

(1)
A STUDY OF INDUSTRIAL
IMPLICATIONS OF TERMINAL
ATTACHMENT IN CANADA

A Report Prepared for

DEPARTMENT OF COMMUNICATIONS

R. W. HOUGH AND ASSOCIATES LTD.

TELECOMMUNICATION CONSULTANTS

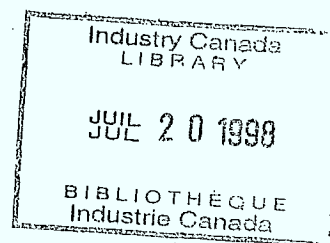
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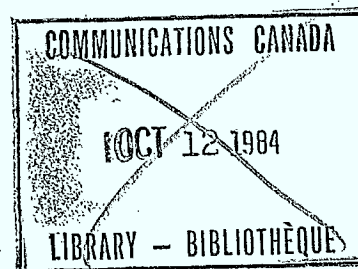
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Roger W. Hough and Associates Ltd.
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The views expressed in this report are those of the author alone and do not represent the position of the Department of Communications or the Government of Canada. The Department, however, wishes to express the preliminary and incomplete nature of the research contained in the document and the need for further analytical work in this important field.

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EXECUTIVE SUMMARY

Introduction

This study has had as its principal focus a preliminary investigation of industrial and market impacts in Canada potentially resulting from liberalized terminal attachment instituted by the CRTC. Specifically at issue is the CRTC's decision, in its Telecom Decision 80-13 (the "Interim Decision," August 5, 1980), to authorize and allow on an interim basis the connection of any and all terminal devices meeting not only Canadian-established technical standards but those meeting standards previously set by the FCC in the United States. These standards, set out by the FCC in its Rule 68, are thought by some to be less restrictive than those established in Canada prior to the CRTC's Interim Decision, and so have the potential of either harming the public switched network technically, harming Canadian telecommunication manufacturers economically, or both. As a result of this perception of harm, two important participants in the matter, Bell Canada and the Ontario Provincial Government, appealed to Cabinet to vary the Interim Decision principally on the grounds that industrial implications were not considered by the Commission in making its decision.

Findings

Our principal findings are set forth below.

1. In substantial and dramatic contradistinction to other major industries in Canada, such as oil and energy, automobile manufacture, and so on, the Canadian telecommunications equipment industry is almost wholly owned and controlled by Canadians. Moreover, this statement applies across the board to all types of equipment, for switching, transmission, and terminal use, in both residence and business markets.

2. Of the total equipment market, amounting to approximately \$1.4 billion in 1978 from interconnect suppliers, it is estimated that that pertaining to terminal equipment of all types, including mobile radio, was some \$398 million (approximately 28% of the total) and within this submarket Canadian manufacturers, including Northern Telecom, AEL Microtel, Gandalf, Mitel, and others supplied over 70%, in monetary terms. Excluding mobile radio, the percentage of Canadian participation in the terminal equipment market reaches a considerably higher figure of almost 85%.

3. From the above, while it can be seen that foreign-owned manufacturers are in the market, they cannot be thought to have the potential of dominating the field, either now or in the future. On the contrary, an examination of the record to date reveals that of all the participants in the interconnection debate so far, only Bell Canada and the Province of Ontario have suggested that Canadian manufacturers might be harmed by allowing interconnection according to the ground rules set forth in the Interim Decision. By contrast, other Canadian manufacturers and suppliers, as well as users, both through their associations and individually, have expressed the position that liberalized interconnection according to the CRTC's ruling will not only not harm them, but actually be of significant benefit, as a result of opening additional Canadian and world markets to Canadian manufacturers.

4. Considering the potential future impact of additional foreign supply, two items are of direct relevance. First, in the United States some four years ago, specific attention was paid by the FCC to the issue of economic harm to the telephone industry as a result of allowing competition in the terminal equipment field. There it was found that "...interconnect competition has had no discernible adverse impact to date on telephone industry revenues...and...there is very little like-

lihood of any adverse impact in the near future." (FCC Docket 20003). From Canadian data to date, it appears that similar statements could be made, because exactly parallel to record increases in telephone industry revenues in the U.S., Canadian telephone companies also show outstanding gains, in the range of 20% to 40% per year, depending on which specific set of products or services are being analyzed. These results are, moreover, brought about at least in part by gains in foreign markets on the part of Canadian suppliers. Second, on the issue of foreign penetration, while it cannot be said that competition in the Canadian market will not attract foreign suppliers, evidence from the U.S. again indicates that all countries, including Japan, are beginning to relax their procurement policies vis-a-vis telecommunications products and it is more than likely that reciprocal arrangements between countries will be the norm rather than the exception.

5. Finally, on the question of technical harm potentially resulting from the CRTC's Interim Decision, this study has found no basis whatever for such a conclusion. On the contrary, FCC Rule 68 is very carefully drawn and much evidence is available to indicate that no technical harm has yet occurred by its adoption in the United States. Since, therefore, the U.S. and Canadian networks are interconnected and designed to the same standards, it stands to reason that what has not harmed one network will be unlikely to harm the other.

Summary and Conclusions

Since this study was begun, a Public Notice has been released by the CRTC (Telecom Public Notice 1981-8, March 10, 1981) which outlines the procedure to be followed in the Commission's full hearing on terminal interconnection, to be held commencing November 17, 1981. Within the hearing, nine

broadly defined subject areas are to be considered of which one is specifically addressed to the subject matter of this contract, i.e., industrial impacts (issue number seven of the list of issues). Accordingly, we believe it is premature to attempt to establish definitive conclusions with respect to "impact or no impact" of the interim terminal attachment rules on Canadian manufacturing. From the study findings, however, it can at least be said that there is some reasonable doubt that the Canadian manufacturing sector will be harmed by the adoption of such rules, and at least some evidence, expressed by manufacturers themselves as well as originating from other sources, that the sector will be better off, rather than worse off, with permanent adoption of such rules. During the hearing itself, it is assumed, much evidence will be brought forward by the parties to support or counter the harm argument and this information is, of course, not available to us at this time. While we have been able to derive preliminary conclusions, therefore, it is essential that these conclusions be understood and interpreted as preliminary ones, and not accepted as final arguments, either for ourselves or others.

CHAPTER 1

INTRODUCTION

This document represents the final report on a study of the industrial implications of terminal interconnection in Canada. As explained in detail later, the report is not intended to be a definitive statement and forecast of industrial impacts, as this area of change is still subject to many influences outside the scope of the study, not least of which is the fact that a full hearing into the matter is scheduled to be held by the CRTC in November of this year. What the study does purport to do, however, is establish preliminary data, market trends, and likely sequences of events relating to industrial impacts, based on the following types of evidence:

1. Filings and procedural developments relating to interconnection, which have already occurred over the last year and a half in Canada;
2. Extremely detailed and comprehensive studies of the subject of interconnection in the United States-- where such changes have already preceded those in Canada by almost fourteen years; and
3. Additional evidence as to how competition in telecommunications supply is being encouraged, initiated, and implemented in other countries, including the U.S., Japan and Europe.

Background

In this opening section we intend to touch only briefly on a very complex and lengthy history of interconnection as it has developed over the last ten to fifteen years in Canada. It is essential to realize at the outset, of course, that terminal interconnection has not traditionally or historically been favored by telephone companies or telephone administrations around the world, and Canada is no exception in this regard. Bell Canada for one, for example, has successfully discouraged attempts to change the status quo in these matters for many years and has taken positions identical to those of AT&T and some other telephone companies in the United States, i.e., that competition in the terminal equipment market would be detrimental and harmful not only to itself but to the public as well. Strongly countering such claims, however, have been telephone users in both countries, as well as non-telephone-affiliated manufacturers, again, it should be noted, in both countries. From these supply organizations and user groups there has been uniform insistence that competition in such markets would be beneficial to all participants and interested parties--including the public, as represented by both business and residence users, large and small business, telephone company stockholders, the telephone industry itself, and the public at large. Crucial to these arguments, it should be recognized, is the contention that the telephone industry itself, while perhaps changing form somewhat, will also ultimately benefit from new interconnection rules and regulations, rather than being harmed by them. For this to happen, of course, it will be

necessary for future telecommunications markets to expand more than they otherwise would in order to sustain not only present companies but new ones as well. As we will see in this report, the answer to questions about industrial implications thus will ultimately hinge on what does in fact happen with respect to market growth in these areas in the future.

Description of the Study

A general outline of the present study is shown in Table 1. As indicated there, an initial discussion of the scope of the original Bell application to the CRTC was thought to be useful as a starting point, together with a brief description and comment on the CRTC's forthcoming hearing on the matter. These items are covered in Chapter 2. In Chapter 3, we identify the types of equipment represented by the interconnect market, and discuss suppliers to that market both in Canada and around the world (items 2 and 3 of Table 1). Also in this chapter, the structure of the Canadian market is especially discussed, including the fact that it is highly Canadian-oriented at the present time, is dominated by Northern Telecom, a very aggressive and innovative manufacturer, but includes other expert companies as well, which have already demonstrated themselves as capable, world-class competitors in these and other related markets.

Chapter 4 of the report, in accordance with item 4 of

TABLE I

GENERAL OUTLINE OF INTERCONNECT CONTRACT

1. Examination of scope of Bell application, and terms of reference for CRTC hearing.
2. Identification and classification of equipment and services, and relevant markets.
3. Identification of major existing and potential suppliers in Canada.
4. Review of experience with terminal attachment outside of Canada.
5. Establishment of estimates of size of terminal attachment market and market shares.
6. Preliminary discussion of potential impact on Canadian manufacturing and employment.

Table 1, reviews briefly the experience with interconnection outside of Canada, especially the United States. Finally, items 5 and 6 of the table are dealt with in Chapter 5, where factors leading to our conclusion that forecasts of severe erosion of Canadian manufacturing have not been demonstrated as yet, are presented. As mentioned above, we do not consider our study to be the final word in this area, as a specific hearing on these matters is still forthcoming. We will, however, be dealing with what is on record at the present time.

CHAPTER 2

BELL CANADA'S APPLICATION AND THE SCOPE OF INTERCONNECTION MATTERS BEFORE THE CRTC

The current national policy debate respecting terminal interconnection was initiated in its present form by Bell Canada on November 13, 1979. At that time, Bell applied to the CRTC for an order approving an amendment to Rule 9 of the company's General Regulations, which rule had been in effect for many years, and was in fact Bell's legal authority prohibiting interconnection. This rule reads as follows:

9. The Company's equipment and wiring shall not be re-arranged, disconnected, removed or otherwise interfered with, nor shall any equipment, apparatus, circuit or device which is not provided by the Company be connected with, physically associated with, attached to or used so as to operate in conjunction with the Company's equipment or wiring in any way, whether physically, by induction or otherwise, except where specified in the Tariffs of the Company or by special agreement. In the event of a breach of this Rule, the Company may rectify any prohibited arrangement or suspend and/or terminate the service as provided by Rule 35.

It is important to note that this Rule had been "on the books" for many years, and was invoked by Bell only insofar as they thought it appropriate to do so. In fact, for almost half,

anyway, of the entire history of data communications, Rule 9 has been continually violated by many data communications users, especially time sharing users, by virtue of the fact that so-called "acoustic couplers" operate "in conjunction with" the telephone network, making possible the sending and receiving of slow- to medium- speed data without physical attachment of circuits to the network, and with the use of many different makes of couplers, virtually none of which are supplied by the telephone company. Within the last few years, moreover, in response to the introduction of terminal competition in the U.S. and in anticipation of similar changes in Canada, a number of new suppliers, distributors and retail organizations have been marketing, in Canada, not only telephone ancilliary devices, such as answering machines, but telephones themselves, including a full line of decorator units. These have been purchased by many individuals and businesses and thus also, presumably, are either "attached to" or "used so as to operate in conjunction with" the telephone network, thus again, technically at least, violating Rule 9. So far as we know, Bell has not invoked Rule 35 against any of these recent distributors or indeed any purchasers of such equipment--meaning at the very least that there have to date been no instances of technical harm to the network that they or anyone else knows about. Moreover, some or all of these activities date back more than ten years for example, in the case, at least, of acoustic couplers and answering machines.

With this background, the original Bell filing of 1979

becomes considerably important--and as we will find it subsequently became important to the CRTC itself. We find, in other words, that in its filing, Bell proposed not to modify Rule 9 in a substantive way, but instead suggested changes that would introduce interconnection only slightly, rather than in a truly effective manner, thus delaying the process even further.

It is important to note that these are not our conclusions and interpretations but are statements of fact, as the CRTC came to realise and respond to in its interim decision on interconnection, issued and made effective on August 5, 1980. To see how this occurred it is first necessary to quote, again verbatim, the amendment to Rule 9 which Bell proposed. As stated by the CRTC in its recent Public Notice (CRTC,1981), "The Company [i.e., Bell] proposed to amend Rule 9 by designating the existing Rule as clause 9(a) and adding a clause 9(b) as follows;"

(b) In any case where terminal equipment, terminal apparatus, or a terminal device not provided by the Company is approved or certified by the Department of Communications of the Government of Canada and bears an identification mark specified by that Department that indicates compliance with standards which have been specified by the Company and approved by that Department, and written notice of such certification, together with an adequate written description of such equipment, apparatus or device has been given to the

Company, the Company shall prepare and file tariffs in respect of the connection, attachment or use of such equipment, apparatus or device in connection with the facilities of the Company, and upon approval by the Canadian Radio-Television and Telecommunications Commission of such tariffs, shall permit the connection with the facilities of the Company of such certified equipment, apparatus or device, the whole subject to such terms and conditions as are set out in the applicable tariffs of the Company." [Emphasis our own.]

On the surface, of course, this proposed amendment does appear reasonable as an initial start toward a more liberalized interconnection policy. On closer reading, however, especially with reference to the underlined section above, it is seen that Bell was attempting to have the CRTC authorize interconnection only for equipment that the Company itself had set standards for, and that had, subsequently, been certified as complying with those standards by the DOC through its Terminal Attachment Program (TAP). Moreover, following such establishment of standards by Bell, and certification of compliance by DOC, Bell proposed to file tariffs for each piece of equipment, apparatus or device, thus requiring the CRTC (according to Bell's proposed Rule 9 amendment), to get involved with each and every non-telephone-company-provided terminal device before it could be legally 'attached to or used in conjunction with' the network. While the proposed Rule 9 amendment thus appeared initially to be reasonable, it was subsequently found by

the CRTC to be completely unreasonable,* and the CRTC responded as follows, in its Interim Decision (CRTC, 1980):

In the light of the position taken by Bell in its letter to the Commission of 11 January 1980, cited above, the Commission has concluded that the prescribed interim requirements cannot be considered reasonable. Bell's interpretation of these requirements replaces what the Commission considered to be a commitment to permit attachment of authorized equipment except for reasonable cause with a refusal to permit attachment except in unspecified exceptional circumstances. In the Commission's view, the mere fact that the application of 13 November 1979 is pending before the Commission does not constitute reasonable cause for refusing to sign a special agreement permitting terminal attachment. [Emphasis our own.]

In accordance with this conclusion, the CRTC "disallowed all such requirements and prescribed new interim requirements which were set out in an order accompanying the decision." (CRTC,

* We have purposefully not gone into detail as to how the Commission arrived at its conclusion, as this information is available elsewhere (e.g., CRTC, 1980, pp. 1-24). In fact, however, it involved a lengthy process over many months, in which public comments were invited, parties were given an opportunity to respond, and so on. In all, some 52 parties commented on various aspects of the interconnection matter, and all parties, including Bell, were given ample opportunity to be heard. These are important points to be noted in the context of the present study and will be addressed again, later in the report.

1981, p.3). It is to these requirements that we turn next.

Requirements for Interconnection Prescribed by the CRTC

The requirements for interconnection prescribed by the CRTC in its Interim Decision have been, essentially, the cause of the greatest degree of consternation and debate with respect to new terminal attachment rules, principally because they eliminated all of the involved procedural requirements proposed by Bell and substituted instead a requirement that Bell immediately and forthwith allow any and all equipment meeting any one of three separate criteria to be attached to the network, unless Bell could show due cause that such attachment would be detrimental to the network in some way. Specifically, Bell was ordered to allow the interconnection of all equipment that met at least one of the following standards (quoted from CRTC, 1980, p.28):

(a) the terminal equipment is of a class and manufacture which meets the requirements of Bell Canada document TCS-130 "Terminal Connection Standards for Single Line Network Addressing Devices, Key Telephone Systems, PBX" dated January 1980;

(b) the terminal equipment is of the same class and manufacture as that provided by Bell Canada to its subscribers; or

(c) the terminal equipment is of a class and manufacture which meets the current requirements of Part 68 of the

Rules and Regulations of the Federal Communications
Commission of the United States.

Of these three criteria, it is the last one which has caused the most concern among certain parties, among them, understandably, Bell itself. What is crucial to note, however, is that only one other really significant party, namely the Province of Ontario, has acted since the interim decision in such a way as to support Bell Canada's submissions regarding interconnection, even in part. (See, for example, Table 2). In particular, Ontario filed a petition with the Governor in Council to vary the CRTC's interim decision on the grounds that Canada's (and in particular Ontario's) telecommunications manufacturing sector would be harmed by the introduction of equipment made to FCC specifications because it would allow a flood of imports to occur, thus inundating the market and impacting severely the existing domestic industry. As we shall see, the "industry" potentially affected, however, is really Bell itself, or, rather, its manufacturing subsidiary, Northern Telecom. This point will become very obvious, as we see that not one other manufacturer in Ontario or even the whole of Canada has supported Bell's and Ontario's position that the "industry" will be harmed. On the contrary, all other manufacturers, both individually and through their associations, have taken the position that telecommunication manufacturing capabilities, revenues, and so on, will be enhanced as a result of liberalized interconnection rules, not harmed by them.

TABLE 2

LIST OF PETITIONERS TO GOVERNOR IN COUNCIL

<u>NAME OF PETITIONER OR PETITIONING ORGANIZATION</u>	<u>PETITION TO VARY INTERIM DECISION?</u>
1. Bell Canada	Yes
2. Ministry of Transportation and Communications, Province of Ontario	Yes
3. Ontario Hospital Association, et al.	No
4. Canadian Business Equipment Manufacturers Association (CBEMA)	No
5. Canadian Manufacturers Association (CMA)	No
6. Canadian Industrial Communications Assembly (CICA)	No
7. Communications Workers of Canada (CWC)	Yes
8. Telecommunications Workers Union (TWU)	Yes
9. Retail Council of Canada	No
10. Canadian Radio Common Carriers Association	No
11. Plessey Canada Limited	No
12. Mr. R.E. Huband	Yes
13. Association des Companies de Telephone du Quebec Inc	Yes
14. Canadian Federation of Communications Workers	Yes
15. Consumers Association of Canada	No

Scope of the CRTC Hearing

The CRTC has recognized all of these problems, and with its Public Notice of March 10, 1981 has anticipated that they would either surface during the course of the debate or be brought up later if they were not addressed during the hearing itself--in petitions to Cabinet, for example, as was the case with Telesat. Accordingly, the Commission has seen fit to deal specifically with the matter, as is illustrated by the list of subjects and issues expected to be dealt with in the full hearing (see Table 3). In particular, item 7 of the list is directed toward industrial impacts essentially in the same way as this contract is directed toward them. Whether the subject will be treated in the same or similar way is something we have no way of knowing. Nevertheless, it is the fact that the Commission has made specific provision within the scope of its anticipated deliberations--again in which, it should be noted, all parties are invited to present evidence and be cross-examined on that evidence--that leads us to have suggested earlier that this report be considered only as one piece of information dealing with the subject, and not a resource document representing compelling evidence, having regard to its accuracy at the present time, resulting from using presently available data.

In summary, the initiation of these matters was led off by Bell Canada; however, as a result of particular filings and responses, the CRTC was led to the conclusion that immediate, clear, and unambiguous action regarding terminal interconnection was appropriate and necessary in the interim period. What follows then

TABLE 3

ITEMS OF INQUIRY TO BE INCLUDED IN
C.R.T.C. HEARING ON INTERCONNECTION,
NOVEMBER, 1981.

1. Impact of interim requirements on subscribers, Bell, manufacturers and public.
2. Extension of scope of liberalized attachment to include basic telephone and inside wiring.
3. Advantages and disadvantages of liberalized attachment for subscribers.
4. Impact on carrier revenues, costs and rates.
5. Impact on quality of service, maintenance and network development.
6. Lawfulness of carriers' rules, re: terminal attachment.
7. Impact on telecommunications manufacturing sector.
8. Technical standards.
9. Terms and conditions for participation of carriers, or subsidiaries of carriers.

(with respect to examining potential industrial impacts) is to look closely at whatever information is presently available on markets for interconnect (i.e., terminal) equipment and apparatus in Canada, paying particular attention to suppliers, market shares, managerial expertise, prospects for the future, and so on. These are the areas dealt with in the next and subsequent chapters.

CHAPTER 3

EQUIPMENT, SERVICES, AND EXISTING AND POTENTIAL SUPPLIERS

Introduction

Telecommunication activities in Canada are very large-- in fact, perhaps, even enormous when compared to certain other kinds of activities. For example, Bell Canada alone generates over \$6 billion in revenue at the present time (cf. 1980 Annual Report--citation: Bell, 1980) and that carrier represents less than 70% of total carrier revenues in the country, to say nothing of additional participants in the industry not included within the carriers 'families'.

While manufacturing is only a part of this total revenue, it is a large part, based on Northern Telecom's \$2.055 billion in sales last year.

In the case of manufacturing, of course, many Canadian companies, including Northern Telecom, have thriving business interests outside of Canada, thus illustrating that not all of the company's manufacturing business stays here by any means. In fact, as is well known, Northern's business outside of Canada has been growing faster than its domestic business, and as a result its ratio of Canadian to non-Canadian employees has been steadily declining.

Despite this fact, Northern as well as others have been able to sustain the very important telecommunications manufacturing sector in Canada, and keep it overwhelmingly Canadian-owned. Unfortunately, completely up-to-date data on all components of this sector are not available, although figures will be presented subsequently for Bell and Northern separately. For the other companies represented in telecommunications manufacturing and sales it is necessary to turn to data compiled for the year 1978.

The first set of such information is given in Tables 4 and 5. These tables are presented essentially as illustrative background material. The data in them were compiled by others, and thus are not guaranteed to be correct in all respects--in addition to the fact that even between the two tables there may be some inconsistencies. What the tables do illustrate, however, are the facts, first, that with respect to world telecommunications markets, Canada's Northern Telecom is considerably smaller than most other manufacturers and very much smaller than the largest three (ITT, Philips, and Siemens), and, second, that despite this fact Northern Telecom within Canada is by far the largest firm in terms of number of employees in the telecommunications sector,* as

* In the original DOC document from which the data in Table 5 were extracted, CGE employment in Canada is given as 18,000. The vast majority of these employees are not engaged in telecommunication activities; however, thus this very large number is substantially deceptive as an indicator of CGE's influence in this area. A more appropriate number for telecommunications has been reported as 160 employees. Whether this is a good or bad estimate we do not know, but it is clearly closer to the right figure than 18,000. In a similar way, the 2,200 Canadian employees reported for Philips in Table 5 are mostly salespeople, with a more accurate figure for manufacturing being in the range of 700-750.

TABLE 4

MAJOR TELECOMMUNICATIONS MANUFACTURERS -
SALES AND R&D EXPENDITURES, 1978 MILLIONS OF CDN \$

COMPANY	TOTAL SALES	TELECOM SALES	R & D	R & D AS % TOTAL SALES
Western Electric (US)	\$11,431	\$11,431	518 ^b	4.5%
ITT (US)	23,289	5,668	959 ^a	4.1
Philips N.V. (Holland)	19,603	5,046	900 ^e	4.6
Siemens (Germany)	18,600	3,500	1,476 ^a	7.9
L.M. Ericsson (Sweden)	2,521	2,521	208	8.2
Hitachi (Japan)	12,965 ^d	2,197	437	3.4
GTE (US) ^c	4,951	2,113	152	3.1
General Electric Co. (UK)	5,200	1,900	260 ^e	5.0
CIT-Alcatel (France)	4,700	1,600	235 ^e	5.0
Nippon Electric Co. (Japan)	3,962	1,525	126	3.2
AEG-Telefunken (Germany)	7,700	1,400	385 ^e	5.0
Thomson CSF Group (France)	5,800	1,330	300 ^e	5.2
Standard Electric Lorenz (ITT) (Germany)	1,200	1,200	60 ^e	5.0
Northern Telecom (Canada)	1,505	1,131	98 ^a	6.5
Plessey (UK)	1,700	463	188 ^a	11.1
	TOTAL:	\$43,025		
			AVERAGE:	5.4%

NOTES:

- a) NTL, ITT, Plessey and Siemens internally funded \$98,\$445, \$52, and \$1,347 million of their total R & D.
- b) Total development and special engg. - '77.
- c) Product group operations.
- d) Year end March 31, 1979.
- e) Estimates.
- f) Including traffic control, information, medical telecom sales.
- g) Exchange rates: 1 US\$ = 1.2005 Can. \$
1 UK£ = 2.3890 Can. \$
1 FR. Franc = 0.2821 Can. \$
1 DM = 0.6416 Can. \$
1 Y = 0.005966 Can. \$

Source: Bell Canada Special Task Force Report, March, 1980.

TABLE 5
WORLDWIDE AND CANADIAN EMPLOYMENT
BY THE MAJOR TELECOMMUNICATIONS
EQUIPMENT SUPPLIERS TO CANADA, 1978.

COMPANY	TOTAL WORLDWIDE SALES 1978 (\$Millions)	WORLDWIDE NUMBER OF EMPLOYEES	CANADA NUMBER OF EMPLOYEES*
Northern Telecom	\$ 1,505.0	32,000	18,035
AEL Microtel	150.8	2,950	2,950
Motorola Canada	2,700.0	1,000	1,000
Canadian General Electric	1,000.0	18,000	18,000
Gandalf	13.0	475	350 ^e
Mitel	11.5	679	410
SED Systems	10.0	260	260
L.M. Ericsson Ltd	2,521.0	65,000	30 ^e
Philips Electronics	19,603.0	385,000	2,200
AEI Telecommunications	9.0	--	130
Siemens Electrics	18,600.0	322,000	400
ITT Canada	540.0	500	500
Plessey Canada	9.0	200	200
Plantronics Canada	2.0	30	25
Small Companies	164.3	5,466	5,466
64 Companies	Avg. 2.6		85.3
		TOTAL:	49,956

NOTES: * Total employees, not necessarily telecommunication employees.
e) Estimated.

SOURCE: Compiled from data appearing principally in "The
Supply of Communications Equipment in Canada," DOC,
Economics Branch, 1980.

well as sales, as we shall see later.

To begin the process of attempting to estimate total interconnect market sales within Canada (as this information is not available, as such, in other documents), we have compiled the components of relevant information into two large foldout tables, which are included at the end of the report as Tables T-1 and T-2. These tables depict essentially our entire data set on companies operating in the interconnect market in Canada, together with particulars, as they are available, as to either number or percentage of total sales which are Canadian sales, and number or percentage of total sales which are telecommunications-based. Finally, as we will see shortly, Tables T-1 and T-2 also contain basic data on the components of telecommunication sales, because it is only a portion of the totals in each case that are applicable to the interconnect market we are seeking to estimate and analyze.

Before proceeding further it is useful to describe somewhat the information depicted in the two foldout tables. First, it is necessary to point out that Table T-2 is essentially a continuation of Table T-1, in that it presents the same type of data, in the same format, for another set of companies. As may be seen, Northern Telecom heads the list, followed by AEL Microtel, Motorola Canada, Canadian General Electric, Gandalf, Mitel, and so on. In all, some 15 companies are individually represented in the table(s), plus 64 additional small companies which have been grouped together and displayed as a whole at the end of Table T-2.

Together, all of these companies are participating in the complete range of telecommunications manufacturing activities in Canada, from telephones, to switching machines, to electronic PBXs, data communications equipment, central office equipment, wire and cable, microwave radio, mobile radio, and so on. In total, our best current estimate of the share of these companies markets in Canada was approximately \$1.4 billion in 1978, as shown in Table 6. Furthermore, the percentage distribution of total market obtained by the list of companies is also shown, as column 3. There it may be seen that, to the best of our ability to calculate it, Northern Telecom does have very close to 70% of the Canadian market in total, as they estimate themselves, followed by AEL Microtel and the 64 small companies combined, each of which has between 7% and 8% of the total market.

From these data, one of the first items that we believe it is relevant to observe is that Canada is blessed with its own domestic telecommunications industry to a very high degree, considering the fact that Northern Telecom, AEL Microtel, Gandalf, Mitel, SED Systems, and virtually all of the 64 small companies are Canadian owned and operated.* Together these companies account for over 86% of the total Canadian market, leaving just over 13% for others.

A second point to note is that because the data were compiled for 1978, they are out of date by two years, and thus do not reflect the fact that very substantial changes have taken

* There are some exceptions to this general rule, but it is, on the whole accurate. For reference, a complete list of the 64 companies surveyed, as compiled by DOC, is given at Appendix A.

TABLE 6

MAJOR SUPPLIERS OF INTERCONNECT EQUIPMENT TO CANADA: ESTIMATED SALES AND MARKET SHARE

COMPANY	ESTIMATED COMMUNICATIONS SALES (1978)		PERCENT CANADIAN MARKET	ESTIMATED CANADIAN INTERCONNECT SALES (1978)		INTERCONNECT MARKET SHARE (PERCENT)	
	WORLD	CANADA				WITH	WITHOUT MOBILE RADIO
Northern Telecom	1505.0	1008.0	69.9%	250.0		62.7%	75.4
ABL Microtel	150.8	111.6	7.7	16.1		4.0	4.9
Gandalf	9.2	5.5	0.4	1.5		0.4	0.5
Mitel	11.5	3.0	0.2	2.5		0.6	0.8
ITT Canada	NA	25.0	1.7	23.3		5.8	7.0
Plessey	463.0	2.7	0.2	0.6		0.2	0.2
L.M. Ericsson	2521.0	9.5	0.7	10.0		2.5	3.0
Philips	5046.0	10.0	0.7	10.0		2.5	3.0
AEI Telecommunications	NA	9.0	0.6	8.0		2.0	2.4
Siemens	3500.0	30.0	2.1	3.5		0.9	1.1
Small Companies	164.3	109.1	7.6	5.0		1.3	1.5
Motorola	999.0	56.3	3.1	56.3		14.1	--
CGE	50.0	50.0	3.5	10.0		2.5	--
Pye	NA	0.3	3.5	0.3		0.1	--
SED Systems	10.0	10.0	0.7	0.2		0.1	0.1
Plantronics Canada	NA	2.0	0.1	1.0		0.3	0.3
TOTAL:		\$1442.0		\$398.3			

place in certain areas. For example, Northern itself, as we will see later, has increased its revenues over 17% per year on average over the period 1978-1980, and Mitel's growth has increased over 80% per year, putting it at the \$40 million per year revenue level rather than \$11 million.

In both of these cases, of course, large amounts of the new sales are attributable to growth outside of Canada, in terms either of exports, or sales of one or more subsidiary companies. Nonetheless, they are still revenues accruing to Canadian owned and operated companies, and as such are contributing to the continued overall growth of Canada's telecommunications manufacturing sector.

Finally, with these data as background information, it is necessary to make the next transition to appropriate sets of figures for the interconnect market itself. In order to do this it is first necessary to establish what the 'interconnect market' consists of, in terms of products, services, and so on.

The first step in this process is to list, as in Table 7, the principal kinds of equipment we are talking about. From this exhibit it is clear that the major emphasis is on voice equipment such as telephone sets, key telephones, PBXs, and so on, with data communications devices being essentially left out. The principal reason for this is the fact that it is the voice terminal market that is new in terms of interconnection--i.e., the data area has always had other suppliers, and provisions

TABLE 7

PUBLIC SWITCHED TELEPHONE NETWORK
TERMINAL EQUIPMENT

1. Telephones - dialing, non-dialing, decorator, portable, speakerphones, etc.
2. Telephone Ancilliary Devices - single line hold, etc.
3. Answering Machines.
4. Automatic Dialers.
5. Key Telephone Systems.
6. Key Telephone Ancilliary Devices.
7. PBXs
8. PBX Ancilliary Devices.
9. Call Restrictors.
10. Call Diverters.
11. Music or Message on Hold.

have been made by one means or another to allow interconnection of all of this equipment, whether supplied by the telephone company or not, to both public and private lines. It is generally the rule, of course, that the interface device, i.e., data modems (modulators-demodulators) are supplied by the telephone companies if they are attached to the public switched network, and network addressing devices generally, if not always, follow the same pattern. However, as mentioned earlier, users have procured acoustic couplers for many years from a great variety of suppliers, and competitive modems have been used in many data communications systems as well. What is clear therefore is that our greatest concern is with new potential markets, which also coincides with other's interpretation of the market, as well. Having said this, the first question to arise is, How big is the telephone, key telephone, PBX, etc. market now?

To establish credible data on this question is not an easy process. We have approached it, however, from a perspective of logic and analysis that at least appears reasonable, and we will, in the course of the discussion, explain most if not all of the routes we have taken to arrive at our conclusions. First, however, some very interesting data relating to the question of terminal markets, compiled elsewhere, will be presented.

In the summer of 1978, a survey was conducted by DOC in which the Canadian telecommunications 'market' was approached in a different way, specifically, from the standpoint of the buyers.

of telecommunications equipment in the country, i.e., the carrier industry itself. From this survey a report was written entitled "The Principal Canadian Telecommunications Carriers: Expenditures on Telecommunications Equipment, 1973-1982" (DOC, no date). As described in the Introduction to that report, the data in it were compiled in association with the Canadian Telecommunication Carriers Association (CTCA), whose 19 corporate members supplied the requisite information, which were then assembled, prepared for data processing, and formatted into appropriate tables by DOC.

Of particular interest to us with respect to these data is the fact that they are broken down by types of expenditures, first by major category or classification, then into subcategories. Table 8, taken from the referenced report, gives an illustration of this. In particular, it is the category referred to by the telephone industry as 'Station Apparatus' that is of interest to us, for it is this category that includes telephones, PBXs and so on. Furthermore, that category is shown to specifically include data, which as mentioned above we are intending to leave out of the present analysis, as well as teletypewriters, which also fall into the non-voice category. Finally, there is an additional item under this classification that does not have an obvious meaning, i.e., 'Station Connections.' Upon examination it is discovered that this subcategory refers, in particular, to the "capitalized cost of the labour necessary to facilitate connections at customer locations," plus miscellaneous terminal hardware and inside wiring. For our present purposes, then, this is also not an appropriate expenditure,

TABLE 8
PLANT EQUIPMENT EXPENDITURES - CANADA.
Millions of Dollars.

Number of Carriers: 18

	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>
<u>CENTRAL OFFICE EQUIPMENT</u>					
Switching: Manual	8.9	16.5	14.1	6.4	7.0
Step-by-Step	57.9	80.4	89.5	101.9	93.0
Crossbar	78.6	133.5	140.0	144.0	160.3
Electronic	61.0	116.5	179.3	239.5	240.8
Transmission: Radio	45.5	45.8	60.7	63.4	60.0
Other	103.9	172.1	218.0	186.0	188.6
SUBTOTAL:	356.7	564.8	701.5	741.3	749.7
<u>STATION APPARATUS</u>					
Teletypewriters	7.9	6.8	22.4	14.9	15.5
Telephones	29.0	47.6	124.2	122.5	129.5
Radio Telephones	5.6	12.7	19.7	17.8	20.2
Data	4.8	5.6	16.5	16.1	19.1
Station Connections	110.3	151.0	170.5	190.0	226.4
Large PBX	35.9	56.0	58.7	57.6	59.0
SUBTOTAL:	193.5	279.8	412.0	418.9	469.6
<u>OUTSIDE PLANT</u>					
Pole Lines	15.0	18.8	20.7	24.5	42.8
Cable: Aerial	79.2	104.8	111.2	126.5	149.3
Underground	54.7	80.8	78.5	97.8	89.3
Buried	84.5	106.0	98.1	111.1	141.7
Submarine	21.0	7.9	1.1	.6	1.1
Aerial Wire	3.5	3.6	3.5	3.7	7.3
Underground Conduit	53.8	70.3	62.4	65.1	70.3
SUBTOTAL:	311.6	392.2	375.5	429.3	501.8
TOTAL:	861.6	1,236.8	1,489.1	1,589.5	1,789.4

SOURCE: Department of Communications, The Principle Canadian Telecommunications Carriers: Expenditures on Telecommunications Equipment 1973-1977.

and we are left with the three subcategories 'telephones,' 'radio telephones,' and 'large PBX' as the appropriate items to include as representing the terminal attachment or interconnect market, from the standpoint of carrier purchases. In 1977 these three expenditure items summed to a total of about \$209 million, which is a figure we will come back to later in the report.

It is also possible to approach the subject of estimates for the interconnect market from the supply side of the equation. The development of these estimates is considerably more complex, however, since it involves making various sequences of assumptions and carrying out a number of calculation procedures. None of these are in the least complex in a mathematical sense, but what is important is that the calculation procedures be identified unambiguously, in order that modifications and/or corrections can be made, as more and better data become available.

To start this process we return to our basic data charts, Tables T-1 and T-2, where information on each of the relevant companies or sets of companies is presented. Beginning with Northern at the top of chart T-1, we see that data are given, where they are available, for worldwide sales, percent of Canadian market, world and Canadian employees, R&D expenditures, types of products (if any such data are available), and a number of other descriptive variables including Canadian sales as a percentage of total worldwide sales. Finally, in the last column to the right, each company or company group has associated with it additional sets of remarks to assist in characterizing, sizing, or otherwise making

more clear those details that are relevant to the markets and market sizes for each organization.

On the basis of these data, we have, using separate calculation and approximation methods for each company as appropriate, derived estimates for each company's contribution to the interconnect market individually. To make these methods clear, we have specified them completely, and included these descriptions in the report, at Appendix B. Without going into detail for all, therefore, Northern Telecom can be used as an example. In this case, Northern has reported its sales in categories that are analogous to those seen just above for telephone company purchases, i.e., central office switching; subscriber apparatus and business communication systems; wire, cable and outside plant; and transmission--the latter two when combined being equivalent to total outside plant purchases as reported by the carriers. From these descriptions, it is seen that 'subscriber apparatus,' while not broken down in detail, does correspond to terminal equipment hardware in total as reported by the carriers under the heading 'station apparatus,'* thus allowing the figures to be compared for equivalent years.

* If comparisons are made here, it must also be remembered, as previously indicated, that the carrier subcategory 'station connections' is not terminal hardware at all but rather capitalized labor, inside wiring and so on. These purchases would then be in addition to purchases of the terminal hardware itself, as reported as sales by Northern Telecom.

Using the figure in the Station Apparatus category, then, it may be seen that Northern's contribution to the interconnect market can be estimated as approximately \$250 million in 1978, based on an overall assumption that 67% of subscriber apparatus sales are in Canada, just as 67% of total sales are reported (by the company) as being in Canada. Similarly, with AEL Microtel we have a figure of \$21.9 million for subscriber apparatus in total, and against its reported 73%-75% Canadian sales we derive an estimate of approximately \$16 million for Canadian interconnect contribution. Finally, this process of reasoning is continued for each company or company group, with the results appearing in Table 6, column 4.

The end result of these calculations is our estimate that the total Canadian interconnect market in 1978 was probably about \$390 million including mobile radio, or some \$320 million excluding mobile radio. Of these two figures it is the latter one that is most important, because again (as with data) mobile radio has been a competitive area all along, and as before our greatest interest is in those areas subject to new competition, namely telephones, PBXs, and ancilliary devices connected directly to the network.

The last two columns in Table 6 conclude, then, our reevaluation of the companies participating in the interconnect market in 1978. From this information it may be seen that Northern Telecom by itself, according to our best estimate, contributed approximately 63% when mobile radio is included, and over 75% when mobile radio is excluded (the more relevant figure, generally).

Moreover, the set of Canadian companies operating in these markets (i.e., Northern, AEL Microtel, Gandalf, Mitel, and most of the small companies) contributed over 83% in total, again when using the figures excluding mobile radio. These percentages, of course, are seen to be very high, and the central question of our analysis is, Can these ratios be maintained? It is to this question, then, that we turn in the next chapter.

CHAPTER 4

INTERCONNECT EXPERIENCE OUTSIDE OF CANADA

In this chapter it is our intention to review as briefly as possible relevant experience with interconnection in countries other than Canada. Unfortunately, as may well be imagined, the emphasis in the discussion will be almost entirely on the United States, for the simple reason that it is there that most of the changes in this area have been occurring. In addition, as we will see, there have in the U.S. long been similar debates to those now occurring in Canada, though couched in somewhat different terms, and many of the 'players' represent the same or similar groups-- in contrast, it should be noted, to many other countries.

To begin, we first address the problem by identifying some of the relevant issues. These would include, as in Canada, what impacts, if any, might be felt by the carrier industry, assuming that terminal interconnection was allowed; how the domestic telecommunications manufacturing industry might be impacted (again, if at all); how domestic telephone rates might be affected, if at all; and impacts of foreign competition. As is ultimately clear, these are virtually all the same or similar issues to those now being addressed, or soon to be addressed, in Canada. It is reasonable to assume, therefore, that there may be, and indeed are likely to be, many similar bases for comparison.

A comprehensive study of all of these matters is, of course, very much outside the scope of this study. What is relevant, however, is a discussion dealing with industrial impacts. As we shall see, this issue is intrinsically involved with the issue of potential economic harm to the carriers. Thus, the discussion will involve both of these areas.

The Question of Economic Harm

As is by now well known, the interconnect era in the U.S. had its essential origins in 1968, with what is referred to as the FCC's Carterfone decision. Leading up to this proceeding, and during it, many arguments were put forward by the telephone industry against interconnection, just as they are now in Canada. Principal among these arguments at the time was the issue of technical rather than economic harm. For example, the question of potential danger to the network, to telephone maintenance personnel, and so on from the inadvertent (or perhaps even purposeful) introduction of higher voltages than the telephone system was designed for, was one of the issues. Another was the sophisticated nature of the inband signaling system used throughout the network to carry network addressing information and the potential complications that could arise in this area from the introduction of inappropriate signals by users. Also, of course, the telephone companies were concerned about the introduction of non-standardized terminal equipment itself, including additional complications of maintenance, fault identification, establishment of responsibility in case of

failure, and so on.

All of these potential problems were, of course, of very legitimate concern, not only to the telephone companies themselves, but to regulatory authorities, both state and federal, and to users. No one, in other words, was anxious to press for a new era in which competition would be allowed, but the very sophisticated, complex, efficient, and above all superbly operating network would be subject to failure on any grounds whatsoever.

As is the case with almost all aspects of this study, is is both impractical and impossible to go into detail with respect to the solution to the above problems. However, it is important to note that they were dealt with in the U.S. from many different aspects, including the empaneling of an expert group of telephone and telecommunication engineers under the auspices of the National Academy of Engineering; consideration of a variety of solutions, including introduction of telephone company designed and maintained coupling devices; consideration of the fact that telcos were already interconnecting with certain private systems, particularly those operated by utility companies; and so on. Suffice it to say, therefore, that the issues of potential technical harm were dealt with very comprehensively over the years, both prior to and subsequent to the 1968 Carterfone decision, and the conclusion was that, with careful regulation, technical harm could be completely avoided.

In a similar way, though later, the issue of economic harm was brought up. This matter, it turned out, was considerably

more complex and difficult to deal with, since it involved, naturally, only forecasts, propositions, economic theories of how markets evolve and change, and so on. To deal with these questions, therefore, the FCC initiated a full hearing into the subject area, commencing in approximately 1975, and concluding between July and September, 1976. This hearing is known by its designation within the FCC, as Docket 20003.

Docket 20003 has now become well known both within the U.S. and outside it, because, as with technical harm, the 'bottom line' to the issue of economic harm was, Would it, or would it not, occur? In both of these areas, therefore, the telephone industry was put on notice to prove its contentions, rather than simply allege them. Since these matters are important in Canada as well, we will deal with the conclusions arrived in Docket 20003 in some detail.

To begin, we find that by far the best way to introduce the subject is with a verbatim transcription of several of the document's early paragraphs. For reference, these are taken from Part A, Executive Summary, paragraphs 3-7:

3. This proceeding, Docket 20003, was instituted as a broad fact-finding investigation into the economic effects and interactions of several telecommunications industry and regulatory policies and practices. In particular, we are examining the economic effects of competition in the private line and terminal equipment markets, of present procedures for segmenting intrastate and interstate costs and revenues, and of present rate structures for local telephone services. In this, the initial phase of our investigation, two fundamental questions of immediate concern have been addressed:

1) whether the existence of competition in the market for private line services and terminal equipment either has caused or is likely to cause a significant loss of revenues by the telephone industry, or an increase in basic telephone rates; and 2) whether the beneficial cross-subsidies claimed by the telephone industry do in fact exist, and if so whether they will be adversely affected by the presence of competition in the private line and terminal equipment markets.

4. In this proceeding, interested parties have been afforded ample opportunity to submit their views, comments, studies, or other information concerning these major issues as well as numerous subsidiary topics. The Commission's staff, aided by an independent economics consulting firm, has examined these filings in great detail, as well as other relevant data in the public record. The following observations represent a distillation of our findings. For a more comprehensive analysis of each item, reference is made to the main text and/or the report of the consulting firm.

5. First, we are compelled to express our disappointment with the overall depth and quality of the comments and studies submitted. Considering the importance of these issues to the American public, the strong views expressed by some of the parties, and the length of time allowed for preparation, we expected comprehensive economic analyses complete with substantial documentation. Instead, as is elaborated more fully in the main text, we received primarily a reiteration of previous views together with various reports of fragmentary studies, and very little supporting documentation. Accordingly, we find that these comments raise a far greater number of questions than they resolve. Nevertheless, we believe that sufficient evidence exists to enable us to arrive at some initial conclusions which will be valid for the foreseeable future, while we and others pursue these issues with greater rigor and more factual information.

6. The first question we address is whether competition has had any adverse impact, to date, on telephone industry revenues or basic telephone rates. To answer this question, we have reviewed very carefully the revenue and earnings reports of the telephone industry and its competitors for the past several years--up to and including the most recent quarterly stockholders reports--as well as the supporting arguments presented in recent rate increase proposals for both intrastate and interstate services. We find that the telephone industry--including both Bell and the independent telephone companies--have been experiencing a period of record growth in revenues and earnings, even despite the recent inflationary and recessionary trends in the economy. During the second quarter in 1976, operating revenues for those companies

more than 95% of the industry were up 11-18% over the same quarter in 1975--an amount typical of the past several years. For the same period, net income was up 12-22% over the corresponding 1975 results while earnings per share were up 15-20%. Furthermore, the telephone companies dominated the industry by a wide margin--receiving \$35.1 billion, or about 97% of total industry revenues, in 1975. Even in the private line and terminal equipment markets--the only areas open to competition--the telephone industry received \$4.1 billion, or 95.5% as compared with \$194 million, or 4.5% for the competitive industry. Based on these absolute differences, as well as recent comparative growth trends, we are confident that the telephone industry will continue to dominate its competitors--even in the competitive markets--by increasing margins. Furthermore, there is general agreement among all the comments and studies we have received that competition has had little, if any, adverse impact on telephone industry revenues or local telephone rates to date. Of some 14 intrastate and interstate rate increase requests studied, either granted during 1975 or currently pending, not one cites the existence of competition as a significant factor.

7. Despite the absence of evidence that competition has resulted in any adverse economic impact thus far, the telephone industry claims that there will be a substantial impact in the future. This impact will occur, it is alleged, through a combination of two basic processes: contribution losses and jurisdictional separations effects. We address each of these issues separately.

From the above point, Docket 20003 goes on to discuss the two arguments, contribution loss and jurisdictional separations effects, in great detail. For example, in the area of potential impacts on revenue contribution, the document says the following:

9. There is little doubt that certain services and/or customers of a large multi-service operation such as the telephone industry may contribute somewhat more than enough to pay for their service, while others may contribute somewhat less. ... The matter to be resolved in the present instance, however, is which services or customers are the beneficiaries of such pricing practices, and which are the "donors"?; ... Specifically, we should like to determine whether those particular services now subject to competition are currently providing any real contribution --i.e., revenues in excess of the total cost of providing such services--, and whether and to what extent that is likely to be affected in the future by the existence of competition...

following which, after a very comprehensive analysis of the filed material, it reaches the conclusion that "contributions" have not been shown for terminal equipment, and indeed in some studies submitted, especially by New York Public Service Commission, just the opposite is purported to be occurring, namely that local basic service charges support terminal rentals, rather than the other way around.

The major conclusion of all of these deliberations can be sufficiently described in the following four paragraphs, quoted in part from the Summary:

[Re: contribution of terminal equipment not being shown]:

"Indeed, it is likely that terminal equipment is a recipient of subsidy from basic local service rather than a donor. Under such circumstances loss of terminal equipment business to interconnect competition could possibly result in rate reductions for local telephone service users rather than rate increases." [Emphasis our own].

"Further, we find no evidence in this Docket of natural limitations in supply such as economies of scale, substantial economic barriers to entry or conditions of service which would support a finding that there is a natural monopoly in the provision of terminal equipment or private communications systems. Moreover, electric companies and gas companies are in some ways similar to telephone companies. In each case, the service provided travels the lines of the electric or gas company, and the telephone company, to a piece of terminal equipment. Electric and gas companies do not normally supply the terminal piece of equipment."

"We also find that market penetration by interconnect companies is insignificant to date...perhaps 5% in the PBX and KTS markets which are in primary competitive markets."

Even by 1984, the maximum penetration is likely to be well under 20%. However, even these penetration figures are misleading. The studies supplying such figures generally ignore the overall market stimulation caused by interconnect competition (which results in net revenue benefits to both telephone and interconnect companies thereby neutralizing telephone industry diversions, if any), and also ignore the effect of competitive responses by telephone carriers."

"Based on detailed evaluations by T+E and our staff of the comments and studies submitted in this proceeding, and other evidence, we conclude that interconnect competition has had no discernible adverse impact to date on telephone industry revenues or on basic local service rates and availability, and that there is very little likelihood of any adverse impact in the near future..."

In summary, as may be seen without question from the above, the FCC determined that none of the economic harm allegations claimed by the telephone industry had been shown to be valid, and they thus denied any changes to their previously established interconnect policies. From this point, then, there are two questions that remain, namely, (1) What has happened since 1976 in the U.S., and (2) the relevance of all of these matters to Canada. Each of these issues will be dealt with in subsequent sections of the report, especially in Chapter 5.

Other Countries

As indicated at the beginning of this chapter, data on interconnection activities in countries other than the U.S. is very sparse. It is known, however, that many European countries are now beginning to change their procurement policies to allow

competitive bidding, and in some cases, England for one,* inroads are being made to allow attachment of customer provided terminal equipment of various types. Of special interest, however, is Japan, since it is from this country that the threat of harm from foreign terminal equipment hardware is perceived to be, we believe, most severe.

Since interconnection has now been allowed in the U.S. for some twelve years, and that country, too, has been affected by Japanese imports of all types, i.e., cameras, radios, watches, television sets and automobiles being only a few examples, it is natural to anticipate that the U.S., in some quarters at least, had similar concerns with respect to Japanese telecommunication equipment products, as those now being expressed in Canada. Understandably, these concerns were expressed in various ways, many of which have, again, a similar ring to them--for example, concerns

What has happened in the United States is, we believe, very much indicative of what could happen in Canada as well, if the subject is discussed properly and appropriate actions are taken. For example, recent evidence indicates that Japanese markets are already being opened to foreign competition, and there is no reason whatsoever to expect that they would not also be open to Canadian products, if the proper accords were established.

* See, for example, RTPC, 1980, p. 144.

We believe this to be the case for a number of reasons, the first of which is the fact that such agreements have already been worked out with the U.S., very recently, and the precedents for them have thus already been set. (See, for example, the reproduction of a recent news article, at Appendix C). Secondly, Canada already has products that have proved to be eminently marketable around the world, and more are undoubtedly coming. Thirdly, it is clearly to Japan's advantage as well as Canada's to be able to sell in world markets. They thus, it is assumed, will be willing and responsive to establishing reciprocal relationships with other countries, as illustrated in the last article in Appendix C. Finally, as shown in Table 9, which is an extract of the high points of the Electronic News article, the amount of sales potentially negotiable is very large, making such transactions undoubtedly attractive to Northern Telecom--and other Canadian companies if they could supply appropriate equipment--as well as to U.S. companies.

To summarize this issue, then, it is apparent that other countries are taking steps similar to Canada's, to open telecommunications markets to competitive bidding, and to provide for an increasing degree of customer owned and maintained equipment. We have no way of knowing how far this will go, of course, or how successful Canada will be in negotiating agreements where they are required. What is, clear, however, is that at least in the U.S. case, domestic industry has been very successful in warding off vast inroads by foreigners, and Canada can do the same if her companies innovate fast enough and carefully enough.

TABLE 9

EXCERPTS FROM ELECTRONIC NEWS ARTICLE, 22 DECEMBER 1980

- \$3.3 billion purchase made available to American firms
- Negotiated bilateral agreement concluded in Dec/80
- \$1.5 billion under GATT agreements (routine items)
- \$1.8 billion special purchases of high technology switching, computing and transmission equipment
- American firms to be on NTT bidder's lists, with access to all appropriate documents, allowed time to respond, knowledge of all procurement requirements, selection criteria, debriefing of losing firms, and so on.

Note: See Appendix C for text of complete article.

CHAPTER 5

POTENTIAL IMPACTS ON CANADA

In this final chapter, information and data presented in the earlier chapters will be assimilated, and new information will be added, to attempt to make our case that negative industrial impacts of interconnection in Canada will be, or least can be made to be, minimal.

To begin, we illustrate in Table 10 certain data extracted from FCC Docket 20003 which we did not present earlier. These data pertain to estimates of the impact of interconnection on the telephone carrier industry in the U.S., as made by, or for, four different organizational entities. By way of explanation, the four sponsoring or contributing groups were:

- . AT&T (i.e., "Bell");
- . National Association of Regulatory Utility Commissions (NARUC);
- . New York Public Service Commission (NYPSC); and
- . United States Independent Telephone Association (USITA).

Of these four, the first and last commissioned outside consultants to do studies on their behalf, and these organizations are also indicated on Table 10 with initials, "SRI" being Stanford Research Institute and "SAI" being Systems Applications Incorporated, both based in California. Organizations two and three in the above list either did their own studies internally, or incorporated consultants'

TABLE 10

PROJECTED TELEPHONE COMPANY (TELCO) AND INTERCONNECT
INDUSTRY (IC) MARKET SHARE FOR PBX & KTS--1975-1984, U.S.

	1975			
	PBX		KTS	
	TELCO	IC	TELCO	IC
BELL (SRI)	94.6%	5.4%	97.3%	2.7%
NARUC	92.0	8.0	93.0	2.0
NYPSC	94.34	5.66	93.48	6.52
USITA (SAI)	96.0	4.0	97.0	3.0

	1980			
	PBX		KTS	
	TELCO	IC	TELCO	IC
BELL (SRI)	89.5%	10.5%	93.4%	6.6%
NARUC	79.0	21.0	92.0	8.0
NYPSC	81.52	18.48	73.14	26.86
USITA (SAI)	83.0	17.0	89.0	11.0

	1984			
	PBX		KTS	
	TELCO	IC	TELCO	IC
BELL (SRI)	84.4%	15.6%	88.9%	11.1%
NARUC	61.0	39.0	85.0	15.0
NYPSC	68.43	31.57	50.46	49.54
USITA (SAI)	75.0	25.0	85.0	15.0

NOTES: NARUC National Association of Regulatory Utility Commissions
NYPSC New York Public Service Commission
USITA United States Independent Telephone Association

SOURCE: Appendix C, First Report, FCC Docket 20003, 1976.

findings with their own.

Now, Table 10 is interesting for a variety of reasons, not least of which is the fact that the estimates of potential future impact varied enormously when these studies were carried out, from, for example, 11% to 50% in key telephone system (KTS) markets and 15% to 40% in PBX markets in 1985. In addition, it is very interesting that Stanford Research Institute's estimates, made on behalf of Bell, are the lowest of all the sets of estimates, for all three reference points in time, 1975, 1980, and 1984. This would indicate, obviously, that SRI was the most conservative of all of the organizations doing these studies at the time, and presumably AT&T concurred in the figures as well. Finally, Table 10 is interesting because it is now 1980, and some indication, at least, can be brought forward as to the accuracy of the various estimates to the present time.

Before dealing with this point however, it is relevant to return momentarily to part of the material quoted in the previous chapter from FCC Docket 20003. There, as may be recalled, there was a discussion of the fact that the FCC had found the telephone industry in the U.S. to have been experiencing record growth between 1975 and 1976, quoting figures in the range of 11-18% growth in revenue, 12-22% growth in net income, and 15-20% growth in earnings per share --despite, the FCC noted, the current inflationary and recessionary trends in the overall economy at that time.

In the four years since this document was written, these trends with AT&T and independent telephone company revenues and earnings have become even more pronounced. In fact, just within the last few months, AT&T reported its revenues and earnings for 1980, and the latter figure exceeded \$6 billion--i.e., more profit in one year than that made by any other company in U.S. history, and even more than the largest oil company in the world, Exxon. (Exhibit 1 records some of the details, as described in a wire service news article by Associated Press). In addition, as in Canada, AT&T and independent telephone operating companies in the U.S. have been filing petitions for increases in allowable rates of return on investment, leading to even greater revenue and profit figures in the future.

The significance of these developments is that, not only did the FCC make a finding that it could not not foresee economic harm to the telcos in the future, but history has borne them out, as well.* Moreover, to the best of our ability to ascertain it, the estimates given in Table 10 as to forecasted market shares are all too high for the interconnect industry, since actual values still appear to be more in the five percent rather than the ten percent range, based on present record growth of the telephone

* This point is very much underscored in recent filings in the ongoing RTPC hearing into telecommunications matters (e.g., RTPC, 1980, p. 93).

AT&T rings up record US profits

Associated Press

NEW YORK — American Telephone & Telegraph Co. (AT&T), the nation's pre-eminent monopoly, netted \$6.08 billion in 1980 — more profits than any US company has ever earned in a single year.

Next year may be better still in the wake of a decision by a Washington, D.C., federal law judge who concluded AT&T should be authorized to increase its profit margin from 10 percent to 10.87 percent, a move expected to lead to higher telephone bills.

AT&T is a regulated monopoly, and its profits are not allowed to exceed a specified percentage of its total investment. It has been seeking a 12 percent rate of return, arguing that the 10 percent limit is not realistic given the inflationary economy. The judge's decision was expected to be announced later by the Federal Communications Commission.

In its earnings announcement, AT&T said profits for 1980 rose 7.1 percent, to \$6.08 billion, from \$5.67 billion in 1979. Earnings per share increased 1.9 percent, to \$8.19 in 1980 from \$8.04 a year earlier, reflecting the issuance of more stock.

No American company has ever made more money in one year than did AT&T. Exxon Corp., the oil giant and the largest industrial company in the nation, last week reported 1980 profits of \$5.66 billion.

AT&T's chairman, Charles L. Brown, said 1980 was characterized at its beginning by recession and persistent inflation and in the second half by an upturn in the volume of business.

"Earnings were strengthened through vigorous marketing, firm control of costs, technological innovation, rate increases and strong growth in productivity," he said.

ATT Page 14

AT&T rings up record US profits

■ ATT

Continued from Page 1

The improvement late in the year was evident in AT&T's report of results for the quarter that ended Dec. 31. During the final three months of the year, profits rose 13.4 percent, to \$1.61 billion, from \$1.42 billion in the same period of 1979. Earnings per share were up 7.1 percent, to \$2.12, from \$1.98 a year earlier.

Operating revenues for the year rose 11.9 percent, to \$50.79 billion, from \$45.41 billion. For the quarter, revenues were up 13 percent, to \$13.27 billion, from \$11.74 billion.

Profitability by one key measure — return on common shareholders' equity — slipped to 12.69 percent, from 12.94 percent in 1979. Return on total capital, including borrowed funds, rose to 9.91 percent, from 9.81 percent the year before.

By other measures, AT&T's growth slowed in 1980. Long-dis-

tance calling volume rose 7.8 percent; there was a 10.8-percent increase in 1979.

The number of telephones in service was up 2.5 percent, to 141.7 million, following a 1979 gain of 3.6 percent. The number of phone lines rose 3 percent, to 200 million, compared with a 3.9 percent increase in 1979.

AT&T releases its earnings on the basis of quarters ending in January, May, August and November, but also releases calendar-year figures. It previously reported earnings of \$6.04 billion, or \$8.18 a share, in the 12 months that ended Nov. 30, 1980.

AT&T's 12.69-percent return on common equity was slightly higher than the utility industry average of 12.6 percent for the 12 months that ended Sept. 30, as computed by Business Week magazine, but that was below the 15.4-percent average for all companies.

industry itself. What has happened, therefore, is that the entire industry, both telco and interconnect, has expanded together, and more than it would have without competition. In the next section we will show that this can happen in Canada as well.

Interconnection in Canada

Turning now to the introduction of similar information for Canada, we find some very interesting phenomena. To begin, we extract again some of the data from DOC's report on carrier expenditures. This time, however, we will document what some of the growth rates have been in recent years, for various classes of equipment.

Our data for this illustration are presented in Table 11, where it may be seen that we are now concentrating on Station Apparatus separately, rather than on the whole of carrier expenditure. Also, we have added a column to the right of the sets of expenditure figures, in which average annual growth rates over the period 1973-1977 are depicted.

From this information, it is apparent that some rather astonishing changes have been occurring recently, especially in those categories in which we are especially interested. In Ontario and Quebec, for example--i.e., specifically, Bell Canada territory--telephones by themselves are shown to have increased an average of over 138% per year in each of the four years 1973-1977. Moreover, for the country as a whole, carrier purchases

TABLE 11
STATION APPARATUS EXPENDITURES OF THE PRINCIPLE
CANADIAN TELECOMMUNICATIONS CARRIERS 1973-1977.

MILLIONS OF DOLLARS.

						Average Annual Growth Rate 1973-1977
Number of Carriers: 18						
<u>CANADA</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	
Teletypewriters	7.9	6.8	22.4	14.9	15.5	18.4%
Telephones	29.0	47.6	124.2	122.5	129.5	45.4
Radio Telephones	5.6	12.7	19.7	17.8	20.2	37.8
Data	4.8	5.6	16.5	16.1	19.1	41.2
Station Connections	110.3	151.0	170.5	190.0	226.4	19.7
Large PBX	<u>35.9</u>	<u>56.0</u>	<u>58.7</u>	<u>57.6</u>	<u>59.0</u>	<u>13.2</u>
TOTAL:	193.5	279.8	412.0	418.9	469.6	24.8

						Average Annual Growth Rate 1973-1977
Number of Carriers: 8						
<u>QUEBEC AND ONTARIO</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	
Teletypewriters	4.0	3.6	18.2	12.0	12.3	32.4%
Telephones	2.3	2.4	71.4	67.6	74.5	138.6
Radio Telephones	.5	.8	8.1	7.4	6.5	89.9
Data	3.8	3.2	11.0	9.7	11.6	32.2
Station Connections	78.8	82.6	94.5	102.1	132.3	13.8
Large PBX	<u>25.8</u>	<u>42.6</u>	<u>36.8</u>	<u>40.5</u>	<u>40.6</u>	<u>12.0</u>
TOTAL:	115.2	135.2	240.0	239.5	277.7	24.6

SOURCE: Department of Communications, the Principle Canadian
Telecommunications Carriers: Expenditures on Telecom-
munications Equipment 1973-1977.

in this category were up more than 45% per year on average, and purchases in other terminal equipment or station apparatus categories had similarly increased substantially.

Unless some of the figures in these tables are in error, therefore, what this means is that terminal apparatus markets in Canada have already been increasing at record rates, to say nothing of the future. In addition, we have data that confirm these high growth rates in station equipment, compiled from the supply side, namely Northern Telecom figures of sales in these categories, as shown in Table 12. There, it may be seen that not only are the figures valid for 1973-1977, but they continue right up through 1980. As the table shows, in fact, sales of subscriber apparatus increased over 40% from 1978 to 1979, and some 36% from 1977 to 1978. In no way, therefore, is it possible to demonstrate that these markets are not growing for Canadian companies, both within the country, and in terms of exports and sales in foreign countries.

Finally, we have two additional charts, Tables 13 and 14, that substantiate these arguments even further. These tables show, respectively, Bell Canada and Northern Telecom revenues, net earnings, and retained earnings, and year over year increases for each of those measures, for the years 1969 to 1980. In both of these cases, phenomenal growth has been exhibited, with the single exception of last year, 1980. Here, as may be ascertained from the annual reports themselves, performance was down only because Northern found itself being forced to write off the equivalent of \$220 million, as a result of unfortunate management problems connected with its purchase

TABLE 12

NORTHERN TELECOM SALES: SUBSCRIBER
APPARATUS AND BUSINESS COMMUNICATIONS SYSTEMS

(\$000,000)		
<u>YEAR</u>	<u>SALES</u>	<u>YEAR/YEAR INCREASE</u>
1971	\$ 95.0	
1972	106.7	12.3%
1973	117.4	9.3
1974	181.4	54.7
1975	178.7	- 1.7
1976	213.8	19.6
1977	275.3	28.8
1978	374.3	36.0
1979	542.6	40.2
1980	618.6	17.9

AVERAGE ANNUAL GROWTH RATES
FOR VARIOUS YEARS

<u>YEARS</u>	<u>GROWTH RATE</u>
1971-1975	17.1%/year
1971-1979	28.8
1971-1980	23.1
1975-1979	30.9
1975-1980	28.2

SOURCE: Annual Reports.

TABLE 13
BELL CANADA REVENUES AND EARNINGS
(CONSOLIDATED FIGURES)
(\$000,000)

<u>YEAR</u>	<u>REVENUE</u>	<u>YEAR/YEAR INCREASE</u>	<u>NET EARNINGS</u>	<u>YEAR/YEAR INCREASE</u>	<u>RETAINED EARNINGS</u>	<u>YEAR/YEAR INCREASE</u>
1969	842		133		216	
1970	936	11.16	133	0.00	250	15.74
1971	1018	8.76	147	10.53	287	14.80
1972	1836	80.35	175	19.05	364	26.83
1973	2101	14.43	205	17.14	449	23.35
1974	2665	26.84	224	9.27	537	19.60
1975	2988	12.12	317	41.52	692	28.86
1976	3158	5.69	289	- 8.83	804	16.18
1977	3559	12.69	288	- .35	882	9.70
1978	4374	22.90	395	37.15	1041	18.03
1979	5265	20.35	433	9.62	1198	15.08
1980	6037	14.66	274	-36.72	1156	- 3.51

SOURCE: Annual Reports

TABLE 14

NORTHERN TELECOM REVENUES AND EARNINGS

(\$000,000)

<u>YEAR</u>	<u>REVENUE</u>	<u>YEAR/YEAR INCREASE</u>	<u>NET EARNINGS</u>	<u>YEAR/YEAR INCREASE</u>	<u>RETAINED EARNINGS</u>	<u>YEAR/YEAR INCREASE</u>
1969	482		10		66	
1970	563	16.80	4	-60.00	61	- 7.76
1971	576	2.31	12	200.00	62	1.64
1972	534	- 7.29	20	66.67	70	12.90
1973	612	14.61	32	60.00	89	27.14
1974	970	58.50	53	65.63	129	44.94
1975*	997	2.79	67	26.42	180	39.53
1976	1083	8.63	77	14.93	241	33.89
1977	1222	12.83	85	10.39	309	28.22
1978	1505	23.16	100	17.65	389	25.89
1979	1901	26.33	113	13.00	473	21.59
1980	2055	8.16	(185)	--	255	-46.09
1981**	2500	21.65	92	--	--	--

* Northern Telecom prior to 1975 = Northern Electric () = loss

** Figures for 1981 estimated, based on Wall Street Journal article, 5 June 81 (Exhibit 2)

SOURCE: Annual Reports

in 1978 of two electronic office systems businesses in the U.S. (see Northern Telecom, 1980, p.2). Without these writeoffs and adjustments, growth rates for both companies would again have been in the 18-20% range for 1980.

What these data illustrate, then, is that, just as the FCC found telephone company revenues in the U.S. to be increasing at record rates in 1976, so in Canada are they increasing in 1980. In the last analysis, therefore, what Bell is complaining about with respect to potential industrial impacts in Canada bears a marked similarity to the situation which occurred in the U.S. during its deliberating period. Moreover, there is much evidence to sustain the argument that those complaints will also be found to have little or no substantiation in forthcoming years, just as has been the case in the U.S. to the present time.

Outlook and Preliminary Forecast, Including Employment Impacts

On the basis of the above data, it is now possible to provide at least a provisional estimate of what the Canadian interconnect market might look like in five years' time. Unfortunately, sufficiently detailed data are not available to enable us to forecast markets by equipment class. However, combining indicators especially from Tables 6, 12, and 14* allows us to

* The latter two, obviously, because Northern Telecom controls and influences the market to such a large extent.

suggest that, barring unforeseen events, interconnect sales in Canada are very unlikely to be less than \$1.0 billion in 1985, based on a modest average annual increase of between 14% and 15% throughout the period 1978-1985. Moreover, in our opinion the figure is much more likely to be in the range of \$1.4-1.5 billion overall, based on the more optimistic growth figure of 20% per year, derived in large part from Northern Telecom's (and Mitel's) very substantial demonstrated growth from 1975-1980. In the next chapter we discuss these points further, and provide additional evidence to substantiate our findings and conclusions.

From the standpoint of employment impact, these results suggest that, contrary to what has been forecast in some other quarters, employment in telecommunications manufacturing in Canada need not be adversely affected by the introduction of new terminal attachment rules in the future. It is necessary to point out very quickly, however, that it is completely impossible to make a firm prediction about this matter because the issue is one that does not depend on statistical data, trend forecasting and the like, but instead upon the management decisions of one large firm, namely, Northern Telecom. As we have mentioned earlier, for example--and as we will demonstrate in more detail in the next chapter--changes in telecommunications equipment manufacturing employment in Canada depend almost entirely on this one company's choices about where it will operate its manufacturing facilities in the future, i.e., either within Canada or outside of the country,

particularly in the United States. The reason for this, of course, is that as the U.S. market for telecommunication equipment was opened to competition over the last few years, Northern began to establish not only sales outlets in the U.S., but manufacturing facilities as well, thus increasing external employment and, according to some reports at least, reducing Canadian employment from what it would have been had all sales originated with Canadian manufactured products. We do not quarrel with these approaches to the market, of course,--assuming that Northern based its choices of plant location on market access, lower labor costs, reduced transportation cost, and other appropriate management decisions. What they do reflect, however, is the substantial sensitivity of Canadian telecommunications manufacturing employment to decisions made by Northern Telecom alone. These matters, also, will be examined in more detail, and validated, in Chapter 6.

CHAPTER 6

VALIDATION OF FINDINGS AND STUDY RESULTS

We are aware that much of the material presented in the previous chapters of this report is controversial, and for some, perhaps, even suspect. We believe, however, that there is much evidence to support our conclusions, and that this evidence is increasing every day. In order, therefore, to attempt to establish our conclusions on as firm a basis as possible we have assembled additional information which we present in this chapter, essentially to confirm, or validate, our study results. This material is presented in several sections, including discussions of Northern Telecom employment and growth, import/export figures from the U.S., and results of alternative growth estimate calculations.

Northern Telecom Employment

The subject of Northern Telecom employment was identified in the previous chapter as being of considerable importance in evaluating potential industry employment impacts. In this section we deal with these matters in specific terms, using actual employment data extracted from Northern Telecom Annual Reports. These data, presented in Table 15, cover all employment figures available to us at the present time, for Northern Telecom Ltd., the parent company, and most if not all subsidiaries.

TABLE 15

EMPLOYEES OF NORTHERN TELECOM LTD. AND
SUBSIDIARIES, FOR YEARS AS AVAILABLE

NORTHERN TELECOM LTD. (TOTAL)

1980	31,915
1979	33,301
1978	31,756
1977	24,962
1976	25,277
1975	23,690
1974	26,147
1973	25,073
1972	20,787
1971	23,230
1970	24,986
1969	26,032
1968	23,682
1967	22,557
1966	23,864
1965	19,632

NORTHERN TELECOM CANADA LTD.

1980	15,736	49% of total
1979	15,567	46%
--		
1977	15,148	60%
1976	16,375	65%

BELL NORTHERN RESEARCH LTD.

1980	2,210	
1979	2,856	
--		
1977	2,183	
1976	1,948	
1975	1,700	Includes BNR Inc.

NT INTERNATIONAL LTD.

(Europe, Asia, Mid East, etc.)

1980	2,482
1979	687*
--	
1977	2,293
1976	2,176

*Excludes NETAS employees.

TABLE 15, CON'T

NT INC. (U.S. SUBSIDIARY)

1980	12,359
1979	5,934
--	
1977	4,048
1976	2,940
1975	1,300+

BNR INC.

1980	577
1979	343

NT SYSTEMS CORP.

1979	7,870
------	-------

BN SOFTWARE RESEARCH

1979	80
--	
1977	114

NEDCO LTD.

1977	858
1976	968
1975	1,000

Source: Northern Telecom Annual Reports.

To begin the discussion we first note that, from the standpoint of the parent company's consolidated figures, Northern employment has steadily increased, from approximately 19,600 in 1965 to some 32,000 in 1980. With regard to Canadian employment, however, as we mentioned earlier in our report, the ratio has been steadily declining, and rather markedly, from 65% in 1976 to 49% in 1980. Moreover, according to these figures, even the total absolute numbers of employees in Canada declined between 1976 and 1980, from 16,375 to 15,736. As may be seen, this decrease first occurred in 1977 and since that time there have been modest increases. Nevertheless, the overall conclusion is obvious that a substantial shift in location of Northern's plants has been occurring.

The second point to notice, then, is where these shifts have been taking place. Here again the data in Table 15 provide ready answers, since under the heading Northern Telecom Inc. it can be seen that this U.S. subsidiary increased its employment from some 1,300 in 1975 to over 12,000 in 1980--i.e., an increase of almost ten times, or 57% compounded annual growth per year. Since NTI is, thus, Northern's main manufacturing subsidiary outside of Canada, it stands to reason that this growth has occurred because of access to, and sales to, the U.S. market. What it also makes obvious, however, is that the total growth of the company over the last five years has occurred essentially at the expense of Canadians, since what was at one time exclusively an export market (from Canada) has been diluted substantially in the direction of a domestic U.S. market--albeit still Canadian owned.

Northern Telecom's Rebound in 1981

Turning, now, to a very recently-revealed piece of information, additional relevant and highly significant facts regarding Northern Telecom come to light. These facts concern Northern's most recent financial performance, i.e., for the first part of 1981, not previously recorded.

Recalling from the previous chapter that in 1980 the company lost money (recorded as \$185 million in Table 14), a question arises as to projected 1981 performance, since the previous loss resulted from a \$220 million extraordinary writeoff. Here, Exhibit 2 provides the answer,--and for Northern Telecom stockholders it is good news indeed. As reported by the Wall Street Journal, Northern expects earnings to be "at least \$3 a share" in 1981, on revenues of \$2.5 billion, up 20% from 1980. This means, of course, that the previously compiled record of year-over-year increases (Table 14) will now be reinstated after 1980's momentary decline, adding further credence to our projection of healthy increases for the Canadian interconnect industry. (As the news article in Exhibit 2 states, a major factor in the projected 1981 revenue gain will be digital switching sales, much of which, because of size, are outside of the terminal interconnect market. We assume, however, that terminal equipment will continue to increase as well, in concert with the trends illustrated previously in Table 12).

EXHIBIT 2

(Wall Street Journal, 6/5/81)

Northern Telecom Expects Net for Year Of 'at Least \$3 a Share'

By a WALL STREET JOURNAL Staff Reporter

TORONTO—Northern Telecom Ltd., rebounding after sustaining a loss of \$185.2 million (Canadian) in 1980, expects to earn "at least \$3 a share" in 1981, Walter F. Light, president and chief executive officer, said.

Mr. Light made the prediction to New York securities analysts.

The 1981 forecast for earnings would still be below the Canadian telecommunications company's 1979 profit of \$113.5 million, or \$3.70 a share, on sales of \$1.9 billion.

In the first quarter, the concern had profit of \$39.5 million, or \$1.15 a share, including a \$16 million extraordinary gain on the sale of an investment. Sales were \$583.8 million.

Mr. Light predicted the company will have 1981 revenue of about \$2.5 billion, up 20% from the 1980 total of \$2.05 billion. Northern, 55% held by Bell Canada of Montreal, expects a major factor in the revenue gain will be digital switching sales, which are expected to exceed \$450 million in 1981.

up 70% from 1980. By 1985, digital switching sales could total \$900 million, he added.

Edmund B. Fitzgerald, president of Northern Telecom Inc., the company's U.S. subsidiary, said there is still much to be done to improve the unit's profitability and, despite some progress this year, "It will be 1982 before we show significant profitability." The U.S. unit accounted for sales of \$800 million in 1980.

Northern's U.S.-based electronic office systems division was responsible for \$220 million in write-offs, special provisions and operating losses in 1980 relating to the 1978 acquisitions of Sycor Inc. and Data 100 Corp. Mr. Fitzgerald said the division isn't expected to make money in 1981, but costs are being cut and new products introduced.

Texts of remarks by Mr. Light and Mr. Fitzgerald were released in Toronto.

U.S. Import and Export Data

Our next set of validating evidence as to the strength of Canada's telecommunication sector is completely different from what has been presented up to now. It too, however, is compelling in its implications for a strong and healthy future for this industry.

As we have indicated previously, there is much evidence that Canadian manufacturers have participated in the liberalized U.S. telecommunications market to a high degree. What has not yet come to light, however, is the degree of this participation with respect to other countries. Some recently obtained data, depicted in Table 16, tell this story.

The figures in Table 16 represent U.S. trade data in telephone and telephone switching equipment, as compiled by the U.S. Department of Commerce. These figures are, if not astonishing, at least highly revealing, for they show that Canada is second only to Japan in its exports to the U.S. in this field, and even there, Japan is only slightly ahead (\$119 to 91 million), while either of the countries exceeds all others by wide margins. Moreover, of even greater significance, it is undoubtedly true that since these are export and import figures only, they do not include sales of products manufactured by Northern Telecom in the U.S., and sold in the U.S., thus further increasing Canada's

TABLE 16

US BALANCE OF TRADE IN TELEPHONE AND
TELEPHONE-SWITCHING EQUIPMENT, 1980

<u>NET IMPORTS*</u>	SWITCHING & SWITCHBOARD EQUIPMENT	TELEPHONE INSTRUMENTS	OTHER TELEPHONE APPARATUS	TOTAL
CANADA	\$ 59,814,000	\$ 5,165,477	\$ 25,674,740	\$ 90,654,217
SWEDEN	5,224,671	16,878	1,079,104	6,320,653
ISRAEL	6,363,527	600	2,091,852	8,455,979
JAPAN	66,802,053	24,285,820	28,339,492	119,427,365
CHINA (TAIWAN)	740,394	11,560,530	11,718,470	24,019,394
KOREA	51,721	3,702,499	239,794	3,994,014
FRANCE	1,540,637	3,180	3,330,563	4,874,380
FR GERMANY	3,258,432	6,951	466,766	3,732,149
SPAIN	56,716	281,096	157,679	495,491
HONG KONG	139,444	1,860,058	186,550	2,186,052
SINGAPORE	16,693	3,390,484	23,151	3,430,328
OTHER	203,746	805,886	2,265,837	3,975,469
<u>TOTAL</u>	<u>\$144,912,034</u>	<u>\$51,079,459</u>	<u>\$ 75,573,998</u>	<u>\$271,565,491</u>
<u>EXPORTS</u>				
CANADA	\$ 19,613,841	\$ 2,158,815	\$ 38,410,161	\$ 60,182,817
CENTRAL&S.AMERICA	38,741,796	6,277,071	43,167,859	88,186,726
WESTERN EUROPE	26,574,887	5,604,904	21,791,803	53,971,594
ITALY	5,883,966	406,530	2,093,495	8,383,991
ISRAEL	7,239,126	189,650	2,331,633	9,760,409
SAUDI ARABIA/ EMIRATES/EGYPT	10,549,788	2,128,978	23,958,851	36,637,617
PHILIPPINES	6,177,651	448,840	9,649,832	16,276,323
CHINA (TAIWAN)	36,461,886	1,470,228	13,933,092	51,865,206
HONG KONG	4,038,726	584,437	1,494,073	6,117,236
AUSTRALIA	5,410,378	103,051	2,635,508	8,148,937
AFRICAN CONT.	4,257,505	282,523	5,429,655	9,969,683
JAPAN	704,283	885,373	4,526,940	6,116,596
OTHER	23,501,345	3,398,124	46,223,606	73,123,075
<u>TOTAL</u>	<u>\$189,165,178</u>	<u>\$23,938,524</u>	<u>\$215,646,508</u>	<u>\$428,750,210</u>

Figures show a net US surplus for 1980 of \$157,184,719 compared to \$143,585,313 in 1979--an increase of 9.5%.

*Excludes articles assembled abroad from components produced in U.S.

Source: US Department of Commerce

participation in the total U.S. market.

There are other factors to consider here, of course, such as the fact that while Japan records very high imports to the U.S. of its products, it accepts only a very marginal value of U.S. products in return. The possibility of a similar situation occurring in Canada is cause for concern, we know. However, a stronger conclusion to be derived, we believe, is the overall strength of both Canadian and U.S. manufacturers, and, thus, their combined ability to sell products in markets which are open to them, in concert with combined efforts to open additional markets. These matters go beyond the scope of this study, of course, but they cannot be dealt with without a full understanding of the strengths, as well as the vulnerabilities, of Canada's industrial base in this field.

Impact of Reduced Market Share

Our final set of validating information is derived from a few very simple, but not simplistic, calculations.

A concern in these deliberations on industrial impact has been, What happens if Canadian industry loses market share to foreign companies? This is, of course, a potential trouble spot. However, it is easy to overstate the potential for devastating results, by comparing telecommunications to other, heavily impacted industries while giving less attention to the specific facts of

Canadian telecommunications as distinct from, instead of similar to, other industries. In particular, our emphasis is on two areas, i.e., present market share of Canadian firms, and the impact of a decline in that share.

Recalling from Table 6 that our calculated total inter-connect market in 1978 without mobile radio was some \$332 million, it is an easy step to assess Canada's participation at \$276 million, or 83.3%.

Now, on the basis of previous data, assume the conservative figure of 15% growth to 1985, or

$\$276 \text{ million} (1.15)^7 = \$734 \text{ million},$
representing Canada's absolute dollar volume in 1985, increasing from 1978 at 15%/year. If, then, this still represented the same share of market in that year, total revenues for 1985 would have to be

$$\frac{734}{0.833} = \$881 \text{ million}.$$

Continuing the analysis, assume that Canada lost some of its market share to say, 70% rather than 83%. Under these conditions, if the total market were to remain at \$881 million, Canada's absolute revenues would decline. However, it is also possible, and indeed demonstrated in the U.S., that the total market would expand with interconnection, rather than stay the same. The question is, then, How much would the market have to

expand in order to retain Canada's absolute dollar volume, if not its market share? This figure is derived by calculating a new total market requirement for 1985, i.e.,

$$\frac{734}{0.70} = \$1050 \text{ million,}$$

representing the revenue that would have to be generated if Canada's dollar volume were \$734 million, at a 70% market share. This figure represents, in comparison to 1978's total revenue of \$332 million, an increase of 17.88% rather than 15% per year, which is a very modest market expansion under any circumstances, and well within the realm of possibility with interconnection in Canada. What it shows, therefore, is that even if market share is lost in the future, it cannot be rightly assumed that Canada's telecommunications manufacturing sector, or employment, will necessarily suffer on that account.

Company	Worldwide Sales (1978) (\$millions)	% of Canadian Market 1978	Number of Employees	R&D Expenditures	Central Office Switching	Subscriber apparatus & bus com syst	Wire Cable & Outside Plant	Transmission	Electronic Office Systems	Distributed Products	Optical Fibres Technology	Mobile Radios	PBX PABX	KTS Telephone Sets	Intelligent Electronics	Terminal Equip.	Expected Growth in 1980s	Capital Expenditure on Can manufac-turing facilities	Ownership	Canada as % of worldwide sales	Remarks
Northern Telecom (NTL) Can	\$1505M	69.9% (NTL estimate 70%)	32,000 world 18,035 Can	7% (mfg) sales \$135M NTL & subsidiaries \$39M sales of R&D	\$339M ¹	\$374M	\$277M Telecom equipment sales \$1,131	\$141M	\$172M	\$163M ²	✓		✓	✓		✓ U.S.	\$4000M before 1990 60% in foreign markets	\$271M 1970-1979	55% Bell 45% public	67% (1978) exc (R&D)	1. 1977. \$413M = 34% of sales. 1978 drop is first in 5 years below 30% of sales related to (1976) announcement of impending intro. of digital multiplex system. 2. Product dropped Dec. 31, 1978
AEL Microtel formerly Lenkert Electric and Automatic Electric (GTE)	\$150.8M	7.7	2950 Can	\$5.3M	\$60.2M	\$21.9M	\$47.8M also Microwave			\$20.9M			✓	✓		✓ Telidon	9% annual to 1984 \$250M		B.C. TEL ³ (Oct 1979)	Automatic 75% Lenkert 73%	3. Formerly Automatic Electric wholly-owned Lenkert, while GTE wholly-owned Automatic. GTE still holds majority of BCTel through GTEL 4.3% and Anglo-Canadian Telephone Co. 49.9%. Anglo-Canadian Tel Co wholly-owned by GTE. 4. Based on NTL estimate of 70% of Can. market (see adjoining page).
Motorola Canada (Motorola)	\$2,700M ⁵ Total Sales Motorola, Inc.	3.9	1,000 Can	3% of Can sales revenue								✓ \$56.28M ⁵ Can							Motorola Incorporated Chicago	3.1% ⁵ \$84M 1978	5. \$84M 1978 revenues Motorola Canada communications products account for 67% of total i.e. \$56.28M. 40% of total \$84M manufactured in Can.
Canadian General Electric Can	\$1,000M ⁶	3.5	18,000 Can 160 none in com- munications	little to products								15% of mkt \$10M 15% of mkt 75% Can mfg.							General Electric Company U.S.		6. Communications products division accounts for 3-5% of total \$1,000M \$30-50M. \$10M in mobile radios, remainder base station equipment.
Gandalf Can	\$13M 1978 50% agr.	0.4	475 world 95 in R&D	10% revenue ⁷							✓					limited distance modems & PACXs 80% CAN mfg. of total	\$21M 1980		CANADIAN	60% \$7.8M 1979	7. All R&D occurs in Canada
Mitel Can	\$11.5M 1978 \$21.6M 1979	0.2	679 world 410 Can 203 R&D	\$.8M 76-77 \$2.2M 78-79	receivers & generators tone-to-pulse converters	✓							SX-200 ⁹ ✓ SX-20, SX-10		✓ ⁹		\$40M 1980 \$100M 1981		Public Corp 1979 CANADIAN	1978-26% ¹⁰ 1979-21%	8. Including SX-10 handled 10 private lines maybe smallest in world. 9. LSI circuits, 9 developed in past 3 years Mitel Semiconductor. 10. Note 61% of sales to U.S. 18% to other mostly Czechoslovakia.
SED Systems Can	\$10M 1978 35% agr.	0.7	260	5% of sales		✓		Satellite Earth Stations fixed-mobile								modems			Incorp. 1972 U of Sask		Operators divided into three principal areas: aerospace, communications and instrumentation & control
L.M. Ericsson, Ltd.	\$2,000M world \$9.5M Can ¹¹ 1978	0.7	65,000 world	None	✓ 8.55M ¹¹ 1977													no manufact. in Canada	Swedish Telefonaktiebolaget L.M. Ericsson 100%		11. Canadian subsidiary 1977 sales \$19M half from telecom equipment i.e. \$9.5M, 90% of this from switching equipment.

TABLE T-1

Company	Worldwide Sales (1978) (\$millions)	% of Canadian Market 1978	Number of Employees	R&D Expenditures	Central Office Switching	Subscriber apparatus & bus com syst	Wire Cable & Outside Plant	Transmission	Electronic Office Systems	Distributed Products	Optical Fibres Technology	Mobile Radios	PBX PABX	KTS Telephone Sets	Intelligent Electronics	Terminal Equip.	Expected Growth in 1980s	Capital Expenditure on Can manufac-turing facilities	Ownership	Canada as % of worldwide sales	Remarks
Philips Electronics Ltd.	1978 \$150M Can NB large % is consumer products	0.7	2,200 Can 14.7 R&D 734 mfg. ¹²	design facility in US		telephone answering devices intercom			✓ ¹³				✓					no comm. equip. mfg in Can. Prod. designed to Europe specs.	Dutch 100% Philips Lamp Holding Company		12. Little communications equipment is made in Canada. Predominantly Philips mfgs. consumer products here. 13. 1977 purchased Micom data systems entered into office automation.
Pye Electronics Philips	\$6M 1978	--	80 Can 18 tech staff	design fac. same as Philips								✓ ¹⁴						no Can. mfg.	Philips thru British sub-parent 1967.	5% of sales	14. Mobile radio to European specifications
AEI Telecommunications (Canada) Ltd. Can.	\$9M 1979	0.6	130 Can	System design	✓ Nippon Electric	ANIPAKS ¹⁵ ✓				✓ Nippon Elec. PBX & Central Office Switching			✓ Telephone answering switch-boards					50% of Can sales from products mfg. in Can.	British ¹⁶ General Electric Co.	est. 88.8% See report	15. ANIPAK-Automatic number identification systems. Sales of ANIPAKs have declined steadily since 1970. 16. General Electric Co. 7th largest telecom equip. supplier in world.
Siemens Electric, Ltd.	\$80M 79 \$40M 78 \$15M 79 ¹⁸	2.1	400 Can 100 Can in telecom equip.	Some R&D to be done in US to meet network incompatibility problem.		✓ ¹⁸							✓ ¹⁸					No Can. mfg. Willing to set up design & mfg. facilities if mkt. warranted. Mfg. PBX. See Telecommunicator Aug. 1980	Germany ¹⁷ Siemens AG		17. Siemens AG. third largest communications equip. supplier in world. 18. Can. sales of telecom equip. tele-graph & signalling sys. generated revenue amt. to \$15M. Telecom equip. inc. teleprinters & telex switching and PBXs.
ITT Canada Ltd.	\$540M 78 ¹⁹	1.7	500 Can 70 in R&D		✓								✓						US ITT 100%		19. 4.5% of sales (\$25M) from Communications & electronics division
Flessey Canada	\$9M 1978 \$=4.5M 77	0.2	200 Can? 20 R&D	\$2M thus far (?)		✓							✓						British 100% Plessey Company	Most of Can production exported to U.S. ²⁰	20. How much was exported?
Plautonics-Canada	\$2M 1979	0.1	25-30 Can							✓ ²³ 4 systems sold in 1975/peak						✓ ²¹	✓ ²²				21. Universal terminal controller & Model 7800 which acts as interface between data line and terminal 22. Vusset CRT terminals \$1M 1979 23. Eltrex line of telex switching systems
Small Companies (64 companies)	Total \$164.3M 1978 Avg. \$2.6M 1978	7.6	Total 5405 Avg. 85.3		Exports	Imports															24. Collection of companies earning less than \$10M 1978. Note totals and avgs. 64 companies listed in Appendix

TABLE T-2

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Provided Terminal Equipment, Ottawa, 5 August 1980

Canadian Radio-Television and Telecommunications Commission,
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Restrictive Trade Practices Commission, In the Matter of a General
Inquiry Under Section 47 of the Combines Investigation
Act Relating to the Manufacture, Production, Distribution,
Purchase, Supply and Sale of Telecommunication System
and Equipment: Argument of the Director of Investigation
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APPENDIX A
LIST OF SMALL COMMUNICATIONS
EQUIPMENT MANUFACTURERS IN
CANADA

LIST OF SMALL COMMUNICATIONS EQUIPMENT
MANUFACTURERS IN CANADA

Adaptive Microelectronics Ltd.
Anatek Electronics Ltd.
Audio Transformer Company
Auto-Vox Inc.

Barvic Services Ltd.
Beckman Instruments Inc. (Helipot Division)

Canadian Astronutics Ltd.
CETA Learning Systems
Challenger Electronics Ltd.
Challenger Electronics (a division of Challenger Equipment Ltd.)
Com Dev Ltd.
Crescent Controls Ltd.
Croven Ltd.
CTS of Canada Ltd.

Dale Electronics Canada Ltd.
Daniels Electronics Ltd.
Decca Austin Insulators
Dynamic Industries Inc.

EDAC Inc.
Electronic Craftsmen
Electro-Vox Industries Inc.
Epitek Electronics Ltd.

Ferritronics Ltd.
FMC of Canada Ltd. (Semi-Conductor Products Division)

Geleco Electronics Ltd.
Glenayre Electronics Ltd.
Goodwood Data Systems Ltd.
Graphico Precision (Division of Firan-Glendale Corporation)

Hamilton Engraving Company Ltd.
Hammond Manufacturing Company Ltd.
Hermes Electronics Ltd.

Intercontinental Data Control Corp. Ltd.
International Systcoms Ltd.

Lazer-Tech Ltd.
LeBlanc and Royle Communications Towers Ltd.
Leecraft Industries Ltd.
Linear Technology Inc.

LIST OF SMALL COMMUNICATIONS EQUIPMENT
MANUFACTURERS IN CANADA

MacDonald, Dettwiler and Associates Ltd.
MA Electronics Canada Ltd.
McCurdy Radio Industries Ltd.
Microwave Technology
Muirhead Systems Ltd.
Multi-Vox Ltd.

National Electrolab Ltd.
Neosid (Canada) Ltd.
Norpak Ltd.

Omicron Data Systems
Optotek

Precision Electronics Components Ltd.
Pylon Electric Development Company Ltd.

Quindar Products Ltd.

Racal (Canada) Ltd.
Rantech Electronics
Reliance Telecommunications Products Ltd.
Renfrew Electric Co. Ltd.
Research Industries Ltd.

Sinclair Radio Laboratories Ltd.
Spilsbury and Tindall Ltd.
Staticon Ltd.

Tectrol, Inc.
Tele-Radio Systems Ltd.

Valcom Ltd.
Varian Associates of Canada Ltd.
Volker-Craig Ltd.

SOURCE: The Supply of Communications Equipment in Canada,
Communications Economics Branch, Department of
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APPENDIX B

DERIVATION OF FIGURES IN TABLE 6, COLUMN 4

DERIVATION OF FIGURES IN TABLE 6, COLUMN 4

NORTHERN TELECOM

Worldwide sales (1978) = \$1505 Million (Annual Rpt)

Canadian Sales as a percentage of world sales = 67%
(Annual Rpt)

Canadian Sales (1978) = $.67 \times 1505 = \$1008.35$

World sales of Subscriber Apparatus and Business Communications Systems = \$374 million (Annual Rpt)

Canadian Sales of Subscriber Apparatus and Business Communications Systems = .67 x 374 = \$250.58M

AEL MICROTEL

Worldwide Sales (1978) = \$150.8M (Annual Rpt)

Canada as % of world sales=	74% Automatic Electric
	73.1% Lenkurt Electric
AVG	<u>73.55%</u>

World sales of Subscriber Equipment = \$21.9M (Annual Rpt)

Canadian sales of Subscriber Equipment = $.735 \times 21.9 =$
\$16.1M

MOTOROLA CANADA

World sales by Parent Company = \$2.7 billion (Annual Rpt)

Communications equipment as % of total sales = 37%

World sales of communications equipment= .37 x 2.7B = \$999M

World sales by Motorola Canada = \$84M (Annual Rpt)

Communications products as % of world sales = 67%

World sales of communications products= .67 x 84 = \$56.28M

Exports of 2-3% of Motorola Canada products

Canadian Sales of Communications products $56.28 - (56.28 \times 3\%) =$
\$54.87M

CANADIAN GENERAL ELECTRIC (CGE)

World sales all sources = \$1.0 billion (1978 Annual Rpt)

Communications Products = 3-5% of total = \$30-50M

1978 sales of mobile radio= \$10 million

Their estimate \$10M= 15% of mobile radio market in Canada

Total market then = \$66.67M

CGE \$10 + Motorola Canada \$56.28M = \$66.28M

GANDALF

Worldwide sales (1978)(est.) = \$9.21M

Worldwide sales (1979) = \$13M

Canadian operations =60% of sales(1978) =\$5.5M

50% of Canadian production exported = \$2.75M

Canadian Interconnect sales (est.) = \$1.5M

MITEL

Total worldwide sales (1978) = \$11.528M (Annual Rpt)

(1979) = \$21.648M

Canada total sales (1978) = \$3.022M =.26x\$11.528M

(1979) = \$4.578M =.21x\$21.648M

Total telecommunications products sales

(1978) = \$9.623M (Annual Rpt)

(1979) =\$18.384M (Annual Rpt)

Canadian telecommunications equipment sales estimated

(1978) = \$2.5M = .26x\$9.623M

(1979) = \$3.86M= .21x\$18.384M

SMALL COMPANIES

64 companies listed in Appendix B.

Total sales of all companies combined = \$164.3M

Canadian Sales = Total - exports (33.6%)

= 164.3 - (164.3x.336) = \$109.1M

Average revenue (1978) = \$2.6M

Assume that since companies are in all areas of communications equipment manufacturing from lasers, radios and videw, that under 5% of the companies are presently producing for the interconnect market per se. Say \$5M in monetary terms.

FOREIGN COMPANIES

L.M. ERICSSON

Total worldwide sales = \$2.1 billion (1978) (Annual Rpt)
Canadian distributor (1977 sales) = \$19 million
50% of the above Canadian sales are of Telecom Equipment
= $.50 \times \$19M = \$9.5M$
90% of Telecom Equipment is switching equipment = \$8.55M
All other telecom equipment = \$0.95M

PHILIPS

Philips Consolidated sales (1978) = \$5046M (Annual Rpt)
Philips Canada world sales (1978) = \$ 150M
Majority of Philips Canada sales consumer products
(Norelco)
Estimate \$10M sales of communications equipment.

PYE

Canadian subsidiary world sales of mobile radio (1979) = \$6M
Canada as % of world sales = 5% = \$0.3M

AEI TELECOMMUNICATIONS

Canadian Sales (1979) = \$9 million
AEI also manufactures circuit boards, etc.
Canadian distributor of NTT products
Estimate interconnect sales in Canada = \$8.0M

SIEMENS ELECTRIC

Parent worldwide sales (Siemens AG) = \$3500M (1978)
Canadian subsidiary world sales = \$80M (1979)
Electronic equipment sales (1979) = \$30M
Telecom sales (teleprinters, signalling equip, telegraph)
(1979) = \$15M
Interconnect equipment sales (Hutchison est.) = \$3.5M

ITT CANADA

Canadian sales all sources (1978) = \$540M (Annual Rpt)
Communications and Electronics Sales 4.5% of total
1978 Canadian Communications and Electronics Sales = \$25M
Interconnect equipment sales (Hutchison est.) = \$23.3M

PLESSEY

Parent Company world wide sales (1978) = \$463.0M
Plessey Canada sales (1978) = 9.0M
Communications products world sales (1978) = \$8.1M
i.e., 90% of total sales
2/3 of communications sales exported = \$5.4M
Remainder of sales of communications equipment and
radar sales to Canadian military = \$2.67M
Interconnect equipment sales (Hutchison est.) = \$0.6M

APPENDIX C

INTERNATIONAL DEVELOPMENTS

Estimate \$3B Orders In U.S. NTT Accord

By JACK ROBERTSON

WASHINGTON — The U.S. and Japan late last week signed a bilateral agreement opening up Nippon Telephone & Telegraph (NTT) procurements to foreign competition — which departing U.S. Trade Representative Reubin Askew estimated would make \$3.3 billion in purchases available to American telecommunication firms.

The complex agreement puts \$1.5 billion in NTT purchases — mostly for routine items — under the legal conditions of the international GATT Code on Government Procurement.

Mr. Askew said the remaining \$1.8 billion is covered by the separate U.S.-Japanese bilateral pact, involving mainline telephone switching, computing and transmission equipment. Because this gear is not under the GATT code, however, the Japanese pledged to follow open buying practices "consistent with the GATT government code."

The agreement included several specific procurement steps for NTT to take when dealing with U.S. telecommunications companies.

- NTT will issue in a timely manner an RFP on any potential purchase of the sophisticated telecommunication equipment, covering the nature and quantity of product, delivery date, information on supplemental procurement documents, economic and technical requirements, and assurance that firms which qualify will be considered for follow-on procurements.

- U.S. firms responding to the RFP will be provided adequate documents to form the basis of their proposals, with criteria for selection and award of contracts spelled out, including any factors for compatibility with existing systems, quality control and stable supply.

- Competing firms will have no fewer than 30 days

See U.S.-JAPAN, Page 4

APPENDIX C

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U.S.-Japan NTT Accord Seen Opening \$3.3B Telecom. Market

Continued From Page One

from the date of RFP issuance to respond.

- NTT will give prompt responses to "any reasonable request for clarification of the RFP document" and "any clarification of RFP amendments shall be provided simultaneously to all interested suppliers in adequate time to respond."

- For procurements of off-the-shelf products that must be modified to meet NTT requirements, the Japanese carrier will supply all necessary specifications.

- NTT will make available guidebooks on its purchasing policy, organization structure, management, plant engineering program, and economic evaluation method, plus guidelines on construction, operation and maintenance of its system.

- NTT will debrief losing U.S. firms in procurements, with a disappointed vendor allowed to challenge any lost procurement — first with higher NTT officials, and ultimately with the Japanese government.

- In developing a new product, NTT will consider bids equally from firms that propose to join with NTT in joint development, as well as from firms which propose to do the development themselves.

Traditionally new NTT products and systems are developed jointly between NTT and Japanese firms. The agreement opens the way for U.S. firms to sign with NTT on such joint developments — although U.S. industry has warned that such demand may be a Japanese attempt to force greater transfer of technology from American companies.

Ambassador Askew said U.S. negotiators also tried to get more definite terms spelled out on interfacing U.S. equipment with existing NTT systems — an area where American firms feared the Japanese would reject their equipment as "incompatible" with the NTT system.

A separate joint statement on interconnection was signed in which NTT assures:

- The agency will make type approval available for all classes of customer-provided equipment, such as PBXs and key telephone systems;

- All relevant documents and requirements for type approval, procedures and testing will be made available, and technical requirements "wherever appropriate" will be specified in terms of performance criteria rather than definite design criteria;

- NTT will accept test data from Japanese and foreign firms and laboratories in fulfilling type acceptance approval requirements and will exchange views on mutually-acceptable type approval test procedures;

- After submission of test data, NTT will grant or deny type approval "expeditiously" — normally within two months except for more complicated types of equipment such as PBXs or key telephone systems;

- NTT will publish technical requirements for terminal equipment connected to circuits, for specific circuit utilization, for telephone ancillary equipment, for PBX systems, for telephone and telegraph and Telex circuits.

The bilateral U.S.-Japanese agreement goes into effect Jan. 1, 1981 — the same date that the GATT Code on Government Procurement becomes effective.

Ambassador Askew leaves office after the long-fought agreement, resigning Dec. 31 to rejoin his Miami law firm.

Mr. Askew said the proof of the new agreement with Japan will be in how much procurement NTT does with U.S. and foreign suppliers.

"We consider Japan is on a trial period. In 3 years the GATT Code will be reopened for negotiation — and if NTT has not made significant purchases from U.S. suppliers, we would consider them noncompliant with the GATT Code and the U.S. would consider countermeasures," he said.

Last week's agreement on NTT was accepted by U.S. industry officials and associations "as probably the best deal that could be gotten," and generally hailed as far better than anything previously offered by Japan in the involved 2-year negotiating struggle.

John Sodolski, staff vice-president of the Electronic Industries Association's Communications division, said

"The text of the agreement is complex, and the carrying out of the various stipulations will be complicated, relying heavily on the good faith of the Japanese.

"It should be noted that because of the heavy reliance on good faith, many are skeptical about the implementation of the agreement. We agree with Ambassador Askew that the real test of the agreements as signed will be whether they work," Mr. Sodolski added.

Most of the U.S. interest centers on the \$1.8 billion in NTT switching, computer and transmission procurements covered by the separate bilateral agreement. In theory this equipment is also opened up for all foreign suppliers — consistent with the GATT government procurement code — but only the U.S. has definite procedures spelled out in the separate agreement on how NTT purchases in these areas would be opened to American firms.

The Japanese contended that since European government-owned postal, telephone and telegraph agencies are not included in the GATT government procurement code, NTT procurements should not be readily open to European suppliers. Since the bulk of the U.S. telecommunications market is open to Japanese vendors, however, NTT procurements would be available to U.S. suppliers on a more detailed basis. (See related story, this page.)

EUROPE-NTT

Urges Separate Pacts

TOKYO (FNS) — The Japanese government last week suggested that European governments negotiate separate agreements as did the U.S., in order for their telecommunications companies to be allowed to bid for Nippon Telegraph & Telephone procurements of major telephone equipment lines.

After signing a bilateral agreement opening NTT procurement to U.S. firms, Sabure Okita, Japan's representative for external economic relations, said his country will urge European governments to begin talks aimed at similar reciprocal arrangements.

The Japanese have maintained that because most European governments own and operate national telecommunications carrier operations, their markets should be under the CATT government procurement code if their industries also want to penetrate the NTT marketplace.

Contacted recently, telecommunications equipment companies in the U.K., France and West Germany declined comment on the U.S.-Japan procurement agreement, pending reviews of the pact's language.

Mr. Okita last week also conceded the Japanese had dropped their demand that AT&T's market be opened under the government procurement code if NTT were opened.

When asked about the Bell System demand, Mr. Okita said that although official U.S. policy is that such markets as the Bell System be open to all competitors, there was a limit to what the U.S. government could do about the procurement policies of private enterprises.

He suggested that the U.S. would make attempts to persuade AT&T to open its market to "a similar degree" as NTT.

AT&T outside purchasing policies are in dispute in the courts and at the FCC, which for several years has been conducting an inquiry into the Bell System's purchasing of non-Western Electric equipment.

—MINORU INABA



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