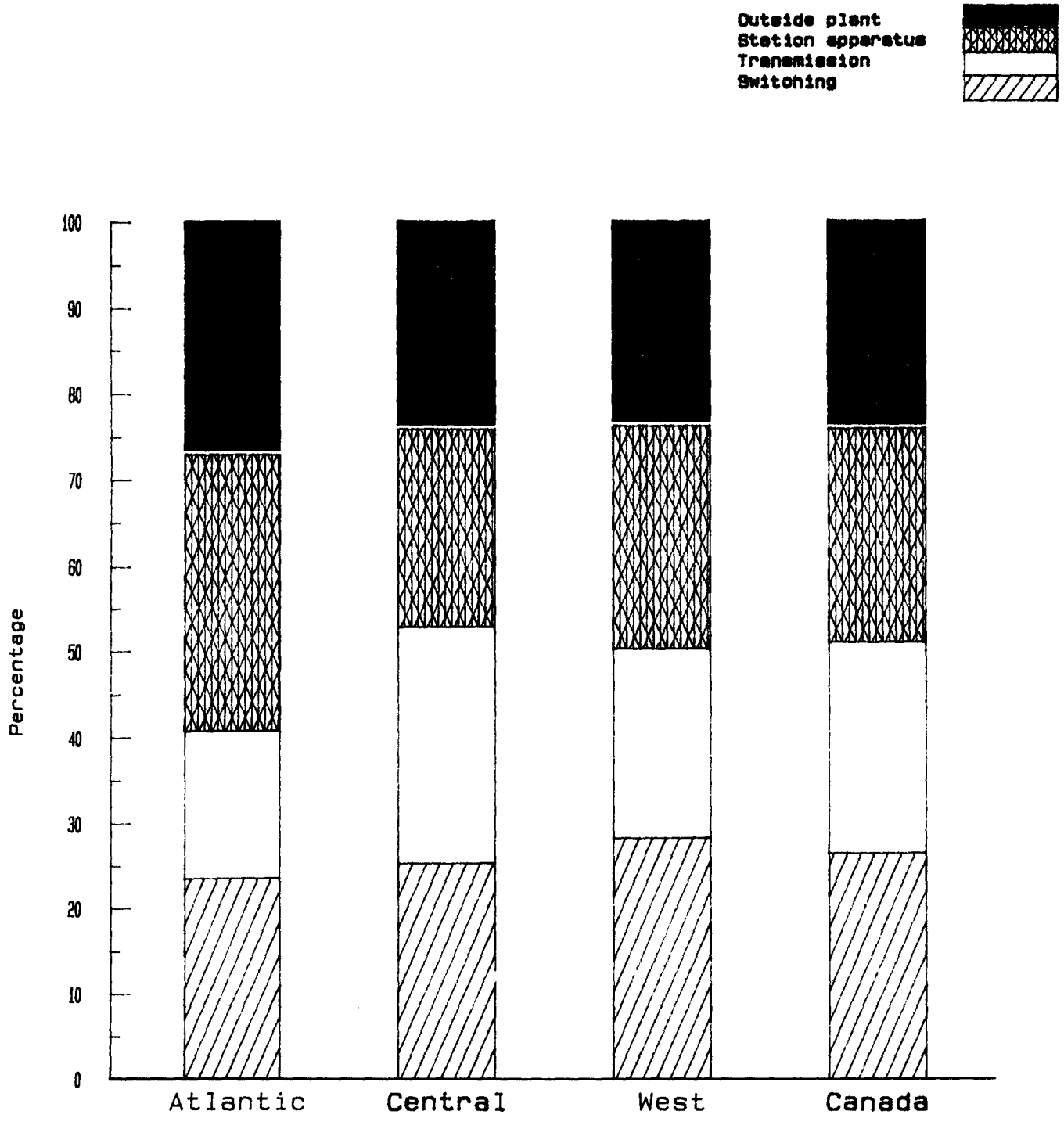
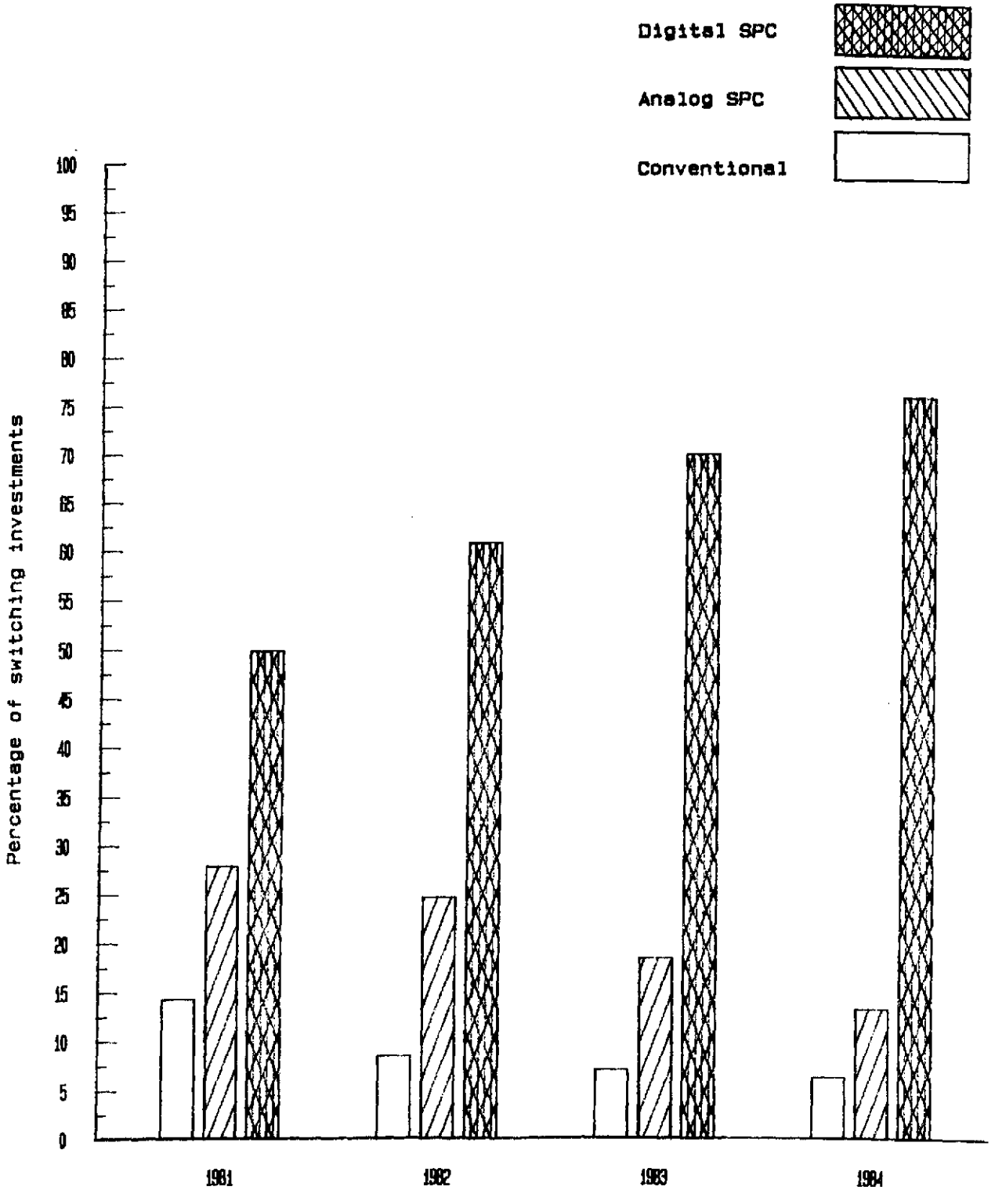


Table 18

Evolution of switching modes in the Western region



Outside plant claims a share of total regional investment that readily compares with the Canadian average. With an average growth of 13.1 per cent, as against 18.0 per cent nationwide, the relative size of this category declines during the period. Underground cables experience growth comparable to that of the entire outside plant sector; they account for an average of 17.2 per cent of total investment. The popularity of pole lines and copper wires diminishes throughout the period (1981: 80 per cent; 1984: 72 per cent) losing ground to optical fibre (1981: 4 per cent; 1984: 10 per cent). This trend, specific to the region, reflects the western provinces' shrewd determination to build a communications infrastructure on this new technology.

4. CONCLUSION

Having obtained a particularly good response rate (35 enterprises out of 67, representing 99 per cent of the telephones in service nationwide), we believe that this study is a true reflection of the intents of Canada's carriers. It should be borne in mind, however, that we are focusing solely on plant acquisitions, not construction budgets. For the carriers that responded to the survey questionnaire, these purchases amount to between $1.37 billion (1981) and $1.75 billion (1984). The average annual growth of this demand stands at 9.2 per cent. Canadian-manufactured products corner a growing share of these purchases (up from 91 per cent to 98 per cent).

The composition of this demand for telecommunications goods is virtually uniform among the four main equipment categories: switching and transmission equipment, station apparatus and outside plant. During the study period the switching and transmission plant categories register growth rates above the average (15.1 per cent compared with 10.1 per cent), whereas the other two categories experience a decline of 6.6 per cent. For all categories the rates of growth of Canadian-made equipment are always higher than the rate observed for all equipment in the same categories. Imports are thus on the decline across the board.

Digital switching is a sector in full expansion. The share of digital switch investment is up from 52 per cent of outlays in 1981 to nearly 71 per cent in 1984. The conventional technologies are falling behind and analog SPC switching is holding steady.

In the transmission sector, the digital technology (microwave and multiplexor systems) rises from 44.8 per cent of total transmission equipment investment in 1981 to 58 per cent in 1984. Expenditures for microwave and multiplexor equipment remain unchanged, whereas outlays for space communications equipment are declining.

Station apparatus and outside plant register growth rates (6.0 per cent) below those of the preceding categories. Receivers, key telephones and PABXs make up 60 per cent of station apparatus expenditures. The remaining share is equally divided among the other four categories and growth is stable.

The outside plant sector holds no surprises, registering slow sustained growth throughout the study period. Copper wire still leads this category (75 per cent of outside plant investment), but optical fibre outlays rise from 1.8 per cent to 5.3 per cent during the period. We also observe that in 1981 the medium-size and large enterprises allocated 95 per cent of their spending to optical fibre, whereas the share fell to 85 per cent in 1984.

To summarize, we note that Atlantic Canada accounts for only 5.5 per cent of the total demand. Ninety-eight per cent of the equipment purchased there is Canadian made, with investment concentrated in station apparatus and outside plant. In the switching sector digital technology has not really made the breakthrough observed elsewhere in the country, whereas the conversion to digital transmission has begun.

The Central region, by far the largest (53 per cent of total investment), exhibits a rate of growth below the national average. Ninety per cent of purchasing is from Canadian sources and is concentrated on transmission and switching equipment.

The Western region experiences major expansion characterized by annual growth rates of 22 per cent and 23 per cent for the 1981-83 period. Investment focuses largely on switching and transmission equipment. The products are Canadian made and digital technology prevails. The station apparatus sector is not as popular. Investment in mobile radios is four times greater proportionately than observed nationwide, while investment in telex equipment is much smaller. Finally, we observe that the West is converting to optical fibre. In 1981 nearly 4 per cent of outside plant investment went to fibre optics, whereas in 1984 the share stands at 10 per cent.

Based on the tables, we can conclude that the development and modernization of the telecommunications infrastructure are closely linked to the level of economic activity. Because of the fragile economy in the Atlantic region, carriers there prefer exploiting a technology to the fullest before replacing it. The flourishing economy in Central Canada encourages carriers to modernize their installations in order to increase the efficiency of their networks. Thus, the growth of purchasing is sustained. The West has had to cope with a rise in demand for telecommunications services and has wagered on the technologies of the future, such as digital-based technologies. In spite of the recent slowdown in economic activity in this region, the carriers have still equipped themselves with an infrastructure that will enable them to meet future demand while keeping operating costs to a minimum. The dramatic fall-off in the growth rate, which plummeted from 23.0 per cent in 1982-83 to 2.5 per cent in 1983-84, points to a slowdown in these investments.

APPENDIX

SURVEY QUESTIONNAIRES

NOTIFICATION

- The purpose of this survey is to obtain current and prospective data on your purchases of telecommunications equipment for resale. The survey is undertaken pursuant to the Department of Communications Act. Your response to this survey is on a purely voluntary basis.

- The Department of Communications will keep all respondents' information CONFIDENTIAL as defined under the Official Secrets Act. Such data will not be released to other government departments and only aggregate information, from which no individual respondent's information can be identified, will be published.

Instructions

- For each period, the values requested should:

  a) be based on the calendar year which covers the period from January 1 to December 31;

  b) reflect the value of your projected or actual purchases for resale to the end user for each category of equipment;

  c) exclude federal tax on manufactured products when it is included;

  d) be expressed in current Canadian dollars to the nearest thousand and, in the case of percentages, to the nearest unit.

- When a category does not apply to your activities, please write "N/A" in the appropriate square.

- When one of your values overlaps two or more categories of the questionnaire, please provide an estimate based on a proportional distribution of this value for each category.

- If your values are dissagregated to the extent that there is more than one value per category, please combine these values in order to make them more compatible with our classification structure.

- Imports include all finished goods completely manufactured and assembled in a foreign country and which are imported directly by your firm or through a Canadian distributor.

- Please return one copy of your completed questionnaire in the enclosed, pre-addressed and postage-paid envelope to the following address before June 12, 1982.

- Keep one completed copy of this questionnaire in your files for reference.

- Should you require further information to assist you in completing this questionnaire, please contact:

Atlantic Region
Mr. J. Guérette
Moncton, New-Brunswick
(506) 388-6531

Central Region
Mr. A.A. Simpson
Winnipeg, Manitoba
(204) 949-2595

Quebec Region
Mr. D. Lachance
Montreal, Quebec
(514) 283-7737

Pacific Region
Mrs. L. Johnston
Vancouver, B.C.
(640) 544-6261

Ontario Region
Mr. A. Pederson
Toronto, Ontario
(416) 966-6331

Headquarters
Mr. Jean Loiselle
Ottawa, Ontario
(613) 995-8181

Return address:

Department of Communications
Economic Development Division
Room 708
300 Slater Street
Ottawa, Ontario
K1A 0C8

PURCHASES BY YOUR FIRM

OF TELECOMMUNICATIONS EQUIPMENT FOR RESALE PURPOSES TO THE END-USER

CALENDAR YEAR

($000)

	1981		1982		1983		1984	
	$	IM-PORTS %	$	IM-PORTS %	$	IM-PORTS %	$	IM-PORTS %
1.0 SWITCHING EQUIPMENT								
1.1 Manual								
1.2 Step-by-Step								
1.3 Crossbar								
1.4 Stored Program - Analog								
1.5 Stored Program - Digital								
1.6 Other (please describe)								
2.0 TRANSMISSION								
2.1 Pt-Pt Microwave - Analog								
2.2 Pt-Pt Microwave - Digital								
2.3 Multiplex - Analog								
2.4 Multiplex - Digital								
2.5 Satellite (inc. Earth Station)								
2.6 Other (please describe)								
3.0 STATION APPARATUS								
3.1 Telephones (incl. key sets and PBXs up to 100 lines)								
3.2 PBXs (100 lines and over)								
3.3 Radio Telephone Equipment								
3.4 Mobile Radio Equipment								
3.5 Data Communications Equipment (incl. equipment purchased for lease to third party)								
3.6 Teletypewriters, CRT Display Units and Similar Devices								
3.7 Station Connections								
3.8 Other (please describe)								

PURCHASES BY YOUR FIRM

OF TELECOMMUNICATIONS EQUIPMENT FOR RESALE PURPOSES TO THE END USER

CALENDAR YEAR

($000)

4.0 OUTSIDE PLANT	1981		1982		1983		1984	
		IM-PORTS		IM-PORTS		IM-PORTS		IM-PORTS
	$	%	$	%	$	%	$	%
4.1 Pole Lines								
4.2 Metal Wire and Cable (aerial, underground and submarine)								
4.3 Fiber Optic Cable								
4.4 Underground Conduit								

Prepared by _____ Firm _____

Title _____ Tel. (incl. city and area code) _____

Comments

NOTIFICATION

- The purpose of this survey is to obtain current and prospective data on the sale of telecommunications equipment. The survey is undertaken pursuant to the Department of Communications Act. Your response to this survey is on a purely voluntary basis.

- The Department of Communications will keep all respondents' information CONFIDENTIAL as defined under the Official Secrets Act. Such data will not be released to other government departments and only aggregate information, from which no individual respondent's information can be identified, will be published.

Instructions

- For each period, the values requested should:

  a) be based on the calendar year which covers the period from January 1 to December 31;

  b) reflect the value of your projected or actual sales for each category of equipment;

  c) exclude federal tax on manufactured products;

  d) be expressed in current Canadian dollars to the nearest thousand and, in the case of percentages, to the nearest unit.

- When a category does not apply to your activities, please write "N/A" in the appropriate square.

- When one of your values overlaps at least two categories of the questionnaire, please provide an estimate based on a proportional distribution of this value for each category.

- If your values are dissagregated to the extent that there is more than one value per category, please combine these values in order to make them more compatible with our classification structure.

- Exports include all finished goods completely assembled in Canada and which are exported directly by your firm or through a Canadian distributor.

- Please return one copy of your completed questionnaire in the enclosed, pre-addressed and postage-paid envelope to the following address before June 12, 1982.

- Keep one completed copy of this questionnaire in your files for reference.

- Should you require further information to assist you in completing this questionnaire, please contact:

Atlantic Region
Mr. J. Guérette
Moncton, New-Brunswick
(506) 388-6531

Central Region
Mr. A.A. Simpson
Winnipeg, Manitoba
(204) 949-2595

Quebec Region
Mr. D. Lachance
Montreal, Quebec
(514) 283-7737

Pacific Region
Mrs. L. Johnston
Vancouver, B.C.
(640) 544-6261

Ontario Region
Mr. A. Pederson
Toronto, Ontario
(416) 966-6331

Headquarters
Mr. Jean Loiselle
Ottawa, Ontario
(613) 995-8181

Return address:

Department of Communications
Economic Development Division
Room 708
300 Slater Street
Ottawa, Ontario
K1A 0C8

SALES OF TELECOMMUNICATIONS EQUIPMENT

CALENDAR YEAR

($000)

	1981		1982		1983		1984	
		EX-PORTS		EX-PORTS		EX-PORTS		EX-PORTS
	$	%	$	%	$	%	$	%
1.0 SWITCHING EQUIPMENT								
1.1 Manual								
1.2 Step-by-Step								
1.3 Crossbar								
1.4 Stored Program - Analog								
1.5 Stored Program - Digital								
1.6 Other (please describe)								
2.0 TRANSMISSION								
2.1 Pt-Pt Microwave - Analog								
2.2 Pt-Pt Microwave - Digital								
2.3 Multiplex - Analog								
2.4 Multiplex - Digital								
2.5 Satellite (inc. Earth Station)								
2.6 Other (please describe)								
3.0 STATION APPARATUS								
3.1 Telephones (incl. key sets and PBXs up to 100 lines)								
3.2 PBXs (100 lines and over)								
3.3 Radio Telephone Equipment								
3.4 Mobile Radio Equipment								
3.5 Data Communications Equipment (incl. equipment purchased for lease to third party)								
3.6 Teletypewriters, CRT Display Units and Similar Devices								
3.7 Station Connections								
3.8 Other (please describe)								

SALES OF TELECOMMUNICATIONS EQUIPMENT

CALENDAR YEAR

($000)

4.0 OUTSIDE PLANT	1981		1982		1983		1984	
		EX-PORTS		EX-PORTS		EX-PORTS		EX-PORTS
	$	%	$	%	$	%	$	%
4.1 Pole Lines								
4.2 Metal Wire and Cable (aerial, underground and submarine)								
4.3 Fiber Optic Cable								
4.4 Underground Conduit								

Prepared by _____ Firm _____

Title _____ Tel. (incl. city and area code) _____

Comments

NOTIFICATION

- The purpose of this survey is to obtain current and prospective data on new investments of telecommunications equipment. The survey is undertaken pursuant to the Department of Communications Act. Your response to this survey is on a purely voluntary basis.

- The Department of Communications will keep all respondents' information CONFIDENTIAL as defined under the Official Secrets Act. Such data will not be released to other government departments and only aggregate information, from which no individual respondent's information can be identified, will be published.

Instructions

- For each period, the values requested should:

  a) be based on the calendar year which covers the period from January 1 to December 31;

  b) reflect the value of your projected or actual new investments for each category of equipment;

  c) exclude federal tax on manufactured products when it is included in the purchase price;

  d) be expressed in current Canadian dollars to the nearest thousand and, in the case of percentages, to the nearest unit.

- When a category does not apply to your activities, please write "N/A" in the appropriate square.

- When one of your values overlaps at least two categories of the questionnaire, please provide an estimate based on a proportional distribution of this value for each category.

- If your values are dissagregated to the extent that there is more than one value per category, please combine these values in order to make them more compatible with our classification structure.

- Imports include all finished goods completely manufactured and assembled in a foreign country and which are imported directly by your firm or through a Canadian distributor.

- Please return one copy of your completed questionnaire in the enclosed, pre-addressed and postage-paid envelope to the following address before June 12, 1982.

- Keep one completed copy of this questionnaire in your files for reference.

- Should you require further information to assist you in completing this questionnaire, please contact:

Atlantic Region
Mr. J. Guérette
Moncton, Nouveau-Brunswick
(506) 388-6531

Central Region
Mr. A.A. Simpson
Winnipeg, Manitoba
(204) 949-2595

Quebec Region
Mr. D. Lachance
Montreal, Quebec
(514) 283-7737

Pacific Region
Mrs. L. Johnston
Vancouver, B.C.
(640) 544-6261

Ontario Region
Mr. A. Pederson
Toronto, Ontario
(416) 966-6331

Headquarters
Mr. Jean Loiselle
Ottawa, Ontario
(613) 995-8181

Return address:

Department of Communications
Economic Development Division
Room 708
300 Slater Street
Ottawa, Ontario
K1A 0C8

NEW INVESTMENTS BY USERS OF TELECOMMUNICATIONS EQUIPMENT

CALENDAR YEAR

($000)

	1981		1982		1983		1984	
	$	IM-PORTS %	$	IM-PORTS %	$	IM-PORTS %	$	IM-PORTS %
1.0 SWITCHING EQUIPMENT								
1.1 Manual								
1.2 Step-by-Step								
1.3 Crossbar								
1.4 Stored Program - Analog								
1.5 Stored Program - Digital								
1.6 Other (please describe)								
2.0 TRANSMISSION								
2.1 Pt-Pt Microwave - Analog								
2.2 Pt-Pt Microwave - Digital								
2.3 Multiplex - Analog								
2.4 Multiplex - Digital								
2.5 Satellite (inc. Earth Station)								
2.6 Other (please describe)								
3.0 STATION APPARATUS								
3.1 Telephones (incl. key sets and PBXs up to 100 lines)								
3.2 PBXs (100 lines and over)								
3.3 Radio Telephone Equipment								
3.4 Mobile Radio Equipment								
3.5 Data Communications Equipment (incl. equipment purchased for lease to third party)								
3.6 Teletypewriters, CRT Display Units and Similar Devices								
3.7 Station Connections								
3.8 Other (please describe)								

NEW INVESTMENTS BY USERS OF TELECOMMUNICATIONS EQUIPMENT

CALENDAR YEAR

($000)

4.0 OUTSIDE PLANT	1981		1982		1983		1984	
	$	IM-PORTS %	$	IM-PORTS %	$	IM-PORTS %	$	IM-PORTS %
4.1 Pole Lines								
4.2 Metal Wire and Cable (aerial, underground and submarine)								
4.3 Fiber Optic Cable								
4.4 Underground Conduit								

Prepared by _____ Firm _____

Title _____ Tel. (incl. city and area code) _____

Comments