

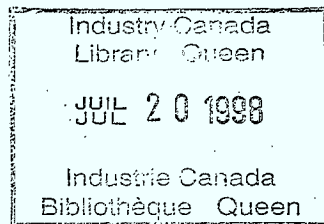
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COMMUNICATIONS
STRATEGIC SITUATION

Prepared for the
Department of Communications

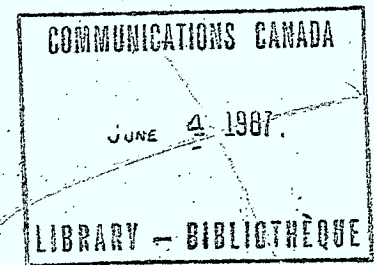
July 23, 1984

The
Canada
Consulting
Group
Inc.

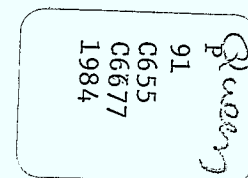


COMMUNICATIONS STRATEGIC SITUATION

Prepared for the Department of Communications



July 23, 1984



The
Canada
Consulting
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Inc.

OUR PRESENTATION IS ORGANIZED IN FIVE PARTS

OVERVIEW

ELEMENTS OF COMMUNICATIONS

INFRASTRUCTURE OF COMMUNICATIONS

CONTENT OF COMMUNICATIONS

COMMUNICATIONS ENHANCED ENVIRONMENTS

OVERVIEW

Elements of Communications

Infrastructure of Communications

Content of Communications

Communications Enhanced Environments

OVERVIEW

- I. We have structured our review of the communications environment in four parts

- II. We have designed a matrix to reflect our conclusions on the strategic situation of communications industries

- III. The matrix is also useful in identifying the active and passive policy options open to the Ministry

1. WE HAVE STRUCTURED OUR REVIEW OF THE COMMUNICATIONS ENVIRONMENT IN FOUR PARTS

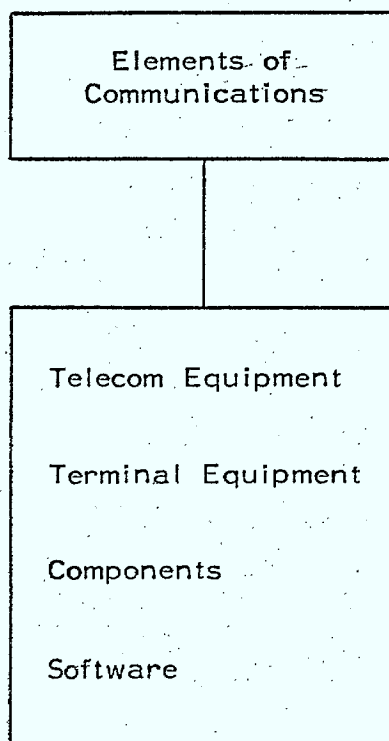
1. Elements of Communications - the building blocks

2. Infrastructure of Communications - the distribution network

3. Content of Communications - entertainment and information

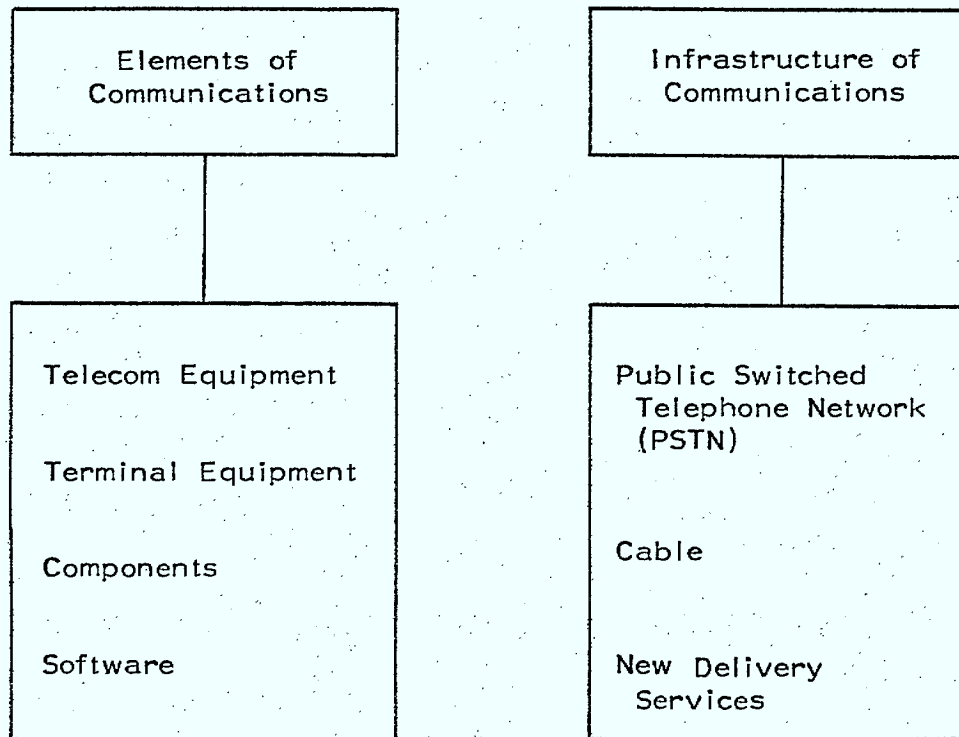
4. Communications Enhanced Environments - the productivity, recreation and expanded capabilities generated through communications systems technology

1. ELEMENTS OF COMMUNICATIONS - THE BUILDING BLOCKS



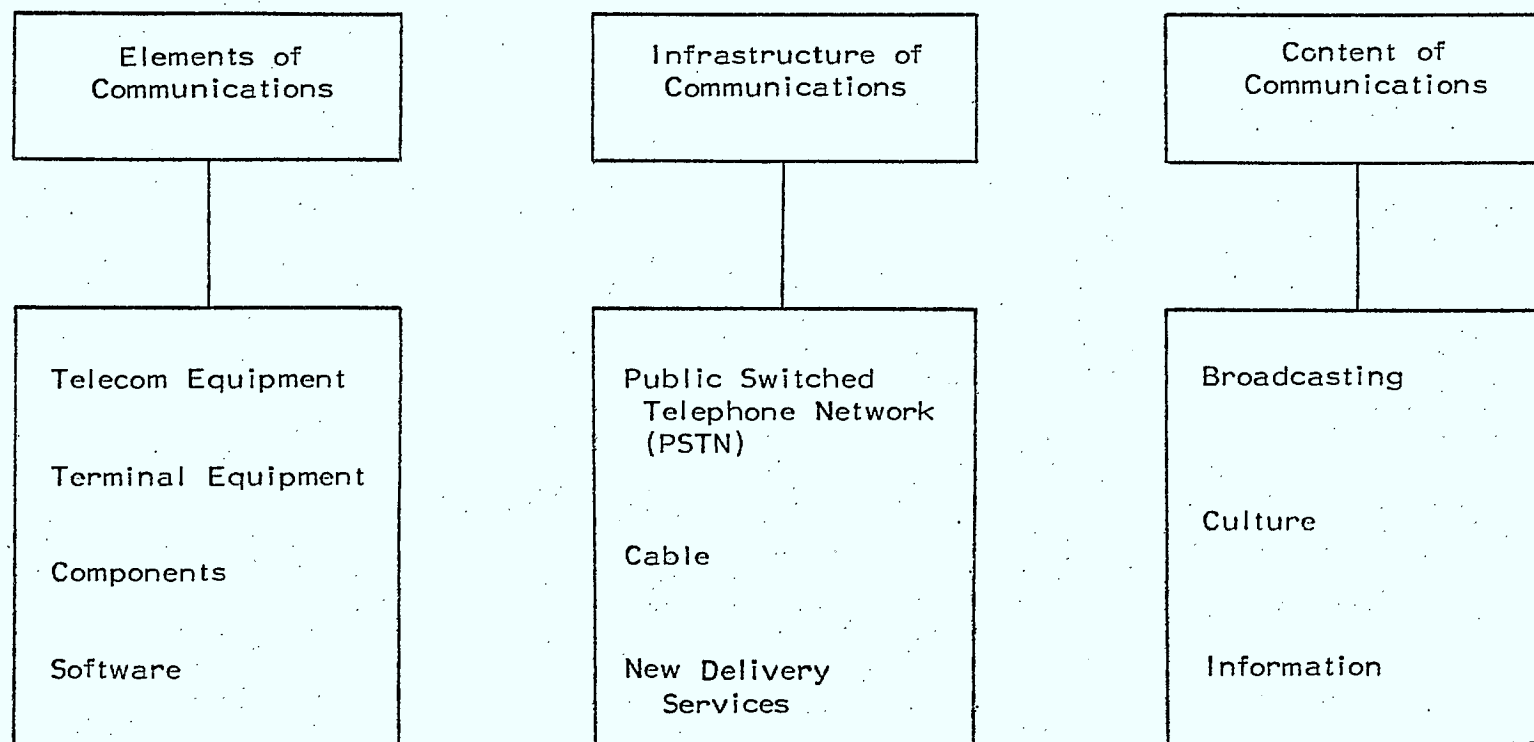
1. Framework

2. INFRASTRUCTURE OF COMMUNICATIONS - THE DISTRIBUTION NETWORK

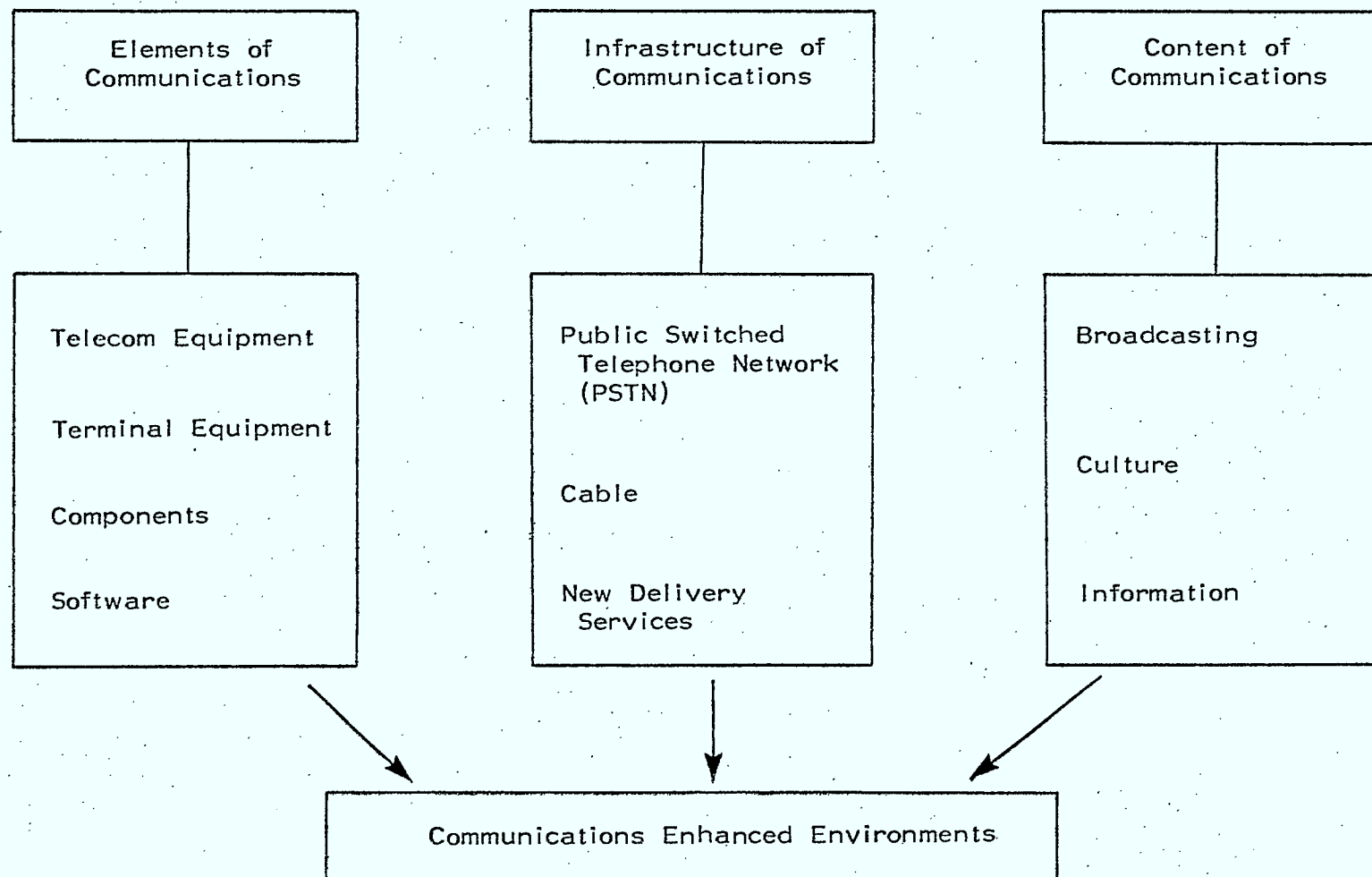


1. Framework

3. CONTENT OF COMMUNICATIONS - ENTERTAINMENT AND INFORMATION



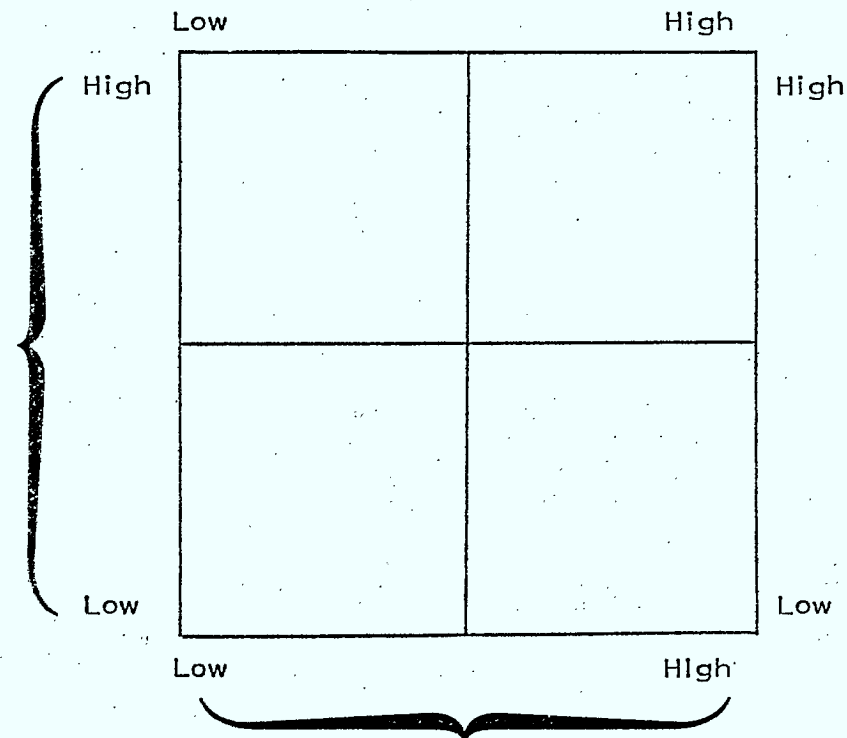
4. COMMUNICATIONS ENHANCED ENVIRONMENTS - THE PRODUCTIVITY, RECREATION, AND EXPANDED CAPABILITIES GENERATED THROUGH COMMUNICATIONS SYSTEMS TECHNOLOGY



II. WE HAVE DESIGNED A MATRIX TO REFLECT OUR CONCLUSIONS ON THE STRATEGIC SITUATION OF COMMUNICATIONS INDUSTRIES

Strategic Significance
to Canada:

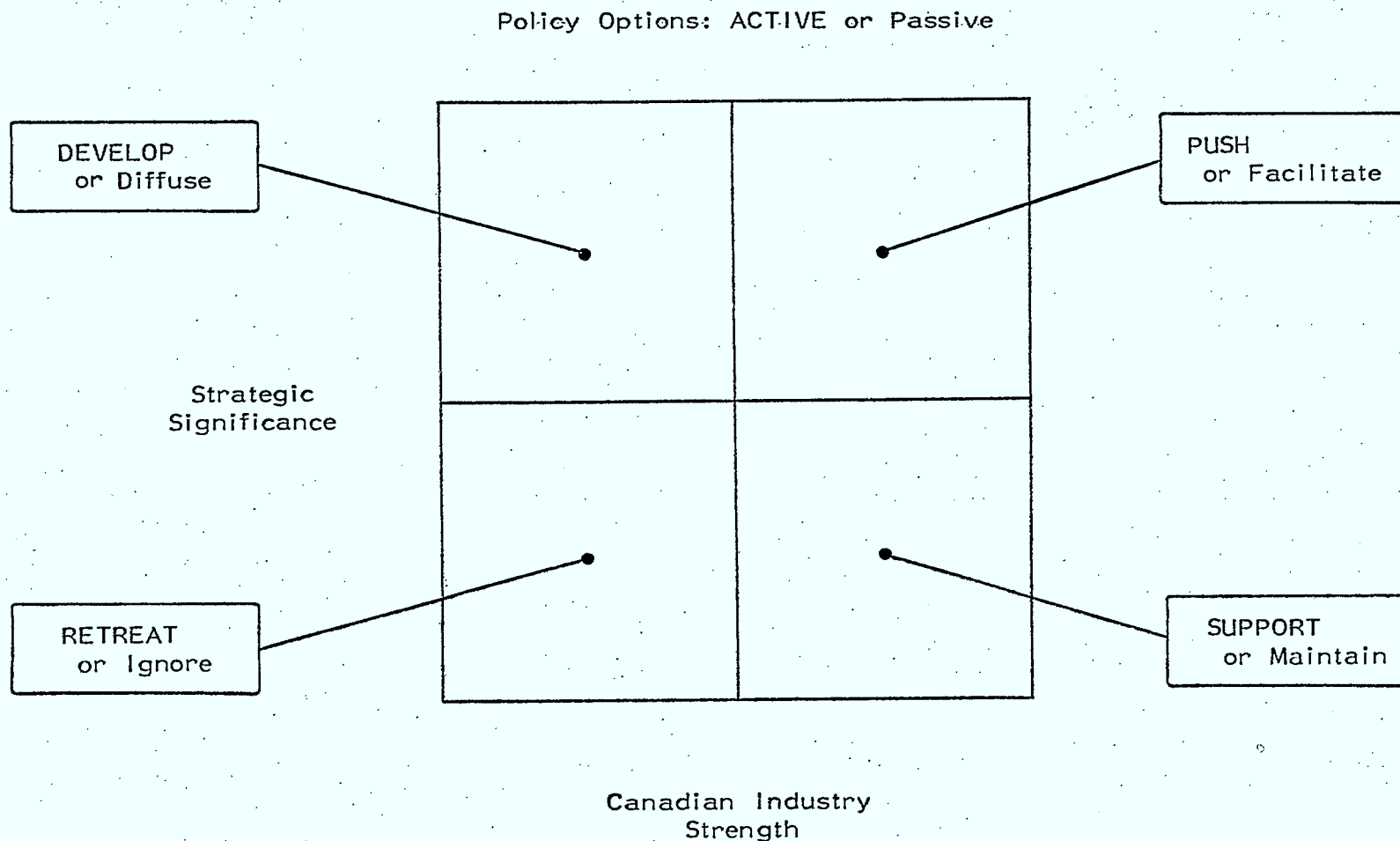
- . Jobs?
- . Human capital development?
- . Technology diffusion?
- . Value-added to economy?
- . Infrastructure?
- . Balance of trade?
- . National identity?



Canadian Industry Strength:
Existing or Potential

- . Scale?
- . Profitability?
- . Marketing/distribution?
- . Human capital?
- . Other?
- . Competition?
- . R&D capability?
- . Venture capital?

III. THE MATRIX IS ALSO USEFUL IN IDENTIFYING THE ACTIVE AND PASSIVE POLICY OPTIONS OPEN TO THE MINISTRY



Overview

ELEMENTS OF COMMUNICATIONS

Infrastructure of Communications

Content of Communications

Communications Enhanced Environments

ELEMENTS OF COMMUNICATIONS

- I. The telecom equipment industry presents attractive opportunities for Canada

- II. Canada is not likely to be a meaningful player in the global terminal equipment (computers & peripherals) industry

- III. International competition in the electronic component market is fiercest in the critical semiconductor segment - other segments may pose greater opportunities for Canadian industry

- IV. The focus of software competition is switching from custom services to mass marketing of packaged products

1. THE TELECOM EQUIPMENT INDUSTRY PRESENTS ATTRACTIVE OPPORTUNITIES FOR CANADA

1. The world telecom equipment industry is huge and growing

2. Canada's capabilities in the telecom equipment industry derive from two key companies - Northern Telecom and Mitel

3. Canada's telecom equipment industry is both strategically significant and competitively strong

1. THE WORLD TELECOM EQUIPMENT INDUSTRY IS HUGE AND GROWING

The world market for telecom equipment exceeded \$40 billion in 1982

The top four firms controlled 67% of the 1980 world telecom equipment market

While North America continues to be the largest market for telecom equipment, Developed Europe and the Middle East are growing fast

Public switching and transmission equipment makes up the largest share of the telecom equipment market, followed by the high growth private systems and terminals segments

Due to the strategic significance of the telecom industry, most governments are continuing to press for the development of indigenous capabilities

According to the OECD, R&D is "the single most important determinant of long run competitiveness" in telecom equipment

THE WORLD MARKET FOR TELECOM EQUIPMENT EXCEEDED \$40 BILLION IN 1982

INTERNATIONAL TELECOM EQUIPMENT INDUSTRY

Industry Sales	1982 World Market - \$40 billion U.S.
	30% of world output of electronic based goods
Industry Structure	Highly concentrated, oligopolistic
	OECD countries - four largest firms in each country have 70% of sales
	Internationally - four largest firms have 60% of world sales
Industry Trends	Emergence and growth of private equipment markets
	New market entrants from electronics and computer industries
	Technological push into new service offerings
Industry Issues	Breakdown of traditional vertical relationships between equipment suppliers and service providers
	Shift in world distribution of telephone usage toward LDCs
	Liberalization of trade to encourage specialization
	International technical standards

THE TOP FOUR FIRMS CONTROLLED 67% OF THE 1980 WORLD TELECOM EQUIPMENT MARKET

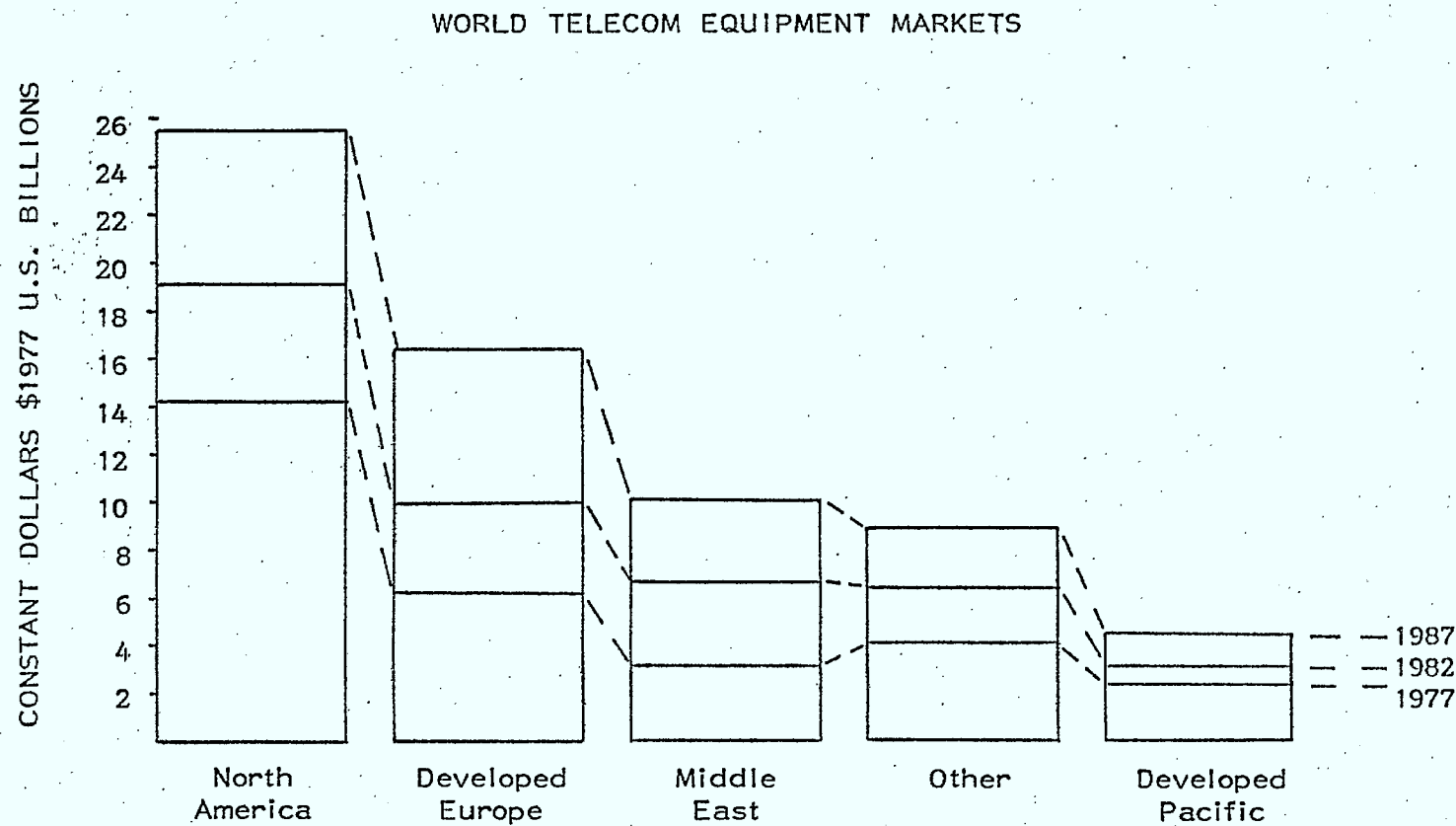
SALES OF MAJOR MANUFACTURERS OF TELECOM EQUIPMENT

MANUFACTURER	SALES OF TELECOMMUNICATIONS EQUIPMENT IN \$U.S. BILLIONS		APPROXIMATE SHARE OF 1980 MARKET
	1980	1981	
AT&T (U.S.)	\$12.0	\$13.0	31%
ITT (U.S.)	6.0	-	16%
Siemens (Germany)	5.0	4.6	13%
L.M. Ericsson (Sweden)	2.9	3.2	7%
GTE (U.S.)	2.2	-	6%
CGE (France)	1.9	-	5%
Northern Telecom (Canada)	1.8	2.1	5%
Thomson Brandt (France)	1.6	-	4%
NEC (Japan)	1.5	1.7	4%
Philips (Netherlands)	1.3	1.3	3%
Plessey (U.K.)	.8	.9	2%
Italtel (Italy)	.6	.6	2%

67%

Source: Canada Consulting based on OECD information

WHILE NORTH AMERICA CONTINUES TO BE THE LARGEST MARKET FOR TELECOM EQUIPMENT, DEVELOPED EUROPE AND THE MIDDLE EAST ARE GROWING FAST



Source: Canada Consulting based on OECD data

PUBLIC SWITCHING AND TRANSMISSION EQUIPMENT MAKES UP THE LARGEST SHARE OF THE TELECOM EQUIPMENT MARKET, FOLLOWED BY THE HIGH GROWTH PRIVATE SYSTEMS AND TERMINALS SEGMENTS

Switching and transmission equipment will account for over 60% of the telecom equipment purchased in 1985

Northern Telecom's product mix closely resembles the global market breakdown for telecom equipment

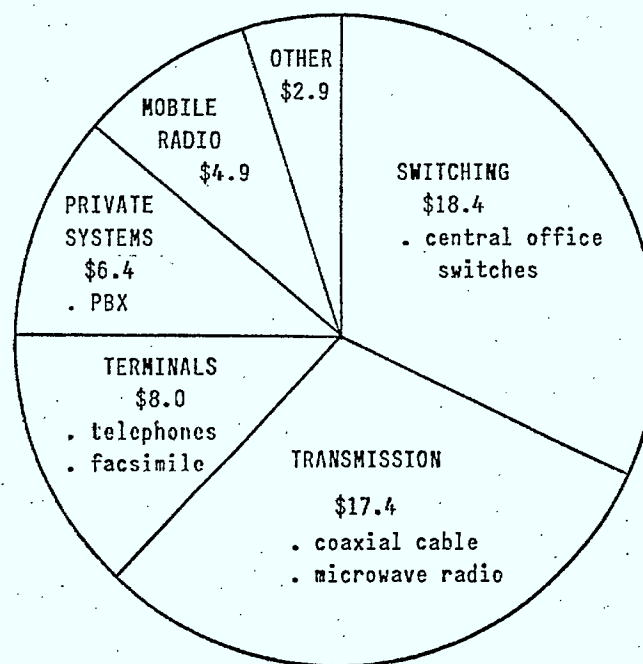
In the PBX market, four firms have over one-third share - including Northern Telecom and Mitel with over 15%

Sales of peripherals are driving growth in the U.S. PBX market

SWITCHING AND TRANSMISSION EQUIPMENT WILL ACCOUNT FOR OVER 60% OF THE TELECOM EQUIPMENT PURCHASED IN 1985

TELECOM EQUIPMENT

Projected 1985 World Sales in \$U.S. Billions. Total = \$58 Billion U.S.



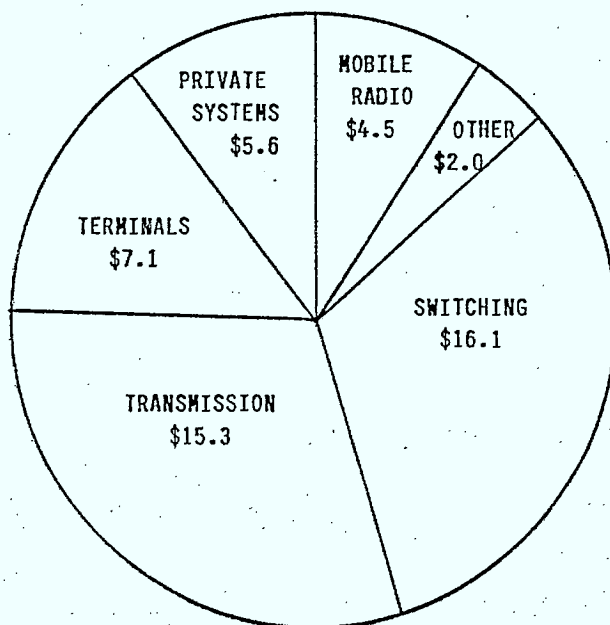
Source: Canada Consulting based on OECD data

1. World Industry
Key Products

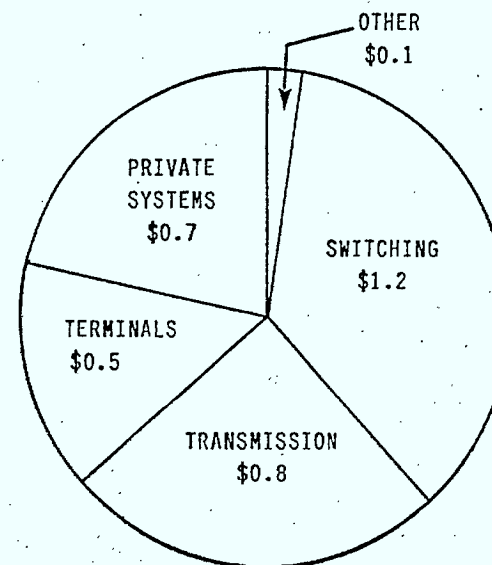
NORTHERN TELECOM'S PRODUCT MIX CLOSELY RESEMBLES THE GLOBAL MARKET
BREAKDOWN FOR TELECOM EQUIPMENT

TELECOM EQUIPMENT

Estimated 1983 World Sales
Total = \$50.6 Billion U.S.



1983 Northern Telecom Sales
Total = \$3.3 Billion C



Source: Canada Consulting based on OECD data

IN THE PBX MARKET, FOUR FIRMS HAVE OVER ONE-THIRD SHARE - INCLUDING
NORTHERN TELECOM AND MITEL WITH OVER 15%

PBX MARKET SHARES - WORLDWIDE AND U.S.

	WORLDWIDE MARKET SHARE				U.S. MARKET SHARE
	1980	1981	1982	1983	1983
Siemens	8.6%	11.1%	10.9%	10.7%	4.3%
Northern Telecom	3.3%	3.8%	5.5%	8.7%	16.2%
Western Electric	12.5%	13.0%	8.2%	8.3%	23.0%
Mitel	1.9%	4.6%	6.2%	6.8%	10.8%
ITT	5.7%	6.5%	6.7%	6.3%	N/A
NEC	3.5%	4.6%	5.5%	5.9%	5.1%
Rolm	3.0%	3.7%	4.8%	5.5%	13.8%
Others	55.8%	52.7%	52.2%	47.8%	26.8%

Source: Canada Consulting based on Northern Telecom market analysis

SALES OF PERIPHERALS ARE DRIVING GROWTH IN THE U.S. PBX MARKET

U.S. PBX/OFFICE CONTROLLER MARKET FORECAST, 1983-1989

Segment	Market Revenues \$U.S. Millions		Compound Annual Growth
	1983	1989	
Voice/Data PBXs	2980	4715	8%
Peripherals			
. Voice/Message	35	450	72%
. Data	100	820	51%
. Workstations	405	2100	28%
Data PBXs	60	360	35%
LANs	90	235	20%
Total Revenues	3670	8680	15%

Source: Canada Consulting based on Northern Telecom market forecast

DUE TO THE STRATEGIC SIGNIFICANCE OF THE TELECOM INDUSTRY, MOST GOVERNMENTS ARE CONTINUING TO PRESS FOR THE DEVELOPMENT OF INDIGENOUS CAPABILITIES

Most developed countries have cultivated local telecom industries through industry vertical integration, Post, Telephone & Telegraph (PTT) purchasing policies, or tariff/non-tariff barriers

- . NEC supplies NT&T, Japan's telecom utility
- . Thomson-Brandt and CGE supply France's PTT
- . Italtel supplies Italy's PTT
- . Ericsson supplies Sweden's PTT
- . Northern Telecom is a major supplier to Canada's Bell system

Governments also support telecom exports through export financing assistance, overseas market intelligence, as well as political contacts and negotiations

Many less developed countries (LDCs) are insisting on local manufacturing and research by multinationals as a means of industry development and technology transfer

ACCORDING TO THE OECD, R&D IS "THE SINGLE MOST IMPORTANT DETERMINANT OF LONG RUN COMPETITIVENESS" IN TELECOM EQUIPMENT

OECD RESEARCH AND DEVELOPMENT GUIDELINES FOR TELECOM EQUIPMENT

KEY AREAS - component integration, computer architecture, opto-electronics

SERVICE PROVIDER'S ROLE - traditional vertical relationships have extended to providing R&D or R&D financing to equipment manufacturers

GOVERNMENT'S ROLE - fundamental research involving time investment, specialized equipment and commercial risk - example projects include investigations of spectrum usage, speech synthesis, signals theory and software design

OECD GUIDELINES FOR PUBLICLY FUNDED R&D

1. There should be competition for and within publicly supported development projects
 2. Development projects should involve application of technologies which will not require continuing government assistance and protection
 3. Development projects should normally complement or extend work being carried out in other countries
 4. Results of publicly funded development should be disseminated broadly and without discrimination
-

2. CANADA'S CAPABILITIES IN THE TELECOM EQUIPMENT INDUSTRY DERIVE FROM TWO KEY COMPANIES - NORTHERN TELECOM AND MITEL

Canadian shipments of telecom equipment totalled close to \$3 billion in 1983 - dominated by Canadian sales by Northern Telecom and Mitel

Northern Telecom also dominates the Canadian industry in terms of operating results - in revenues, earnings, employment and productivity

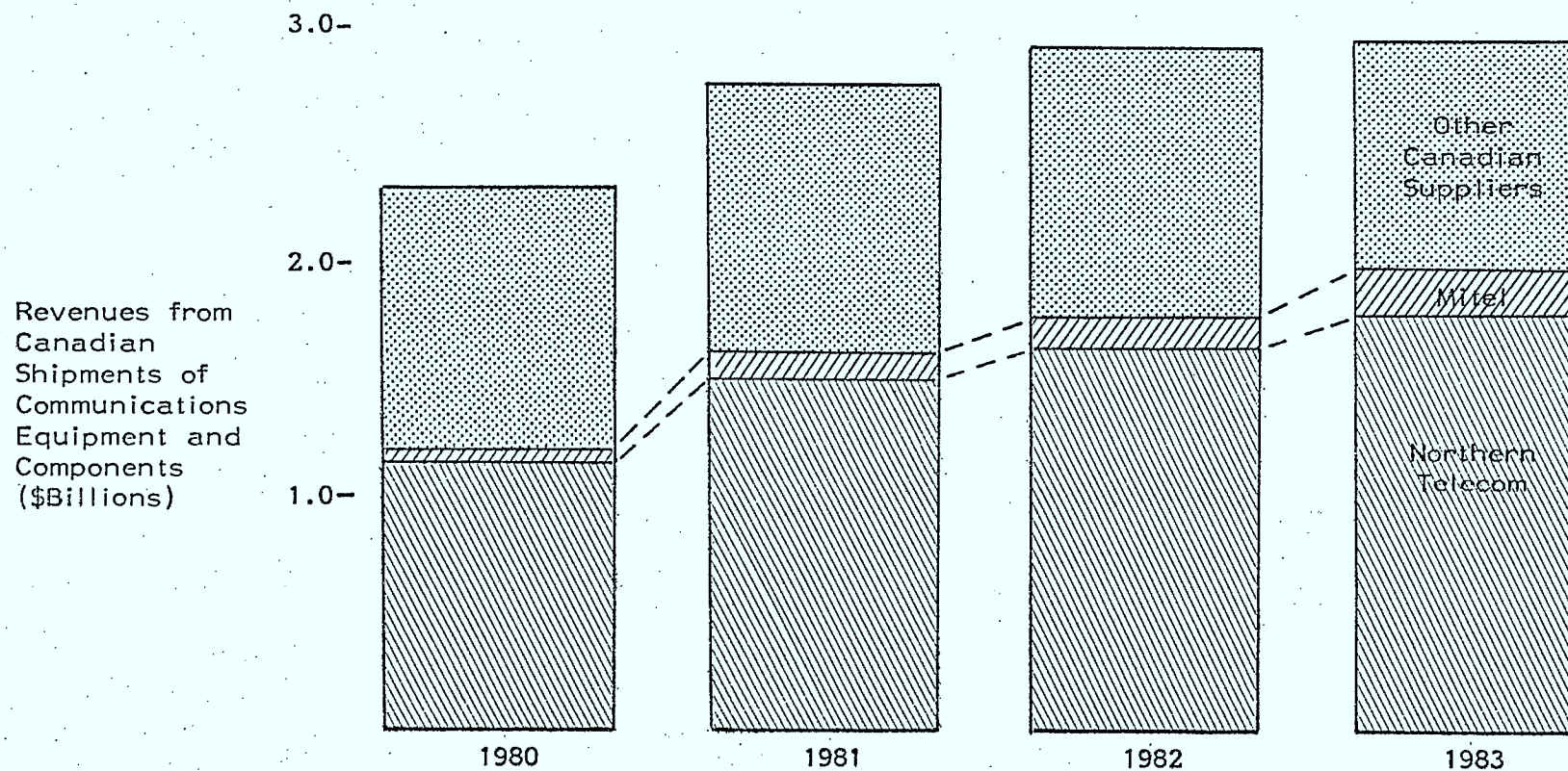
Canada buys telecom equipment from the U.S., Japan, Taiwan, Mexico ... and sells to the U.S., U.K., Turkey, South Korea ...

Canada's telecom R&D effort - while substantial - cannot match that of the two largest U.S. equipment manufacturers

Three trends are critically important to continued Canadian success in the telecom equipment industry

CANADIAN SHIPMENTS OF TELECOM EQUIPMENT TOTALLED CLOSE TO \$3 BILLION IN 1983 – DOMINATED BY CANADIAN SALES BY NORTHERN TELECOM AND MITEL

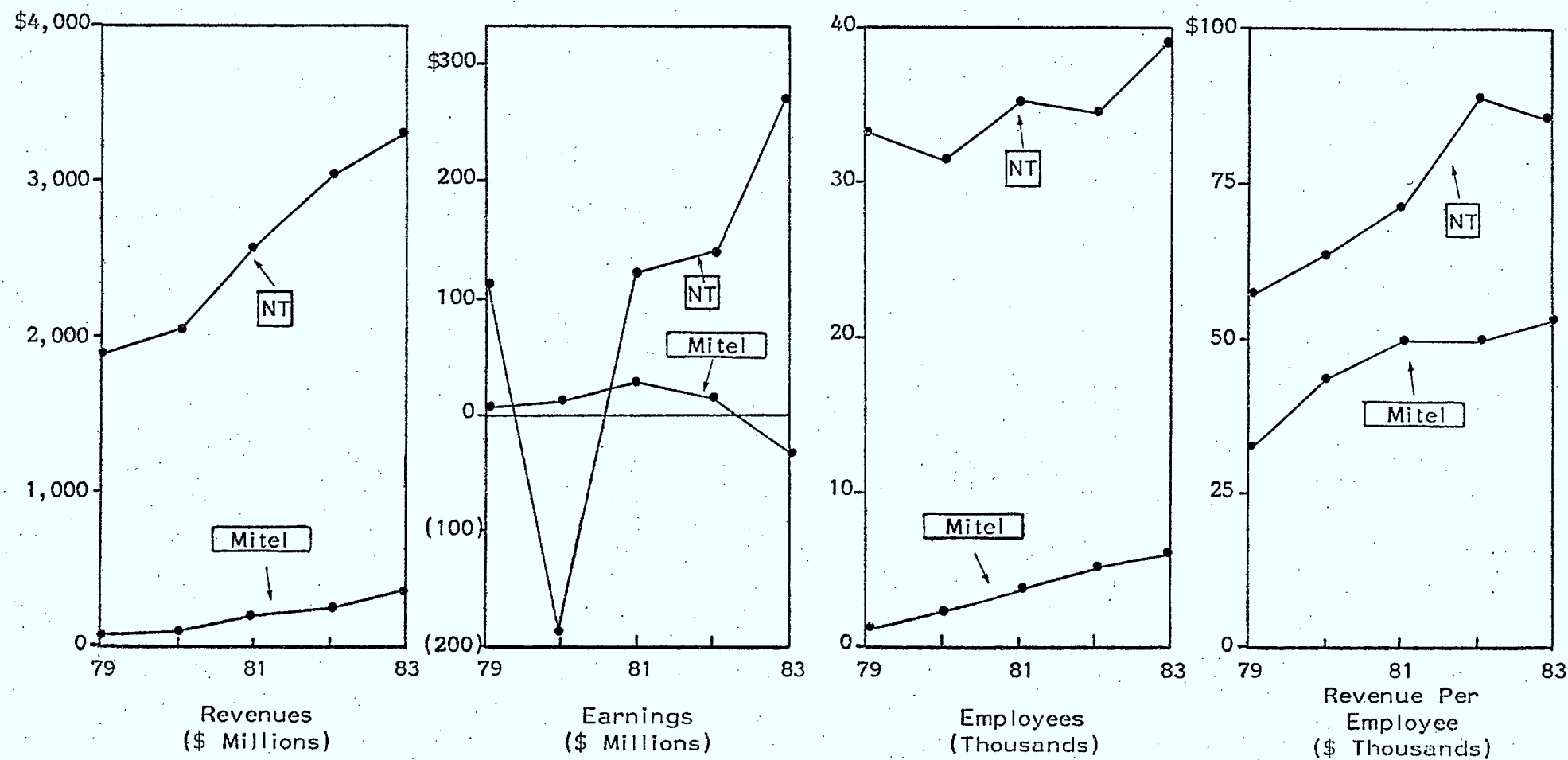
REVENUES OF THE CANADIAN COMMUNICATIONS & COMPONENTS INDUSTRY



Source: Canada Consulting based on data obtained from Statistics Canada

NORTHERN TELECOM ALSO DOMINATES THE CANADIAN INDUSTRY IN TERMS OF OPERATING RESULTS - IN REVENUES, EARNINGS, EMPLOYMENT AND PRODUCTIVITY

A COMPARISON OF OPERATING RESULTS
NORTHERN TELECOM VS. MITEL, 1979-1983



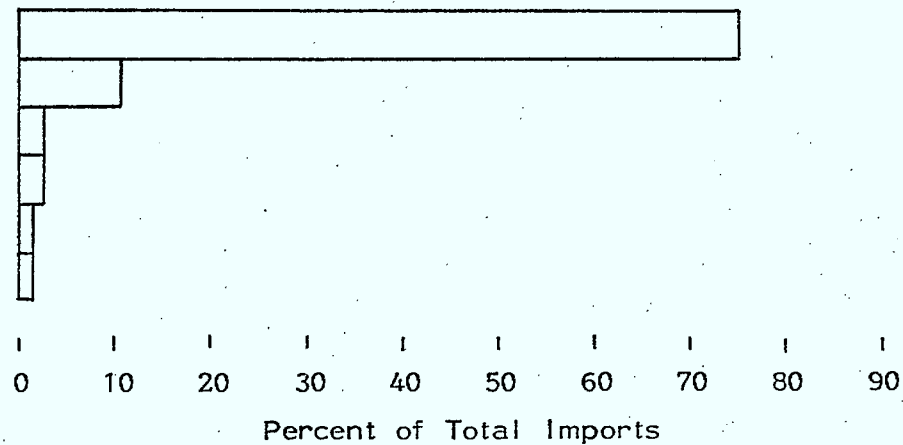
Source: Canada Consulting research

CANADA BUYS TELECOM EQUIPMENT FROM THE U.S., JAPAN, TAIWAN, MEXICO ... AND SELLS TO THE U.S., U.K., TURKEY, SOUTH KOREA ...

CANADIAN TRADING PARTNERS IN TELECOM EQUIPMENT AND COMPONENTS, 1983

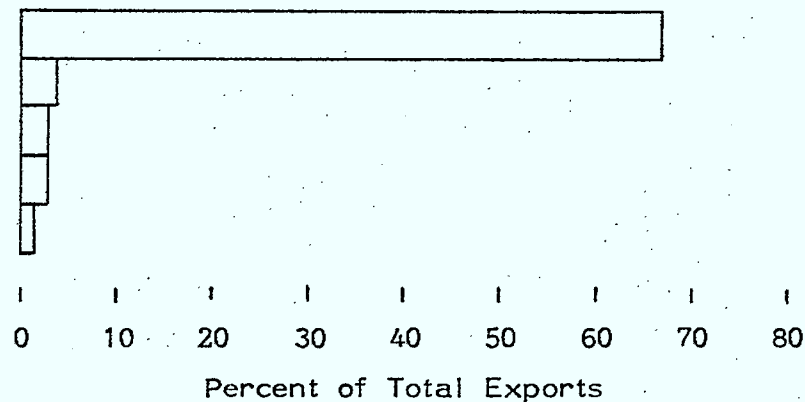
Imports

United States
Japan
Taiwan
Mexico
United Kingdom
Hong Kong



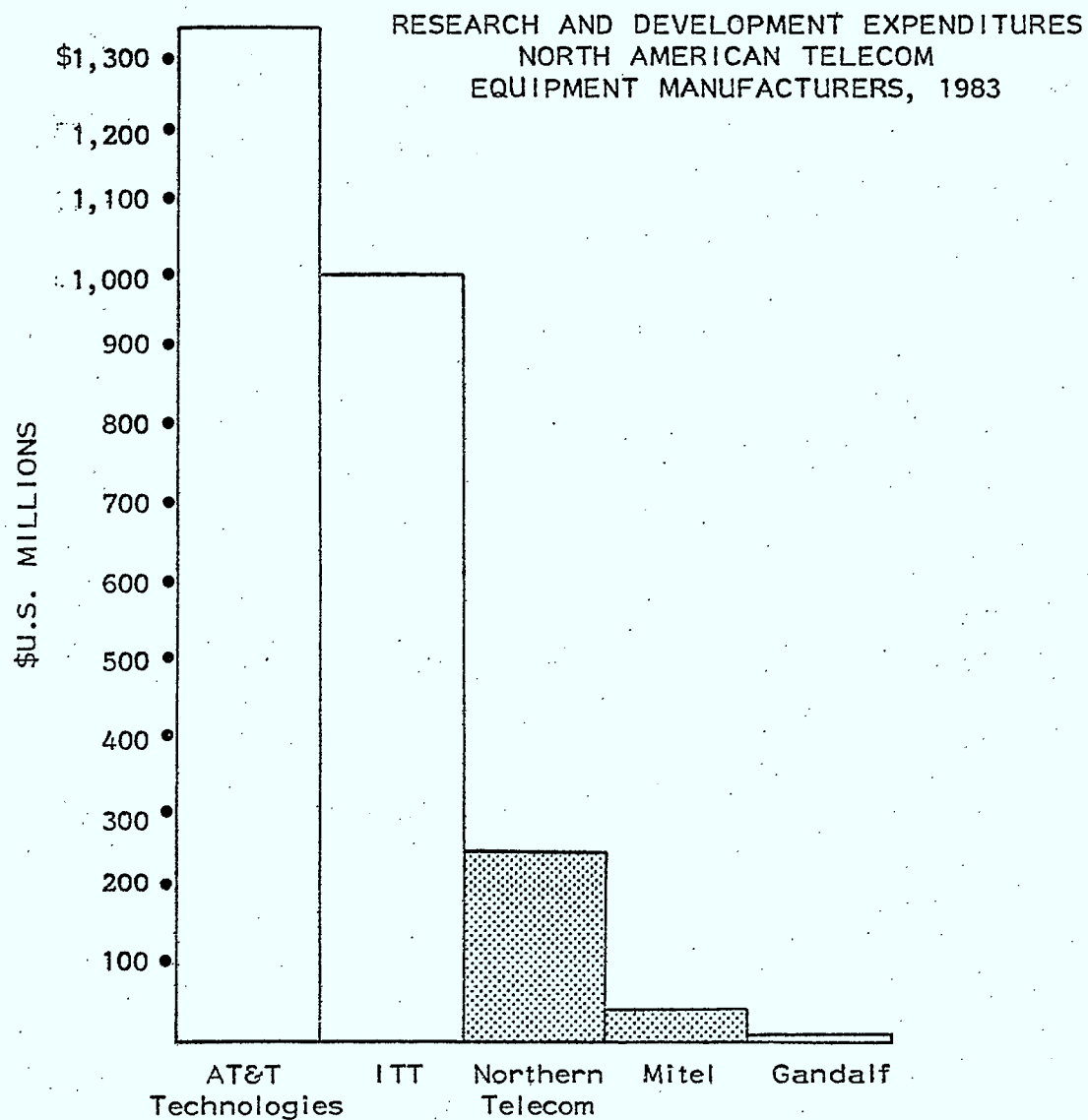
Exports

United States
United Kingdom
Turkey
South Korea
Ireland



Source: Canada Consulting based on Statistics Canada data

CANADA'S TELECOM R&D EFFORT - WHILE SUBSTANTIAL - CANNOT MATCH THAT OF THE TWO LARGEST U.S. EQUIPMENT MANUFACTURERS



THREE TRENDS ARE CRITICALLY IMPORTANT TO CONTINUED CANADIAN SUCCESS IN THE TELECOM EQUIPMENT INDUSTRY

Trends in Telecom Equipment Industry

Covergence - telecommunications, computers, satellites ...

OEM Software - the importance of software as a key element of new product development

AT&T Divestiture - "AT&T wants a bigger share of the Canadian computer and communications market, which the U.S. company believes will generate \$59 billion in revenue over the next six years ... The target is Northern Telecom, a big rival in the U.S."

3. CANADA'S TELECOM EQUIPMENT INDUSTRY IS BOTH STRATEGICALLY SIGNIFICANT AND COMPETITIVELY STRONG

AT&T divestiture and telematic industry convergence are the biggest threats facing telecom equipment manufacturers

The telecom equipment industry is strategically significant along several dimensions

Canada's key industry strength to date has been a successful R&D effort focussed on digital switching technology

Overall, the Canadian telecom equipment industry rates high in strategic significance and industry strength

AT&T DIVESTITURE AND TELEMATIC INDUSTRY CONVERGENCE ARE THE BIGGEST THREATS FACING TELECOM EQUIPMENT MANUFACTURERS

TELECOM EQUIPMENT INDUSTRY

THREATS	OPPORTUNITIES
<p>AT&T divestiture has encouraged aggressive competition in U.S.</p> <p>Convergence is causing big new players, e.g., IBM, to consider this market</p>	<p>World market is huge and growing</p> <p>LDC's do not have domestic telecom equipment industries</p> <p>Private networks offer a new type of customer</p>

THE TELECOM EQUIPMENT INDUSTRY IS STRATEGICALLY SIGNIFICANT ALONG SEVERAL DIMENSIONS

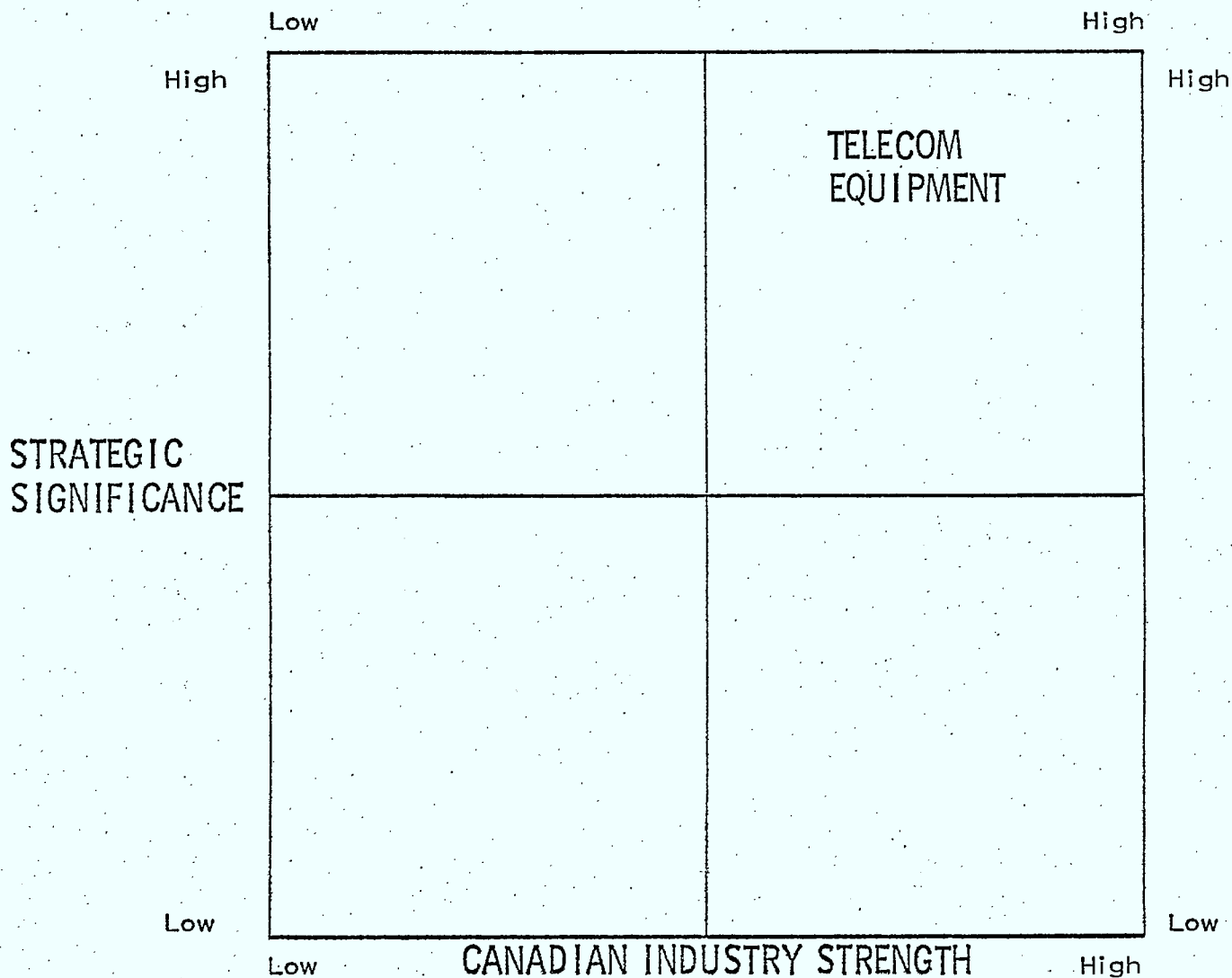
STRATEGIC SIGNIFICANCE OF TELECOM EQUIPMENT INDUSTRY	
Jobs	✓ ✓ ✓
Human capital development	✓ ✓
Technology diffusion	✓ ✓ ✓
Value-added to economy	✓ ✓ ✓
Infrastructure	✓ ✓ ✓
Balance of trade	✓ ✓ ✓
National Identity	✓

CANADA'S KEY INDUSTRY STRENGTH TO DATE HAS BEEN A SUCCESSFUL R&D
EFFORT FOCUSSED ON DIGITAL SWITCHING TECHNOLOGY

TELECOM EQUIPMENT INDUSTRY

KEY FACTORS FOR SUCCESS	CANADIAN INDUSTRY STRENGTH
Research and development	✓ ✓
Large scale operation	✓ ✓
Vertical integration	✓ ✓

OVERALL, THE CANADIAN TELECOM EQUIPMENT INDUSTRY RATES HIGH IN STRATEGIC SIGNIFICANCE AND INDUSTRY STRENGTH



II. CANADA IS NOT LIKELY TO BE A MEANINGFUL PLAYER IN THE GLOBAL COMPUTER EQUIPMENT INDUSTRY

1. IBM dominates a world computer equipment market estimated to be worth over \$110 billion U.S.

2. Canada's relatively small computer equipment industry largely consists of the branch plants of major U.S. multinationals

3. While the computer equipment industry has major strategic significance, it is unlikely that Canada will be able to develop important indigenous capabilities in this area

1. IBM DOMINATES A WORLD COMPUTER EQUIPMENT MARKET ESTIMATED TO BE WORTH OVER \$110 BILLION U.S.

The world market for computing and peripheral equipment is estimated at over \$110 billion U.S., growing at around 15% per year

Much of this growth is being driven by burgeoning markets for small computers - minis, personals and portables

IBM dominates other major U.S. multinational terminal equipment manufacturers in both revenues and profitability

IBM dominance is also reflected in phenomenal market share success, such as in Europe

The most effective means of U.S. government support in all parts of the electronics industry has been a huge government financed research effort in defence and space

IBM's outstanding performance is a result of excellent strategic management capitalizing on research excellence

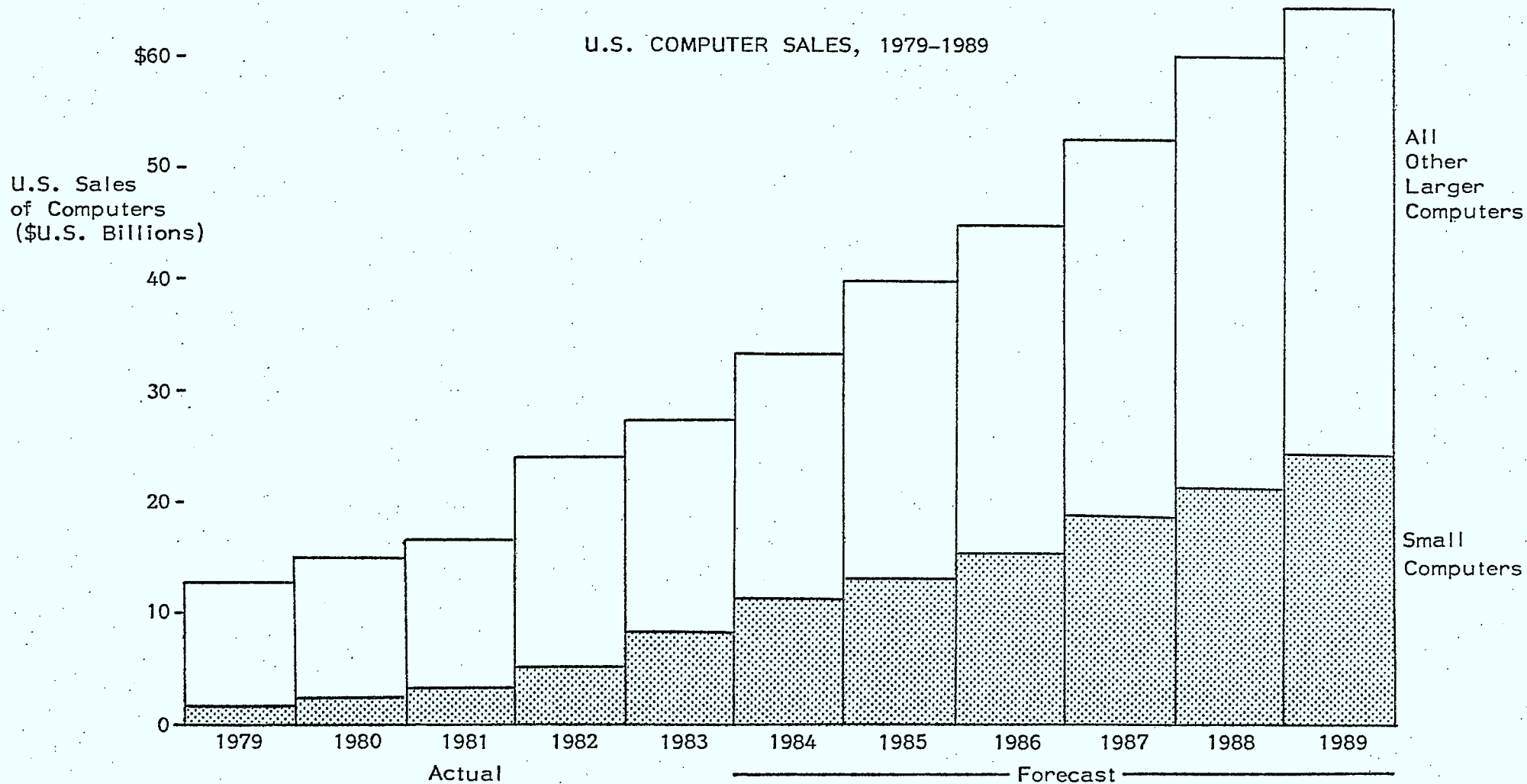
THE WORLD MARKET FOR COMPUTING AND PERIPHERAL EQUIPMENT IS ESTIMATED AT OVER \$110 BILLION U.S., GROWING AT AROUND 15% PER YEAR

COMPUTING EQUIPMENT MARKET FORECASTS

Sector	1983	1983	Forecast
	U.S. Market	World Market (estimate)	Annual Growth
Computing Equipment	\$40 billion	\$80 billion	15%-20%
. Super minicomputers (32 bit)	\$ 1 billion	\$ 2 billion	30%
. Portable computers	\$.3 billion	\$.5 billion	80%-90%
. Personal computers (16 bit)	\$ 3 billion	\$ 5 billion	30%-50%
Peripheral Equipment	\$16 billion	\$32 billion	10%-15%
. Magnetic Disk Storage	\$ 4 billion	\$ 8 billion	5%-10%
. Display Terminals	\$ 3 billion	\$ 6 billion	5%-10%
. Printers	\$ 1 billion	\$ 3 billion	15%-20%

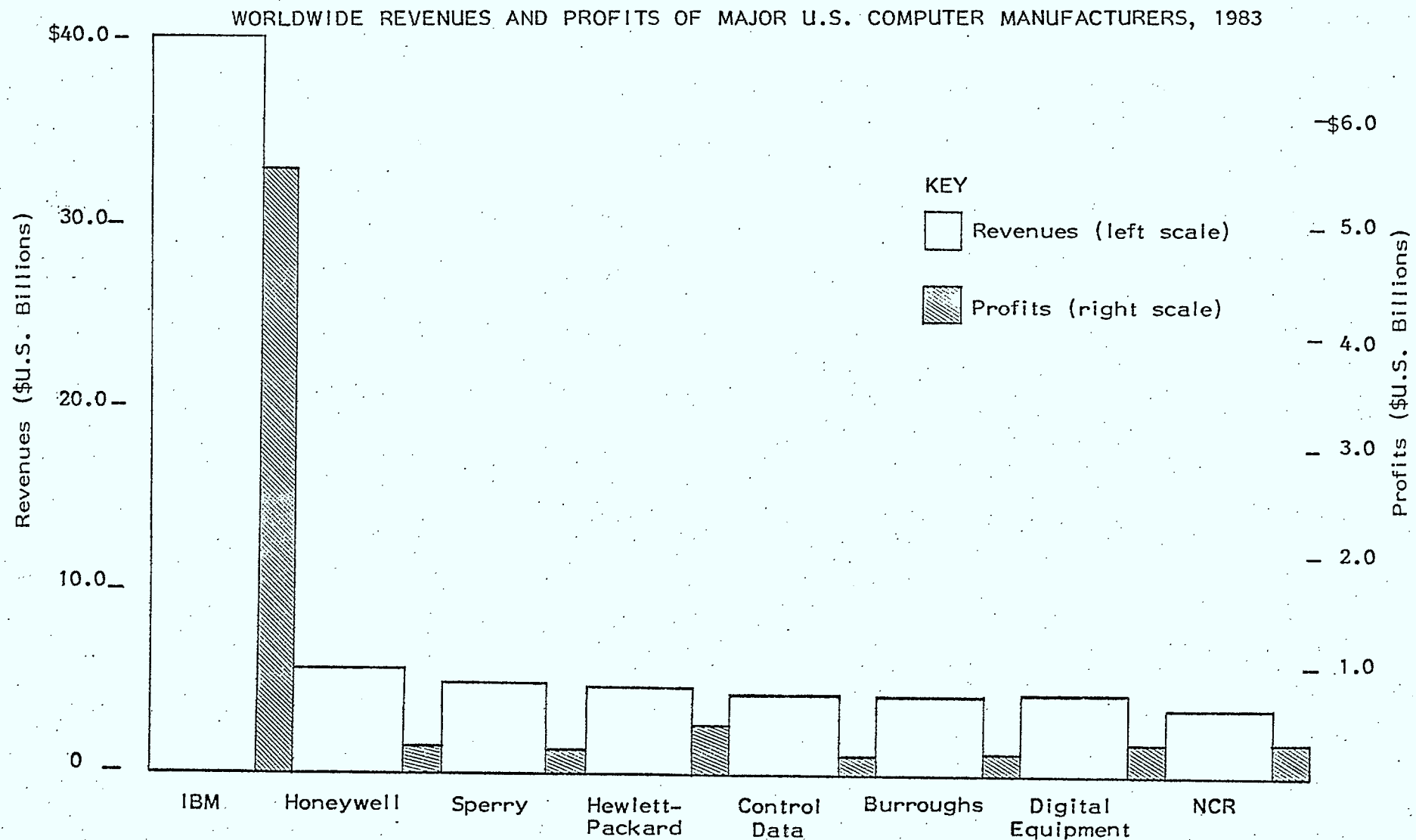
Source: Canada Consulting analysis and U.S. Department of Commerce projections

MUCH OF THIS GROWTH IS BEING DRIVEN BY BURGEONING MARKETS FOR SMALL COMPUTERS - MINIS, PERSONALS AND PORTABLES



Source: Canada Consulting based on International Data Corp. and Business Week estimates

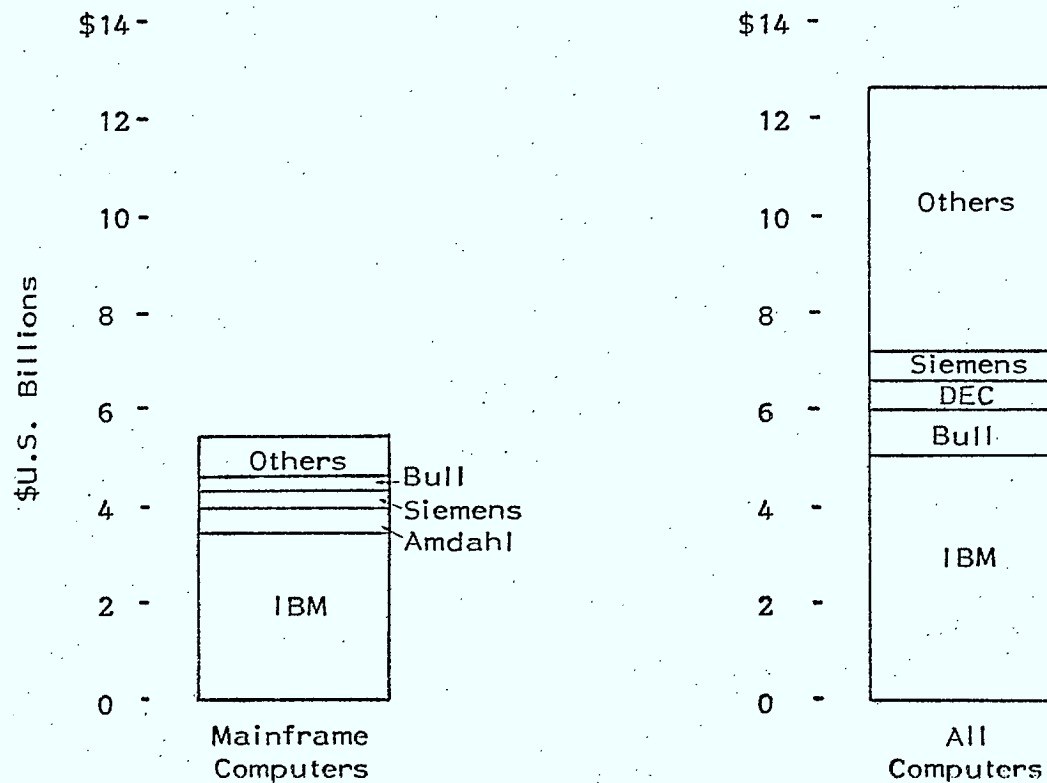
IBM DOMINATES OTHER MAJOR U.S. MULTINATIONAL TERMINAL EQUIPMENT MANUFACTURERS IN BOTH REVENUES AND PROFITABILITY



Source: Canada Consulting research

IBM DOMINANCE IS ALSO REFLECTED IN PHENOMENAL MARKET SHARE SUCCESS, SUCH AS IN EUROPE

EUROPEAN COMPUTER MARKET SHARES



Source: Canada Consulting based on The Economist, June 30, 1984

THE MOST EFFECTIVE MEANS OF U.S. GOVERNMENT SUPPORT IN ALL PARTS OF THE ELECTRONICS INDUSTRY HAS BEEN A HUGE GOVERNMENT FINANCED RESEARCH EFFORT IN DEFENCE AND SPACE

INTERNATIONAL SUPPORT FOR ELECTRONICS INDUSTRIES

- | | |
|----------------|---|
| United States | <ul style="list-style-type: none">. Large scale contract research awarded by Department of Defence. Government-funded space program |
| Japan | <ul style="list-style-type: none">. Multibillion dollar industry-government research venture into fifth generation computer. Tight inspection requirements inhibiting electronic imports |
| West Germany | <ul style="list-style-type: none">. \$500 million government program to enhance chip manufacturing. Massive skilled apprenticeship programs (1.4 million people in 1978). \$600 million four-year program to study social impact of electronics |
| United Kingdom | <ul style="list-style-type: none">. Prestel (interactive videotex). Inmos - \$100 million government seed money in memory device manufacturer. Government procurement programs |
| France | <ul style="list-style-type: none">. Forced mergers to create "super companies". Major commitment to develop public videotex system - terminals to be installed in every home. Government procurement programs |
-

IBM'S OUTSTANDING PERFORMANCE IS A RESULT OF EXCELLENT STRATEGIC
MANAGEMENT CAPITALIZING ON RESEARCH EXCELLENCE

IBM has consistently outperformed the overall U.S. terminal equipment industry

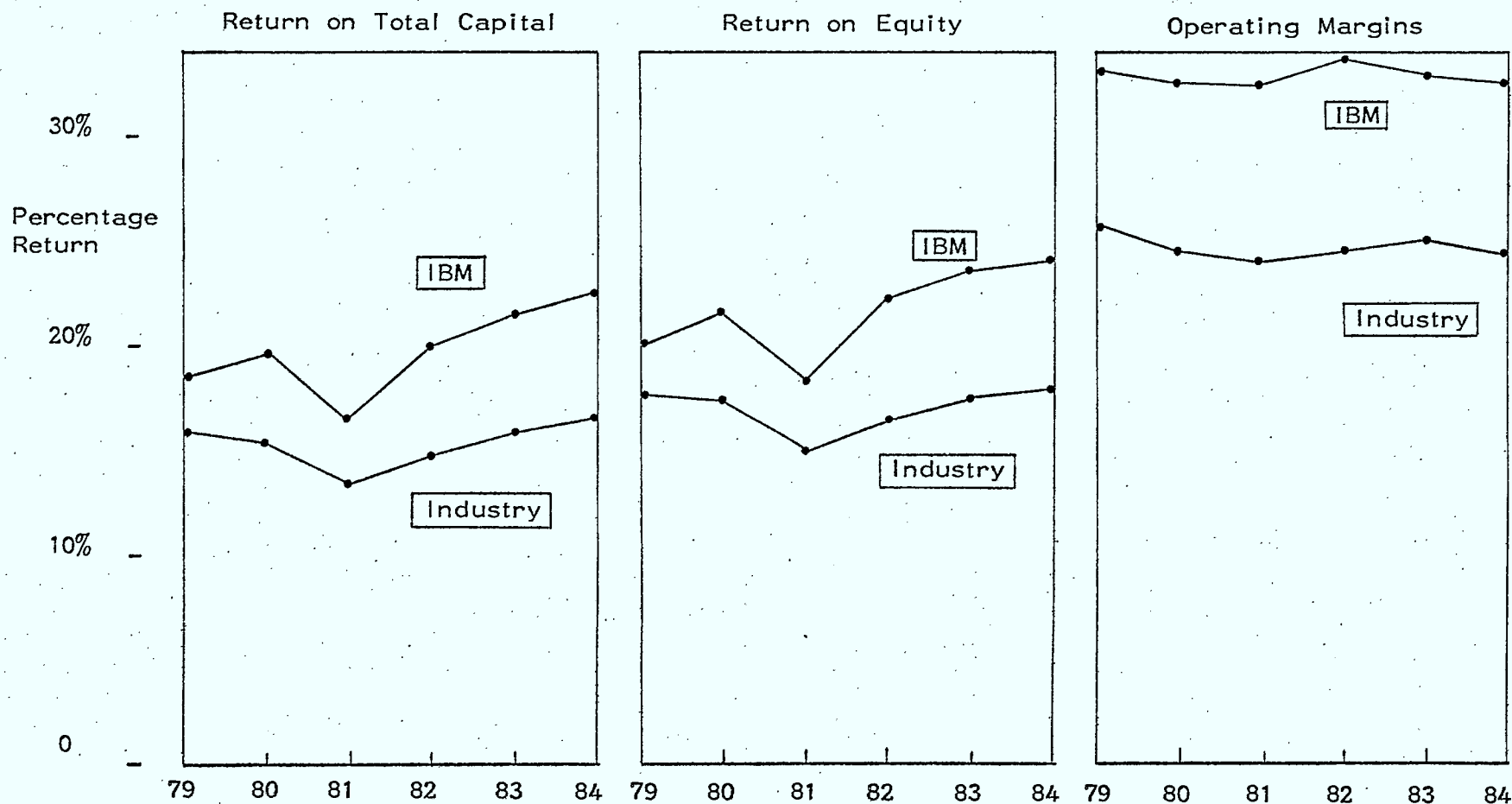
This performance has rested on fundamentally sound strategic planning ...

... Supported by a well directed R&D effort

1. World Industry
IBM - A Case Study

IBM HAS CONSISTENTLY OUTPERFORMED THE OVERALL U.S. TERMINAL EQUIPMENT INDUSTRY

OPERATING RESULTS
IBM VS. U.S. TERMINAL EQUIPMENT INDUSTRY, 1979-1984



Source: Canada Consulting research

THIS PERFORMANCE HAS RESTED ON FUNDAMENTALLY SOUND STRATEGIC PLANNING...

IBM Strategic Planning

Market	Strategy	Actions
Mainframe	Product Leader	<ul style="list-style-type: none">. Intensive R&D. Market research into customer needs. Continual product evolution. Periodic product revolution
Small Computers	Early Follower	<ul style="list-style-type: none">. Spin off "new company" to manage "different business". Remain close to state-of-the-art technology. Develop the best marketing and distribution systems. Ensure blanket software compatibility

1. World Industry
IBM - A Case Study

... SUPPORTED BY A WELL-DIRECTED R&D EFFORT

IBM RESEARCH

Resources employed: \$3.5 billion U.S. per year
35,000 employees

Location: (1) Basic research - Yorkton Heights, N.Y. with smaller installations in California and Switzerland
(2) Development (Applied research) - 26 IBM centres throughout the world, including one in Canada

Goal: To be renowned for the science and technologies vital to IBM's business

Concentration: Surfaces and interfaces
Ceramic and chip processing and handling
Advanced image processing
Speech technology and natural language interfaces
Knowledge-based systems
Man-machine interfaces
Videotex
Computer assisted manufacturing

2. CANADA'S RELATIVELY SMALL COMPUTER EQUIPMENT INDUSTRY LARGELY CONSISTS OF THE BRANCH PLANTS OF MAJOR U.S. MULTINATIONALS

Canadian industry shipments of computer equipment account for only about one-third of the domestic market and less than 1% of the world market

A dominant share of Canadian computer equipment industry sales is held by U.S. multinationals

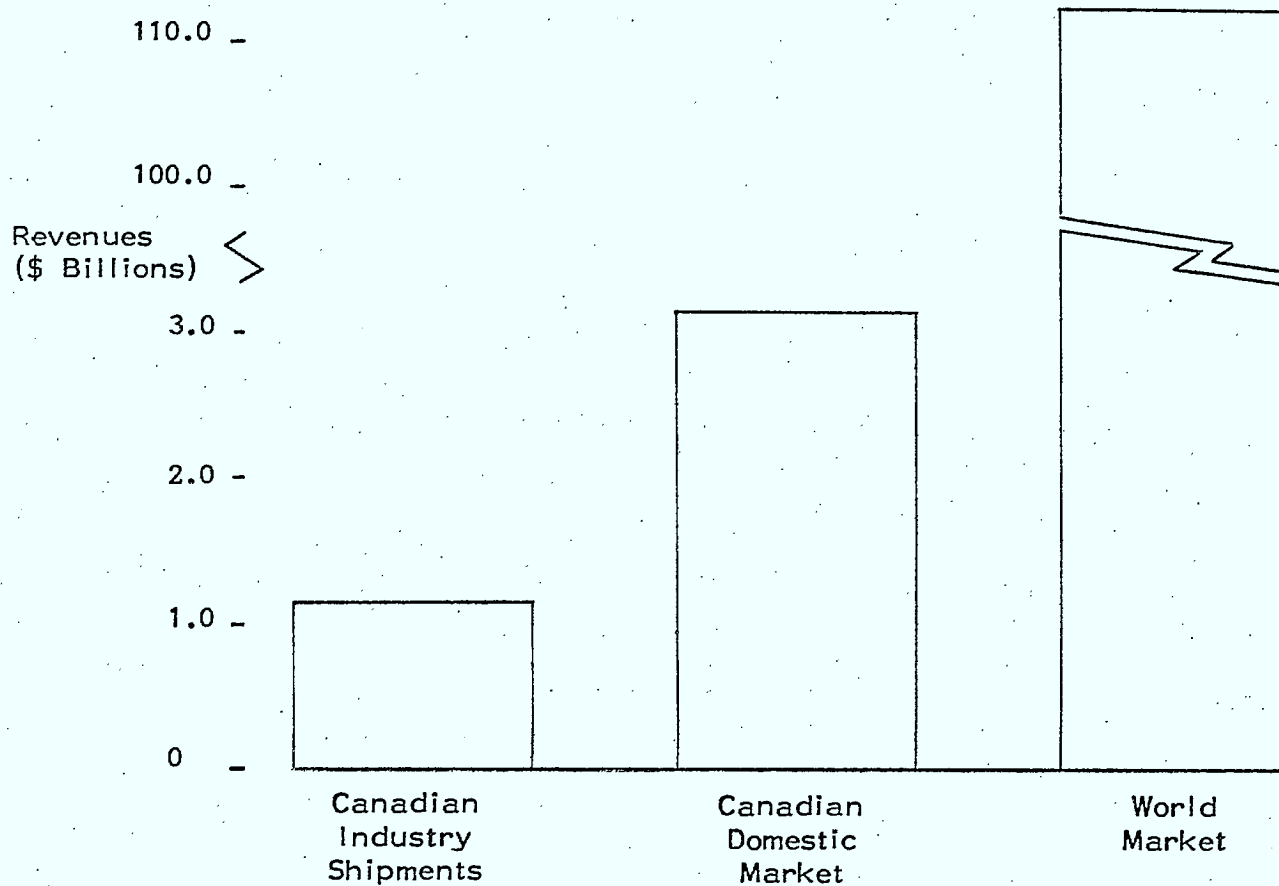
Reflecting the branch plant nature of the Canadian industry, most of Canada's trade in computer equipment crosses the American border

Canada's overall trade position in computer equipment is significantly worse than her major trading partners

Nevertheless, imports have given other Canadian manufacturers access to the productivity-enhancing computer equipment necessary to remain internationally competitive

CANADIAN INDUSTRY SHIPMENTS OF COMPUTER EQUIPMENT ACCOUNT FOR ONLY ABOUT ONE-THIRD OF THE DOMESTIC MARKET AND LESS THAN 1% OF THE WORLD MARKET

COMPUTER EQUIPMENT
SHIPMENTS AND MARKETS, 1983



Source: Canada Consulting based on data from Statistics Canada and the U.S. Department of Commerce.

A DOMINANT SHARE OF CANADIAN COMPUTER EQUIPMENT INDUSTRY SALES IS HELD BY U.S. MULTINATIONALS

THE CANADIAN COMPUTER EQUIPMENT INDUSTRY, 1981-1983

	Sales (\$Millions)			1983 Market Share
	1981	1982	1983	
IBM	1,845	2,210	2,462	54%
Honeywell	309	341	334	7%
Digital Equipment (DEC)	253	322	327	7%
Sperry	347	267	326	7%
Control Data	181	231	240	5%
NCR	179	190	199	4%
Hewlett-Packard	163	180	195	4%
Burroughs	105	155	130	3%
				93%
Canadian Computer Industry (Total Shipments and Imports)	3,730	4,098	4,523	100%

Source: Canada Consulting analysis and market estimates from Canada Department of Regional Industrial Expansion

REFLECTING THE BRANCH PLANT NATURE OF THE CANADIAN INDUSTRY, MOST OF CANADA'S TRADE IN COMPUTER EQUIPMENT CROSSES THE AMERICAN BORDER

CANADIAN TRADING PARTNERS IN COMPUTER EQUIPMENT, 1983

Imports

United States

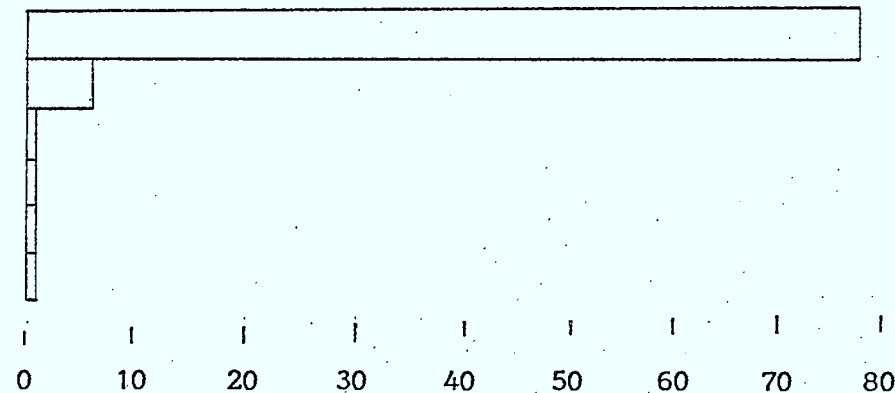
Japan

United Kingdom

West Germany

Hong Kong

Taiwan



% of
Total
Imports

Exports

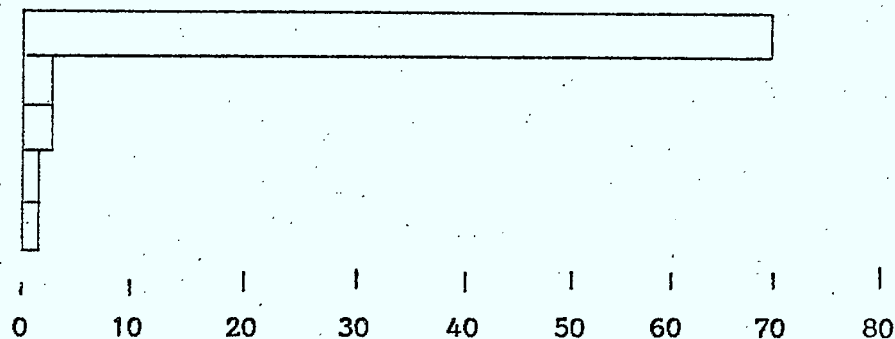
United States

United Kingdom

The Netherlands

Japan

France

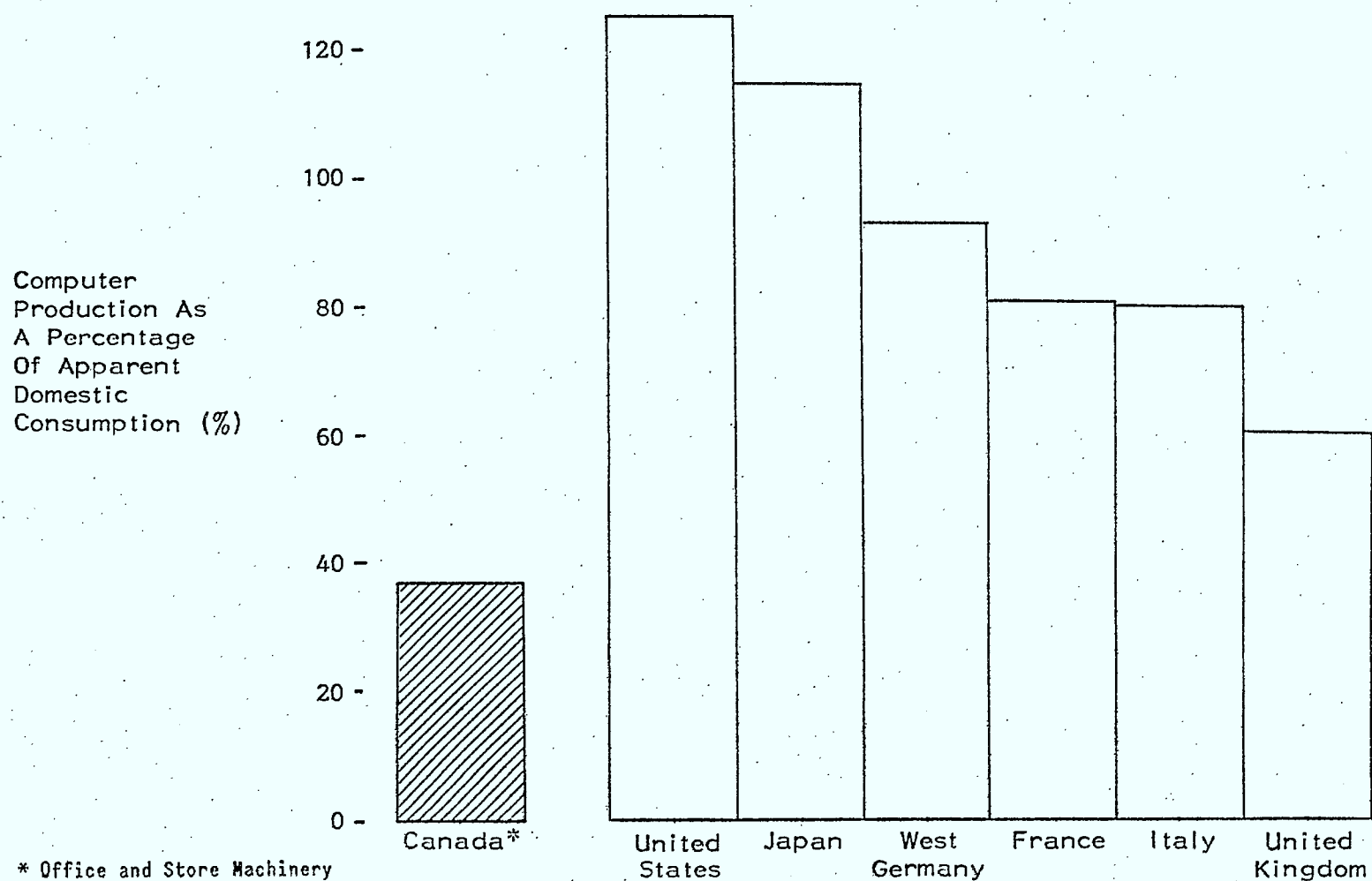


% of
Total
Exports

Source: Canada Consulting based on data from Statistics Canada.

CANADA'S OVERALL TRADE POSITION IN COMPUTER EQUIPMENT IS SIGNIFICANTLY WORSE THAN OUR MAJOR TRADING PARTNERS

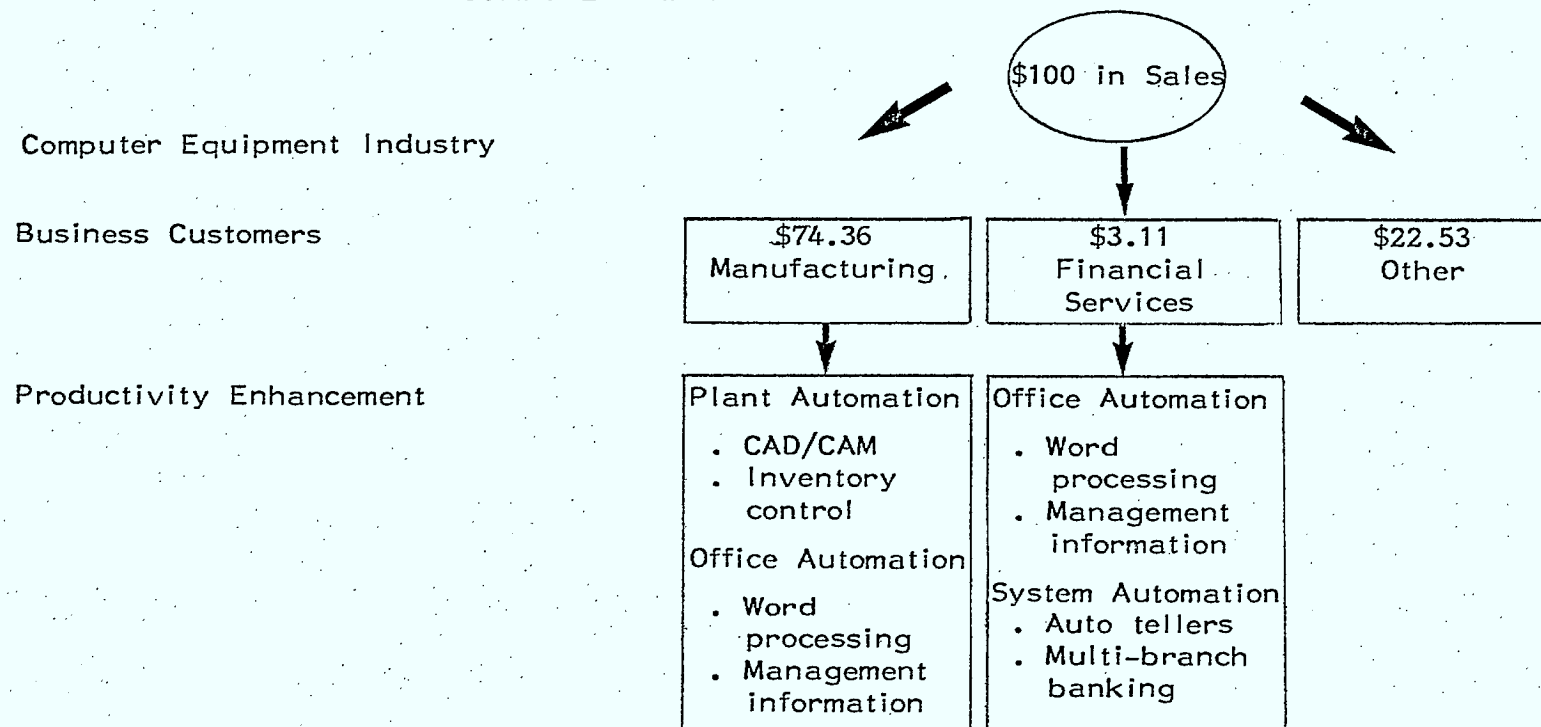
COMPUTER PRODUCTION AND APPARENT DOMESTIC CONSUMPTION, 1982



Source: Canada Consulting based on data from Statistics Canada and the U.S. Department of Commerce

NEVERTHELESS, IMPORTS HAVE GIVEN OTHER CANADIAN MANUFACTURERS ACCESS TO THE PRODUCTIVITY-ENHANCING COMPUTER EQUIPMENT NECESSARY TO REMAIN INTERNATIONALLY COMPETITIVE

COMPUTER EQUIPMENT OUTPUT ANALYSIS



3. WHILE THE COMPUTER EQUIPMENT INDUSTRY HAS MAJOR STRATEGIC SIGNIFICANCE, IT IS UNLIKELY THAT CANADA WILL BE ABLE TO DEVELOP IMPORTANT INDIGENOUS CAPABILITIES IN THIS AREA
-

Massive market opportunities in computer equipment will be pre-empted by major players like IBM

The computer equipment industry must provide the automation infrastructure crucial to many other industries

It is too late for Canada to catch up in any of the key strengths required for computer equipment industry success

The challenge for Canada is to realize the strategic potential of computer equipment products in the context of a weak Canadian industry

MASSIVE MARKET OPPORTUNITIES IN COMPUTER EQUIPMENT WILL BE PRE-EMPTED
BY MAJOR PLAYERS LIKE IBM

COMPUTER EQUIPMENT INDUSTRY

THREATS	OPPORTUNITIES
<p>IBM's stated goal is to be "Number One" in each market it enters</p> <p>Another giant, AT&T, has been freed by divestiture to compete in computer equipment</p>	<p>World market is huge and growing</p> <p>Converging telecom and computer equipment technologies will provide opportunities for Canada's world-class telecom equipment makers</p> <p>Niche strategies offer short term revenue windfalls. e.g., Compaq computer year 1 sales = \$111 million</p>

THE COMPUTER EQUIPMENT INDUSTRY MUST PROVIDE THE AUTOMATION INFRA-
STRUCTURE CRUCIAL TO MANY OTHER INDUSTRIES

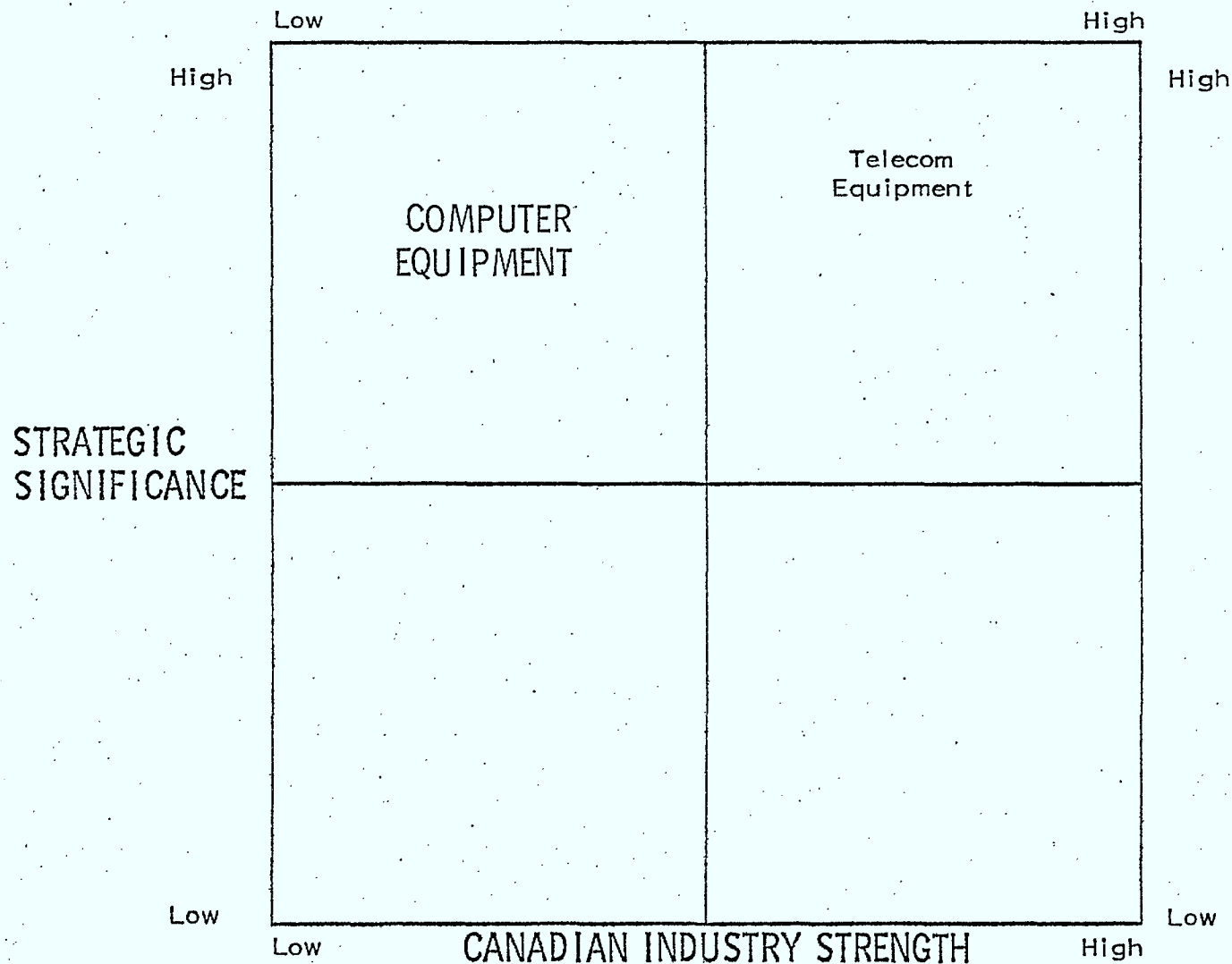
STRATEGIC SIGNIFICANCE OF COMPUTER EQUIPMENT INDUSTRY	
Jobs	✓
Human capital development	✓ ✓
Technology diffusion	✓ ✓ ✓
Value-added to economy	✓
Infrastructure	✓ ✓ ✓
Balance of trade	
National Identity	

IT IS TOO LATE FOR CANADA TO CATCH UP IN ANY OF THE KEY STRENGTHS REQUIRED FOR COMPUTER EQUIPMENT INDUSTRY SUCCESS

COMPUTER EQUIPMENT INDUSTRY

KEY FACTORS FOR SUCCESS	CANADIAN INDUSTRY STRENGTH
Research and development	✓
Large scale operations	
Software supply/compatibility	

THE CHALLENGE FOR CANADA IS TO REALIZE THE STRATEGIC POTENTIAL OF COMPUTER EQUIPMENT PRODUCTS IN THE CONTEXT OF A WEAK CANADIAN INDUSTRY



III. INTERNATIONAL COMPETITION IN THE ELECTRONIC COMPONENT MARKET IS FIERCEST IN THE CRITICAL SEMICONDUCTOR SEGMENT - OTHER SEGMENTS MAY POSE GREATER OPPORTUNITIES FOR CANADIAN INDUSTRY

1. Semiconductors have emerged as the lowest common denominator in the global electronic revolution

2. Canada has no real presence in the global semiconductor industry - but does compete in other electronic component segments

3. The Canadian electronic components industry can seek profitable niches in world markets

1. SEMICONDUCTORS HAVE EMERGED AS THE LOWEST COMMON DENOMINATOR IN THE GLOBAL ELECTRONIC REVOLUTION

Semiconductors constitute by far the largest segment of the market for electronic components

Rapid improvement in price/performance characteristics have made "chips" the basic element in all electronic products

The Japanese are betting that the ability to make, not buy, semiconductors will make a competitive difference in chip-intensive industries

The Americans believe that domestic manufacture of chips only makes sense in the early stages of the chip product life cycle

The largest independent U.S. chip manufacturers have generally performed well - but have been unsuccessful in forward integration efforts

SEMICONDUCTORS CONSTITUTE BY FAR THE LARGEST SEGMENT OF THE MARKET FOR ELECTRONIC COMPONENTS

MAJOR SEGMENTS OF ELECTRONIC COMPONENT MARKET

Segment	U.S. Market Size	5 Year Annual Growth Forecast	Basis For Competition
Semiconductors • Memory chips • Integrated circuits	U.S. \$13,490 Million	13% nominal 18%-20% real	Leading Edge - Technology (e.g., 256K DRAM chip) Trailing Edge - Manufacturing Cost (e.g., 16K DRAM chip)
Electronic Connectors	U.S. \$2,381 Million	Overall: 13%-15% Fibre optics: 50%	Factory Automation Technology
Electron Tubes (e.g., CRTs)	U.S. \$1,916 Million	1%-2%	Cost Quality
Electronic Capacitors • (e.g., photoflash energy storage)	U.S. \$1,310 Million	Overall: 5% Ceramics: 15%-20%	Components - Technology/Quality Assembly - Labour Cost
Electronic Coils & Transformers	U.S. \$1,077 Million	2%-3%	Custom Manufacturing Marketing Cost
Electronic Resistors	U.S. \$ 860 Million	2%	Cost Quality

Source: Canada Consulting analysis and data from the U.S. Department of Commerce

RAPID IMPROVEMENT IN PRICE/PERFORMANCE CHARACTERISTICS HAVE MADE
"CHIPS" THE BASIC ELEMENT IN ALL ELECTRONIC PRODUCTS

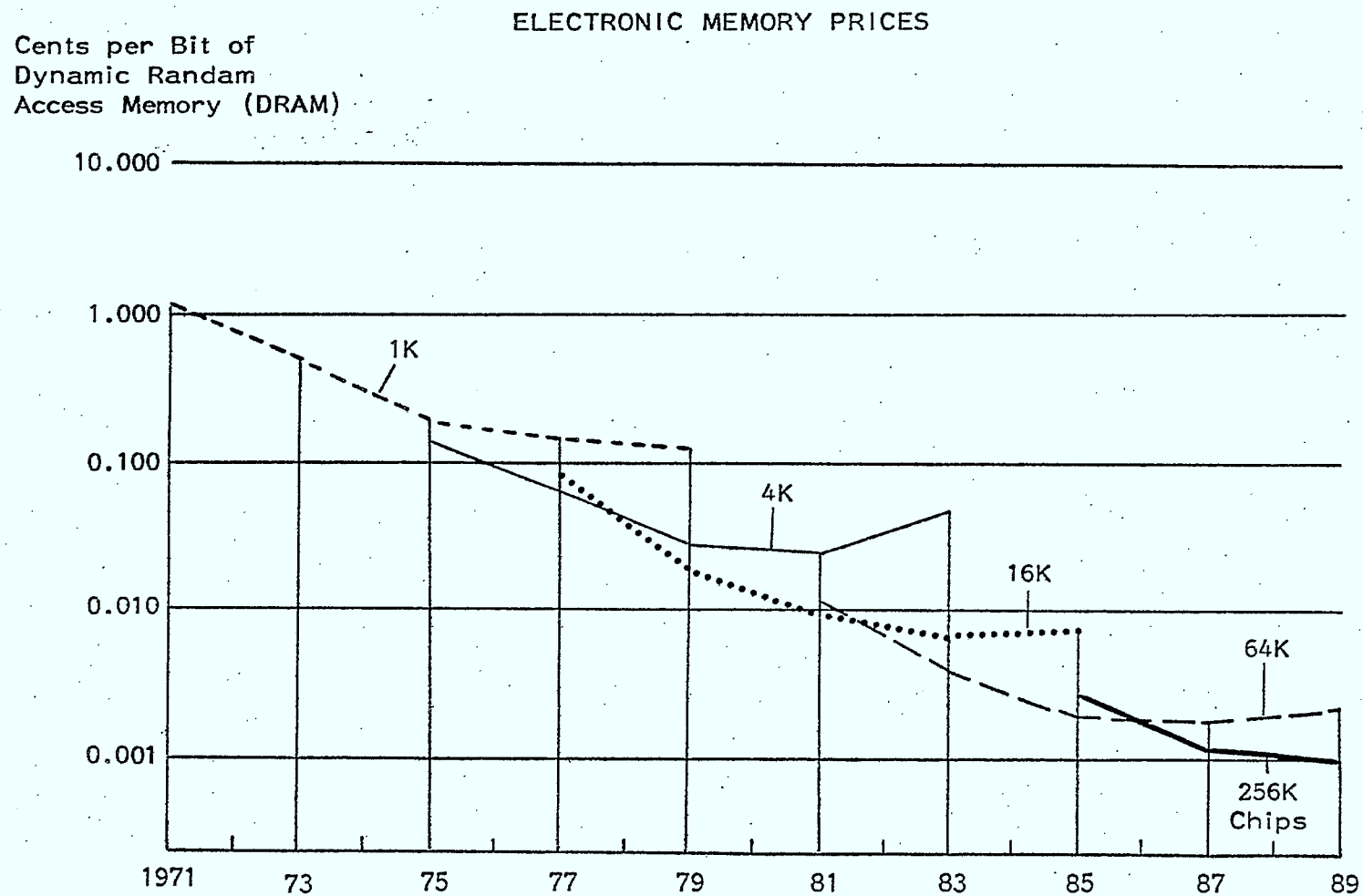
The cost of electronic memory has fallen exponentially with the introduction of
increasingly dense chips

Manufacturers have responded by integrating chips into an extremely diverse array of
products

And shipments have exploded

1. World Industry
As Chip Prices Fall, Markets Explode

THE COST OF ELECTRONIC MEMORY HAS FALLEN EXPONENTIALLY WITH THE INTRODUCTION OF INCREASINGLY DENSE CHIPS

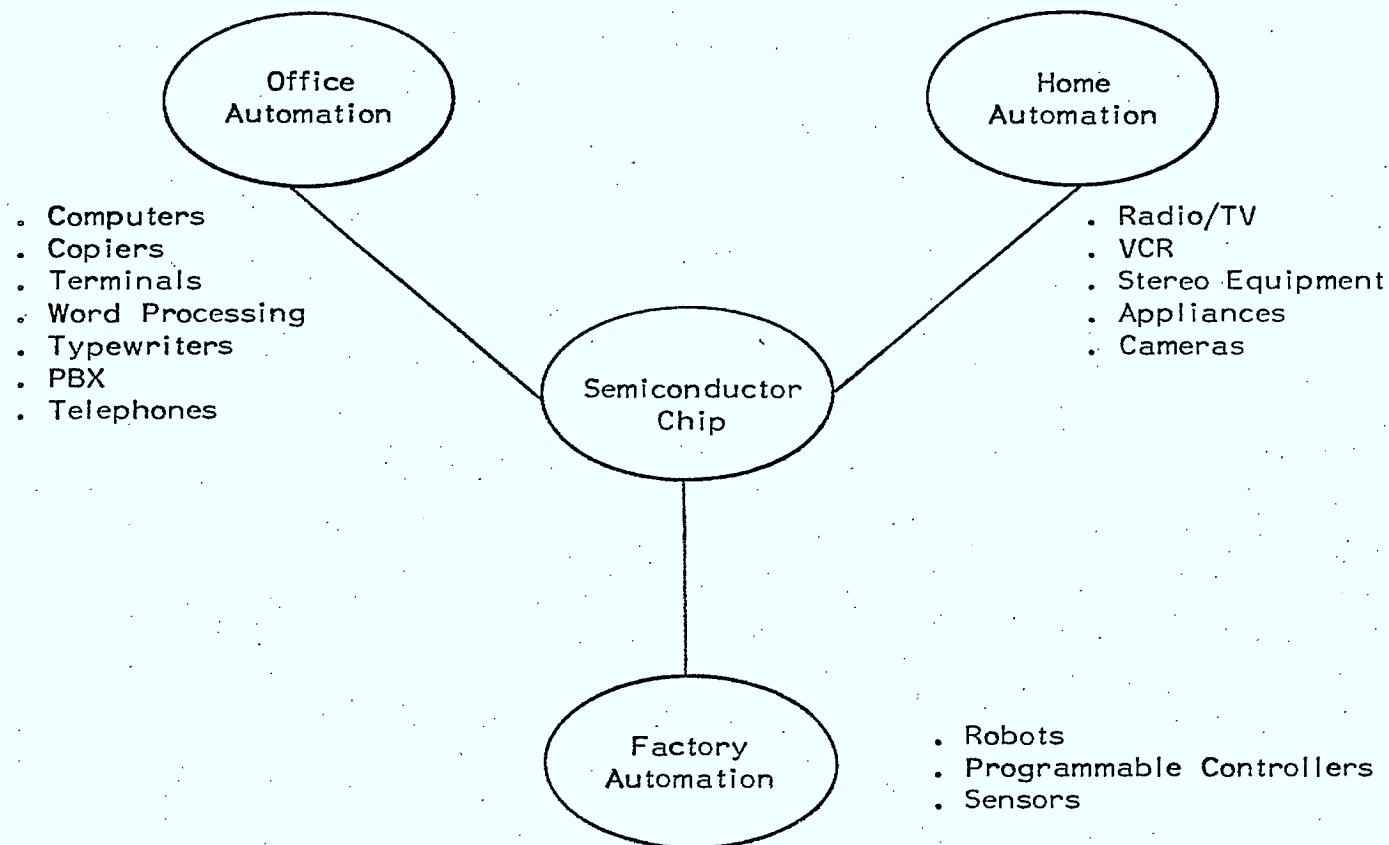


Source: U.S. Bureau of Industrial Economics

1. World Industry
As Chip Prices Fall, Markets Explode

63

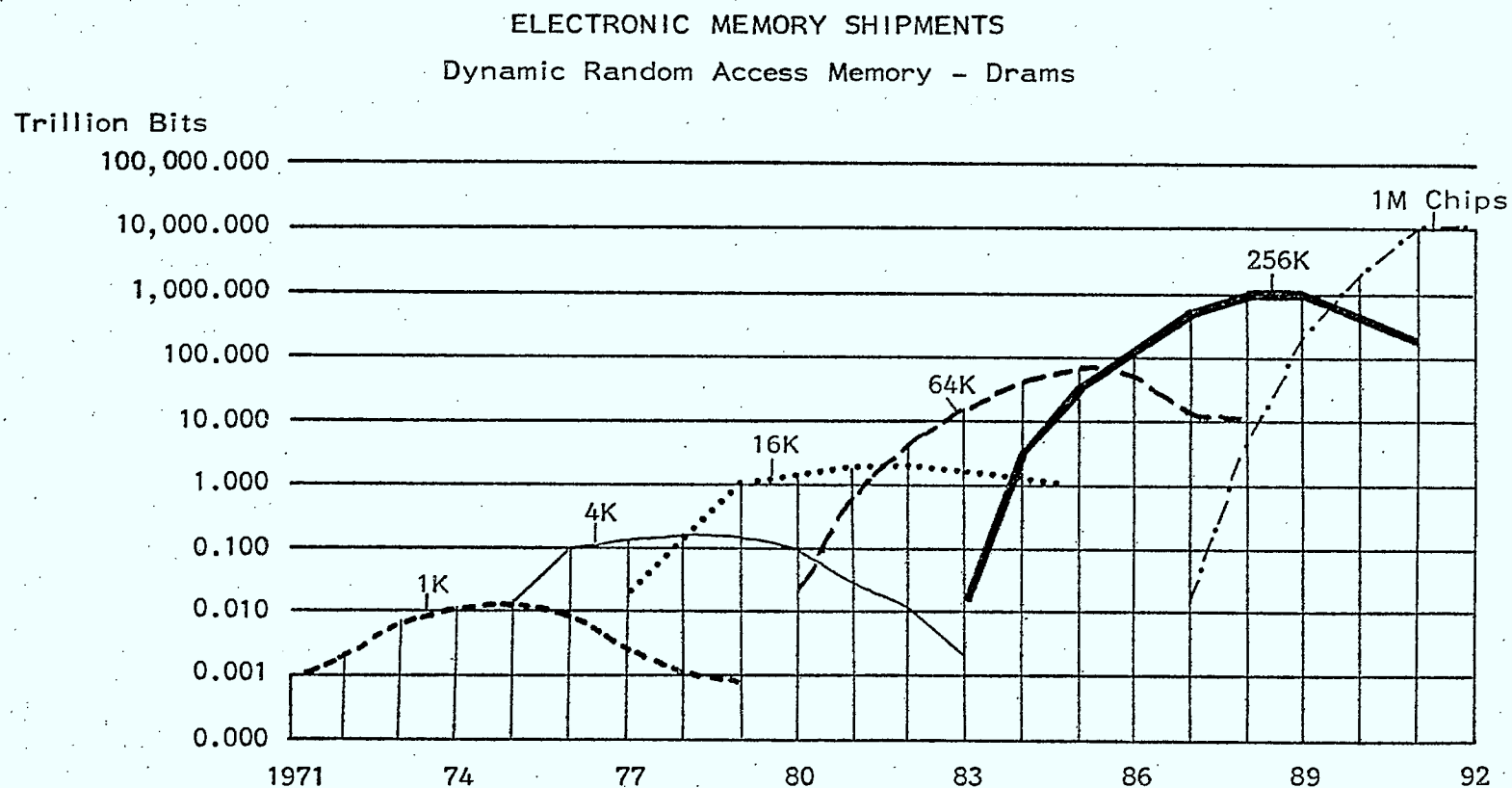
MANUFACTURERS HAVE RESPONDED BY INTEGRATING CHIPS INTO AN EXTREMELY DIVERSE ARRAY OF PRODUCTS



1. World Industry
As Chip Prices Fall, Markets Explode

64

AND SHIPMENTS HAVE EXPLODED



Source: U.S. Bureau of Industrial Economics

THE JAPANESE ARE BETTING THAT THE ABILITY TO MAKE, NOT BUY, SEMICONDUCTORS WILL MAKE A COMPETITIVE DIFFERENCE IN CHIP-INTENSIVE INDUSTRIES

"The top nine Japanese companies are heavily investing in the production facilities for large scale integrated circuits. These are companies such as N.E.C., Hitachi, Fujitsu Toshiba, Matsushita, Sharp, Mitsubishi, Oki, Tokyo Sanyo."

Kenichi Ohmae, Eminent Japanese Strategist

"To keep up with its rivals in high-tech businesses, N.E.C. has had to invest heavily in new factories and equipment, \$280 million last year in the semiconductor business alone. Hitachi invested \$220 million and Fujitsu \$230 million."

Fortune, June 25, 1984

"Overseas semiconductor sales have been booming as they have for most producers. N.E.C. sold \$400 million of chips outside Japan last year."

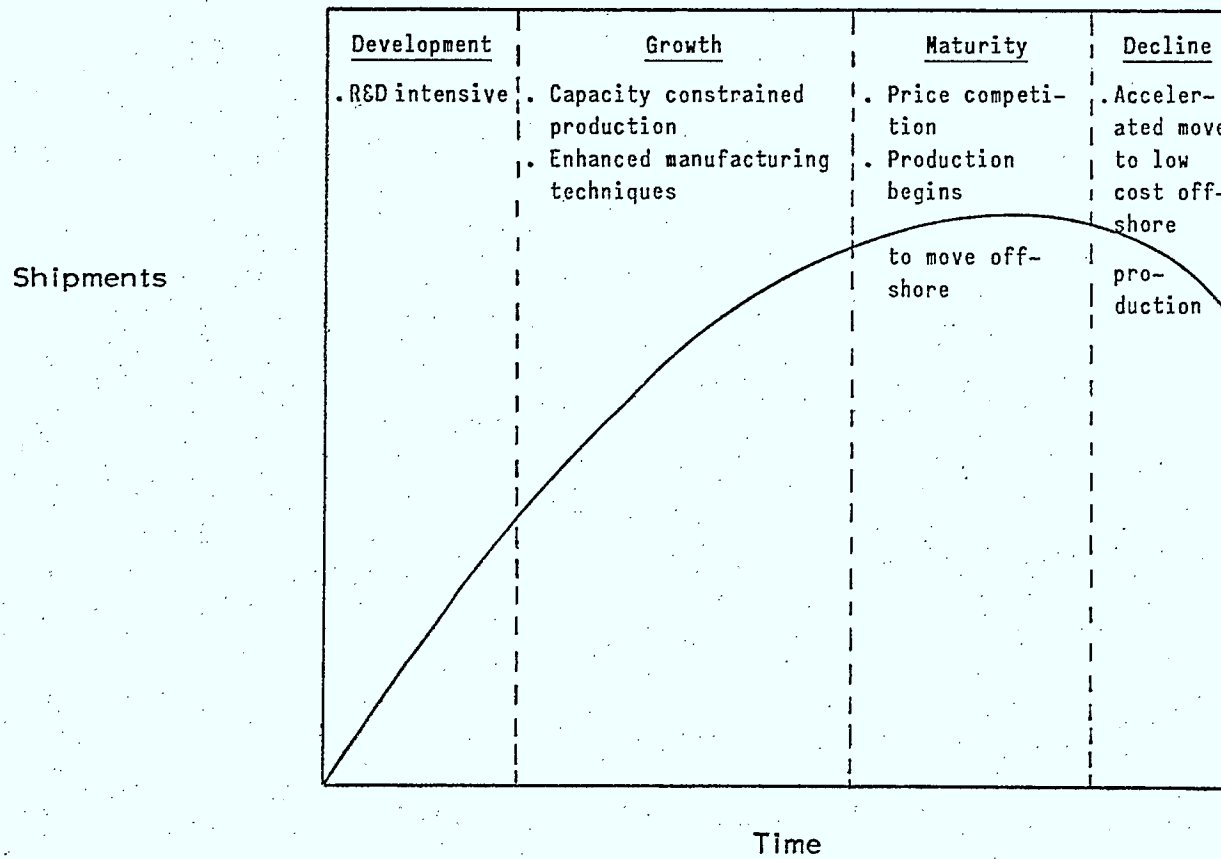
Fortune, June 25, 1984

"Video cassette recorder manufacturers say a feared microchip shortage could be the only thing stopping them from selling 10 million units this year ... (The Manufacturers) have to vie with TV, automobiles and microcomputer manufacturers for semiconductors."

Cablevision, June 25, 1984

THE AMERICANS BELIEVE THAT DOMESTIC MANUFACTURE OF CHIPS ONLY MAKES SENSE IN THE EARLY STAGES OF THE CHIP PRODUCT LIFE CYCLE

THE SEMICONDUCTOR CHIP PRODUCT LIFE CYCLE



THE LARGEST INDEPENDENT U.S. CHIP MANUFACTURERS HAVE GENERALLY PERFORMED WELL - BUT HAVE BEEN UNSUCCESSFUL IN FORWARD INTEGRATION EFFORTS

U.S. SEMICONDUCTOR INDUSTRY PERFORMANCE

Company	1983 Sales (\$ Millions U.S.)	1983 Profits/(Loss) (\$ Millions U.S.)	Five Year Sales Growth	Comments
Texas Instruments	\$4,579.8	(\$145.4)	80%	<ul style="list-style-type: none"> . Largest U.S. merchant manufacturer . \$600 million loss in home computers
Motorola	\$4,328.0	\$244.0	95%	<ul style="list-style-type: none"> . Leading semiconductor supplier . Mobile communication equipment
Harris Corp.	\$1,423.7	\$50.4	63%	<ul style="list-style-type: none"> . Semiconductor sales of \$150 million . High tech defence supplier
National Semiconductor	\$1,210.5	(\$11.4)	145%	<ul style="list-style-type: none"> . Semiconductors: 65% of sales, 95% of profits . Significant losses in computer products
Intel	\$1,121.9	\$112.3	180%	<ul style="list-style-type: none"> . Virtually 100% semiconductors . Profits will double in 1984
Advanced Micro	\$583.3	\$71.1	293%	<ul style="list-style-type: none"> . 98% of revenues from semiconductors . Anticipated compound growth in sales and earnings of 30%-40%

Source: Canada Consulting research

2. CANADA HAS NO REAL PRESENCE IN THE GLOBAL SEMICONDUCTOR INDUSTRY - BUT DOES COMPETE IN OTHER ELECTRONIC COMPONENT SEGMENTS

Canadian industry cannot make the investments required to compete in the mass market semiconductor industry

But Canada has managed to achieve reasonable trade balances in semiconductors and selected electronic components

In the semiconductor segment, our largest chip users are also our largest chip producers

In less glamorous electronic component segments, Canadian Marconi is an example of successful niche penetration

2. Canadian Industry

CANADIAN INDUSTRY CANNOT MAKE THE INVESTMENTS REQUIRED TO COMPETE IN THE MASS MARKET SEMICONDUCTOR INDUSTRY

CAPITAL INVESTMENT, 1983

Top Nine Companies in Japanese Electronics Industry

	<u>\$ Millions</u>
Hitachi	683
Toshiba	575
NEC	551
Fujitsu	468
Mitsubishi	343
Sharp	319
Matsushita	259
Tokyo Sanyo	248
Oki	116

Total of Nine \$3,562

Total Semiconductor Investment \$1,802

Total Canadian Electronics Industry By Segment

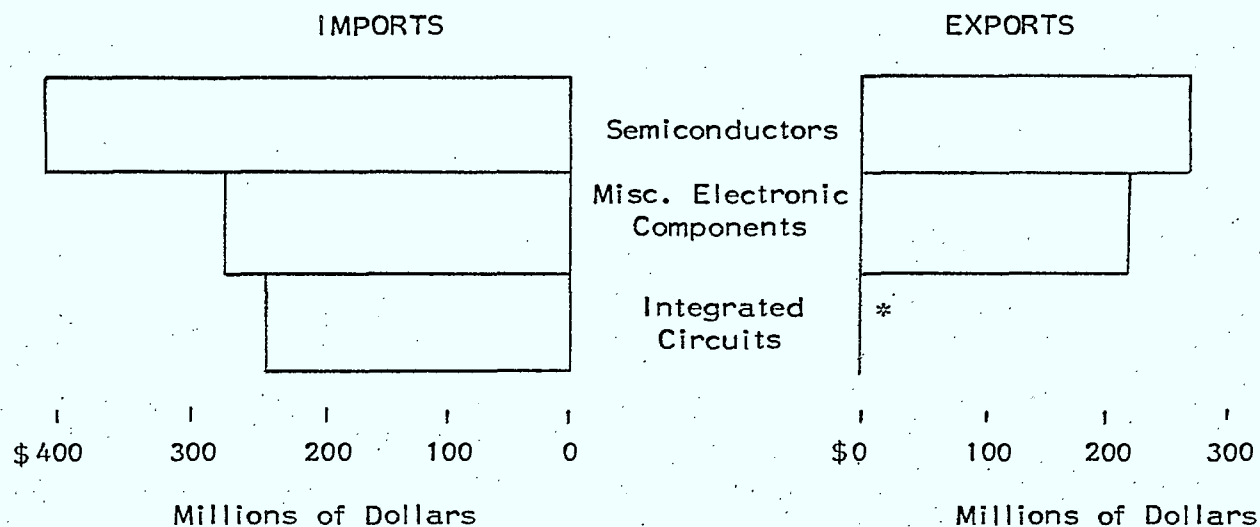
	<u>\$ Millions</u>
Small Appliances	9
Large appliances	22
Radio & TV	15
Communications Equipment	237
Office & Store Machinery	110
Scientific & Professional Equipment	88

Total Industry \$481

Source: Canada Consulting based on data from Statistics Canada and Kenichi Ohmae address to North American Society for Corporate Planning

BUT CANADA HAS MANAGED TO ACHIEVE REASONABLE TRADE BALANCES IN SEMI-CONDUCTORS AND SELECTED ELECTRONIC COMPONENTS

CANADIAN TRADING BALANCE
MAJOR COMPONENTS OF ELECTRONICS INDUSTRY, 1983



* Insignificant

Source: Canada Consulting based on Statistics Canada data

2. Canadian Industry

IN THE SEMICONDUCTOR SEGMENT, OUR LARGEST CHIP USERS ARE ALSO OUR LARGEST CHIP PRODUCERS

NORTHERN
TELECOM



- . In-house chip capability ranks as 5th largest in North America
- . 1983 production of eight million chips valued at \$68 million - expected to double by 1985
- . "Custom" chips are considered a competitive advantage in telecom equipment industry

MITEL



- . Outside chip sales of \$18.5 million in 1983 as well as meeting internal needs
- . Three semiconductor plants

IBM



- . As a corporation, manufactures a high percentage of its chip requirements
 - . IBM Canada produces selected electronic components used by many other IBM locations
-

2. Canadian Industry

IN LESS GLAMOROUS ELECTRONIC COMPONENT SEGMENTS, CANADIAN MARCONI IS AN EXAMPLE OF SUCCESSFUL NICHE PENETRATION

CANADIAN MARCONI

Key Products	<ul style="list-style-type: none">. Avionics. Components. Marine & land communications	<ul style="list-style-type: none">. Radar. Special services. Defence communications
Key Customers	<ul style="list-style-type: none">. Military	
Manufacturing Locations	<ul style="list-style-type: none">. Ontario. Quebec. Florida	
Exports From Canada	<ul style="list-style-type: none">. 80% of sales	
Ownership	<ul style="list-style-type: none">. 51.6% by U.K. shareholder. Inter-company transactions relatively insignificant	
Operating Results	<ul style="list-style-type: none">. 1984 revenues estimated at \$280 million. 1984 income estimated at \$43 million. 1983 return on equity of 24%. Five year sales growth over 200%	
Strategy	<ul style="list-style-type: none">. Canadian Marconi seeks to be "a dominant force in the design, development, manufacture and support of high technology military and commercial electronics"	

3. THE CANADIAN ELECTRONIC COMPONENTS INDUSTRY CAN SEEK PROFITABLE NICHES IN WORLD MARKETS

The semiconductor industry promises rapid growth but also intense and entrenched competition

Semiconductor capabilities will be critical to industries such as telecom equipment - and semiconductor supply will be important to many other industries

Canadian industry strength and potential rests in smaller segments of the electronic component industry - not in the mass semiconductor market

Canadian industrial strategy should take into account the real differences between semiconductors and other electronic components

THE SEMICONDUCTOR INDUSTRY PROMISES RAPID GROWTH BUT ALSO INTENSE
AND ENTRENCHED COMPETITION

ELECTRONIC COMPONENTS INDUSTRY

THREATS	OPPORTUNITIES
<ul style="list-style-type: none">. Component capabilities of major end-users (IBM, NEC, etc.). Large independent chip makers. Leapfrog technologies such as opto-electronics	<ul style="list-style-type: none">. Huge world market for semiconductors. Smaller markets for other components - but also less competition. Leapfrog technology could also be an opportunity if developed here first

3. Evaluation

SEMICONDUCTOR CAPABILITIES WILL BE CRITICAL TO INDUSTRIES SUCH AS
TELECOM EQUIPMENT - AND SEMICONDUCTOR SUPPLY WILL BE IMPORTANT TO
MANY OTHER INDUSTRIES

STRATEGIC SIGNIFICANCE OF ELECTRONIC COMPONENT INDUSTRY		
	Semiconductors	Others
Jobs		✓
Human capital development	✓	✓
Technology diffusion	✓ ✓	✓ ✓
Value-added to economy	✓	✓ ✓
Infrastructure	✓ ✓ ✓	✓
Balance of trade	✓	✓ ✓
National Identity		

3. Evaluation

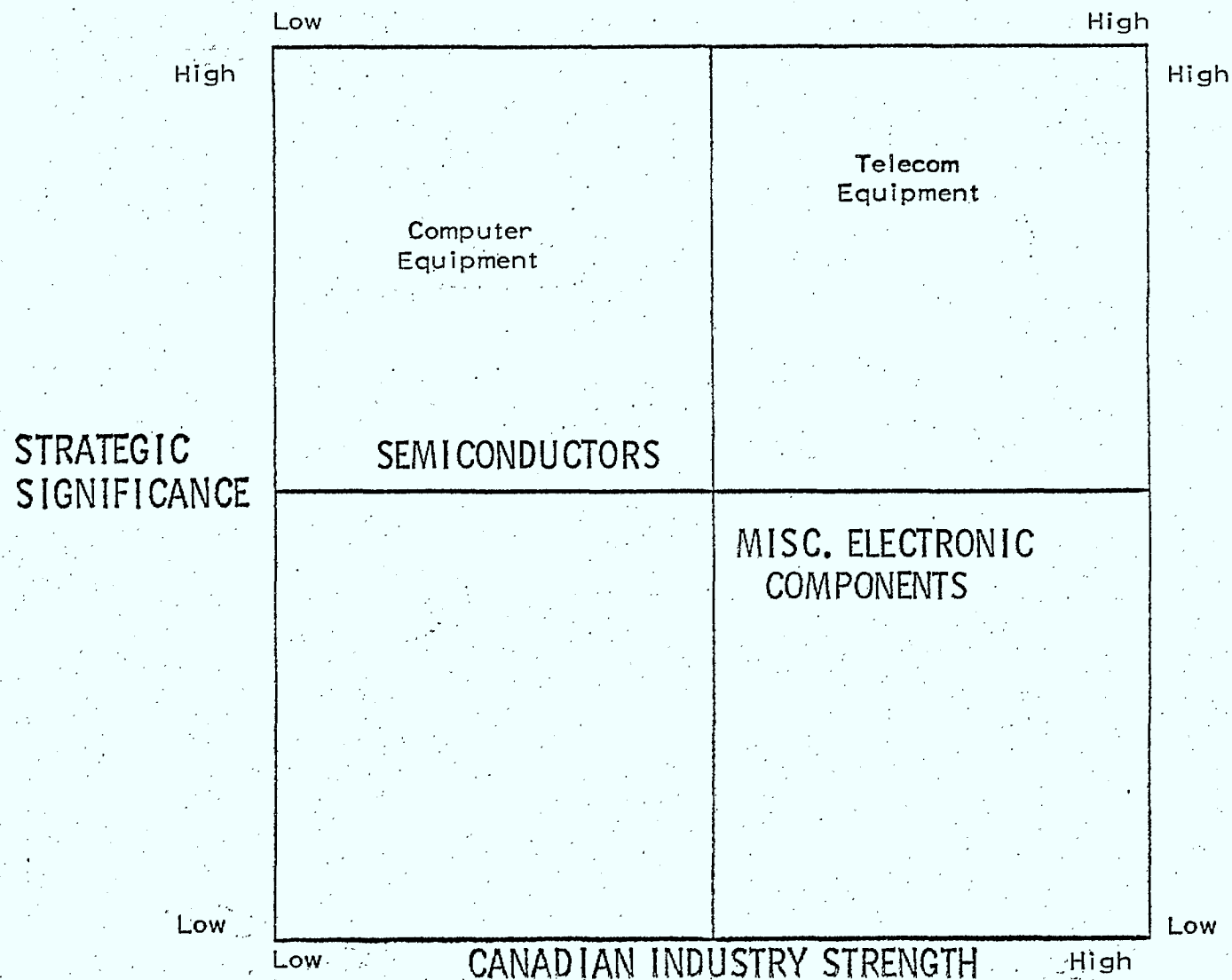
CANADIAN INDUSTRY STRENGTH AND POTENTIAL RESTS IN SMALLER SEGMENTS OF THE ELECTRONIC COMPONENT INDUSTRY - NOT IN THE MASS SEMICONDUCTOR MARKET

ELECTRONIC COMPONENT INDUSTRY

KEY FACTORS FOR SUCCESS	CANADIAN INDUSTRY STRENGTH
Research and development	✓
Manufacturing cost/quality control	✓ ✓
Large scale (semiconductor industry)	

3. Evaluation

CANADIAN INDUSTRIAL STRATEGY SHOULD TAKE INTO ACCOUNT THE REAL DIFFERENCES BETWEEN SEMICONDUCTORS AND OTHER ELECTRONIC COMPONENTS



IV. THE FOCUS OF SOFTWARE COMPETITION IS SWITCHING FROM CUSTOM SERVICES TO MASS MARKETING OF PACKAGED PRODUCTS

1. Scarce human resources are creating a burgeoning North American market for packaged computer software

2. Although much smaller, the Canadian software industry mirrors the U.S. industry in structure and issues

3. Canada has real opportunities to be an important player in the people- and skills-intensive North American software industry

1. SCARCE HUMAN RESOURCES ARE CREATING A BURGEONING NORTH AMERICAN MARKET FOR PACKAGED COMPUTER SOFTWARE

The computer software industry can be divided into three market segments

The U.S. "English-language" software industry dominates the North American packaged software market

Dramatic growth is expected in American packaged software sales for both large and small computers

This market growth will stem from the high cost and scarce human capital required for custom software development

Lotus Development Corporation is perhaps typical of many emerging U.S. software companies

THE COMPUTER SOFTWARE INDUSTRY CAN BE DIVIDED INTO THREE MARKET SEGMENTS

THE COMPUTER SOFTWARE INDUSTRY

Market Segment	Applications Software	Utility Software	Systems Control Software
Software Function	Set up the system to handle a specific task: <ul style="list-style-type: none"> • payroll • word processing 	Manages the efficient running of applications software <ul style="list-style-type: none"> • compilers • data base management 	Manages the operation components (e.g., printers) <ul style="list-style-type: none"> • operating systems • network control
Major Suppliers For Personal Computers	Lotus VisiCorp Peachtree Apple IBM	Microsoft Software Publishing VisiCorp Apple IBM	Digital Research Microsoft Apple IBM AT&T
Major Suppliers For Large Computers	Management Science America Information Science Policy Management Systems	IBM Sperry Information Builders Cincom Systems AT&T Software AG	Computer Associates IBM NCR Sperry Burroughs Honeywell Digital Equipment AT&T

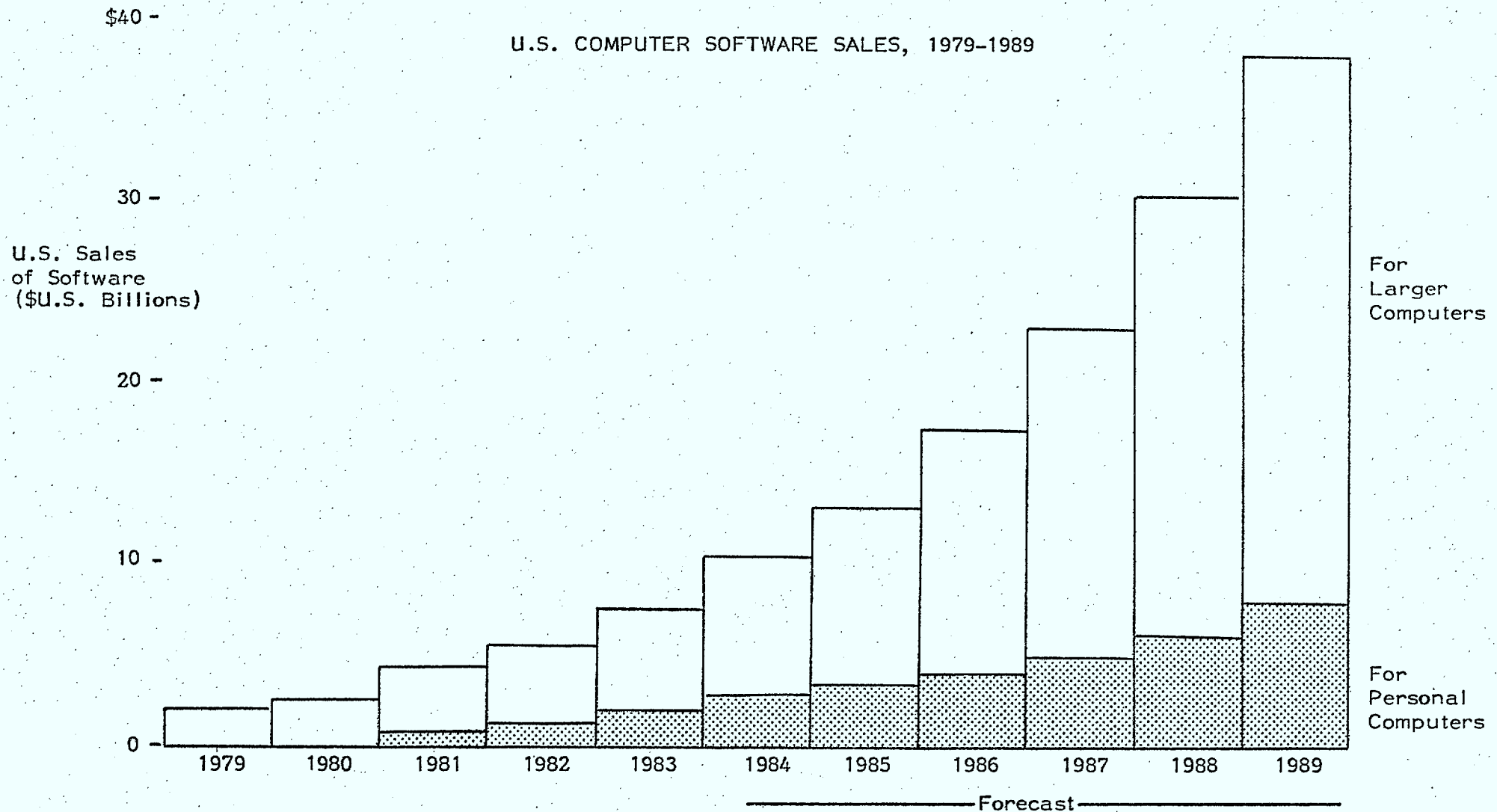
1. North American Industry

THE U.S. 'ENGLISH-LANGUAGE' SOFTWARE INDUSTRY DOMINATES THE NORTH AMERICAN PACKAGED SOFTWARE MARKET

THE U.S. SOFTWARE INDUSTRY

- | | |
|--------------------|--|
| Industry Structure | <ul style="list-style-type: none">. More than 3,000 companies. Largest OEM supplier - IBM - had 1983 software revenues of \$2.3 billion or about 30% market share. Largest independent supplier - Management Science America Inc. - had 1983 revenues of \$145 million or about 2% market share |
| Industry Sales | <ul style="list-style-type: none">. 1983 revenues of \$7-\$8 billion. Five year growth estimated at 32% per year |
| Industry Trends | <ul style="list-style-type: none">. Expanded product lines. Aggressive growth of large OEMs in software through acquisitions. New market entrants in publishing and financial services industry. Shortage of skilled code writers. Merging of three formerly distinct markets: applications software, utility software, systems control software |
| Industry Issues | <ul style="list-style-type: none">. Japanese push to develop "world class" software. Marketing relationships between OEMs and independents. International standards for data storage formats |
-

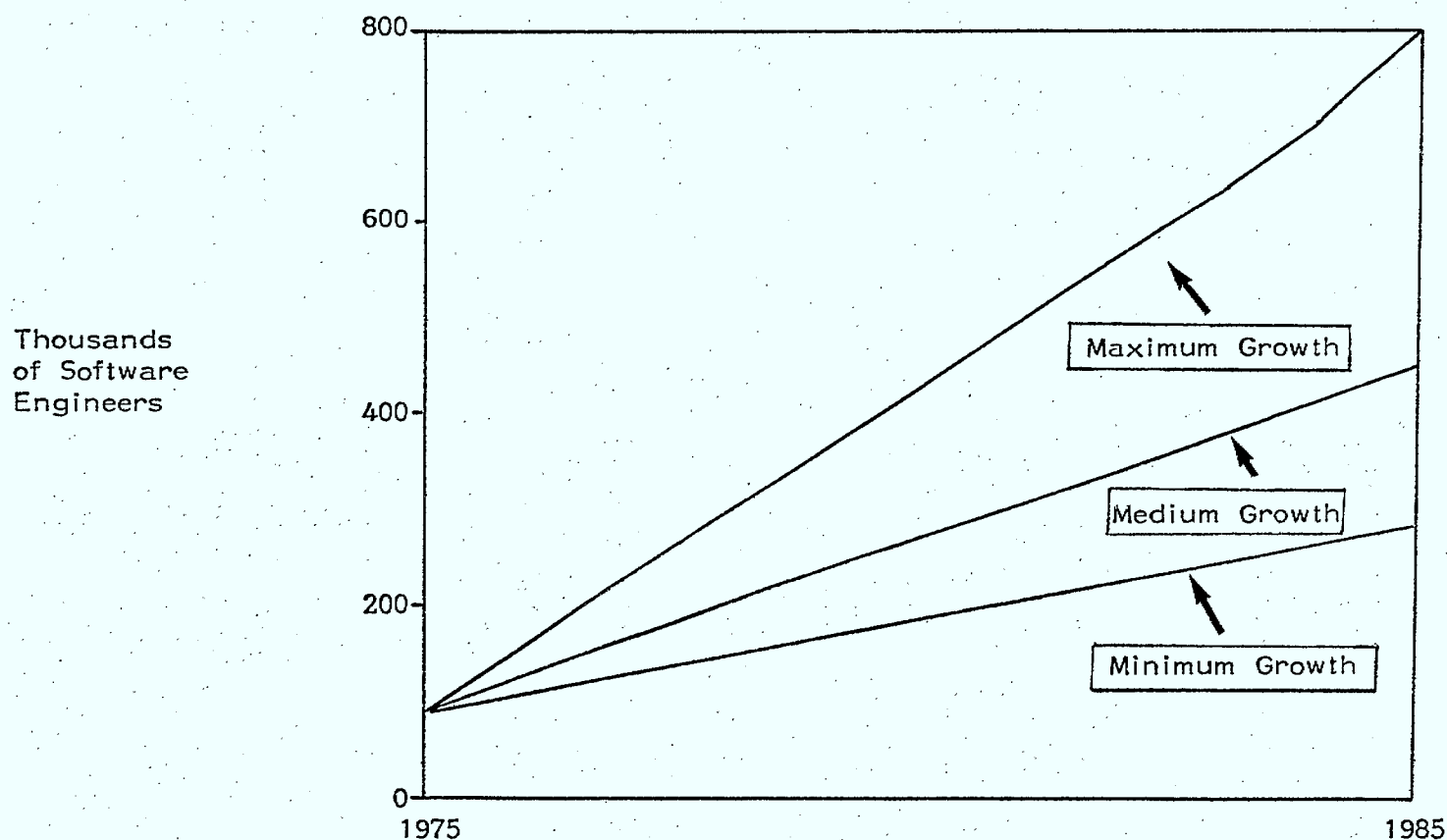
DRAMATIC GROWTH IS EXPECTED IN AMERICAN PACKAGED SOFTWARE SALES FOR BOTH LARGE AND SMALL COMPUTERS



Source: Canada Consulting based on International Data Corp. and Business Week estimates

THIS MARKET GROWTH WILL STEM FROM THE HIGH COST AND SCARCE HUMAN CAPITAL REQUIRED FOR CUSTOM SOFTWARE DEVELOPMENT - WITNESS JAPANESE AND AMERICAN EXAMPLES OF SOFTWARE EMPLOYMENT GROWTH

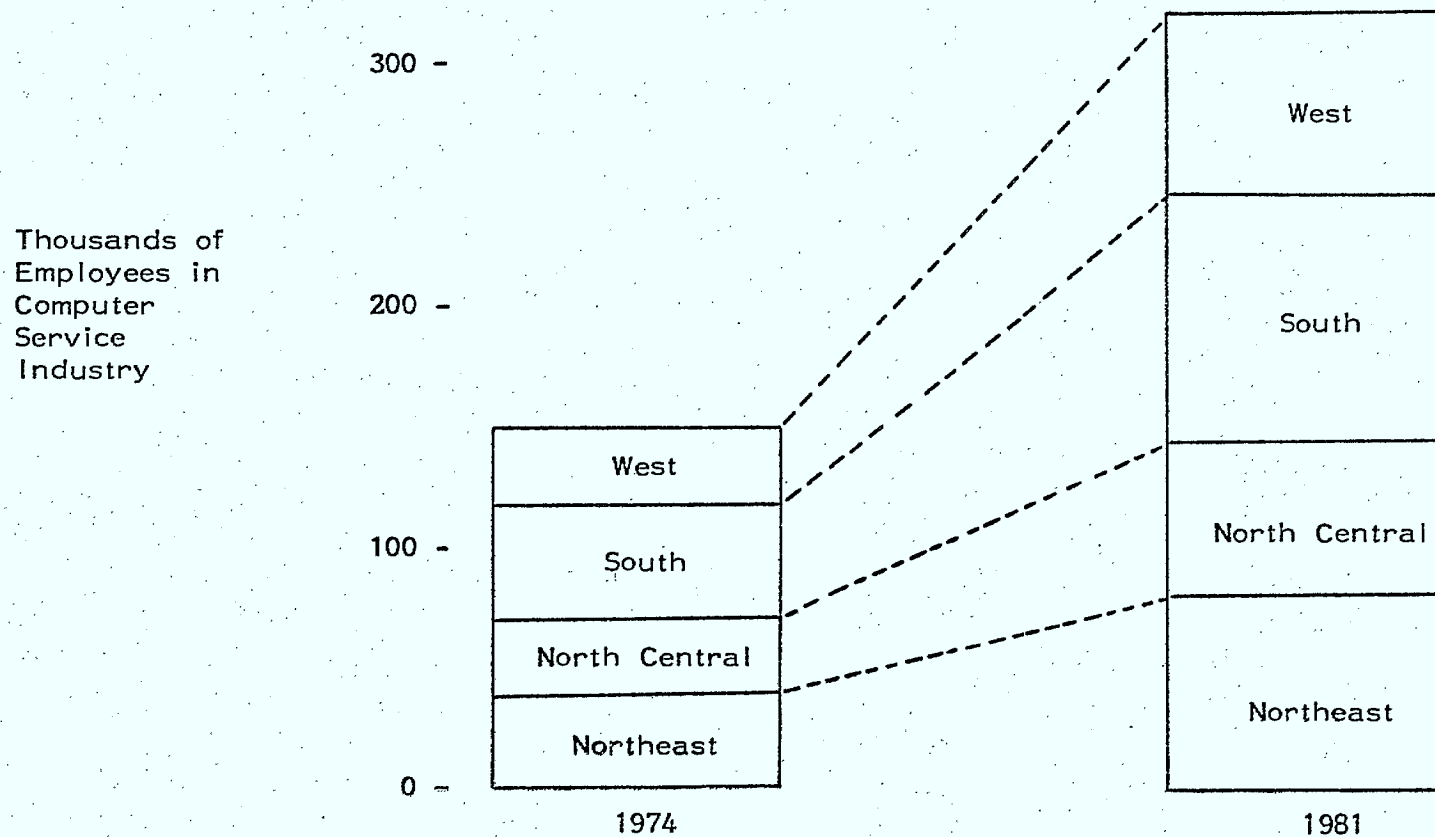
FORECAST GROWTH IN SOFTWARE ENGINEER REQUIREMENTS
JAPAN, 1975-1985



Source: Canada Consulting based on data obtained from MITI (Japan)

THIS MARKET GROWTH WILL STEM FROM THE HIGH COST AND SCARCE HUMAN CAPITAL REQUIRED FOR CUSTOM SOFTWARE DEVELOPMENT - WITNESS JAPANESE AND AMERICAN EXAMPLES OF SOFTWARE EMPLOYMENT GROWTH

U.S. EMPLOYMENT IN COMPUTER SERVICES INDUSTRY



LOTUS DEVELOPMENT CORPORATION IS PERHAPS TYPICAL OF MANY EMERGING U.S. SOFTWARE COMPANIES

LOTUS DEVELOPMENT CORPORATION

Example of a Successful Start-up

Founded -	April 1982 - Cambridge, Massachusetts
Financing -	<p>\$5 million venture capital raised in first 6 months</p> <ul style="list-style-type: none">. to fund program development. to fund market introduction
Product -	Lotus 1-2-3 - spreadsheets, graphics, and file management for personal computers
Price -	\$495
Introduction -	3 month national ad campaign costing over \$1 million
Results -	<p>110,000 copies of Lotus 1-2-3 sold in first 9 months</p> <p>1983 revenues of \$53 million</p>
Follow-up -	<p>October 1983 - Lotus raised \$41 million in public share offering to be used for additional product development</p> <p>February 1984 - "Symphony" introduced, offering word processing, data management and computer communications capabilities</p>

2. ALTHOUGH MUCH SMALLER, THE CANADIAN SOFTWARE INDUSTRY MIRRORS THE U.S. INDUSTRY IN STRUCTURE AND ISSUES

Both industries have a large number of relatively small companies competing in explosive growth markets

The market for computer services in Canada is almost half as big as the Canadian hardware market

The Canadian market for package software and systems is expected to grow to \$5.4 billion by 1990

As in other parts of the world, there do not appear to be major productivity gains on the horizon to relieve projected shortages of software writers

Systemhouse - Canada's leading independent software house - has met with mixed success

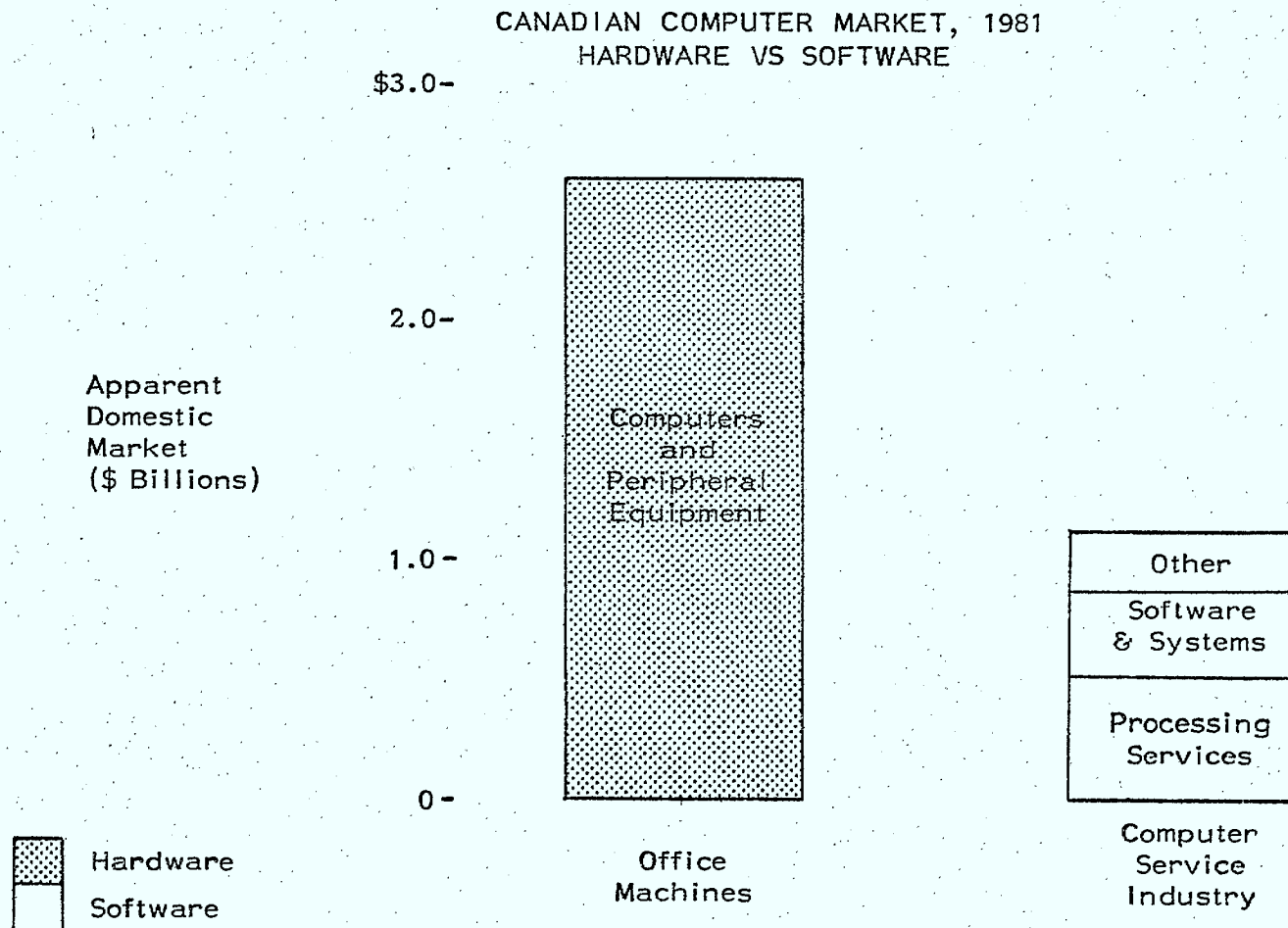
BOTH INDUSTRIES HAVE A LARGE NUMBER OF RELATIVELY SMALL COMPANIES COMPETING IN EXPLOSIVE GROWTH MARKETS

A COMPARISON OF THE U.S. AND CANADIAN SOFTWARE INDUSTRIES

	U.S. Industry	Canadian Industry
1981 Industry Sales	U.S. \$4,400 Million	C \$608.3 Million
Five Year Growth Estimate	32% per year	28% per year
Number of Companies	More than 3,000	About 1,000
Largest OEM Supplier	IBM	IBM
Market Share of Largest OEM	About 30%	About 30%
Largest Independent Supplier	Management Science America Inc.	Systemhouse Ltd.
Market Share of Largest Independent	About 2%	About 4%

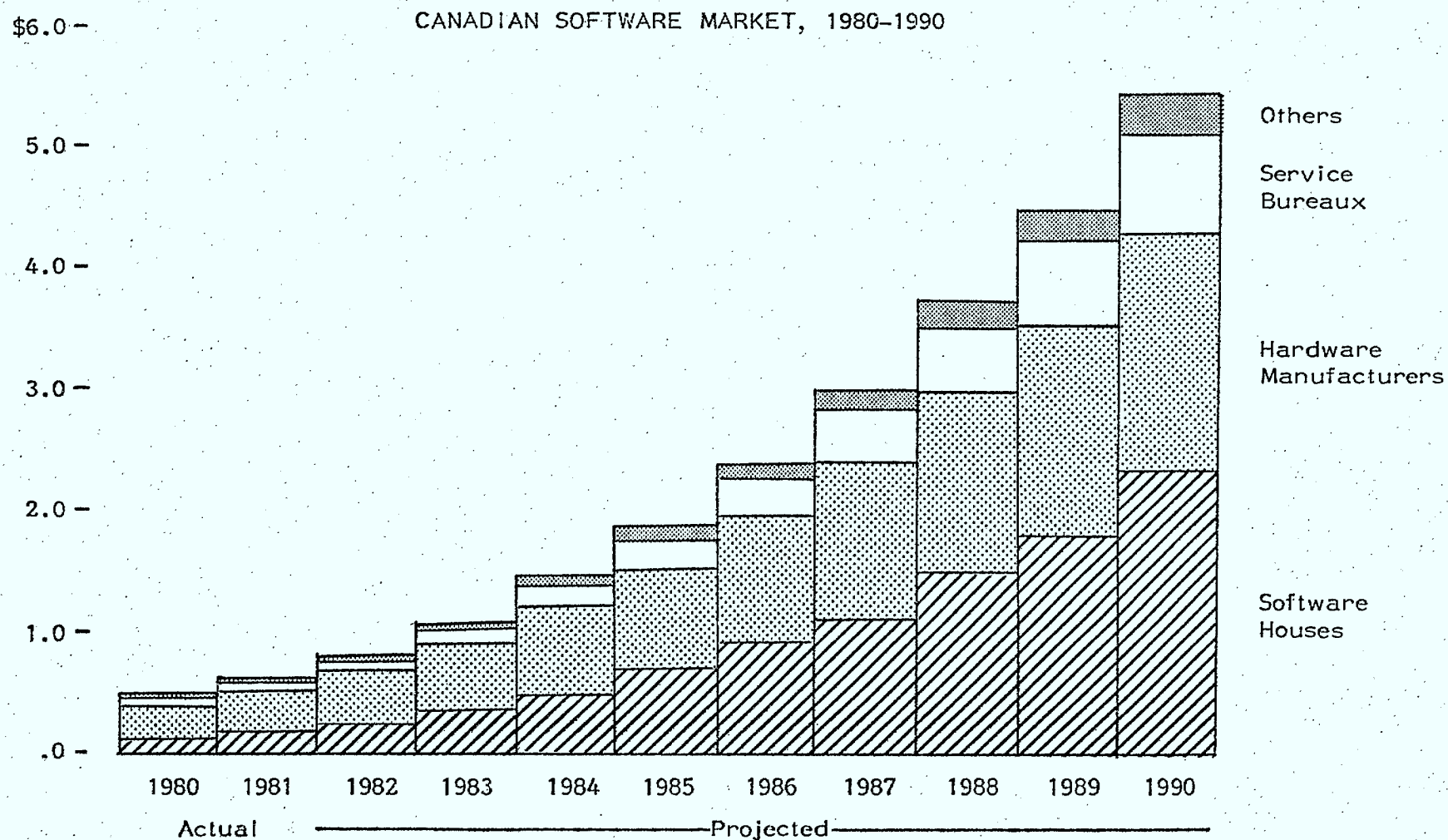
Source: Canada Consulting research and data obtained from Department of Communications

THE MARKET FOR COMPUTER SERVICES IN CANADA IS ALMOST HALF AS BIG AS THE CANADIAN HARDWARE MARKET



Source: Canada Consulting based on Statistics Canada data

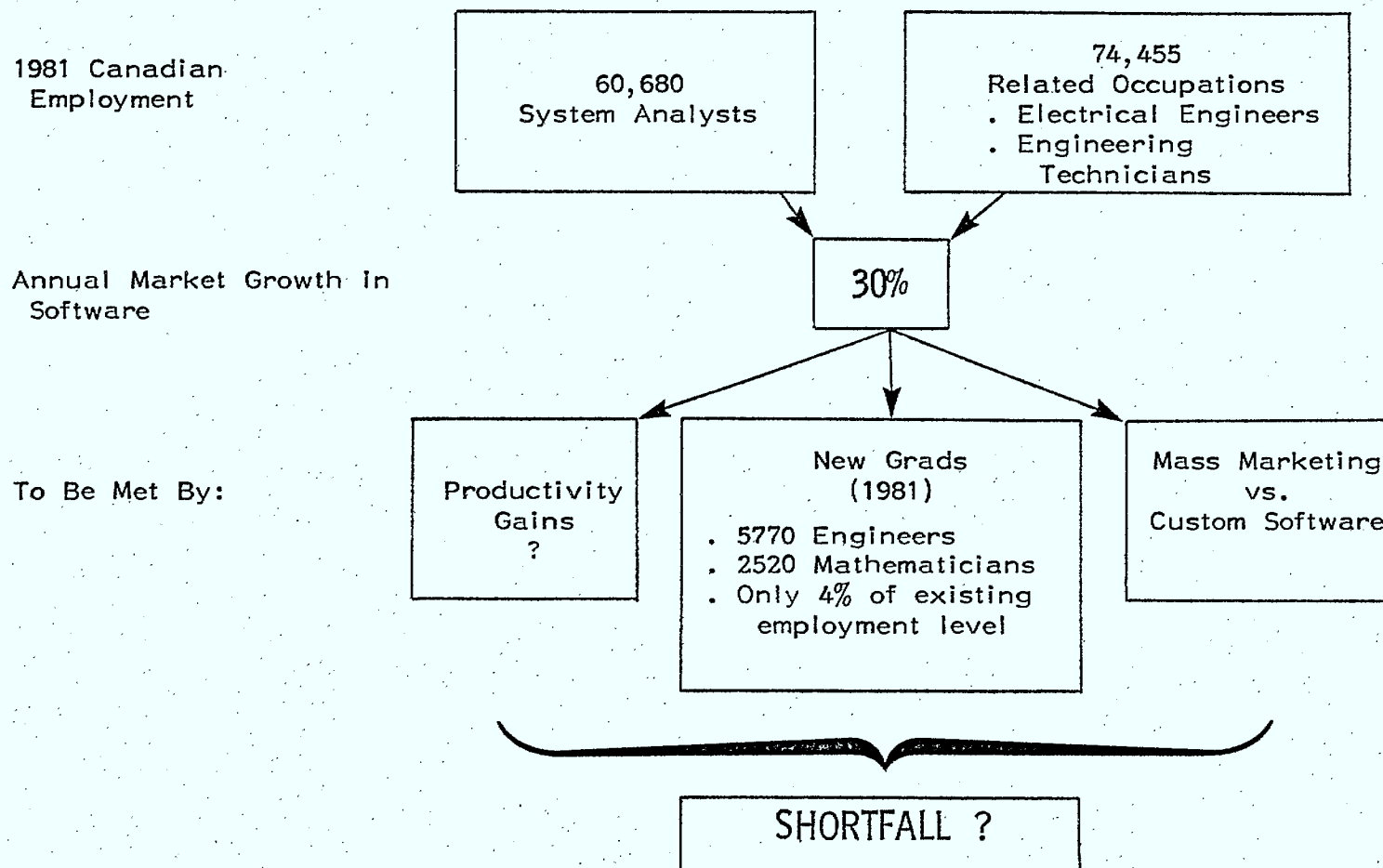
THE CANADIAN MARKET FOR PACKAGE SOFTWARE AND SYSTEMS IS EXPECTED TO GROW TO \$5.4 BILLION BY 1990



Source: Canada Consulting based on study commissioned by Department of Communications

2. Canadian Industry

AS IN OTHER PARTS OF THE WORLD, THERE DO NOT APPEAR TO BE MAJOR PRODUCTIVITY GAINS ON THE HORIZON TO RELIEVE PROJECTED SHORTAGES OF SOFTWARE WRITERS



Source: Canada Consulting analysis and Statistics Canada data

SYSTEMHOUSE - CANADA'S LEADING INDEPENDENT SOFTWARE HOUSE - HAS MET WITH MIXED SUCCESS

SYSTEMHOUSE LTD.

	Custom Software	Software Products
Revenues - 1983	\$42.0 million	\$15.0 million
Operating Profit/(Loss) - 1983	\$ 0.1 million	(\$1.7 million)
Net Income/(Loss) - 1983		(\$28.8 million)
- 1982		(\$29.5 million)
U.S. Source Revenues	21%	37%
Major Products	<ul style="list-style-type: none"> • Graphics • Equipment control systems • Office information systems • Healthcare systems • Videotex/teletext 	<ul style="list-style-type: none"> • Commercial systems • Office information systems
Strategy	Since 1974 - develop key professional and software skills to serve specific customer requirements	Since 1979 - apply systems skills to creation of packaged applications for specific markets

3. CANADA HAS REAL OPPORTUNITIES TO BE AN IMPORTANT PLAYER IN THE PEOPLE- AND SKILLS-INTENSIVE NORTH AMERICAN SOFTWARE INDUSTRY

The most immediate threat in this lucrative market appears to be greater competition from OEMs and from non-traditional suppliers

Software will be a key infrastructure ingredient in our information-based economy as well as a major developer of human capital

As a country, we have the necessary brains and money to compete in the North American software industry

Our goal should be to nurture those national strengths in growing a successful Canadian software industry

THE MOST IMMEDIATE THREAT IN THIS LUCRATIVE MARKET APPEARS TO BE GREATER COMPETITION FROM OEMs AND FROM NON-TRADITIONAL SUPPLIERS

SOFTWARE INDUSTRY

THREATS	OPPORTUNITIES
<ul style="list-style-type: none">. Increased competition from main-frame companies (IBM) as well as non-traditional suppliers (e.g., financial institutions, publishers). Japanese software development - particularly in "computer language" utility and systems control segments. Fifth generation computers embodying artificial intelligence	<ul style="list-style-type: none">. North American market of \$5 billion, growing at 30% per year. Applications segment of North American market largely "language protected"

SOFTWARE WILL BE A KEY INFRASTRUCTURE INGREDIENT IN OUR INFORMATION-BASED ECONOMY AS WELL AS A MAJOR DEVELOPER OF HUMAN CAPITAL

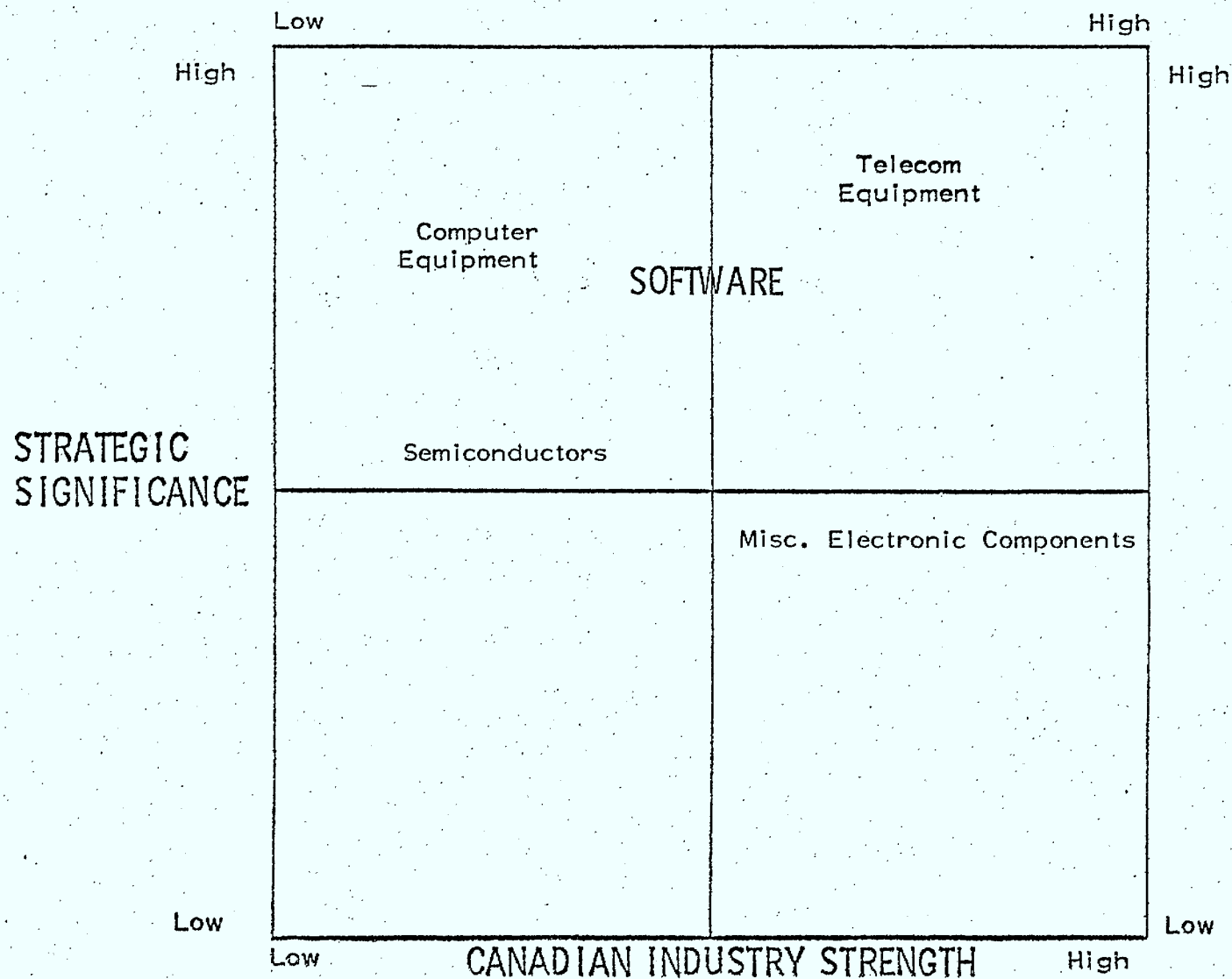
STRATEGIC SIGNIFICANCE OF SOFTWARE INDUSTRY	
Jobs	✓ ✓ ✓
Human capital development	✓ ✓ ✓
Technology diffusion	✓
Value-added to economy	✓ ✓
Infrastructure	✓ ✓ ✓
Balance of trade	✓ ✓
National Identity	✓

AS A COUNTRY, WE HAVE THE NECESSARY BRAINS AND MONEY TO COMPETE IN THE NORTH AMERICAN SOFTWARE INDUSTRY

SOFTWARE INDUSTRY

KEY FACTORS FOR SUCCESS	CANADIAN INDUSTRY STRENGTH
Human capital	✓ ✓
Marketing/distribution capabilities	✓
Venture capital	✓ ✓

OUR GOAL SHOULD BE TO NURTURE THOSE NATIONAL STRENGTHS IN GROWING A
SUCCESSFUL CANADIAN SOFTWARE INDUSTRY



Overview

Elements of Communications

INFRASTRUCTURE OF COMMUNICATIONS

Content of Communications

Communications Enhanced Environments

INFRASTRUCTURE OF COMMUNICATIONS

- I. New technology and accelerating communications requirements are placing new demands on Canada's public switched telephone network (PSTN)

- II. A mature basic business and high interest rates have taken their toll on Canadian cable

- III. New delivery services - satellites, cellular telephone, direct broadcast satellite and bypass networks - are at various stages of development

1. NEW TECHNOLOGY AND ACCELERATING COMMUNICATIONS REQUIREMENTS ARE PLACING NEW DEMANDS ON CANADA'S PUBLIC SWITCHED TELEPHONE NETWORK (PSTN)

1. The Canadian telephone companies (telcos) - a regulated mix of private and public companies - have generally outperformed overall Canadian business while taking less risk

2. In the aftermath of the AT&T divestiture, the most sensitive public policy issue for the PSTN is the impact of deregulation on local phone service costs

3. The largest business issue facing telcos is competition with other carriers in promising new service areas

4. Canada's telcos are well positioned to provide the basic infrastructure for the teledelivery of new services

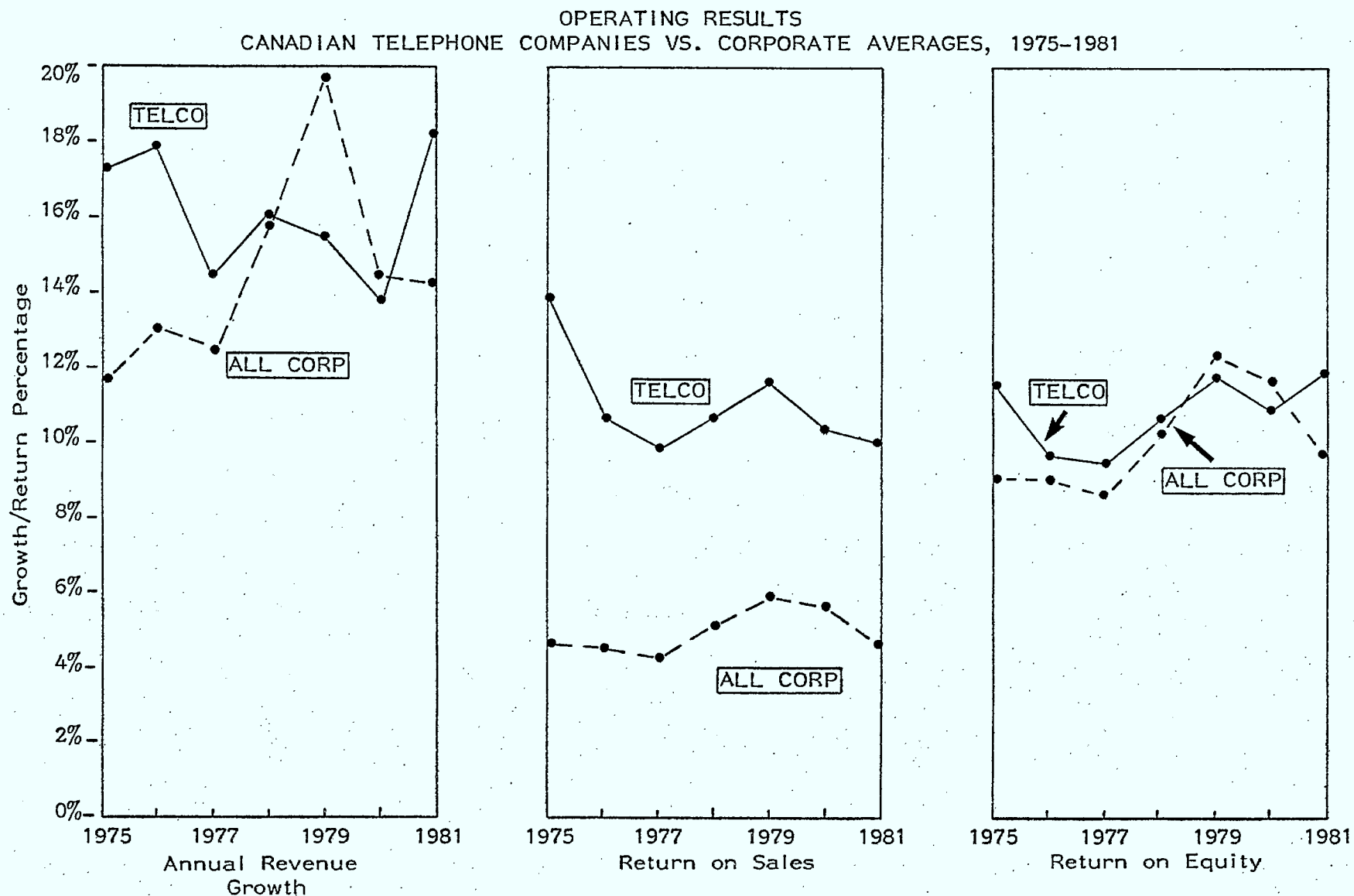
1. THE CANADIAN TELEPHONE COMPANIES (TELCOS) - A REGULATED MIX OF PRIVATE AND PUBLIC COMPANIES - HAVE GENERALLY OUTPERFORMED OVERALL CANADIAN BUSINESS WHILE TAKING LESS RISK

TELECOM CANADA PSTN MEMBERS

Company	1983 Operating Revenues (millions)	Ownership	Regulation
Bell Canada	\$4,812	Private	Federal
British Columbia Telephone	\$1,091	Private	Federal
Alberta Government Telephones	\$893	Public	Provincial
Saskatchewan Telecommunications	\$326	Public	Provincial
Manitoba Telephone System	\$262	Public	Provincial
Maritime Telegraph & Telephone	\$253	Private	Provincial
New Brunswick Telephone	\$210	Private	Provincial
Québec-Téléphone	\$152	Private	Provincial
Newfoundland Telephone	\$120	Private	Provincial
Island Telephone	\$28	Private	Provincial

Source: Canada Consulting based on CRTC data.

1. THE CANADIAN TELEPHONE COMPANIES (TELCOs) - A REGULATED MIX OF PRIVATE AND PUBLIC COMPANIES - HAVE GENERALLY OUTPERFORMED OVERALL CANADIAN BUSINESS WHILE TAKING LESS RISK



2. IN THE AFTERMATH OF THE AT&T DIVESTITUTE, THE MOST SENSITIVE PUBLIC POLICY ISSUE FOR THE PSTN IS THE IMPACT OF DEREGULATION ON LOCAL PHONE SERVICE COSTS

In the U.S., the regulated Bell companies no longer control long distance telephone services

Similar developments in Canada would put serious pressure on telcos' revenue balance

Substantial increases in local service charges could have a dramatic impact on telephone penetration rates

U.S. policy makers are currently debating a number of local service charge options

IN THE U.S., THE REGULATED BELL COMPANIES NO LONGER CONTROL LONG DISTANCE TELEPHONE SERVICES

AT&T DIVESTITURE

AT&T ASSIGNED:

- . long distance service
- . research and development
- . manufacturing
- . other businesses not assigned to BOCs

22 LOCAL BELL OPERATING COMPANIES (BOC) ASSIGNED:

- . local exchange service with defined geographic areas
- . access to long distance carriers
- . yellow pages
- . cellular mobile communications services

"In general, the modified consent decree leaves the new AT&T free to pursue whatever business opportunities it chooses to pursue."

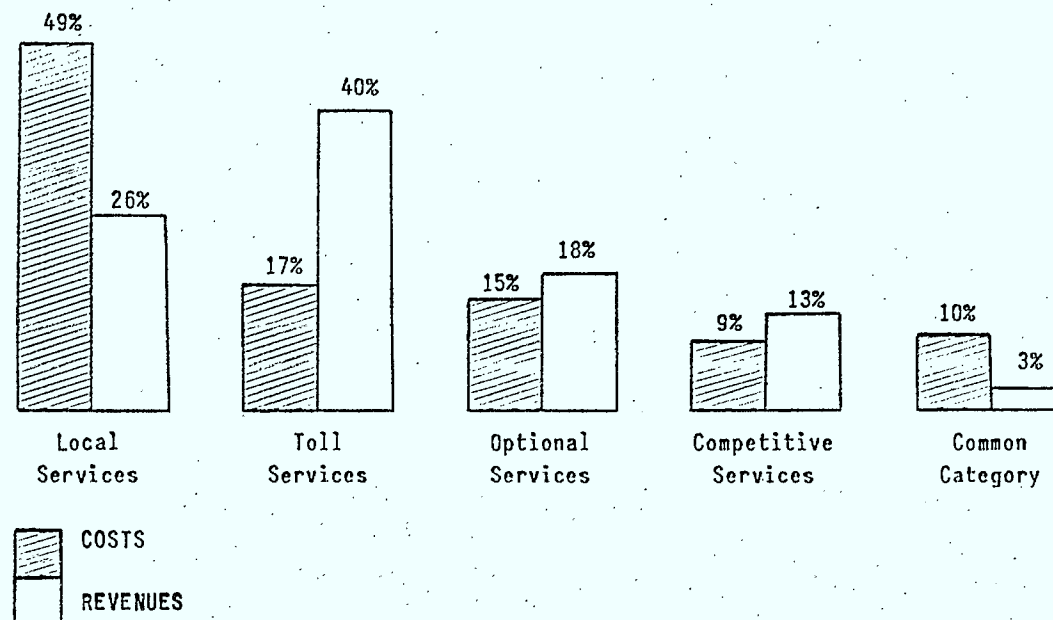
NEW AT&T MISSION

"This new AT&T is in the business of meeting customer needs, worldwide, for electronic movement and management of information. ... in everything we do we intend to be the best ... Our overarching goal will be customer satisfaction."

Source: AT&T 1983 Annual Report

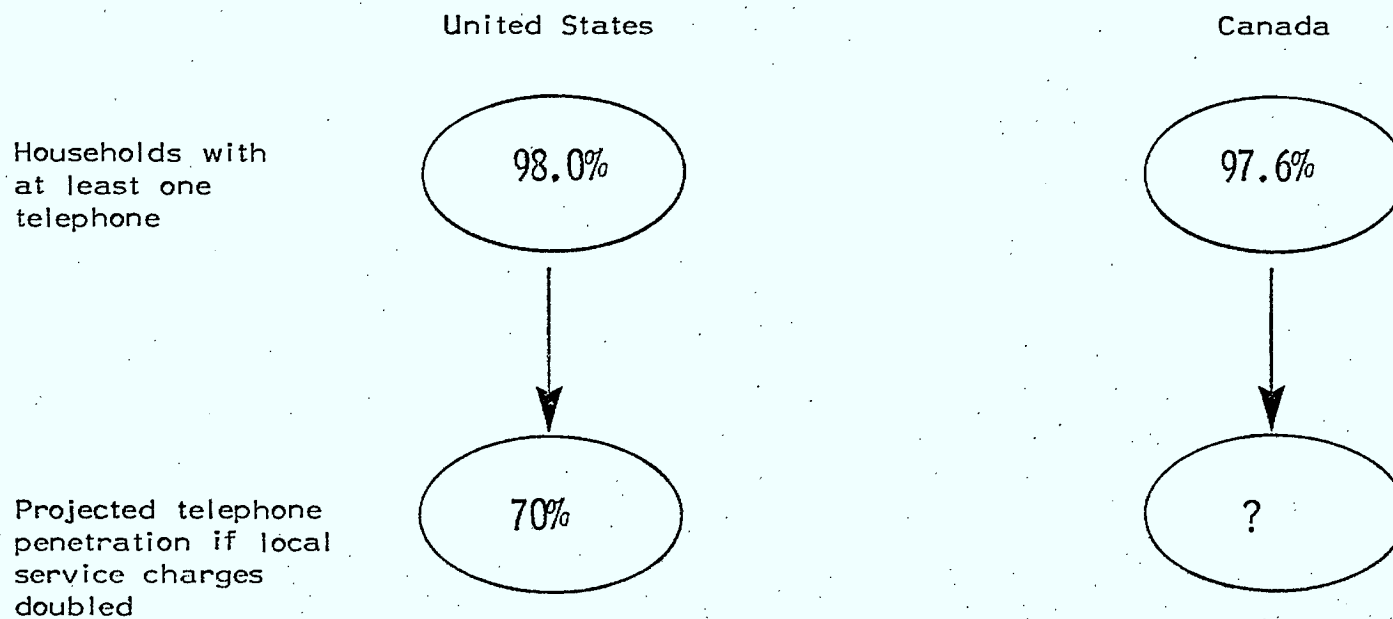
SIMILAR DEVELOPMENTS IN CANADA WOULD PUT SERIOUS PRESSURE ON TELCOS' REVENUE BALANCE

BREAKDOWN BY PERCENTAGE OF
BELL TOTAL COSTS AND REVENUES (1980)



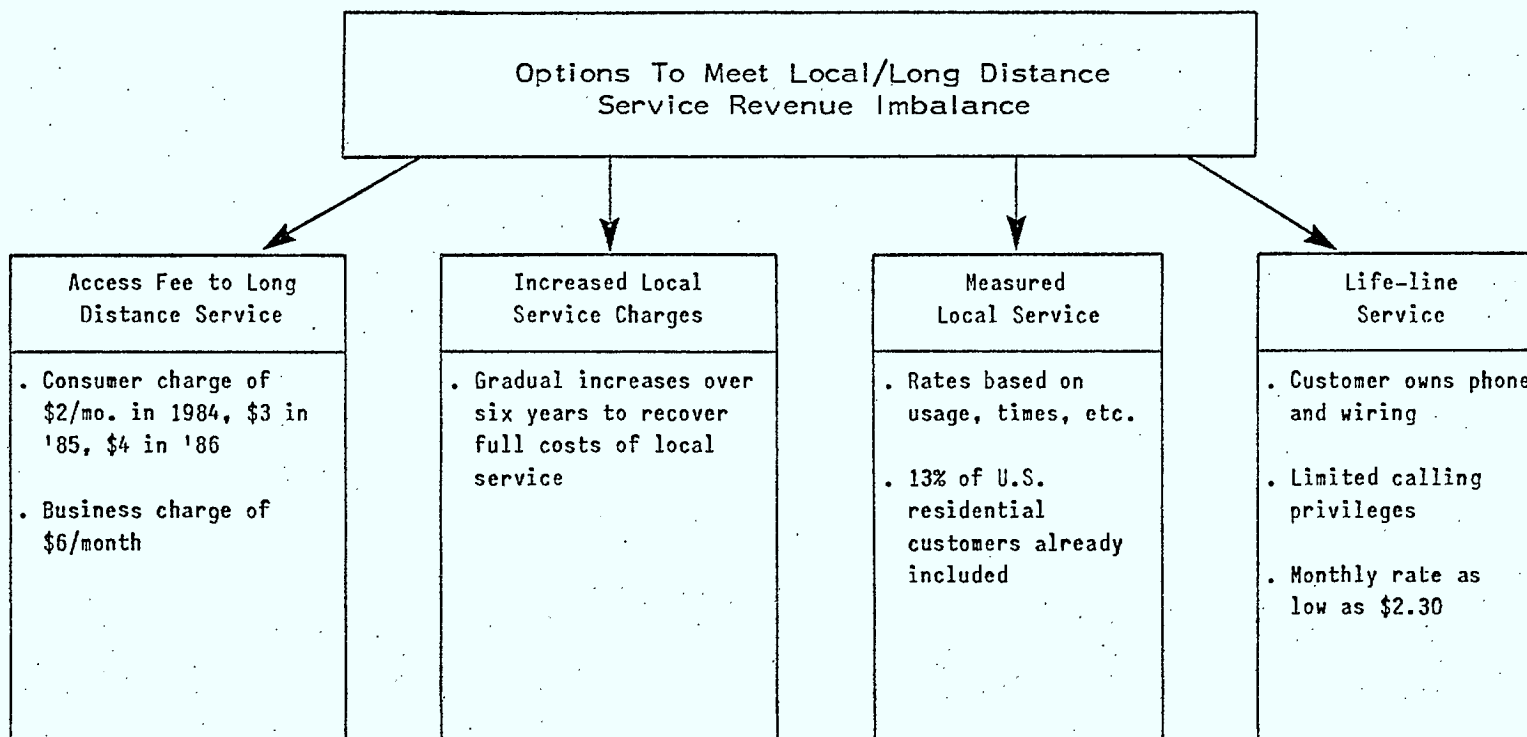
Source: Canada Consulting based on Bell Canada's 5-Way Split Study of 1980.

SUBSTANTIAL INCREASES IN LOCAL SERVICE CHARGES COULD HAVE A DRAMATIC IMPACT ON TELEPHONE PENETRATION RATES



Source: U.S. study conducted by Dr. Walter Bolter; Statistics Canada data

U.S. POLICY MAKERS ARE CURRENTLY DEBATING A NUMBER OF LOCAL SERVICE CHARGE OPTIONS



3. THE LARGEST BUSINESS ISSUE FACING TELCOS IS COMPETITION WITH OTHER CARRIERS IN PROMISING NEW SERVICE AREAS

A developing digital fibre optic network will create huge capacity for a wide array of audio/visual/data services

Games and computer software are two products that should make extensive use of phone line teledelivery

U.S. telcos are actively seeking out new revenue sources to take advantage of their network positions

Bell operating company (BOC) strategists are targetting the business side of the interactive data market

But they will face competition from many other companies accessing the public switched telephone network

A DEVELOPING DIGITAL FIBRE OPTIC NETWORK WILL CREATE HUGE CAPACITY FOR A WIDE ARRAY OF AUDIO/VISUAL/DATA SERVICES

Advance of fibre optic technology - 1980 AT&T installed 3,740 mi. optical fibre
1983 U.S. cos. installed 200,000 mi. optical fibre
1986 est U.S. cos. will install 1,300,000 mi. optical fibre
1990 est U.S. cos. will install 4,500,000 mi. optical fibre

"Many proponents of fibre optics predict that optical-fibre cables will displace civilian communications satellites in the 1990's".*

Integrated optoelectronics - the combination of optical integrated circuits and fibre optic transmission

Directions in optical research: - Light-guide circuits to replace electronic integrated circuits. Light-guide circuits will be to semiconductors what fibre optics is to paired copper wires.
- Hybrid systems combining both optical and electrical circuits

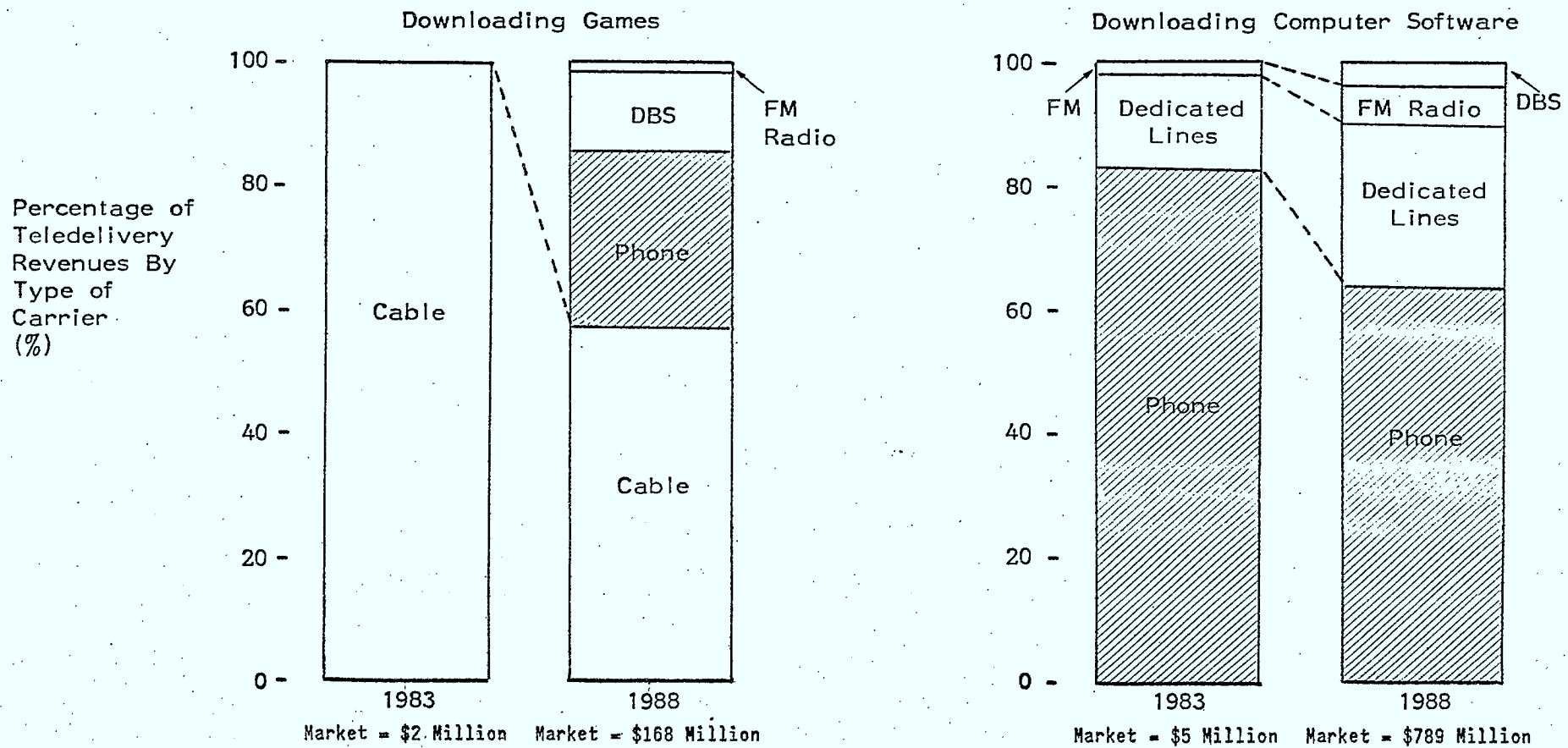
"The best of all possible worlds in the near future is to let electrons compute and let photons transmit the information".

A. Yariv, Professor, California Institute of Technology

* Business Week, May 21, 1984

GAMES AND COMPUTER SOFTWARE ARE TWO PRODUCTS THAT SHOULD MAKE EXTENSIVE USE OF PHONE LINE TELEDelivery

COMPUTER SOFTWARE TELEDelivery FORECAST - U.S.



Source: Canada Consulting based on International Resource Development Inc.

U.S. TELCOS ARE ACTIVELY SEEKING OUT NEW REVENUE SOURCES TO TAKE ADVANTAGE OF THEIR NETWORK POSITIONS

- ITEM Phone companies lobby U.S. Congress to amend cable-TV deregulation bill to limit cable firms to only one-way video services
 - ITEM Commodore and Bell South discuss plans for the telco to distribute products of major personal computer manufacturer
 - ITEM FCC allows Bell operating companies to form new subsidiaries to market network services
 - ITEM The U.S. Bell System introduces three new services in 1982: Expanded 800 Service, National Number Calling, and Automated Calling Card
 - ITEM Bell South teams up with AT&T and Viewdata Corporation of America to field test a home information system in Florida
-

BELL OPERATING COMPANY (BOC) STRATEGISTS ARE TARGETTING THE BUSINESS SIDE OF THE INTERACTIVE DATA MARKET

ONE COMPANY'S STRATEGY: THE "TELETRANSPORT STRATEGY" OF PACIFIC BELL

"The role of our business is, has been and will continue to be in the transportation of information. We carry information today from the low end of one and a half megabits - and I speak of that as the low end - to 135 megabits for major business, corporate customers and government agencies. It is very difficult to make distinctions among those bit streams - of whether they're 4,000 conversations on a pair, or glass, where they're all ones and zeros, or video full motion, or data, moving from machine to machine?"

Pacific Bell Executive

ONE COMPANY'S TACTICS: THE BROADBAND TRANSPORT THRUST OF PACIFIC BELL

- Pacific Bell's application for Palo Alto, California cable franchise proposes a hybrid coaxial/fibre optic residential system and an all-fibre optic institutional network
 - Pacific Bell is negotiating on a multichannel multipoint distribution system (MMDS) videotex joint venture
 - Pacific Bell plans a Teleport for the Port of Oakland which will provide commercial access to data and video services from satellites
 - Pacific Bell has constructed a fibre-switched network for videotex and other communications at the Olympic Games.
-

3. Competition In New Services

BUT THEY WILL FACE COMPETITION FROM MANY OTHER COMPANIES ACCESSING THE PUBLIC SWITCHED TELEPHONE NETWORK

NORTH AMERICAN COMMON TELECOMMUNICATIONS CARRIERS

	Canada	U.S.
Telephone Companies	\$7.8 Billion <ul style="list-style-type: none"> . Bell Canada . Provincial telcos 	\$87 Billion U.S. <ul style="list-style-type: none"> . Regional Bell Operating Companies
Domestic Specialized Common Carriers <ul style="list-style-type: none"> . public and private long distance service 		\$2.1 Billion U.S. <ul style="list-style-type: none"> . MCI . GTE Sprint . Western Union . U.S. Transmission Systems
International Specialized Common Carriers	\$.1 Billion <ul style="list-style-type: none"> . Telelobe Canada 	\$2.5 Billion U.S. <ul style="list-style-type: none"> . ITT Worldcom . RCA Globecom . TRT Telecommunications . Western Union . FTC Communications
Value-added Carriers <ul style="list-style-type: none"> . packet switched data communications . miscellaneous services 	\$.3 Billion <ul style="list-style-type: none"> . CN/CP Telecommunications 	\$1.1 Billion U.S. <ul style="list-style-type: none"> . Tymnet . GTE Telenet . Graphnet . ITT Domestic Transmissions . Uninet
New Entrants		<ul style="list-style-type: none"> . AT&T Net-1000 . IBM Information Network

Source: Canada Consulting based on data obtained from the CRTC and the U.S. Department of Commerce

4. CANADA'S TELCOS ARE WELL POSITIONED TO PROVIDE THE BASIC INFRASTRUCTURE FOR THE TELEDELIVERY OF NEW SERVICES

It is inevitable that telcos will be major players in the delivery of new services unless they are regulated out

The public switched telephone network (PSTN) is a crucial piece of Canada's communications infrastructure

Canadian telcos have the money and technology to introduce new services, but may have to learn how to market them

Most observers expect Canadian telcos to successfully satisfy public demand for more communications services - if government lets them

IT IS INEVITABLE THAT TELCOS WILL BE MAJOR PLAYERS IN THE TELEDelivery OF NEW SERVICES UNLESS THEY ARE REGULATED OUT

PUBLIC SWITCHED TELEPHONE NETWORK (PSTN)

THREATS	OPPORTUNITIES
<ul style="list-style-type: none">Slow or restrictive government regulatory responseNetwork bypass through deregulated U.S. linesPrivate network development	<ul style="list-style-type: none">Major new markets for audio/visual/data carriage and servicesFibre optic transmission lines will increase system capacity and speed

THE PUBLIC SWITCHED TELEPHONE NETWORK (PSTN) IS A CRUCIAL PIECE OF CANADA'S COMMUNICATIONS INFRASTRUCTURE

STRATEGIC SIGNIFICANCE OF THE PSTN	
Jobs	✓ ✓
Human capital development	
Technology diffusion	
Value-added to economy	✓ ✓ ✓
Infrastructure	✓ ✓ ✓
Balance of trade	
National Identity	

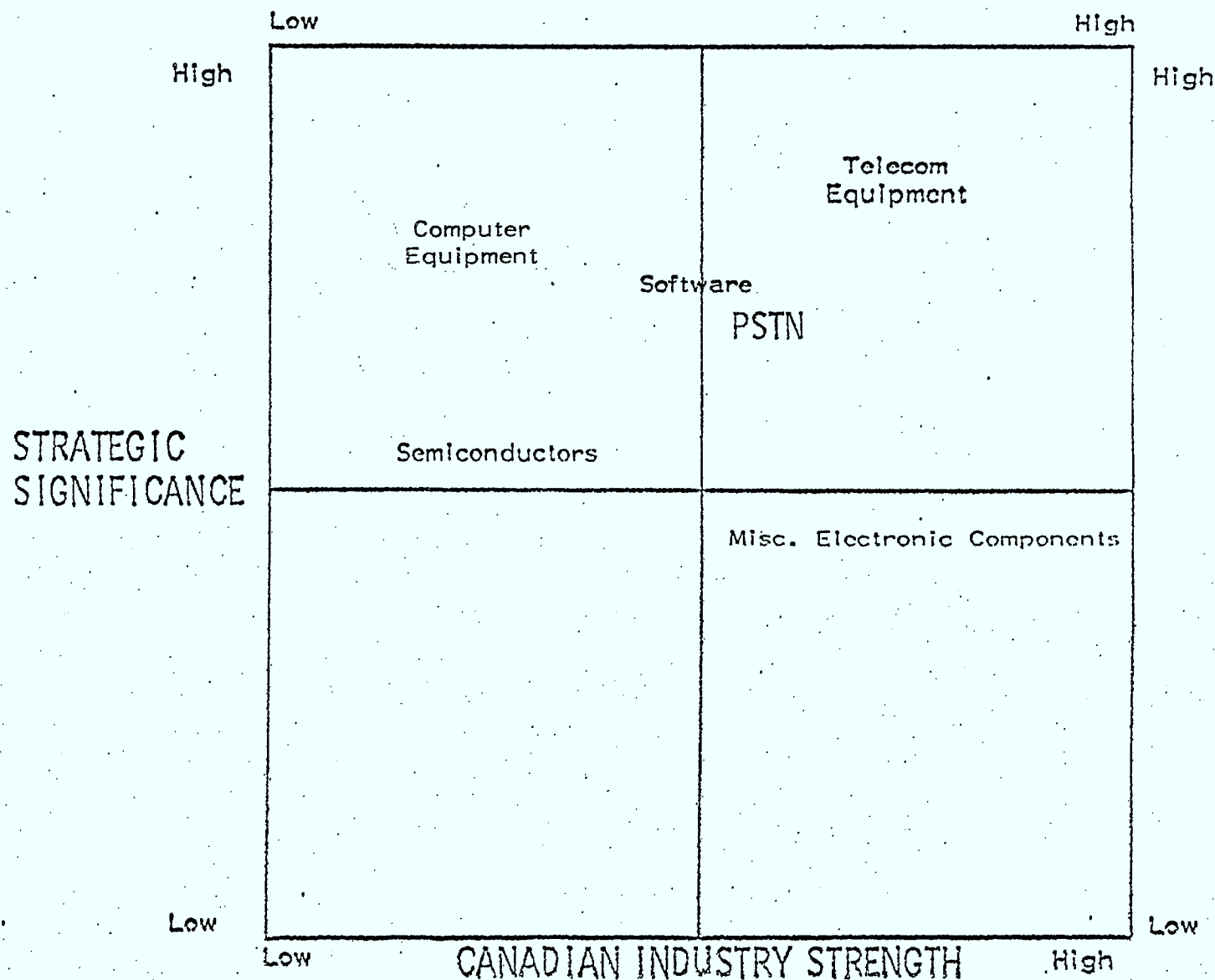
4. Evaluation

CANADIAN TELCOS HAVE THE MONEY AND TECHNOLOGY TO INTRODUCE NEW SERVICES,
BUT MAY HAVE TO LEARN HOW TO MARKET THEM

PUBLIC SWITCHED TELEPHONE NETWORK (PSTN)

KEY FACTORS FOR SUCCESS	CANADIAN INDUSTRY STRENGTH
Access to leading technology	✓ ✓ ✓
Capital	✓ ✓ ✓
Marketing capabilities	✓

MOST OBSERVERS EXPECT CANADIAN TELCOS TO SUCCESSFULLY SATISFY PUBLIC DEMAND FOR MORE COMMUNICATIONS SERVICES - IF GOVERNMENT LETS THEM



II. A MATURE BASIC BUSINESS AND HIGH INTEREST RATES HAVE TAKEN THEIR TOLL ON CANADIAN CABLE

1. Canada has a mature and highly subscribed cable system

2. The cable industry is composed primarily of small businesses but revenues and profits are skewed to the large systems

3. Cable system profits have declined dramatically since 1978

4. Decreased cable profits have been the result of a combination of factors

5. Even very large operators - like Rogers Cablesystems - are facing severe profitability pressures

6. The future of Canadian cable depends on management skill and service innovation

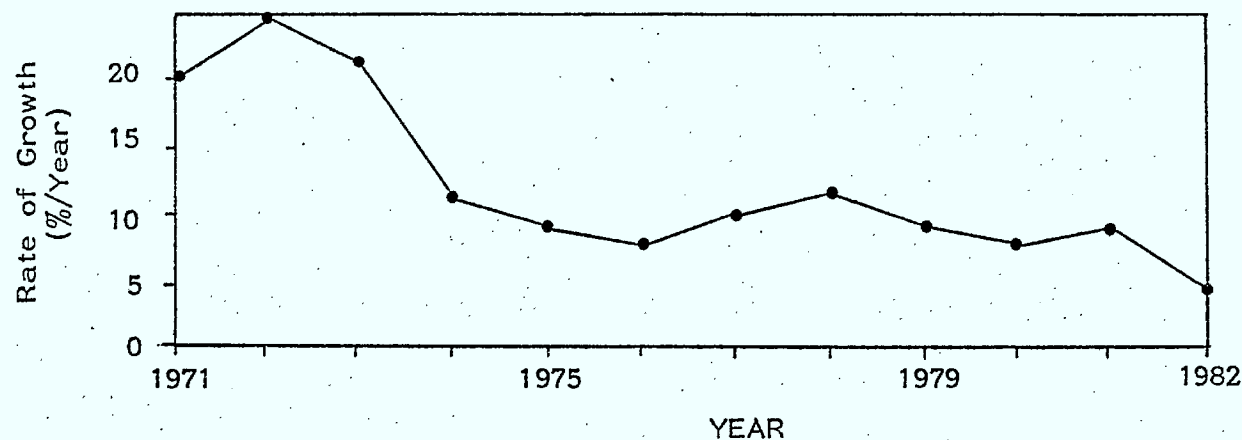
1. CANADA HAS A MATURE AND HIGHLY SUBSCRIBED CABLE SYSTEM

Canada's percentage of TV Households capable of receiving cable at 81% exceeds the U.S. percentage of 63%

CABLE PENETRATION STATISTICS

	1982	1981	1980	1979	1978	1977
TV Households (millions)	8.1	7.8	7.6	7.4	7.1	6.8
Total Cable Subscribers (millions)	4.90	4.70	4.30	4.10	3.70	3.40
% Subs. vs. Total Canadian TV Households	60.9%	59.6%	56.9%	55.3%	53.0%	50.1%
Total Households Passed (millions)	6.60	6.30	6.10	5.90	5.50	4.90
% Subs. vs. Homes Passed	74.7%	74.3%	71.0%	68.7%	68.2%	67.7%

With nearly 75% of homes capable of receiving cable already subscribing, the growth of basic cable subscribers is declining

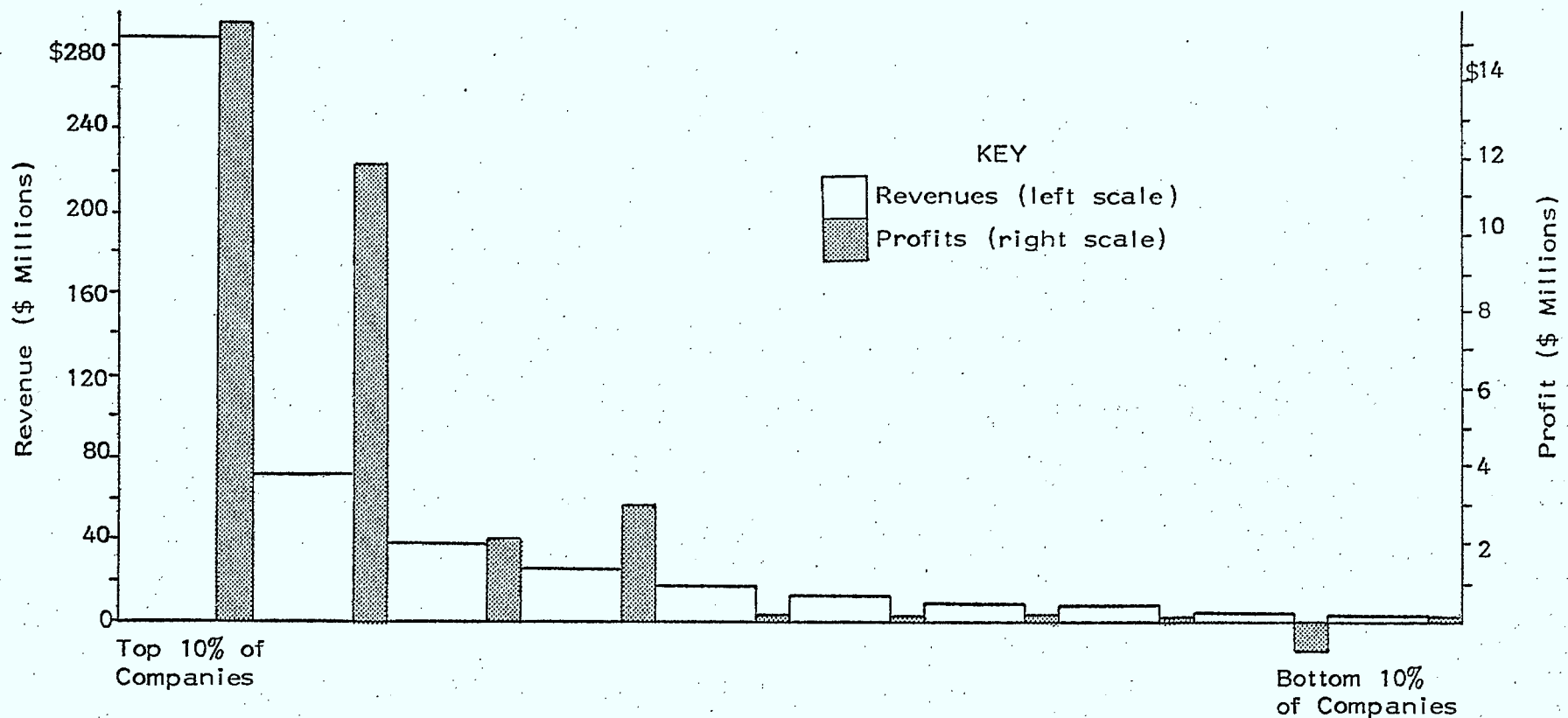


Source: Canada Consulting based on CCTA data.

2. THE CABLE INDUSTRY IS COMPOSED PRIMARILY OF SMALL BUSINESSES BUT REVENUES AND PROFITS ARE SKEWED TO THE LARGE SYSTEMS

There are 328 cable companies

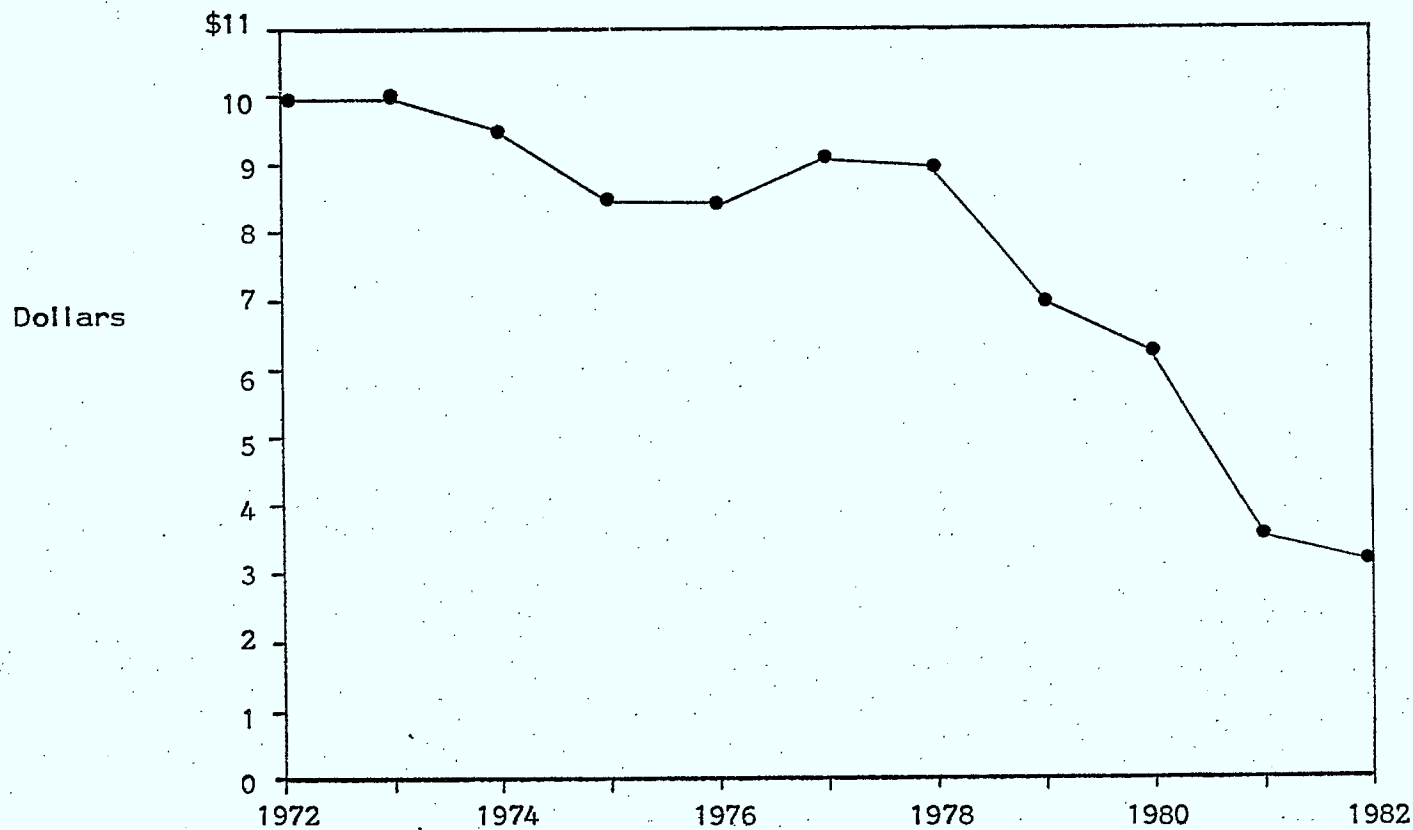
79% have less than 6,000 subscribers
 19% have 6,000-25,000 subscribers
 9% have 25,000-100,000 subscribers
 2% have over 100,000 subscribers



Source: Canada Consulting based on Statistics Canada data

3. CABLE SYSTEM PROFITS HAVE DECLINED DRAMATICALLY SINCE 1978

CABLE INDUSTRY PROFITS PER SUBSCRIBER
Constant (1972) Dollars



Source: Canada Consulting based on Statistics Canada data

4. DECREASED CABLE PROFITS HAVE BEEN THE RESULT OF A COMBINATION OF FACTORS

1) Regulated rates have not increased with the rate of inflation

	1982	1981	1980	1979	1978	1977
Aver. Monthly Rate	\$8.12	\$7.27	\$6.87	\$6.58	\$6.20	\$5.89
Constant Dollars	3.52	3.35	3.49	3.78	3.97	4.06

2) Operators financed system expansion with current debt during times of increasing interest rates

3) Revenue growth from the addition of new subscribers decreased as average system penetration exceeded 70%

4) Pay TV failed to provide the new revenue stream needed to sustain growth

5. EVEN VERY LARGE OPERATORS - LIKE ROGERS CABLESYSTEMS - ARE FACING SEVERE PROFITABILITY PRESSURES

CASE STUDY - ROGERS CABLESYSTEMS

	Operations, 1983		
	<u>Canada</u>	<u>United States</u>	<u>Ireland</u>
Cable systems	16	19	2
Homes passed	1,565,000	869,000	143,000
Basic Subscription rate	84%	53%	77%
Pay Subscription rate	9%	70%	---
Identifiable Assets (millions)	\$308	\$543	\$12
Operating Revenues (millions)	\$147	\$212	\$5

Overall Loss: \$15,066,000

Expansion activities: Rogers aggressively expanded in new franchising initiatives and system acquisitions over the last five years

Expansion was primarily funded by debt and the support of three major Canadian banks

Threats: Rogers overexpanded in times of high interest rates and regulated subscription rates

Rogers has made no new applications for U.S. cable franchises in 1983

Rogers has attempted to stabilize their interest payments by taking on fixed rate debt offers in the U.S.

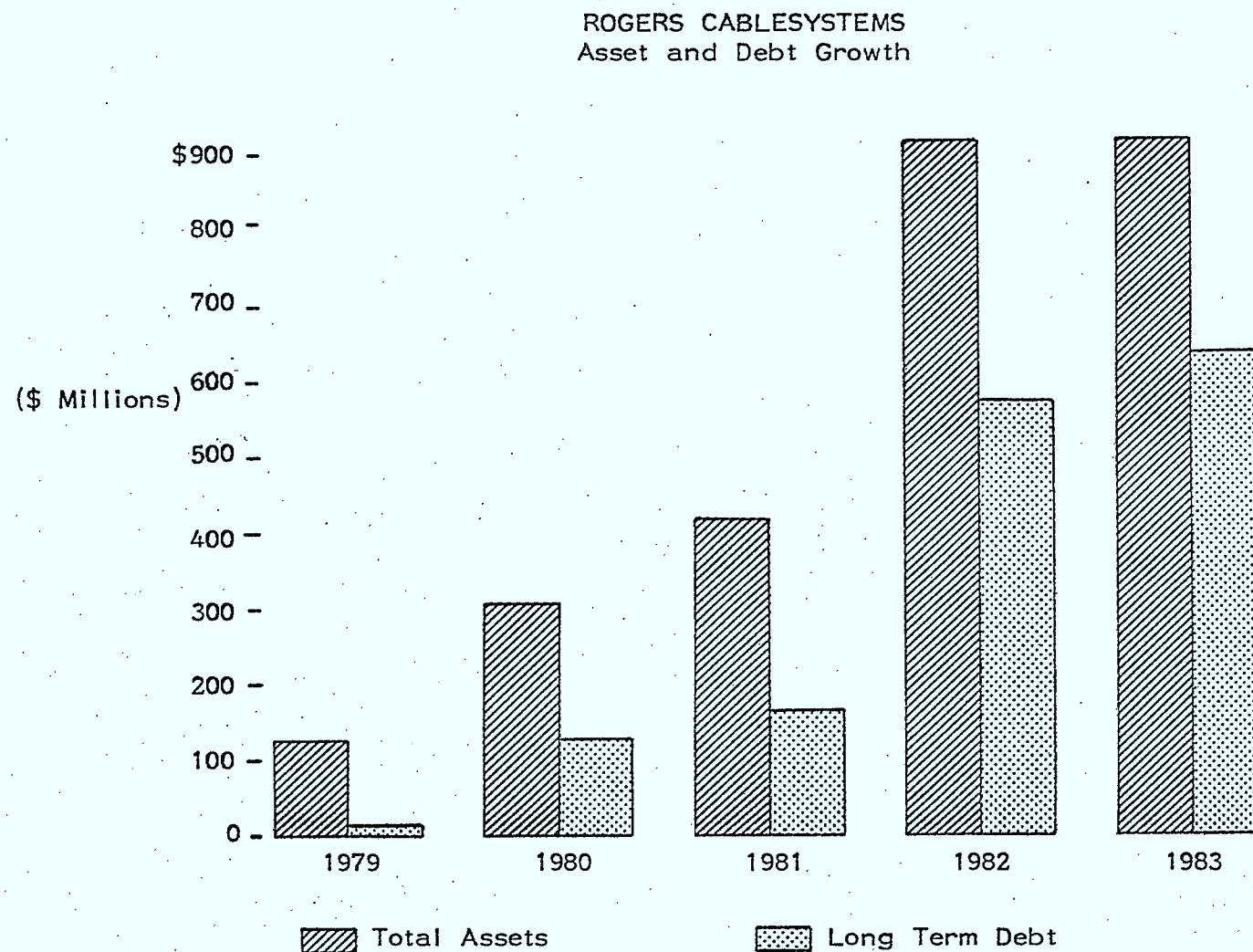
Opportunities: Rogers operations are concentrated in major metropolitan areas and consist of large recently constructed or substantially rebuilt cable systems

Rogers has built their systems with technology necessary to deliver new services as they become marketable

Cable revenues have increased steadily in U.S. with addition of specialty services

Cable revenues have proved "recession proof"

5. EVEN VERY LARGE OPERATORS - LIKE ROGERS CABLESYSTEMS - ARE FACING SEVERE PROFITABILITY PRESSURES



Source: Canada Consulting based on Rogers Annual Report

6. THE FUTURE OF CANADIAN CABLE DEPENDS ON MANAGEMENT SKILL AND SERVICE INNOVATION

The capacity superiority of cable's coaxial plant is threatened by glass fibres

At present cable is in a good position to offer new quality products

The cable industry makes a broad contribution to Canadian communications

Although its position has been eroded, Canadian cable is still a key part of the infrastructure

6. Evaluation

THE CAPACITY SUPERIORITY OF CABLE'S COAXIAL PLANT IS THREATENED BY GLASS FIBRES

CABLE INDUSTRY

THREATS	OPPORTUNITIES
Fibre optic technology will give telcos competitive broadband capacity	New services - programming or non-programming
Lack of capital to replace or upgrade plant	Development of local area networks
Retrenchment mentality when entrepreneurial response is required	Use of system for telephone bypass networks

AT PRESENT CABLE IS IN A GOOD POSITION TO OFFER NEW QUALITY PRODUCTS

CABLE INDUSTRY

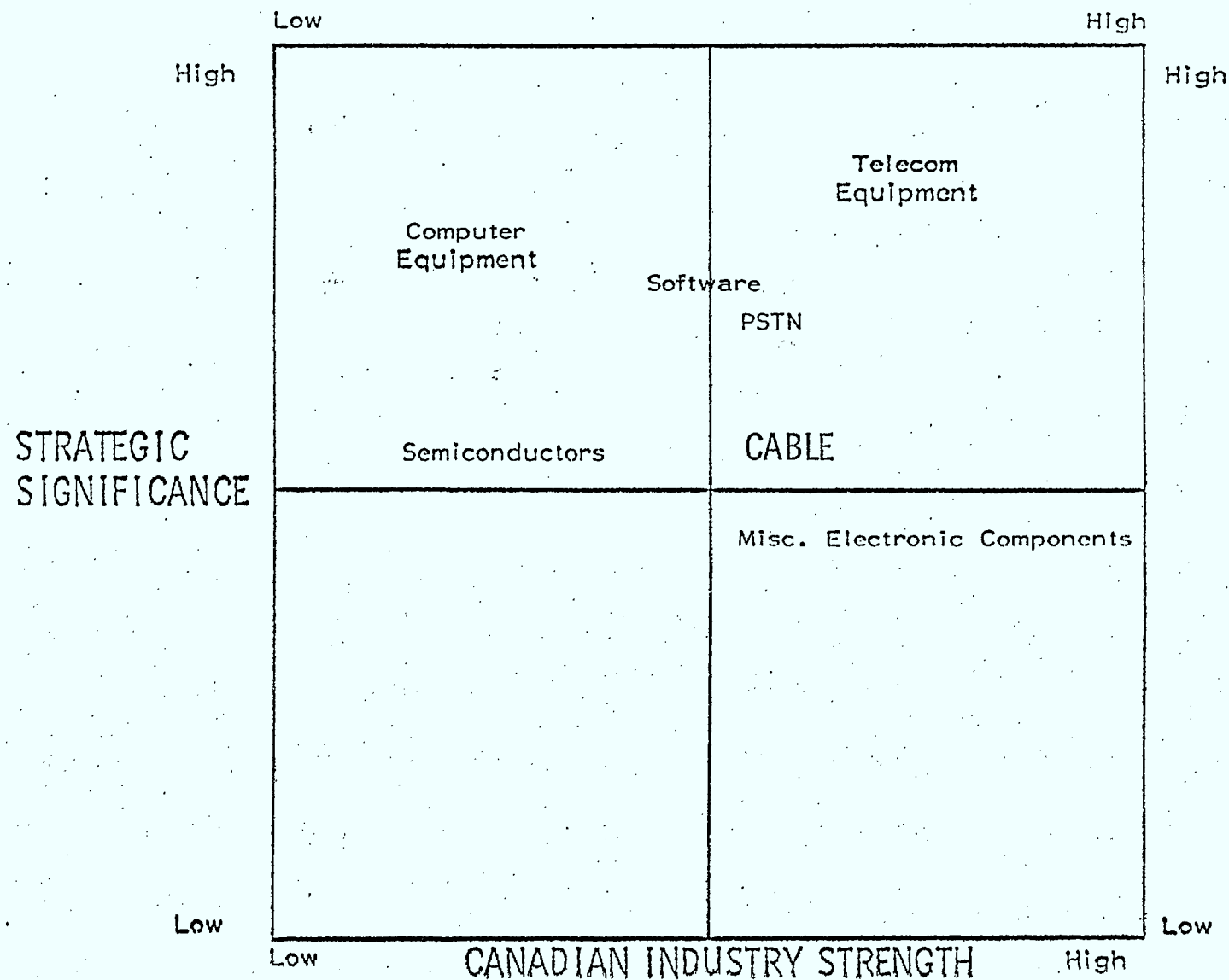
KEY FACTORS FOR SUCCESS	CANADIAN INDUSTRY STRENGTH
Strong new products	✓
Large subscriber base	✓ ✓ ✓
Marketing expertise	
Broadband monopoly	✓ ✓
High converter penetration	✓ ✓

6. Evaluation

THE CABLE INDUSTRY MAKES A BROAD CONTRIBUTION TO CANADIAN COMMUNICATIONS

STRATEGIC SIGNIFICANCE OF CABLE INDUSTRY	
Jobs	✓
Human capital development	✓
Technology diffusion	✓
Value-added to economy	✓ ✓
Infrastructure	✓ ✓ ✓
Balance of trade	✓
National Identity	✓

ALTHOUGH ITS POSITION HAS BEEN ERODED, CANADIAN CABLE IS STILL A KEY PART OF THE INFRASTRUCTURE



III. NEW DELIVERY SERVICES ARE AT VARIOUS STAGES OF DEVELOPMENT

1. Canadian satellite technology has led the world

2. Cellular telephone services have major market potential

3. Direct broadcast satellite service (DBS) is constrained by capacity and cost

4. Bypass networks - both long distance and local area - will proliferate in the next few years

1. CANADIAN SATELLITE TECHNOLOGY HAS LED THE WORLD

Telesat Canada has created a world-class satellite telecommunications network operated on a commercial basis

For distances under 1,000 miles fibre optics is already cheaper than satellite

Satellites have contributed greatly to Canada's state-of-the-art communications infrastructure

In the satellite industry the term successful launch has a concrete meaning

Canada has a global reputation for excellence in satellite technology and operation

TELESAT CANADA HAS CREATED A WORLD-CLASS SATELLITE TELECOMMUNICATIONS NETWORK OPERATED ON A COMMERCIAL BASIS

Ownership: Joint Canadian Government and Telecommunications Carriers

Mandate: Telesat is the product of Canada's space policy which is directed toward domestic telecommunications

Assets: \$398.7 Million (at Dec. 1983)

Revenues: \$88.1 Million (1983)

Net Earnings: \$15.5 Million (1983)

Facilities: Five operational satellites, 140 earth stations

Services: Transmission of network television, telephone conversations, business communications

Accomplishments: The Anik C satellite communications system is the most powerful and advanced available to North Americans today and is the first commercial system to have direct to home capability

Anik D broadcasts at a lower frequency, offers the best coverage of North America from a single transponder

Anik D was the first satellite produced in Canada by Spar Aerospace

Telesat maintains its technology awareness by doing international consulting to developing satellite systems in the areas of organizational skills and technology exploitation

Satellite

Availability: Of a total capacity of 103 transponders, there are currently 59 in use

In the U.S. there is a total capacity of approximately 300 transponders of which 50% are unused

FOR DISTANCES UNDER 1,000 MILES FIBRE OPTICS IS ALREADY CHEAPER THAN SATELLITE

SATELLITE

THREATS	OPPORTUNITIES
New technologies, e.g., fibre optics cables	Bypass networks
Shortage of "parking spaces"	New applications, e.g., M-SAT
Shortage of programming services	Delivery of signals for U.S. market
Liberalization of earth station ownership	

1. Satellite

SATELLITES HAVE CONTRIBUTED GREATLY TO CANADA'S STATE -OF-THE-ART COMMUNICATIONS INFRASTRUCTURE

STRATEGIC SIGNIFICANCE OF SATELLITE	
Jobs	
Human capital development	✓
Technology diffusion	✓ ✓ ✓
Value-added to economy	✓
Infrastructure	✓ ✓ ✓
Balance of trade	
National Identity	✓

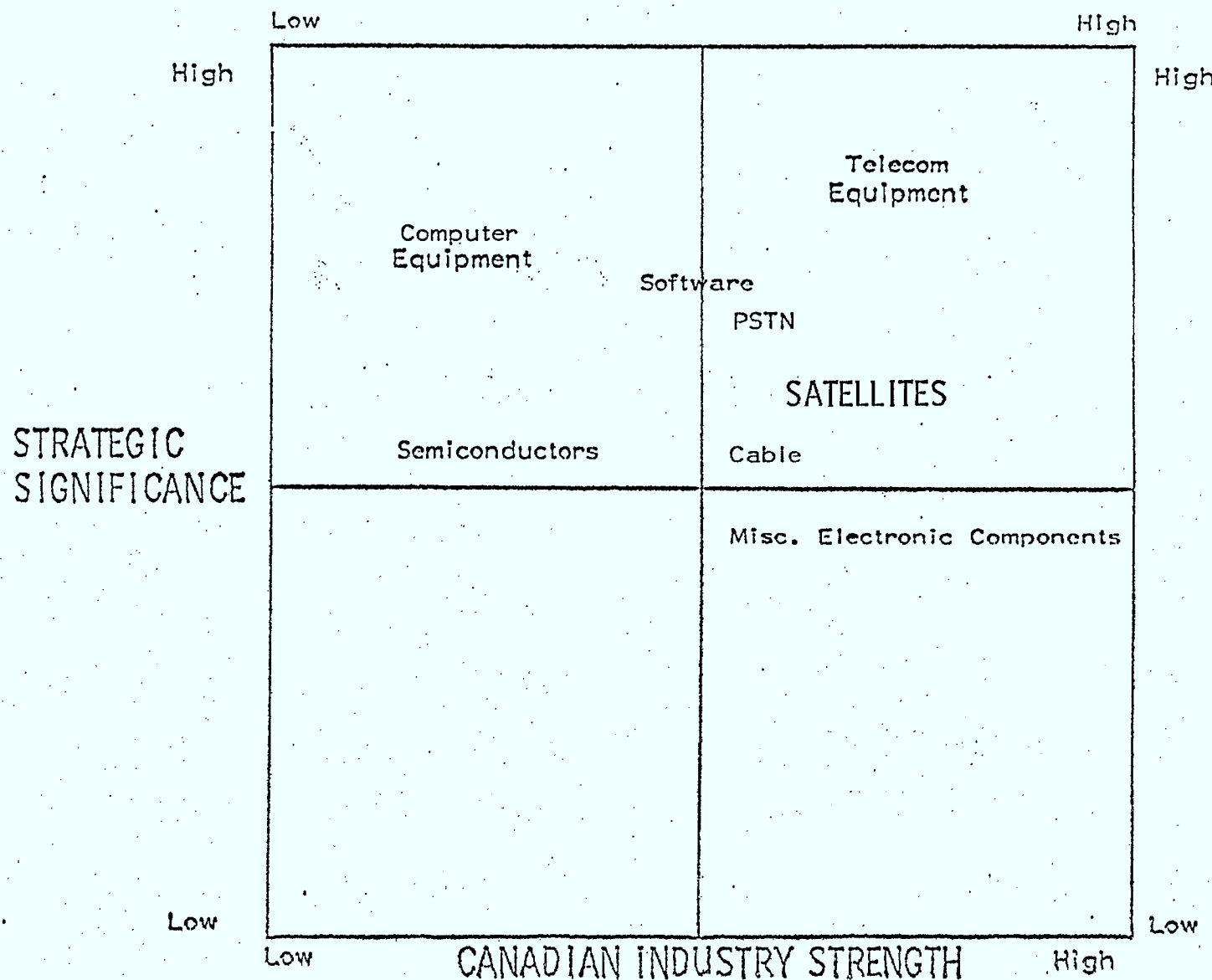
1. Satellite

IN THE SATELLITE INDUSTRY THE TERM SUCCESSFUL LAUNCH HAS A CONCRETE MEANING

SATELLITE

KEY FACTORS FOR SUCCESS	CANADIAN INDUSTRY STRENGTH
Successful launch	J J J
Financially sound customer base	J J
Keeping abreast of technological change	J J J

CANADA HAS A GLOBAL REPUTATION FOR EXCELLENCE IN SATELLITE TECHNOLOGY AND OPERATION



2. CELLULAR TELEPHONE SERVICES HAVE MAJOR MARKET POTENTIAL

By awarding licences for major geographic areas, DOC has enabled cellular operators to achieve efficient system size

Consumer acceptance of cellular telephone may cause the business to take off

The projected strategic significance of cellular telephone is high

The strength of the Canadian cellular industry will rely on marketing and system design

DOC cellular policies are expected to develop a strong Canadian identity

2. Cellular Telephone

BY AWARDING LICENCES FOR MAJOR GEOGRAPHIC AREAS, DOC HAS ENABLED CELLULAR OPERATORS TO ACHIEVE EFFICIENT SYSTEM SIZE

CELLULAR TELEPHONE SERVICES

Market Size:	Expected penetration rate 70,000-150,000 mobile units by the 5th year of operation
Market Structure:	<p>Restrained Competition - one national non-wireline licensee, Cantel, owned by Télémédia Inc., Rogers Telecommunications, First City Financial Corp., and a number of radio common carrier investors. One wireline licensee will be awarded for each major region</p> <p>The Minister of DOC has indicated to Bell Canada that Bell Cellular must be a subsidiary operation. Interconnection agreements with Cantel are a pre-condition of licencing for all wireline companies</p>
Services to be Offered:	Commencing in July 1985 in major markets, cellular service will feature two-way voice communication amongst fixed phones, cars and portable phone sets. An array of enhanced services such as call-forwarding, data transmission, etc. will also be available
Major Equipment Suppliers:	Northern Telecom/Canadian General Electric; NovAtel, a joint venture of AGT and Nova; Motorola; Harris; Oki; EF Johnson; Anaconda Ericsson
U.S. Experience to Date:	Initial rapid take-up in Motorola's Chicago system has slowed down. Washington/Baltimore wireline company got a major head start on the non-wireline licensee which may have undermined opportunities for competition. Technology is still being tested and system capacity is being developed

2. Cellular Telephone

CONSUMER ACCEPTANCE OF CELLULAR TELEPHONE MAY CAUSE THE BUSINESS TO TAKE OFF

CELLULAR TELEPHONE SERVICES

THREATS	OPPORTUNITIES
<p>Non-wireline licensee</p> <ul style="list-style-type: none">- does not have telephone image- is dependent on competitor's plant <p>Wireline licensee</p> <ul style="list-style-type: none">- unaccustomed to new product marketing- is organized on telephone lines <p>Leapfrog technology</p> <p>Portables may be radiation hazards</p>	<p>Convenience of service may result in widespread acceptance</p> <p>Non-wireline licensee may create local/long distance public bypass networks with other carriers, e.g., CNCP or other technologies, e.g., M-SAT</p> <p>System development and management can be exported to developed and undeveloped countries.</p>

2. Cellular Telephone

THE PROJECTED STRATEGIC SIGNIFICANCE OF CELLULAR TELEPHONE IS HIGH

STRATEGIC SIGNIFICANCE OF CELLULAR TELEPHONE		
Jobs	✓	Projected
Human capital development	✓	
Technology diffusion	✓ ✓	
Value-added to economy	✓ ✓ ✓	
Infrastructure	✓ ✓ ✓	
Balance of trade	✓	
National Identity	✓	

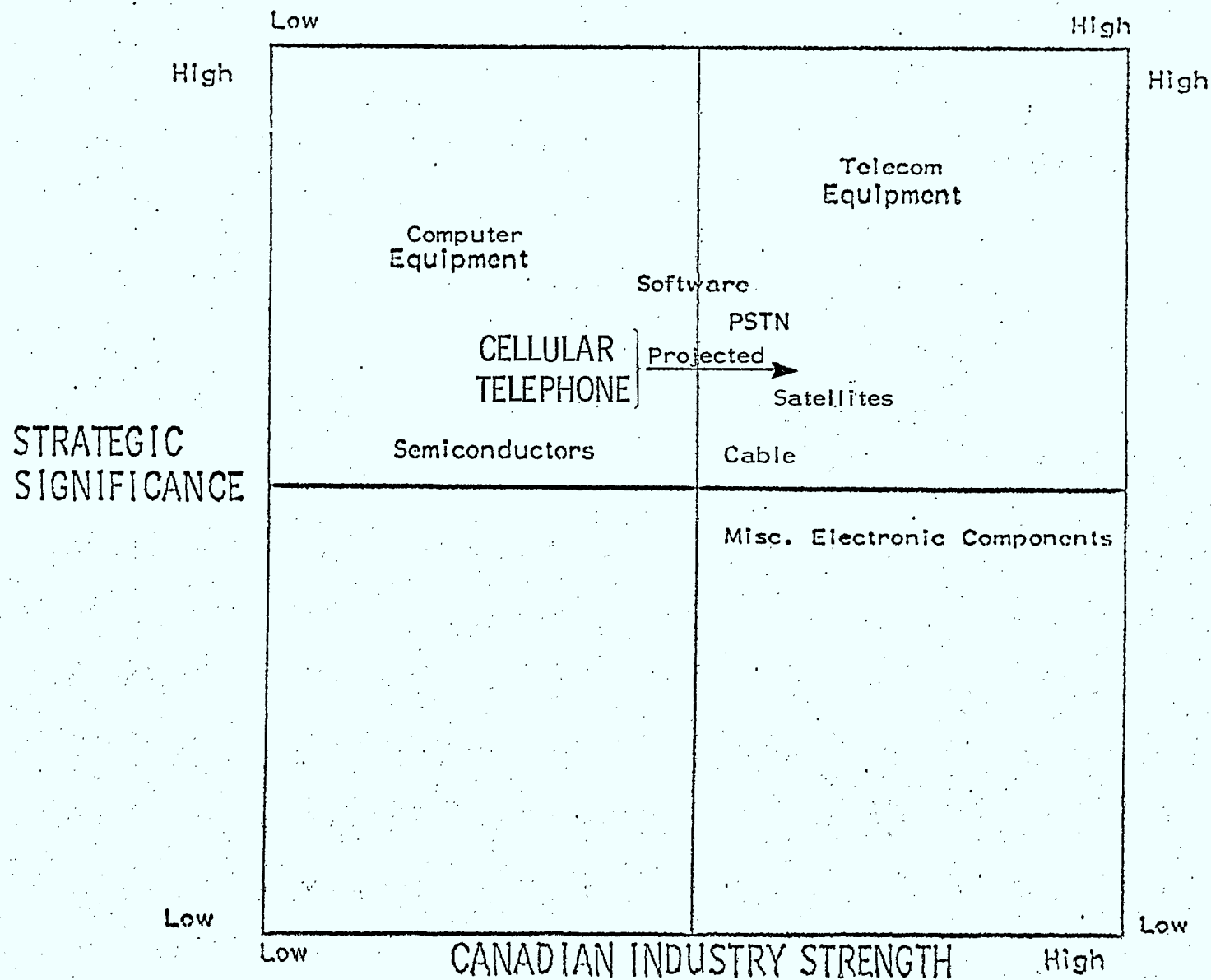
2. Cellular Telephone

THE STRENGTH OF THE CANADIAN CELLULAR INDUSTRY WILL RELY ON MARKETING AND SYSTEM DESIGN

CELLULAR TELEPHONE SERVICES

KEY FACTORS FOR SUCCESS	CANADIAN INDUSTRY STRENGTH
Business/consumer marketing ability	✓
Major telecom project engineering skills	✓ ✓ ✓
Reliable technical equipment	Under development
Low cost operating system	Under development

DOC CELLULAR POLICIES ARE EXPECTED TO DEVELOP A STRONG CANADIAN IDENTITY



3. DIRECT BROADCAST SATELLITE SERVICE (DBS) IS CONSTRAINED BY CAPACITY AND COST

Canadian DBS faces stiff competition from cable and Cancom

The shortage of services willing to use DBS as a primary mode of distribution is also a major problem

DBS services have a modest strategic significance

At present the Canadian DBS industry is virtually non-existent

DBS may prove to be an infrastructure dinosaur

3. DBS

CANADIAN DBS FACES STIFF COMPETITION FROM CABLE AND CANCOM

DBS - DIRECT BROADCAST SATELLITE SERVICE

Key hardware components: transmitting earth station; satellite; earth stations in homes and communities

Potential services: television - advertiser supported, pay or special interest; radio; teletext; facsimile

Service providers: Cancom

Competing Canadian technologies: cable, over-the-air, MATV

Canadian market outlook:

- cable has an entrenched position in the market for delivery of TV signals to the home
- DBS has high initial investment costs and limited channel capacity
- Cancom has lead in providing services to rural and remote areas
- threat of spillover of U.S. DBS services diminishing because U.S.C.I., an American service, is having financing problems, Western Union has shelved plans to initiate a DBS service and the CBS/Comsat joint venture has been aborted. "It's a business whose time has not yet come." (Comsat exec.)

THE SHORTAGE OF SERVICES WILLING TO USE DBS AS A PRIMARY MODE OF DISTRIBUTION IS ALSO A MAJOR PROBLEM

DIRECT BROADCAST SATELLITE SERVICE

THREATS	OPPORTUNITIES
Competing technologies, e.g., cable, over-the-air, MATV High satellite rental costs Shortage of programming services Competition from foreign services	A fixed-cost business with potential for high marginal returns

DBS SERVICES HAVE A MODEST STRATEGIC SIGNIFICANCE

STRATEGIC SIGNIFICANCE OF DIRECT BROADCAST SATELLITE SERVICE	
Jobs	
Human capital development	
Technology diffusion	✓ ✓
Value-added to economy	
Infrastructure	✓ ✓
Balance of trade	
National Identity	✓

3. DBS

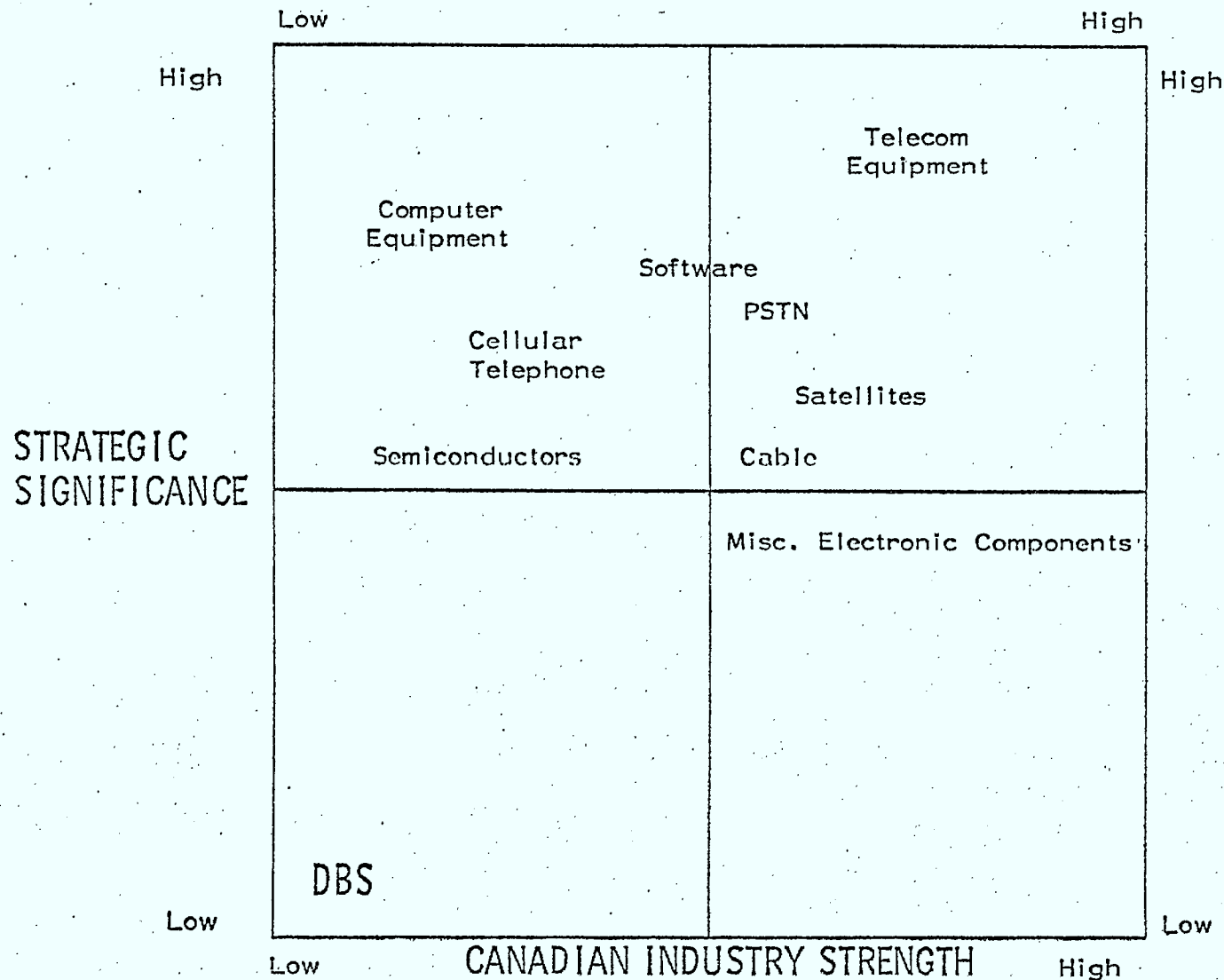
AT PRESENT THE CANADIAN DBS INDUSTRY IS VIRTUALLY NON-EXISTENT

DIRECT BROADCAST SATELLITE SERVICE

KEY FACTORS FOR SUCCESS	CANADIAN INDUSTRY STRENGTH
Large potential market	
Attractive program offerings	
Financial strength	
Access to technology	✓ ✓

3. DBS

DBS MAY PROVE TO BE AN INFRASTRUCTURE DINOSAUR



4. BYPASS NETWORKS - BOTH LONG DISTANCE AND LOCAL AREA - WILL PROLIFERATE IN THE NEXT FEW YEARS

Bypass networks are symbolic of the emerging need for technology compatibility and convergence

Long distance bypass may face aggressive telco competition. Local area networks offer business opportunities for large and small operators

Bypass networks offer a new kind of infrastructure flexibility

CNCP has the potential to be a major long distance service provider. Cable, phone, and equipment companies could be significant players in local area networks

Bypass networks will be an important addition to Canada's already strong infrastructure

4. Bypass Networks

BYPASS NETWORKS ARE SYMBOLIC OF THE EMERGING NEED FOR TECHNOLOGY COMPATIBILITY AND CONVERGENCE

BYPASS NETWORKS

Long Distance Service - provide private or public long distance voice or data transmission to customers without using telephone company long lines.
Transmission methods: microwave, satellite, fibre optics, cable

Local Area Networks - provide closed circuit connection for client data terminals, office equipment, PBX's. Transmission methods: cable, radio waves, microwave, satellite, fibre optics

Industry Developments -

U.S. specialized common carrier 1983 total revenue: \$2.1 billion*

U.S. specialized common carrier four year compound annual growth rate: 72%*

In Canada, CNCP Telecommunications has applied to the CRTC to provide long distance service in competition with Bell Canada and B.C. Tel.

Non-Canadian networks bypassing Telecom Canada, e.g., land lines from Vancouver to Seattle, satellite Seattle to Buffalo, land lines to Toronto, have been rumoured.

* U.S. Industrial Outlook, 1984

4. Bypass Networks

LONG DISTANCE BYPASS MAY FACE AGGRESSIVE TELCO COMPETITION. LOCAL AREA NETWORKS OFFER BUSINESS OPPORTUNITIES FOR LARGE AND SMALL OPERATORS

Long Distance Service - U.S. Experience

Market - Compound annual growth of 72% since 1979; 1983 market = \$2.1 billion

MCI - Market leader: Five year average return on equity = 30.6%; Five year average sales growth = 65.2%*

- is expanding from long distance into mobile telephone, paging, electronic mail, data communications
- bought Western Union International for voice and data services overseas
- has agreement to use Amtrack right-of-way for fibre optics
- is planning digital microwave termination systems to bypass local loops

GTE Sprint - plans to invest \$9 billion for long distance over 10 years

Other Competitors: New England Telephone Co., Western Union, U.S. Transmission Systems, Rochester Telephone Corp.

Local Area Networks (LANs) - U.S. Experience

U.S. industry reports 6,000 LANs are presently in use tying data terminals and office equipment together

Citicorp - spent \$100 million on LAN

Westinghouse - is building \$26 million private microwave LAN for 22 plants and offices

Allstate - is planning 25 mile lightwave LAN

Shell - is planning USRNET, which may be world's largest LAN

Manhattan Cable - has provided LAN for clients in New York for several years

AT&T will deliver LANs in December, 1984; IBM in 1986

* Forbes, January, 1984

BYPASS NETWORKS OFFER A NEW KIND OF INFRASTRUCTURE FLEXIBILITY

STRATEGIC SIGNIFICANCE OF BYPASS NETWORKS	
Jobs	✓
Human capital development	✓
Technology diffusion	✓ ✓ ✓
Value-added to economy	✓ ✓
Infrastructure	✓ ✓ ✓
Balance of trade	
National Identity	✓

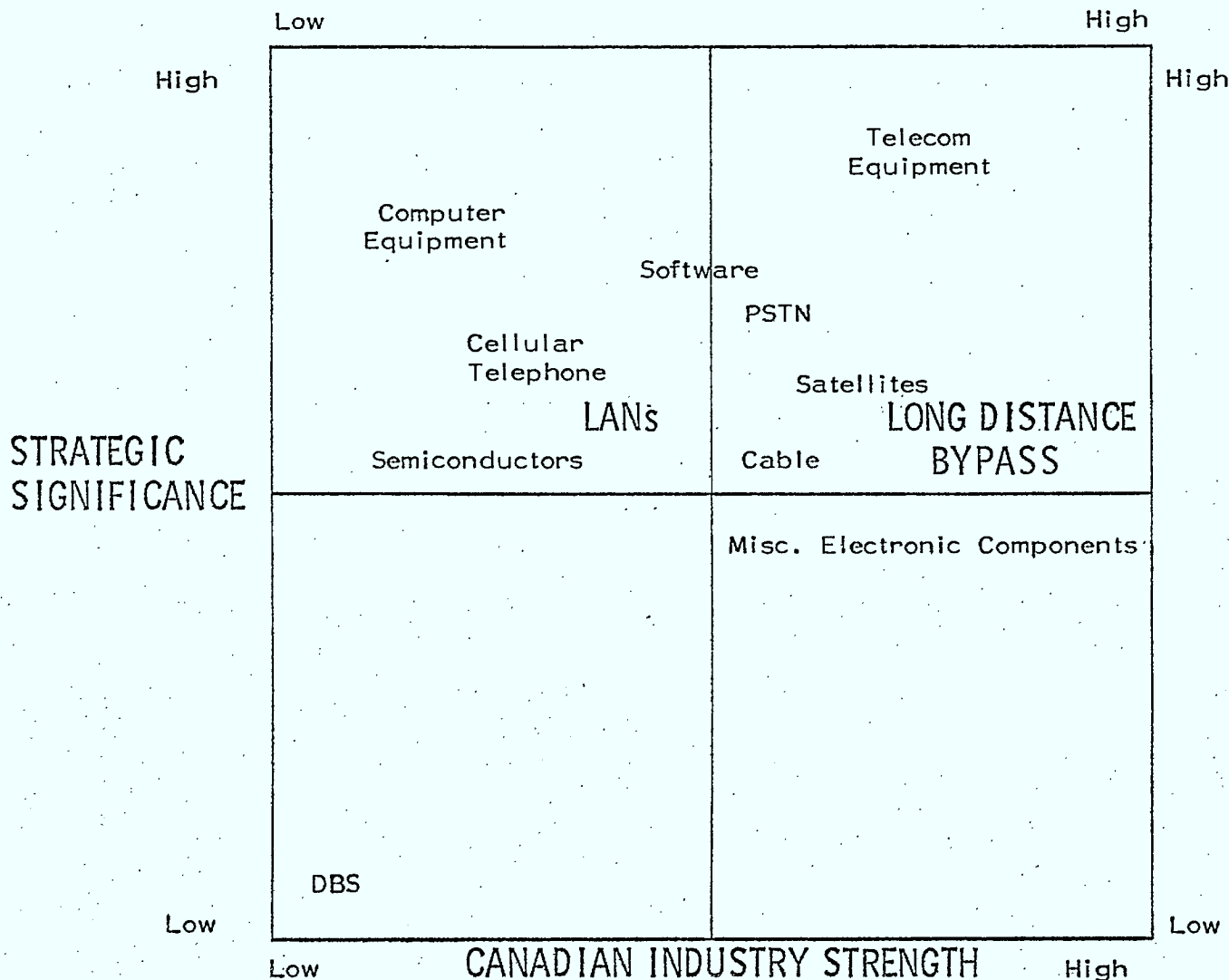
4. Bypass Networks

CNCP HAS THE POTENTIAL TO BE A MAJOR LONG DISTANCE SERVICE PROVIDER. CABLE, PHONE, AND EQUIPMENT COMPANIES COULD BE SIGNIFICANT PLAYERS IN LOCAL AREA NETWORKS

BYPASS NETWORKS

KEY FACTORS FOR SUCCESS	CANADIAN INDUSTRY STRENGTH	
	LOCAL AREA NETWORKS	LONG DISTANCE BYPASS
Telecommunications plant in place, preferably two-way	✓	✓ ✓
Capability to make interface connections with terminals	✓ ✓	✓ ✓ ✓
Funds available for development and expansion expenses	✓ ✓	✓ ✓ ✓
Large customer base	✓ ✓	✓ ✓

BYPASS NETWORKS WILL BE AN IMPORTANT ADDITION TO CANADA'S ALREADY STRONG INFRASTRUCTURE



Overview

Elements of Communications

Infrastructure of Communications

CONTENT OF COMMUNICATIONS

Communications Enhanced Environments

CONTENT OF COMMUNICATIONS

- I. The Canadian broadcasting industry is the focus of communications entertainment in Canada

- II. The cultural sector is a rapidly growing element of the Canadian economy with substantial opportunities for expansion

- III. Information-related activities have grown to play a predominant role in the Canadian economy

1. THE CANADIAN BROADCASTING INDUSTRY IS THE FOCUS OF COMMUNICATIONS ENTERTAINMENT IN CANADA

1. The Canadian broadcasting industry is characterized by a mixture of public and private enterprise

2. While advertising revenue growth for broadcasters has been substantial, TV advertising still lags American standards

3. Broadcasting industry profits tend to be concentrated in large, well managed organizations

4. New delivery technologies will intensify competition from the American - and world - broadcasting industries

1. THE CANADIAN BROADCASTING INDUSTRY IS CHARACTERIZED BY A MIXTURE OF PUBLIC AND PRIVATE ENTERPRISE

Private broadcasting represents 66% of total industry assets

The cost to Canada of the major public network - the CBC - has been relatively flat since 1979

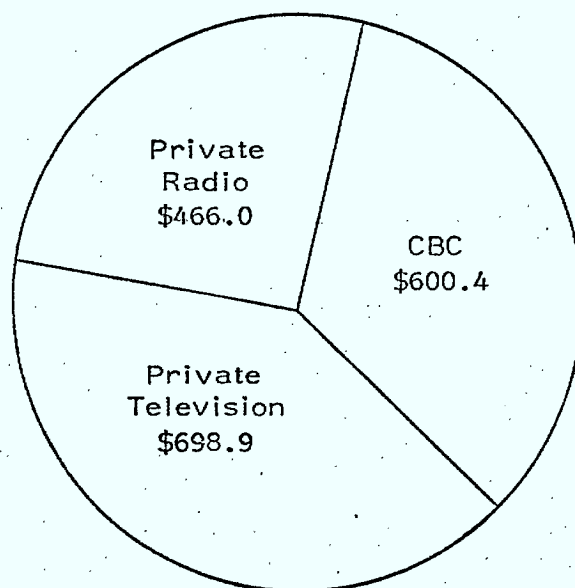
But the CBC has also been losing market share - largely due to increased programming choice through cable

That programming choice now includes several new public network options introduced by provincial governments

PRIVATE BROADCASTING REPRESENTS 66% OF TOTAL INDUSTRY ASSETS

CANADIAN BROADCASTING INDUSTRY

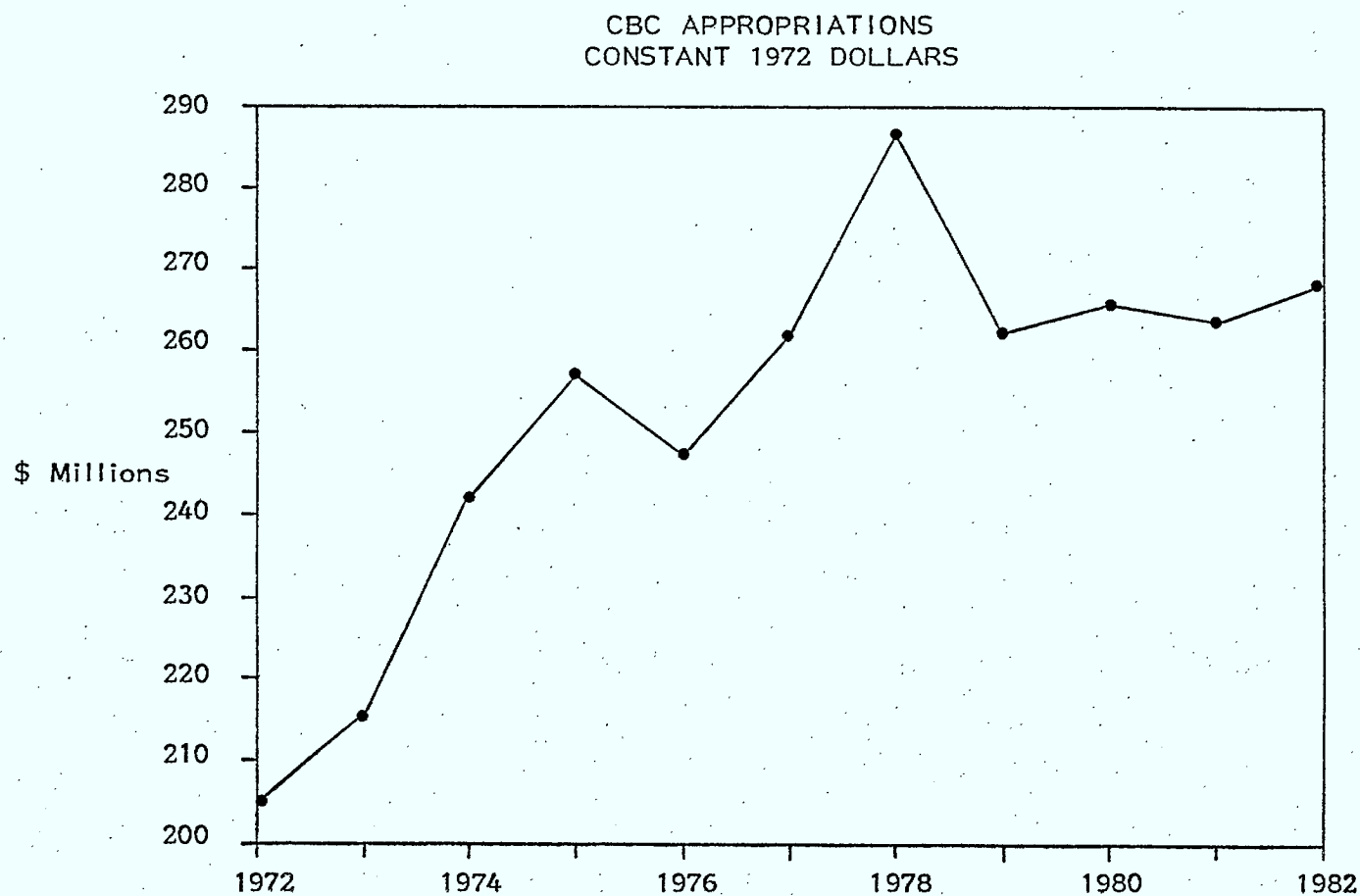
Total Assets, 1982
(\$ Millions)



Television		
Stations		Affiliation
30		CBC owned and operated
32		CBC Affiliates
25		CTV Affiliates
24		Independents
6		TVA
Radio		
Stations		Affiliation
68		CBC owned and operated
9		CBC affiliates
463		Independents

Source: Canada Consulting based on Statistics Canada and CRTC data

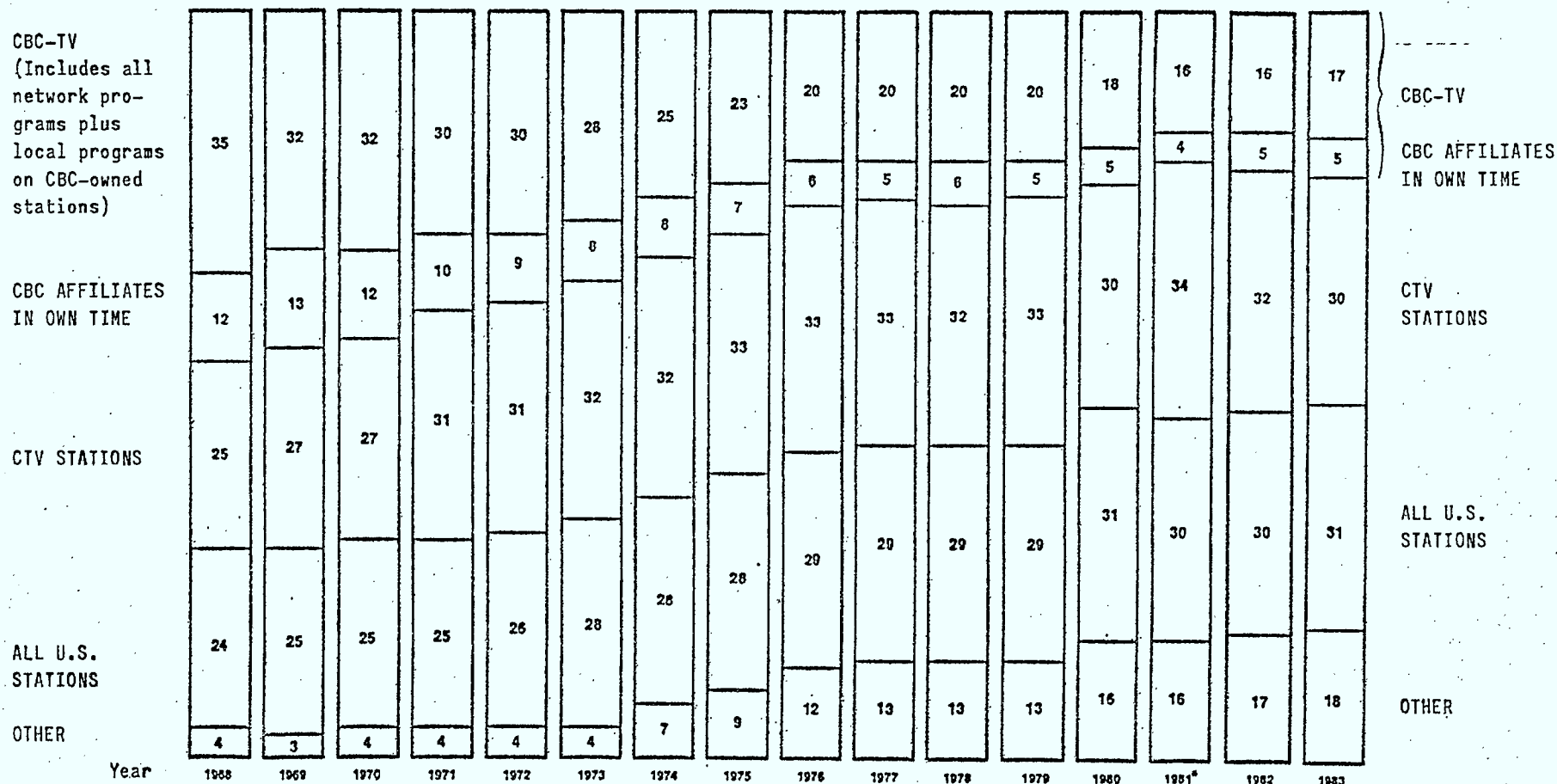
THE COST TO CANADA OF THE MAJOR PUBLIC NETWORK - THE CBC - HAS BEEN
RELATIVELY FLAT SINCE 1979



Source: Canada Consulting based on CBC Annual Reports

BUT THE CBC HAS ALSO BEEN LOSING MARKET SHARE - LARGELY DUE TO INCREASED PROGRAMMING CHOICE THROUGH CABLE

STATION-GROUP SHARES OF THE TOTAL AUDIENCE IN CANADA
FOR ENGLISH-LANGUAGE TELEVISION
AT YEAR-END, 1968-1983



Source: CBC research

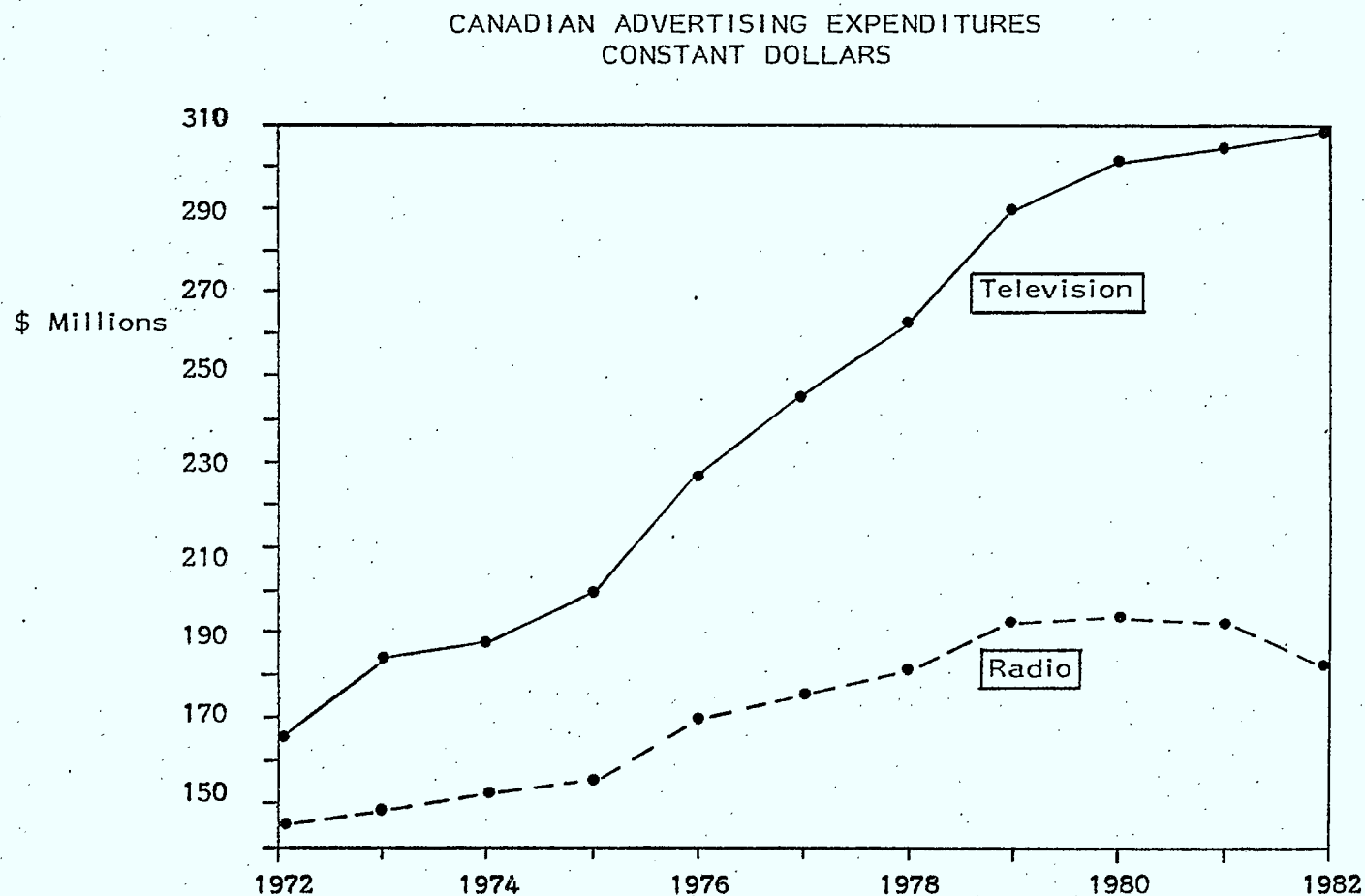
THAT PROGRAMMING CHOICE NOW INCLUDES SEVERAL NEW PUBLIC NETWORK OPTIONS INTRODUCED BY PROVINCIAL GOVERNMENTS

	TVONTARIO	KNOWLEDGE (BC)	ACCESS (ALTA)	SASKMEDIA (Educational Media Services)	RADIO-QUEBEC
HISTORY	Started 1970	Started January 1981	Started 1973	1976 to 1983 (April) - known as Saskmedia; April 1983 - present k.a. "Educational Media Services" (part of Min. of Education)	Created in 1968; began operations in 1972
SERVICES PROVIDED	Broadcasting; Printed support materials/courses; English & French (17%)	Satellite distribution of educational programs (not a broadcaster)	AM/FM radio network Purchase air time from local TV stations; support notes for instructional purposes (free of charge); Heavy instructional emphasis	Production facilities for use by freelance producers; film & video-tape loan service	Owns & operates educational TV stations in Quebec; some printed support materials (e.g., newspaper); Radio support (e.g., open-line radio talk shows after programs); French only
COVERAGE	92% of Ontario population	Not estimated	92% of Alberta covered by video; 85% by radio	N/A	88% of Quebec population covered stations in: Montreal, Quebec, Hull, Val d'Or, Rouyn-Noranda, Chapeau, Rimouski, Trois-Rivieres, Sherbrooke; (May '83 listing)
HOURS	112 hrs./wk.; (16 hrs/day)	98 hrs/wk.; 7 days/wk.	10 hrs/wk/TV (2hrs X 5 days) 139 hrs./wk./radio	N/A	(Approx. 90 hrs/wk.); 13½ hours every weekday
PENETRATION	2.1 mill. viewers/week; 85% elementary schools; 92% French schools; 50% communication college instructors; 23% university students	Not estimated; number of persons enrolled in KNOW-affiliated programs in community colleges & universities has doubled in past 1½ years	5% of population watches ACCESS T.V. (est.); 3% listen to ACCESS radio (est.); 40% of elementary & secondary teachers use ACCESS	N/A	25% of population watches every week

THAT PROGRAMMING CHOICE NOW INCLUDES SEVERAL NEW PUBLIC NETWORK OPTIONS
INTRODUCED BY PROVINCIAL GOVERNMENTS

	TVONTARIO	KNOWLEDGE (BC)	ACCESS (ALTA)	SASKMEDIA (Educational Media Services)	RADIO QUEBEC
FUNDING	75% government: based 58% Min. of C&C on 31% Min. of Ed. 82-3 3% Min. of Colleges data & Universities 8% Other Fed.% 25% program sales, public & corporate support	100% government (Ministry of Education, Universi- ties & Sciences, and Community Services)	90% of government, Ministry of Utilities & Telecommunications; (note Exec. Council (cabinet) grants approval); 10% program sales and corporations	100% Department of Education	99% Department of Communication 1% Private sources
NO. OF EMPLOYEES	411 permanent; 64 contract 475	38	230 fulltime 10 part-time 240	30	850 part-time & permanent
MANAGEMENT	13 member board appointed by Lt. Governor; Board reports to Minister of Citizenship & Culture; an "arms length agency:	8 member board - 1 chairman (Pres. of KNOW - 7 outside appointed by government Chairman of Board/Pres. is only part time; 3 executive Directors operate as President on day-to-day basis	Management reports to Minister of Utilities & Telecommunications; 15 member board of directors appointed by government	Part of the Department of Education	21 member Administrative Council composed of 9 representatives from the Regional TV Councils, the President of R-Q, 1 other officer of R-Q, the rest (named by government) from government, industry
TECHNOLOGY	Telidon	Unwilling to divulge	Microcomputer-oriented learning emphasis (Institutional Technical Unit - 3 people)	N/A	None

2. WHILE ADVERTISING REVENUE GROWTH FOR BROADCASTERS HAS BEEN SUBSTANTIAL, TV ADVERTISING STILL LAGS AMERICAN STANDARDS



Source: Canada Consulting based on Statistics Canada data

2. WHILE ADVERTISING REVENUE GROWTH FOR BROADCASTERS HAS BEEN SUBSTANTIAL,
TV ADVERTISING STILL LAGS AMERICAN STANDARDS

PER CAPITA ADVERTISING EXPENDITURES
CANADA VS UNITED STATES
1982

	Radio National	Radio Local	TV National	TV Local	All Media
Canada	\$5.23	\$13.36	\$23.99	\$7.63	\$180.49
United States	<u>\$5.11</u>	<u>\$14.85</u>	<u>\$45.63</u>	<u>\$16.04</u>	<u>\$290.77</u>
Canada as a % of U.S. .	102.3%	90.0%	52.6%	47.6%	62.1%

3. BROADCASTING INDUSTRY PROFITS TEND TO BE CONCENTRATED IN LARGE, WELL MANAGED ORGANIZATIONS

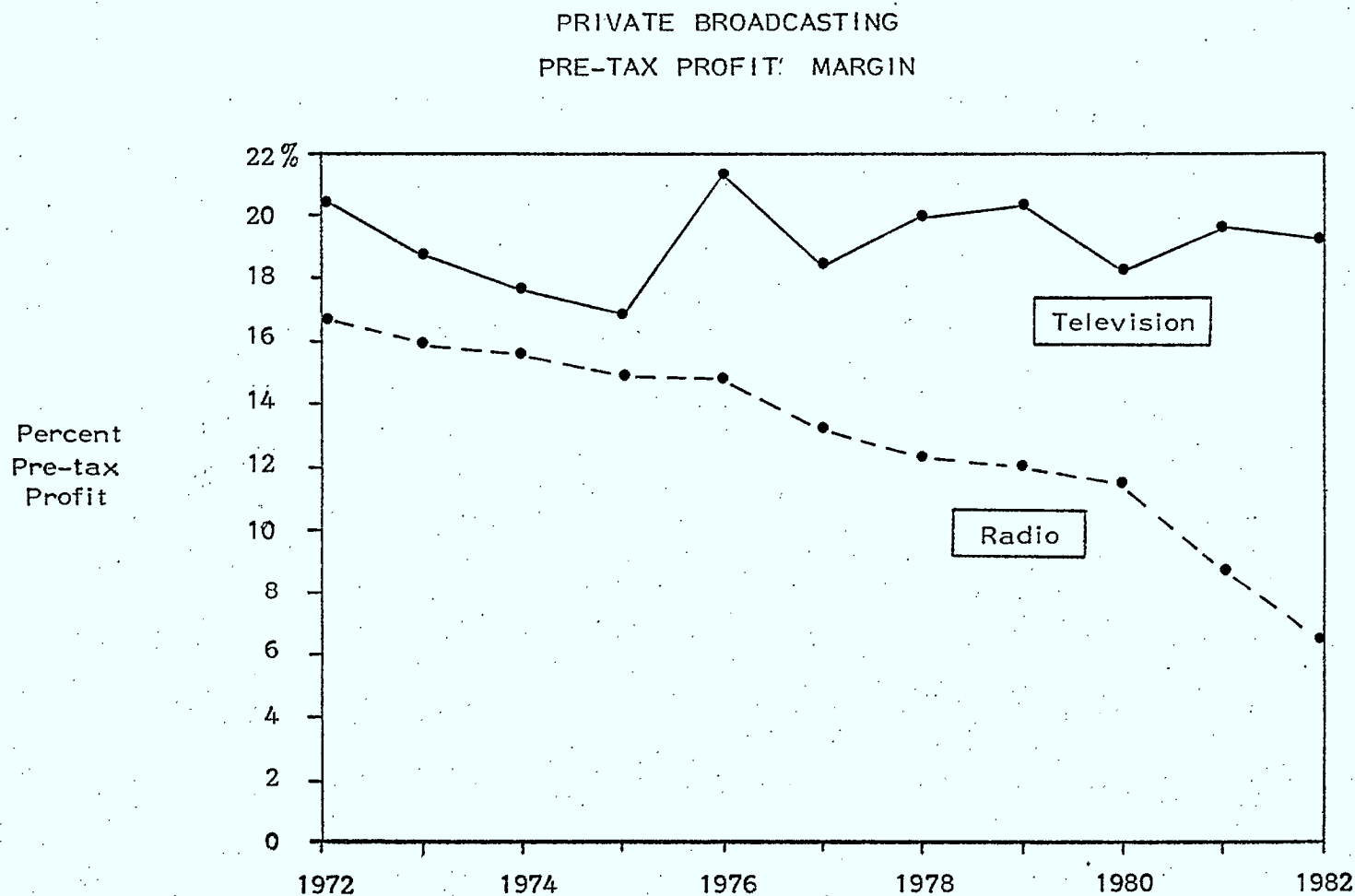
Television profitability is high, and has withstood the economic downturn much better than radio

The profit picture for radio stations located in large markets is radically different from the industry aggregate

The top 40 radio stations make reasonable returns and account for 113% of sector profits

Maclean Hunter's returns reflect the better performance of well managed stations in larger markets

TELEVISION PROFITABILITY IS HIGH, AND HAS WITHSTOOD THE ECONOMIC DOWNTURN MUCH BETTER THAN RADIO



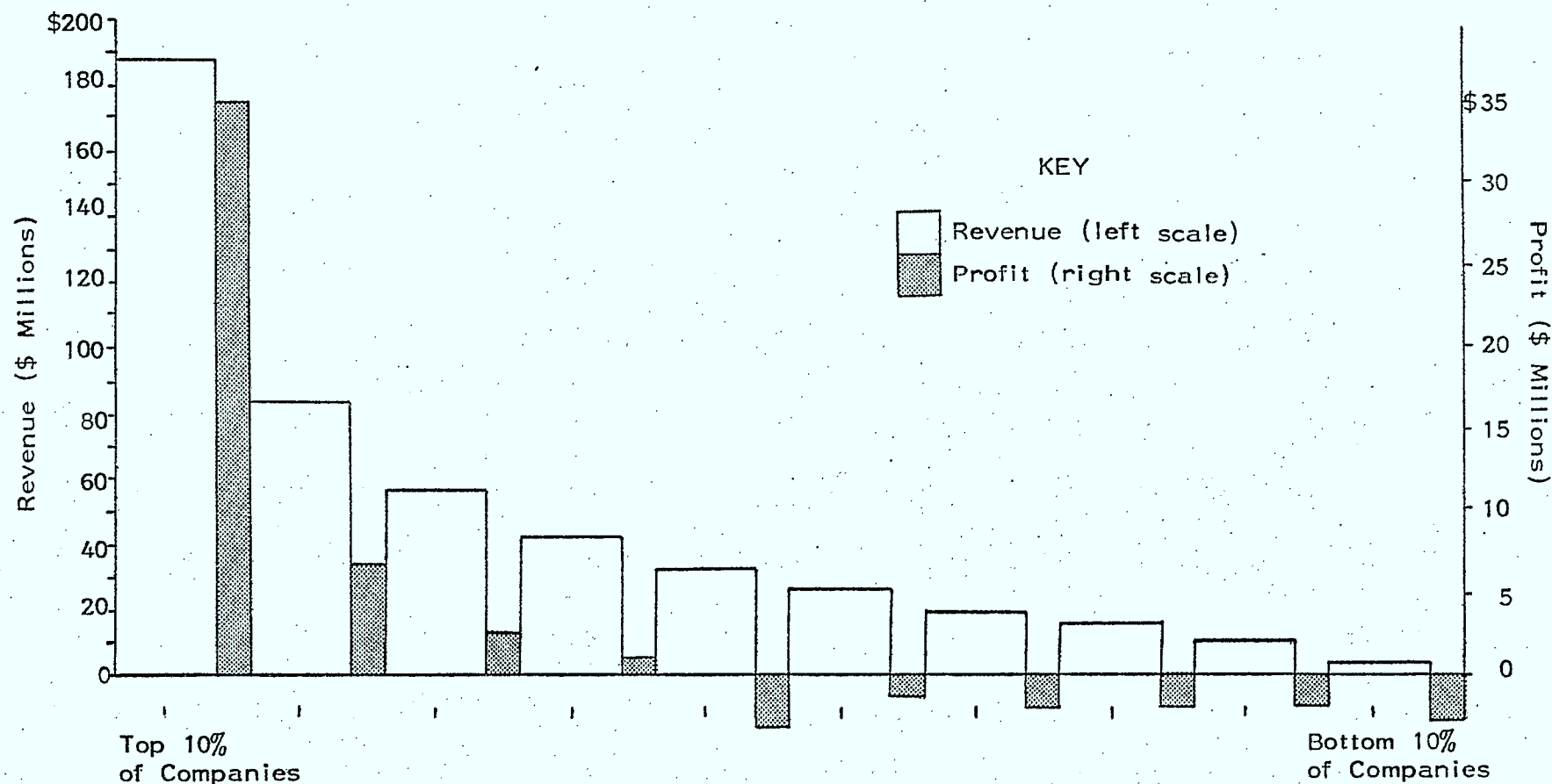
Source: Canada Consulting based on Statistics Canada data

THE PROFIT PICTURE FOR RADIO STATIONS LOCATED IN LARGE MARKETS IS RADICALLY DIFFERENT FROM THE INDUSTRY AGGREGATE

- 1) Top stations by revenue are located in large markets
 - 2) Communications groups tend to own groups of stations located in larger markets
 - 3) Radio station groups benefit from the capital and professionalism of large communication companies
 - 4) Radio stations in small markets are dependent on local advertising that is sensitive to economic downturns
-

THE TOP 40 RADIO STATIONS MAKE REASONABLE RETURNS AND ACCOUNT FOR 113% OF SECTOR PROFITS

NET PROFITS GROUPED BY STATION SIZE
Privately Owned Radio, 1982



Source: Canada Consulting based on Statistics Canada data

MACLEAN HUNTER'S RETURNS REFLECT THE BETTER PERFORMANCE OF WELL MANAGED STATIONS IN LARGER MARKETS

MACLEAN HUNTER BROADCASTING

Activities: Maclean Hunter is a communications group with interest in periodicals, newspapers, cable television, radio and television broadcasting

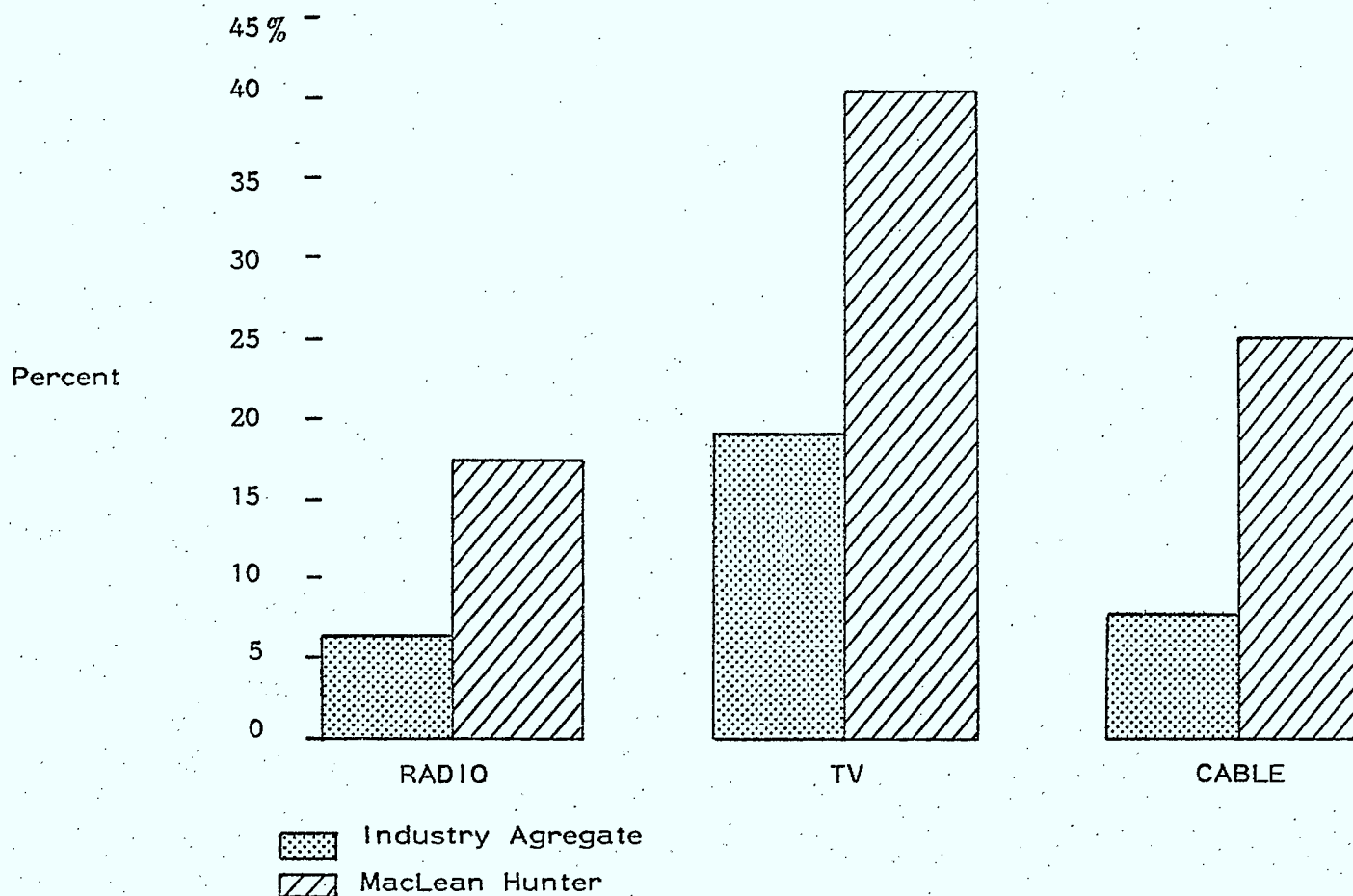
Broadcasting Interests: 11 radio station in Alberta, Nova Scotia and Ontario
1 television station in Calgary
3 cable systems, (594,000 subscribers) in Ontario, New Jersey and Michigan

FINANCIAL DATA (\$000,000's)

		Radio	Television	Cable
Operating Revenue	1983	26.8	24.7	115.1
	1982	26.4	25.0	92.6
Operating Income	1983	4.5	8.2	30.0
	1982	4.6	10.1	23.1
Operating Margin	1983	16.8%	33.2%	26.1%
	1982	17.4%	40.4%	25.0%
Identifiable Assets	1983	19.6	11.4	204.7
	1982	20.4	11.0	180.3
Operating Return on Identifiable Assets	1983	23.0%	71.9%	14.7%
	1982	22.5%	91.8%	12.8%
Average Station Revenue	1983	2.44	24.7	---
Industry Rank		Top 10%	Top 25%	---

MACLEAN HUNTER'S RETURNS REFLECT THE BETTER PERFORMANCE OF WELL MANAGED STATIONS IN LARGER MARKETS

MACLEAN HUNTER VS INDUSTRY AGREGATE
OPERATING RETURN ON REVENUE, 1982



Source: Canada Consulting based on interviews with Wayne Hill, V.P. Finance, Maclean Hunter

4. NEW DELIVERY TECHNOLOGIES WILL INTENSIFY COMPETITION FROM THE AMERICAN - AND WORLD - BROADCASTING INDUSTRIES

Canadian broadcasters must maintain high product quality to survive new broadcast technology

The Canadian broadcasting system is a powerful vehicle in shaping our national identity

Private broadcasters rely heavily on U.S. programming to support cultural content requirements

The challenge to policy-makers is to link the cultural objectives of government with the economic interests of broadcasters

CANADIAN BROADCASTERS MUST MAINTAIN HIGH PRODUCT QUALITY TO SURVIVE NEW BROADCAST TECHNOLOGY

BROADCASTING INDUSTRY

THREATS	OPPORTUNITIES
<p>Large U.S. market capable of supporting higher quality programming</p> <p>Cultural identity in danger of being swamped by U.S. programming</p> <p>Specialty services</p> <p>VCR proliferation</p>	<p>Per Capita advertising revenue is much lower than U.S.</p> <p>AM stereo radio</p> <p>Delivering to huge U.S. and world markets</p>

THE CANADIAN BROADCASTING SYSTEM IS A POWERFUL VEHICLE IN SHAPING OUR NATIONAL IDENTITY

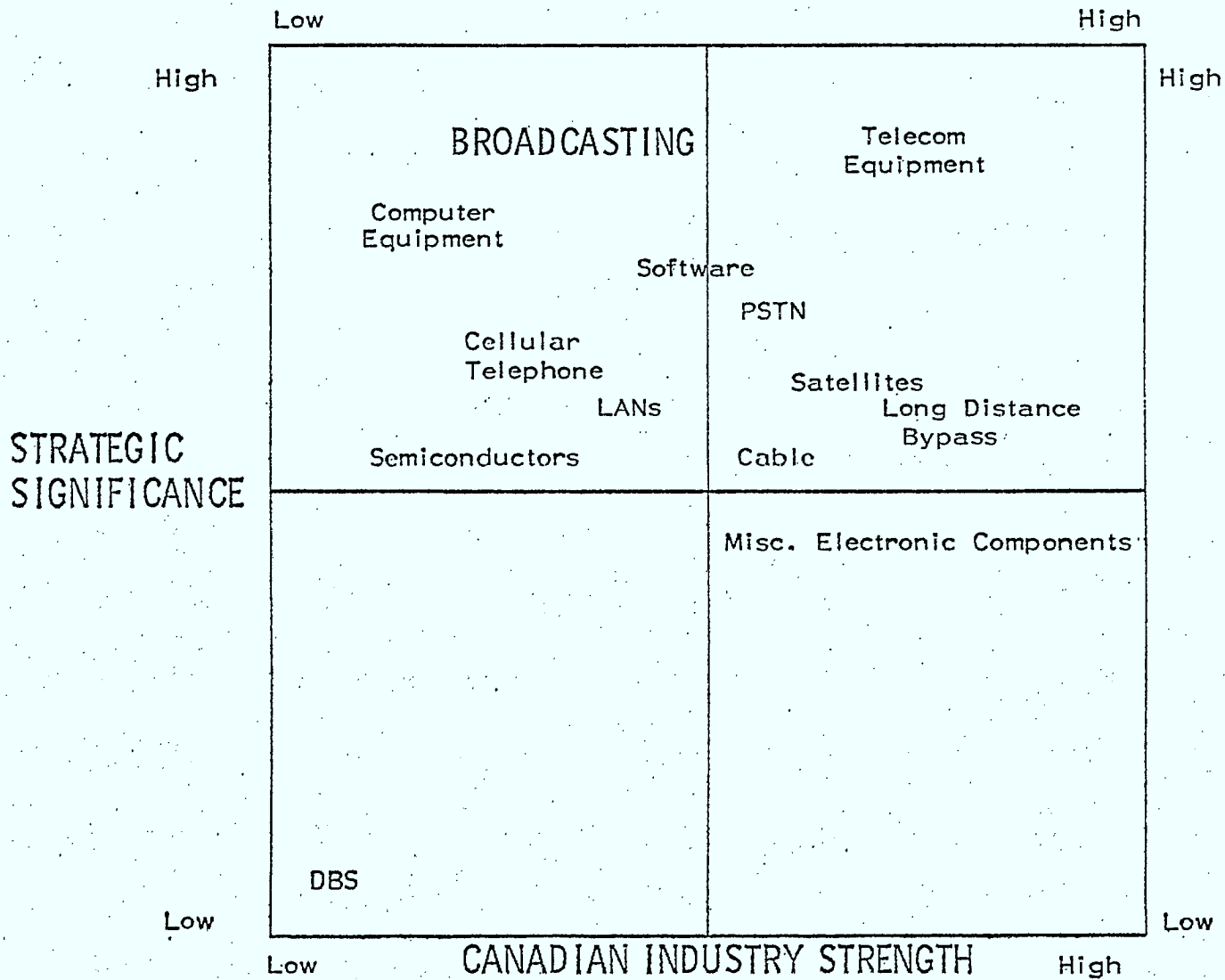
STRATEGIC SIGNIFICANCE OF THE BROADCASTING INDUSTRY	
Jobs	✓
Human capital development	✓ ✓ ✓
Technology diffusion	
Value-added to economy	✓ ✓
Infrastructure	✓ ✓ ✓
Balance of trade	✓
National Identity	✓ ✓ ✓

PRIVATE BROADCASTERS RELY HEAVILY ON U.S. PROGRAMMING TO SUPPORT CULTURAL CONTENT REQUIREMENTS

BROADCASTING INDUSTRY

KEY FACTORS FOR SUCCESS	CANADIAN INDUSTRY STRENGTH
Program quality	✓
Delivery capabilities	✓ ✓ ✓

THE CHALLENGE TO POLICY-MAKERS IS TO LINK THE CULTURAL OBJECTIVES OF GOVERNMENT WITH THE ECONOMIC INTERESTS OF BROADCASTERS



II. THE CULTURAL SECTOR IS A RAPIDLY GROWING ELEMENT OF THE CANADIAN ECONOMY WITH SUBSTANTIAL OPPORTUNITIES FOR EXPANSION

1. The cultural sector is a substantial component of the Canadian economy

2. The non-commercial elements of the cultural sector have experienced rapid growth throughout the 1970's, particularly among smaller organizations with annual revenues less than \$250,000. Continued non-commercial growth is anticipated

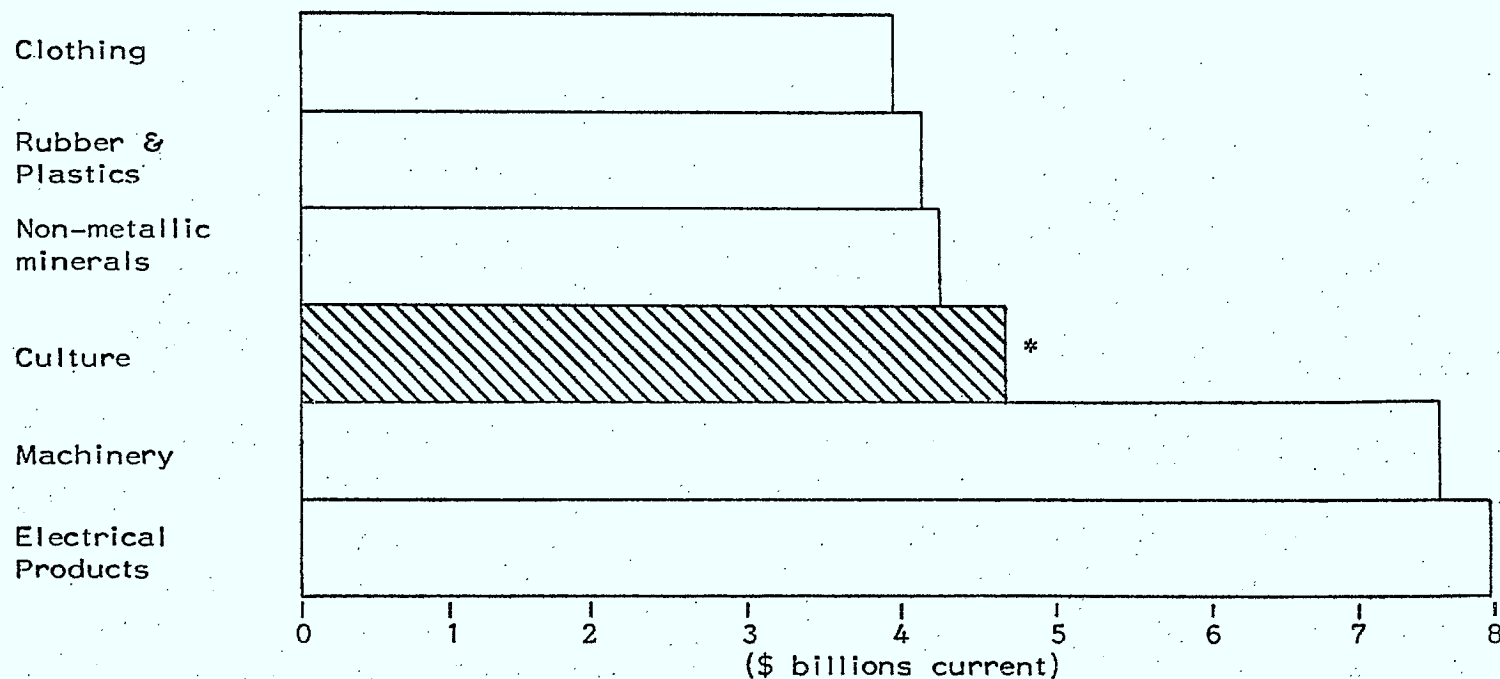
3. Government and corporate support within the non-commercial sector has remained at a relatively constant level since 1973 shifting the source of new revenues to the box office

4. Commercial cultural activity has grown rapidly but is constrained by lack of access to the worldwide distribution required to generate substantial profits

5. Canada's cultural sector must improve its commercial competitiveness in order to gain access to new markets and new distribution technologies

1. THE CULTURAL SECTOR IS A SUBSTANTIAL COMPONENT OF THE CANADIAN ECONOMY

CANADIAN MANUFACTURING INDUSTRIES
1980 Revenues
Relative Position of Culture



*Culture includes: motion pictures, performing arts, publishing, recording, and visual arts.

Source: Canada Consulting based on Canada Council and Statistics Canada data

2. THE NON-COMMERCIAL CULTURAL SECTOR EXPERIENCED RAPID GROWTH THROUGHOUT THE 1970'S, PARTICULARLY AMONG SMALLER ORGANIZATIONS WITH ANNUAL REVENUES LESS THAN \$250,000. CONTINUED NON-COMMERCIAL GROWTH IS ANTICIPATED
-

Performing arts groups increased in number by a factor of 4.5 between 1971 and 1980

The numbers of non-commercial annual performances quadrupled between 1971 and 1980

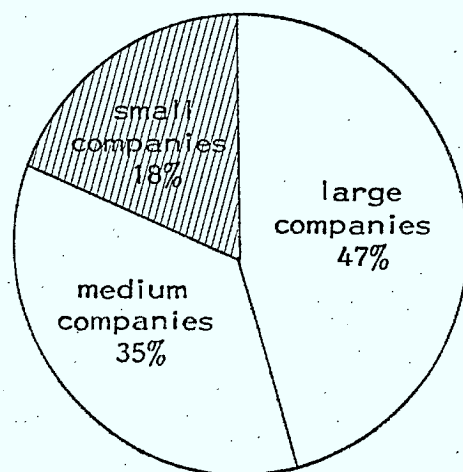
Audience attendance more than doubled between 1971 and 1980

Attendance rates for cultural events are growing at a relatively rapid rate

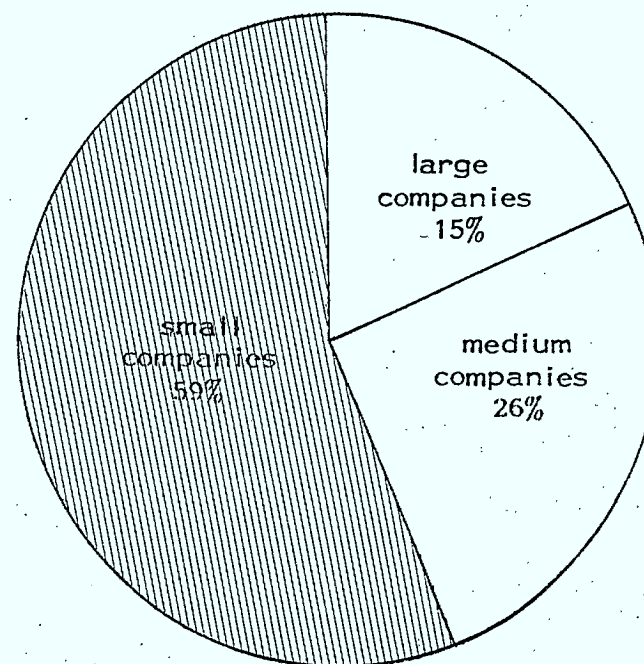
The cultural sector target audience, adults with some level of post-secondary education, is expected to reach 35% of the adult population by 2000

PERFORMING ARTS GROUPS INCREASED IN NUMBER BY A FACTOR OF 4.5 BETWEEN 1971 AND 1980

GROWTH IN NUMBER OF PERFORMING ARTS COMPANIES BETWEEN 1971 AND 1980



1971
(Total = 40 companies)



1980
(Total = 187 companies)

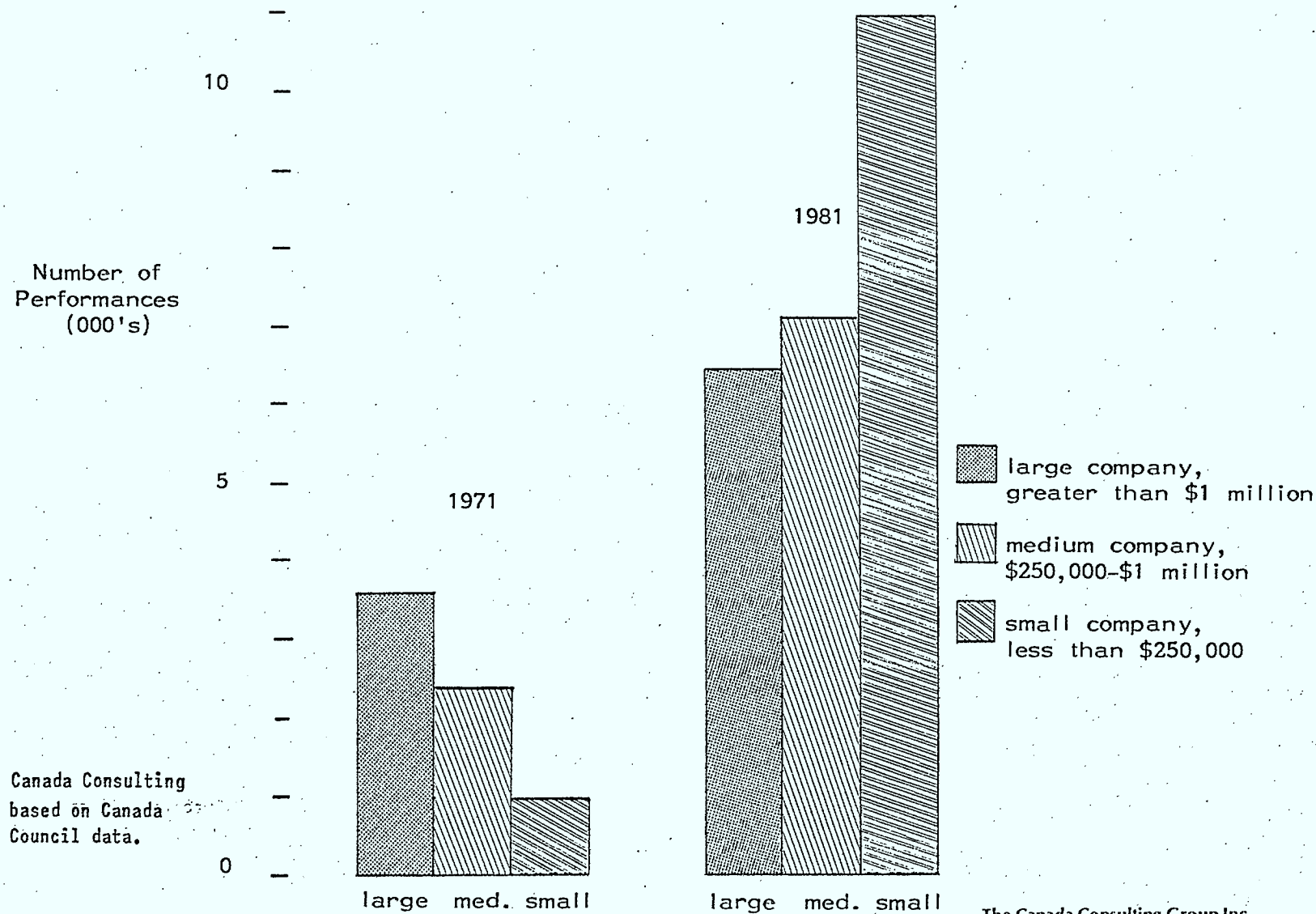
large company,
greater than
\$1 million

medium company,
\$250,000-
\$1 million

small company,
less than \$250,000

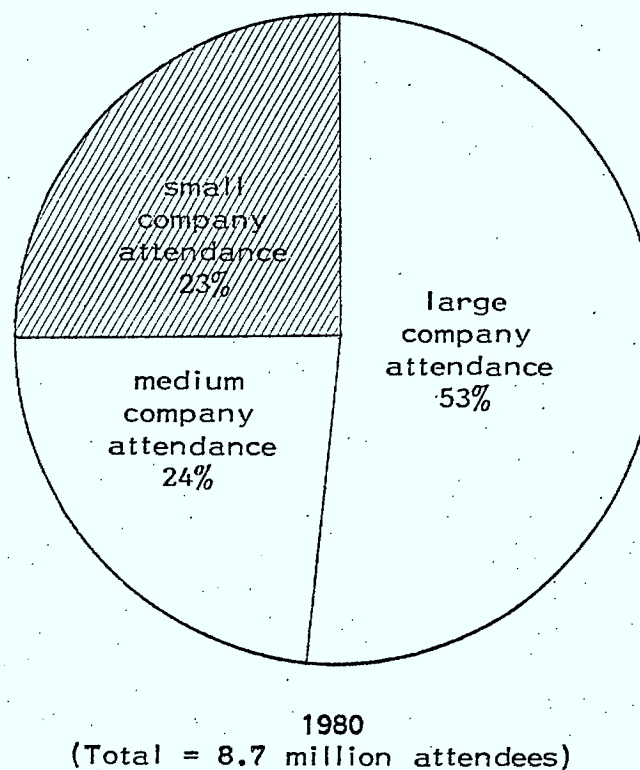
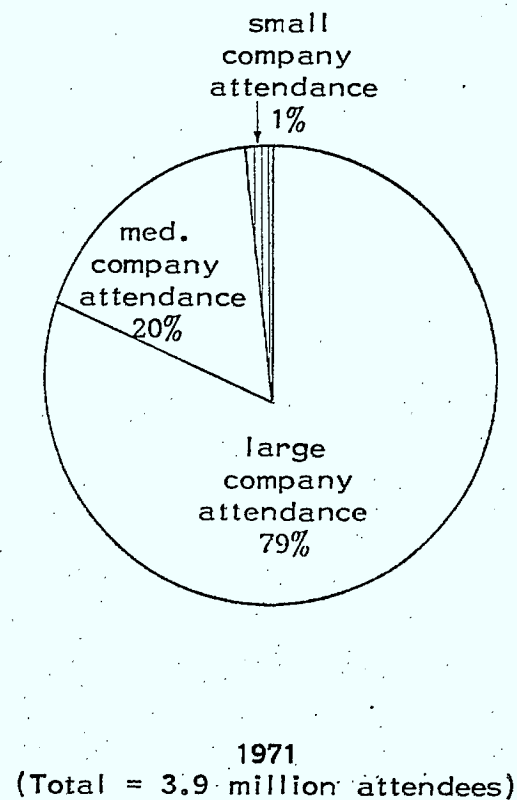
THE NUMBERS OF NON-COMMERCIAL ANNUAL PERFORMANCES QUADRUPLLED BETWEEN 1971 AND 1980

NUMBER OF ANNUAL PERFORMANCES PER SIZE OF PERFORMING ARTS ORGANIZATION



AUDIENCE ATTENDANCE MORE THAN DOUBLED BETWEEN 1971 AND 1980

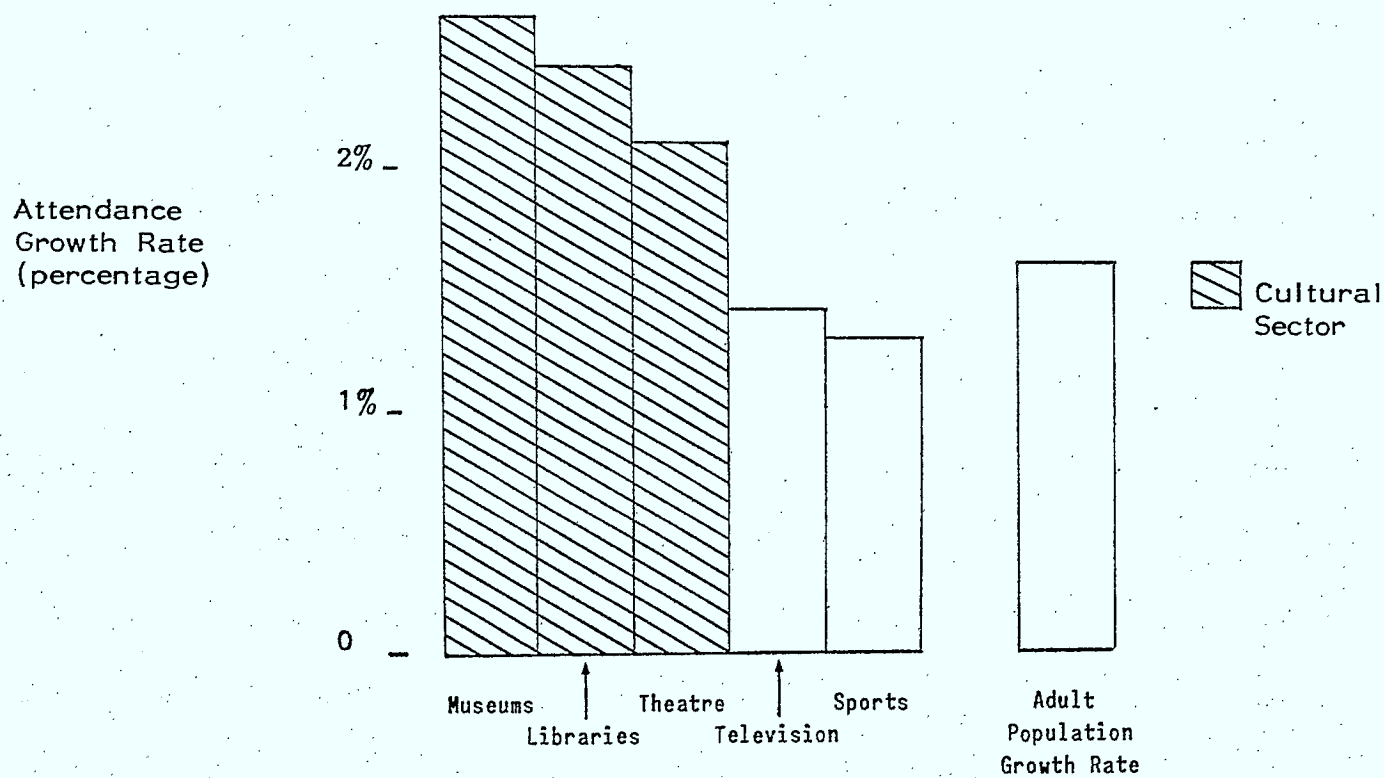
AUDIENCE ATTENDANCE GROWTH BETWEEN 1971 AND 1980



Source: Canada Consulting based on Canada Council data.

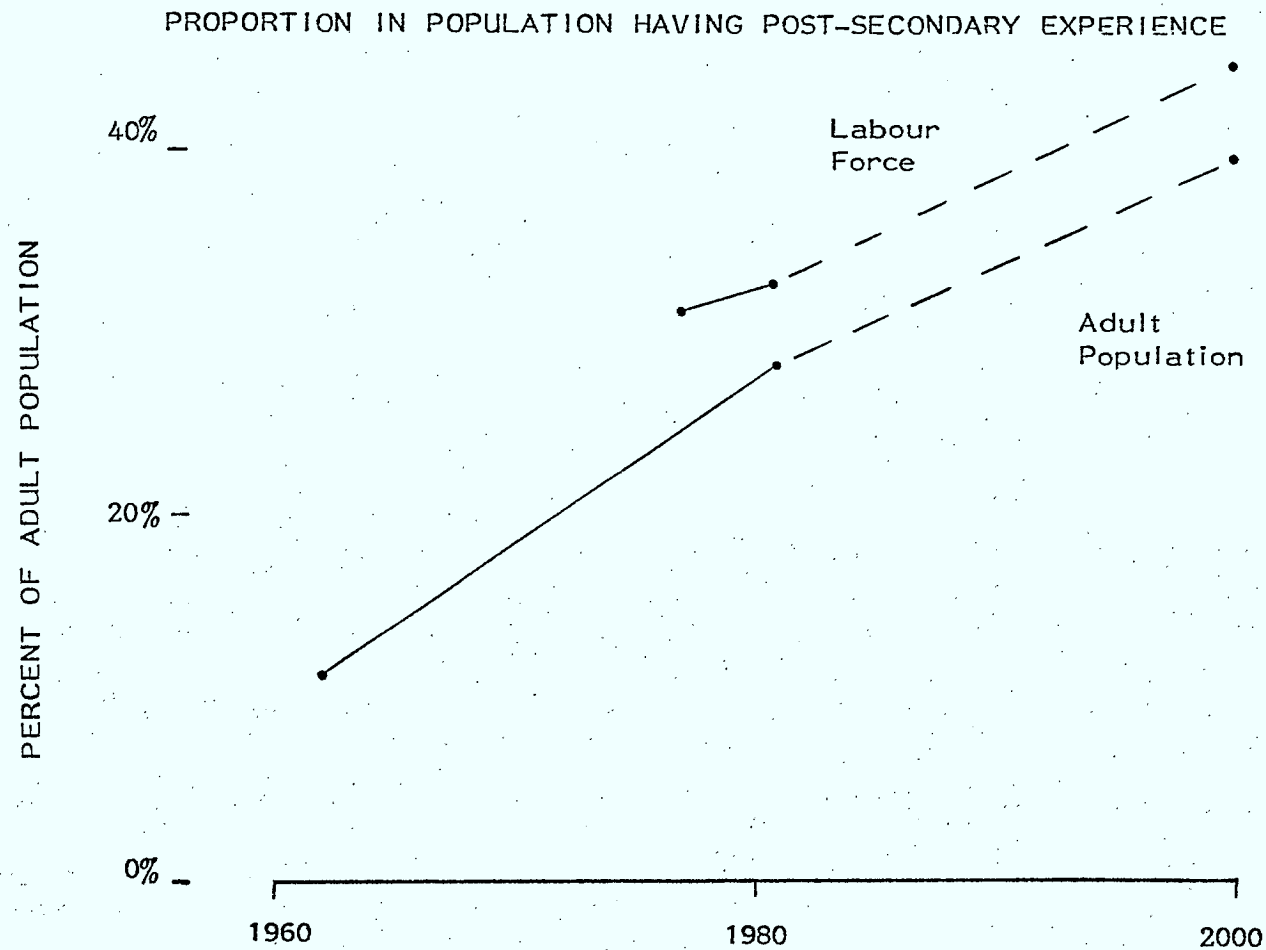
ATTENDANCE RATES FOR CULTURAL EVENTS ARE GROWING AT A RELATIVELY RAPID RATE

ATTENDANCE GROWTH RATES BETWEEN 1977-1985



Source: Canada Consulting based on Canada Council data.

THE CULTURAL SECTOR TARGET AUDIENCE, ADULTS WITH SOME LEVEL OF POST-SECONDARY EDUCATION, IS EXPECTED TO REACH 35% OF THE ADULT POPULATION BY 2000



Source: Canada Consulting based on Canada Council data.

3. GOVERNMENT AND CORPORATE SUPPORT WITHIN THE NON-COMMERCIAL SECTOR
HAS REMAINED AT A RELATIVELY CONSTANT LEVEL SINCE 1973 SHIFTING THE
SOURCE OF NEW REVENUES TO THE BOX OFFICE

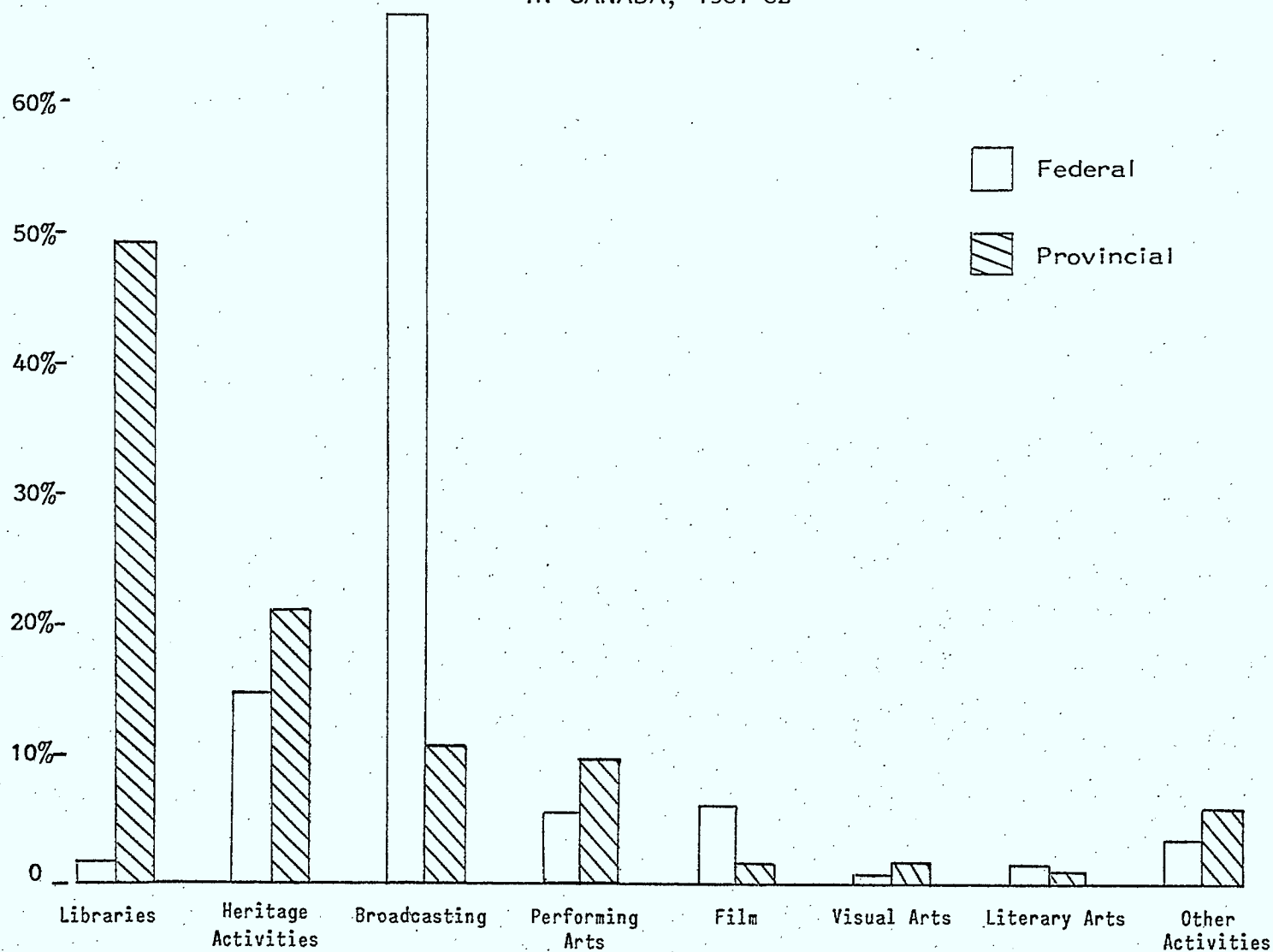
Federal government cultural support is focussed on broadcasting through the CBC; and close to one-half of provincial expenditures designated for culture are directed to the support of libraries

Federal expenditures have changed little in real terms between 1977 and 1981

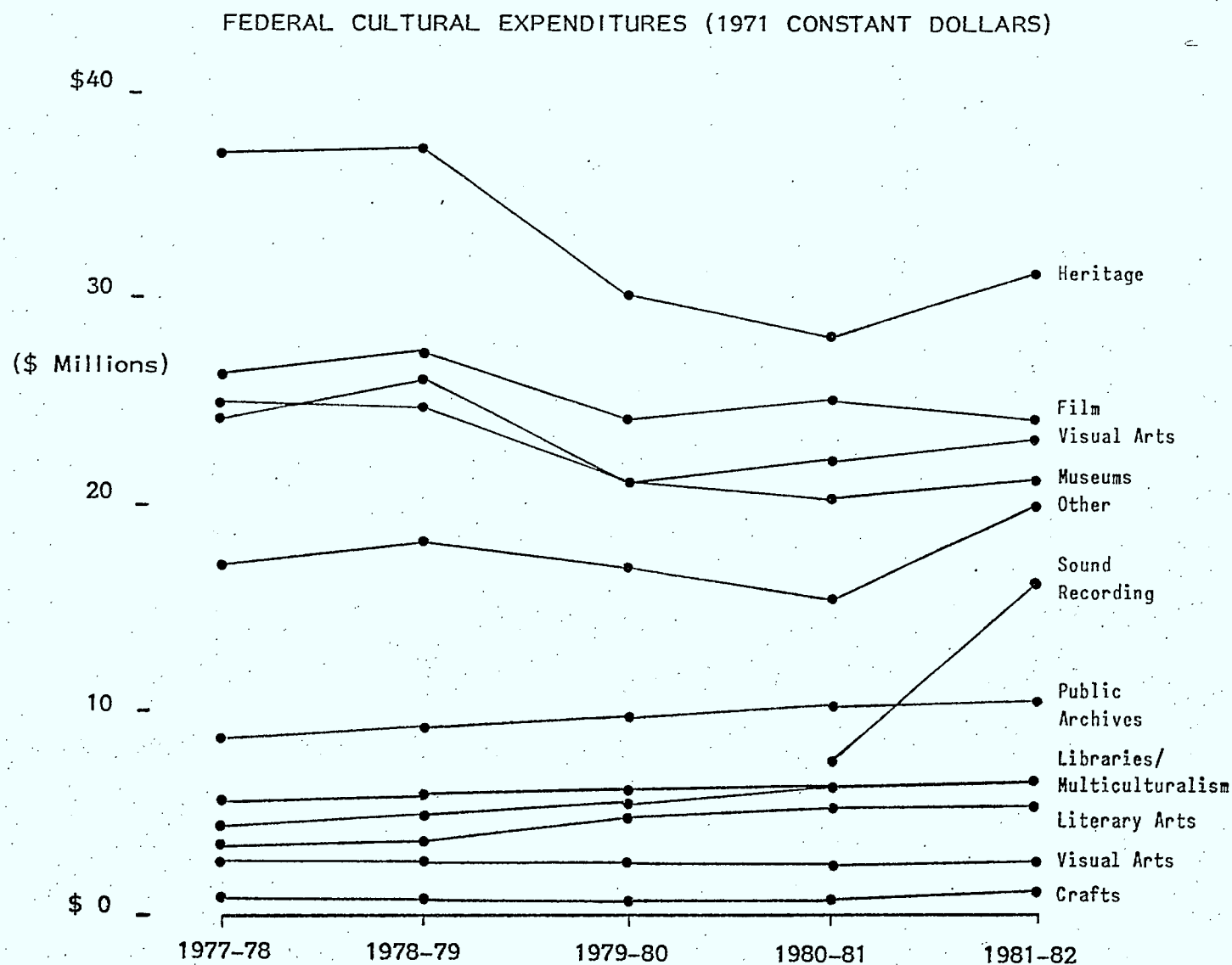
Corporate support has remained relatively constant between 1975 and 1981

FEDERAL GOVERNMENT CULTURAL SUPPORT IS FOCUSED ON BROADCASTING THROUGH THE CBC; AND CLOSE TO ONE-HALF OF PROVINCIAL EXPENDITURES DESIGNATED FOR CULTURE ARE DIRECTED TO THE SUPPORT OF LIBRARIES

DISTRIBUTION OF FEDERAL AND PROVINCIAL GOVERNMENT EXPENDITURES ON CULTURE IN CANADA, 1981-82



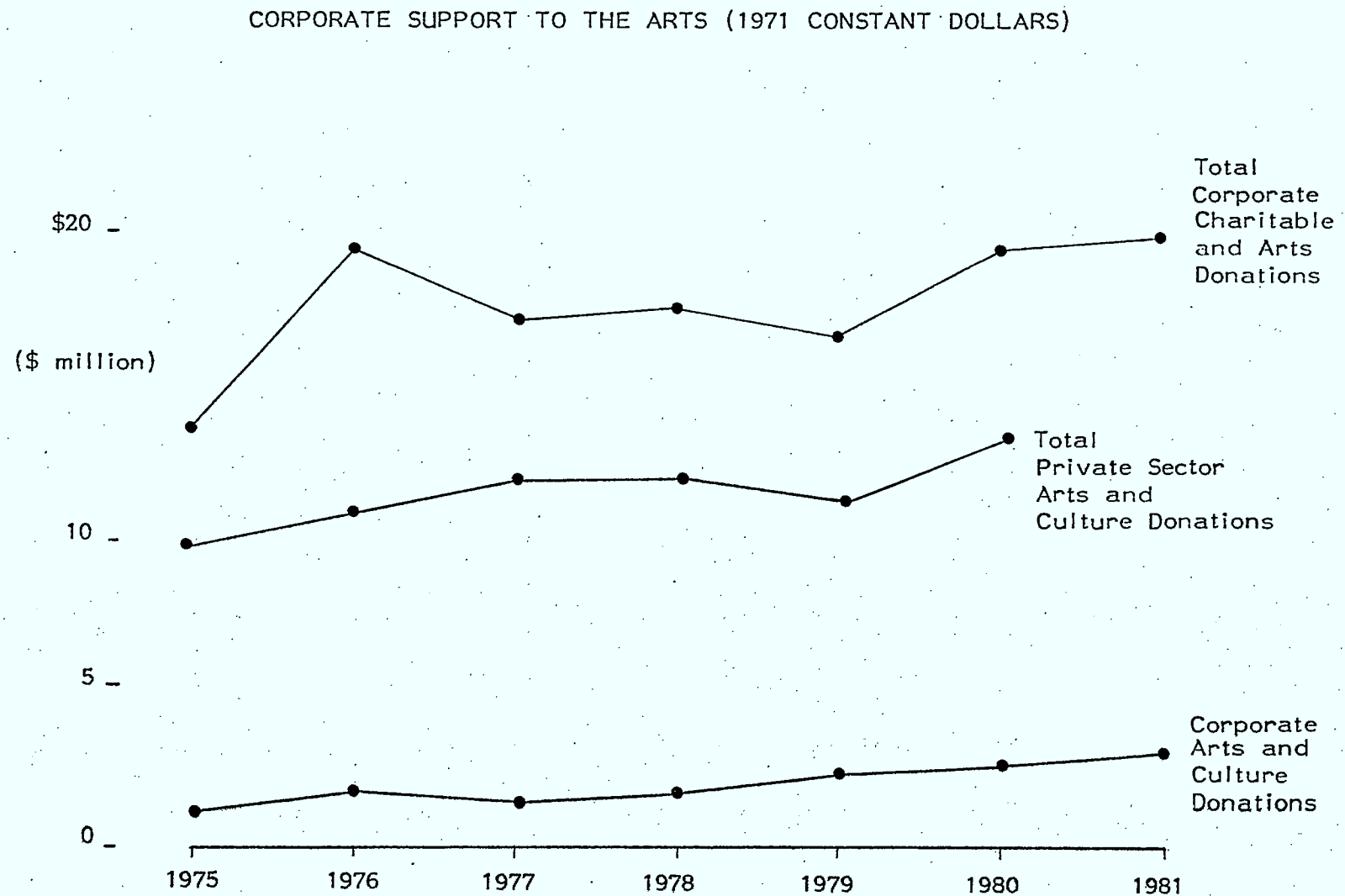
FEDERAL EXPENDITURES HAVE CHANGED LITTLE IN REAL TERMS BETWEEN 1977 AND 1981



Source: Canada Consulting based on Statistics Canada data.

The Canada Consulting Group Inc.

CORPORATE SUPPORT HAS REMAINED RELATIVELY CONSTANT BETWEEN 1975 AND 1981



Source: Canada Consulting based on Canada Council data.

4. COMMERCIAL CULTURAL ACTIVITY HAS GROWN RAPIDLY BUT IS CONSTRAINED BY LACK OF ACCESS TO THE WORLDWIDE DISTRIBUTION REQUIRED TO GENERATE SUBSTANTIAL PROFITS
-

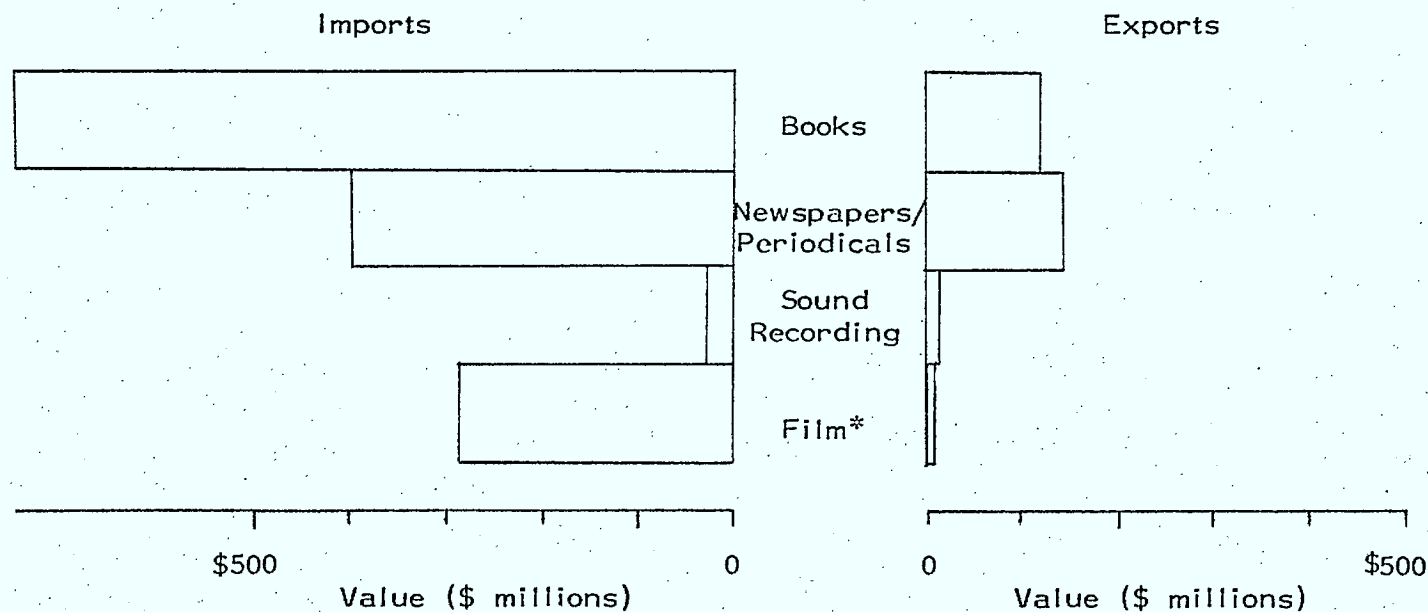
Balance of payments deficits exist in each of the book publishing, newspaper and periodical publishing, sound and video recording and film sectors

Canadian cultural product distribution is dominated by a few large multinationals

Commercial success requires access to markets through distribution as evidenced by the success of Maclean Hunter

BALANCE OF PAYMENTS DEFICITS EXIST IN EACH OF THE BOOK PUBLISHING, NEWSPAPER AND PERIODICAL PUBLISHING, SOUND AND VIDEO RECORDING AND FILM SECTORS

RELATIVE BALANCE OF PAYMENTS, 1983

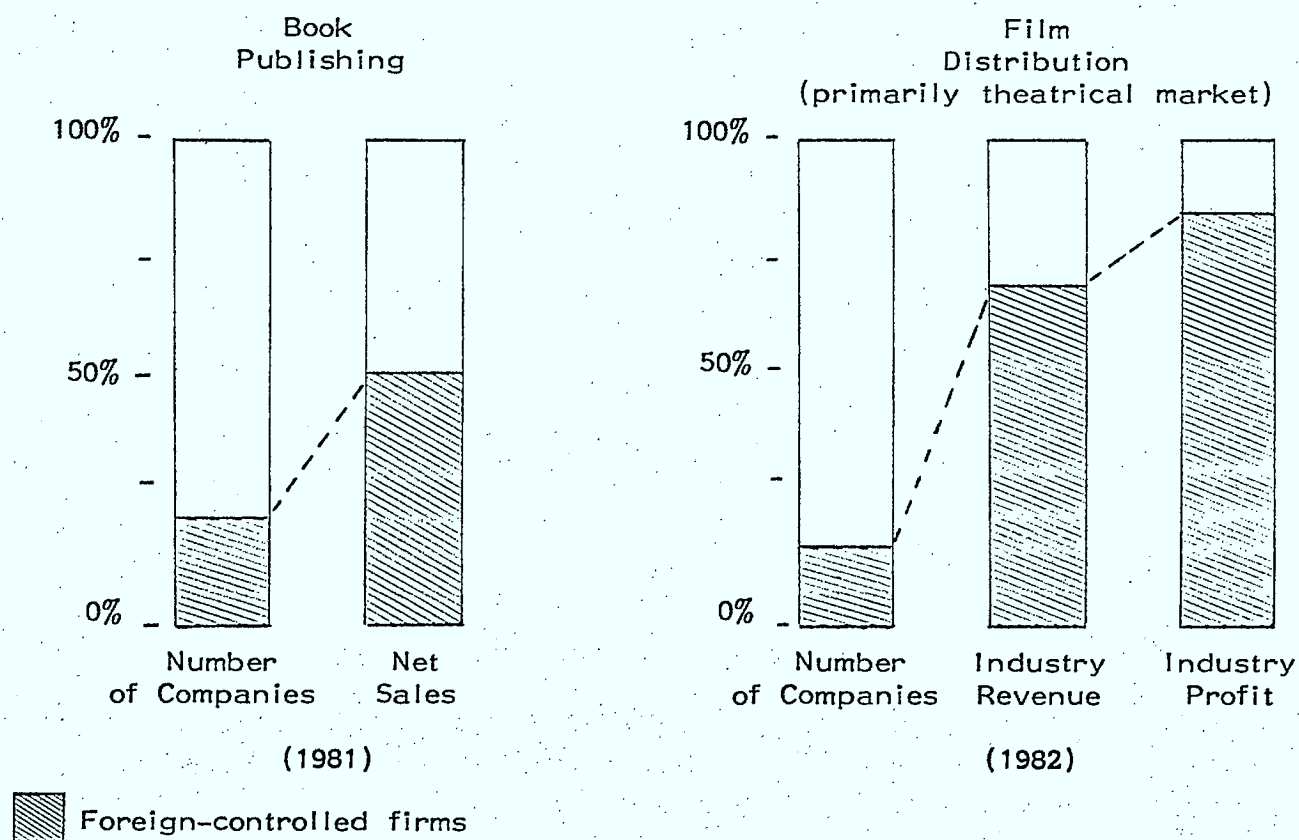


* Value is based on theatrical film distribution revenues in Canada, 1982, for foreign imports versus Canadian product

Source: Canada Consulting based on Statistics Canada data.

CANADIAN CULTURAL PRODUCT DISTRIBUTION IS DOMINATED BY A FEW LARGE MULTINATIONALS

COMMERCIAL CULTURAL INDUSTRIES ARE DOMINATED BY LARGE MULTINATIONALS



Source: Canada Consulting based on Statistics Canada data.

COMMERCIAL SUCCESS REQUIRES ACCESS TO MARKETS THROUGH DISTRIBUTION AS EVIDENCED BY THE SUCCESS OF MACLEAN HUNTER

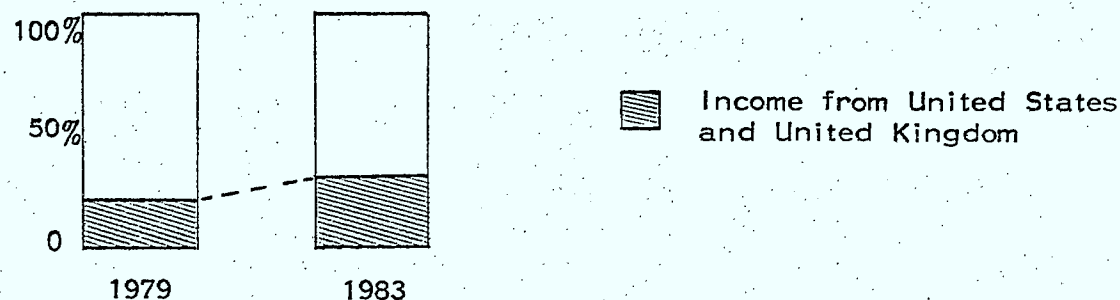
CASE STUDY - MACLEAN HUNTER PUBLISHING

"Maclean Hunter provides information and communications services to consumers and business people throughout North America and parts of Europe"

Maclean Hunter 1983 Annual Report

Strategy	Growth through market development and related diversification
Market Expansion	<p>Purchase of Toronto Sun for \$54 million provided access to the Toronto, Edmonton and Calgary newspaper markets</p> <p>Purchase of The Houston Post in Texas for \$100 million provided increased access to U.S. market</p>
Operations	<p>Periodical publishing and printing</p> <p>Newspaper publishing and printing</p> <p>Cable television</p> <p>Business forms</p> <p>Broadcasting</p>

Percentage of Total Operating Income



5. CANADA'S CULTURAL SECTOR MUST IMPROVE ITS COMMERCIAL COMPETITIVENESS
IN ORDER TO GAIN ACCESS TO NEW MARKETS AND NEW DISTRIBUTION
TECHNOLOGIES

Underfunding of the arts component of the cultural sector is analogous to inadequate
R&D funding

The cultural sector is strategically significant in terms of developing a national identity

Canada's cultural product is widely recognized for its excellence but distribution is
required for commercial success

Both commercial and non-commercial elements of the cultural sector are strategically
significant

UNDERFUNDING OF THE ARTS COMPONENT OF THE CULTURAL SECTOR IS ANALOGOUS TO INADEQUATE R&D FUNDING

CULTURAL INDUSTRIES

THREATS	OPPORTUNITIES
Underfunding will constrain sector growth, restrict creative development, undermining efforts to define a Canadian identity	Recognized excellence of Canadian cultural activity appeals to a growing domestic and foreign market
Lack of access to worldwide distribution channels will restrict development of self-sustaining commercial enterprises	New distribution technologies offer increased exposure for Canadian talent
New distribution channels are being absorbed into existing systems dominated by foreign-controlled firms	New distribution technologies allow commercial access to growing world market

THE CULTURAL SECTOR IS STRATEGICALLY SIGNIFICANT IN TERMS OF DEVELOPING A NATIONAL IDENTITY

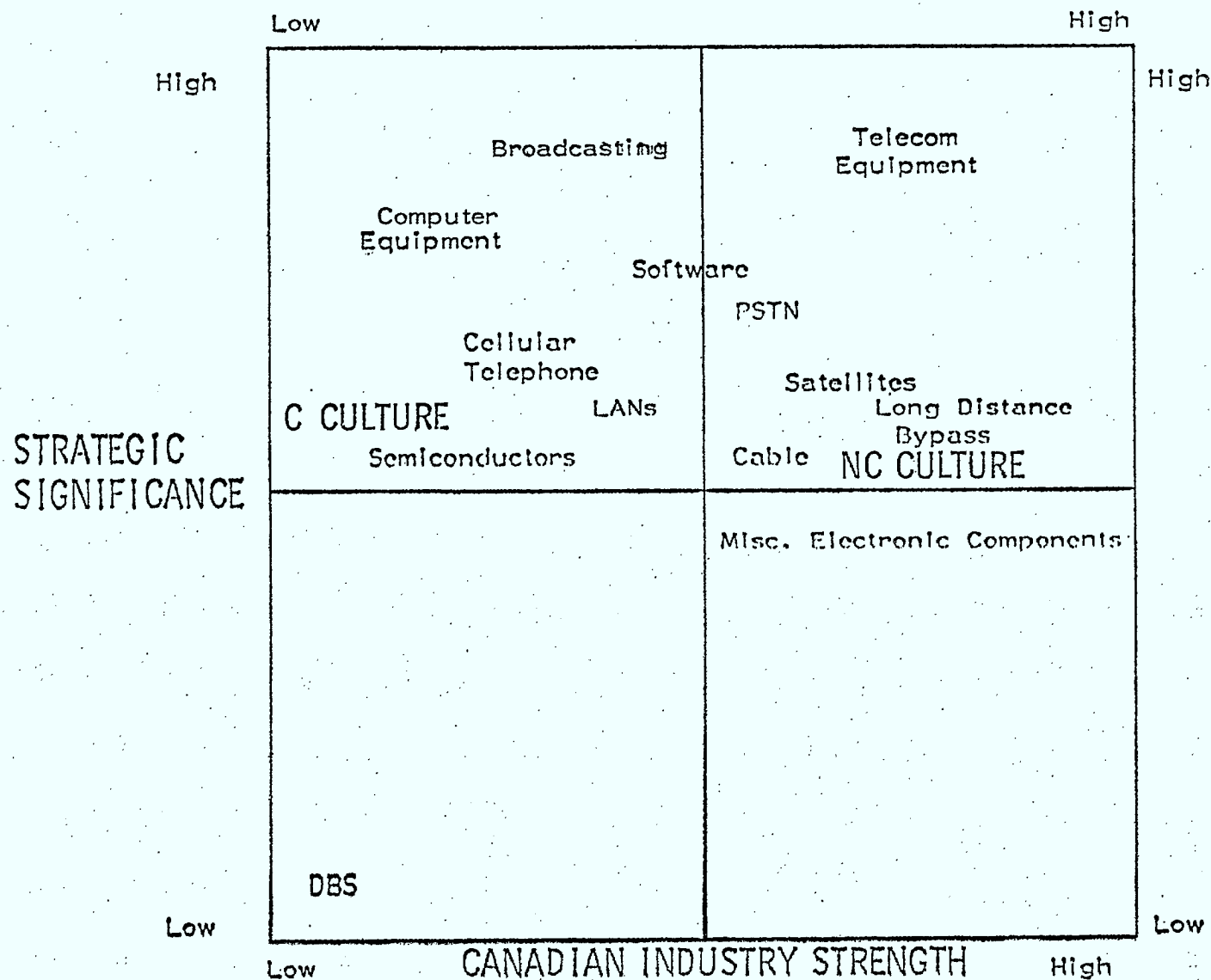
STRATEGIC SIGNIFICANCE OF THE CULTURAL INDUSTRIES	
Jobs	✓ ✓
Human capital development	✓ ✓
Technology diffusion	
Value-added to economy	✓
Infrastructure	
Balance of trade	✓
National Identity	✓ ✓ ✓

CANADA'S CULTURAL PRODUCT IS WIDELY RECOGNIZED FOR ITS EXCELLENCE BUT DISTRIBUTION IS REQUIRED FOR COMMERCIAL SUCCESS

CULTURAL INDUSTRIES

KEY FACTORS FOR SUCCESS	CANADIAN INDUSTRY STRENGTH
<p>Adequate funding for research and development, i.e., non-profit creative activity</p> <p>Access to worldwide distribution channels</p>	<p>✓</p>

BOTH COMMERCIAL AND NON-COMMERCIAL ELEMENTS OF THE CULTURAL SECTOR ARE STRATEGICALLY SIGNIFICANT



III. INFORMATION-RELATED ACTIVITIES HAVE GROWN TO PLAY A PREDOMINANT ROLE IN THE CANADIAN ECONOMY

1. Information-related activities account for close to half of Canada's Gross Domestic Product

2. Business demand for information services has grown rapidly over the past decade

3. Many information services are becoming critical to productivity growth in other industries

1. INFORMATION-RELATED ACTIVITIES ACCOUNT FOR CLOSE TO HALF OF CANADA'S GROSS DOMESTIC PRODUCT

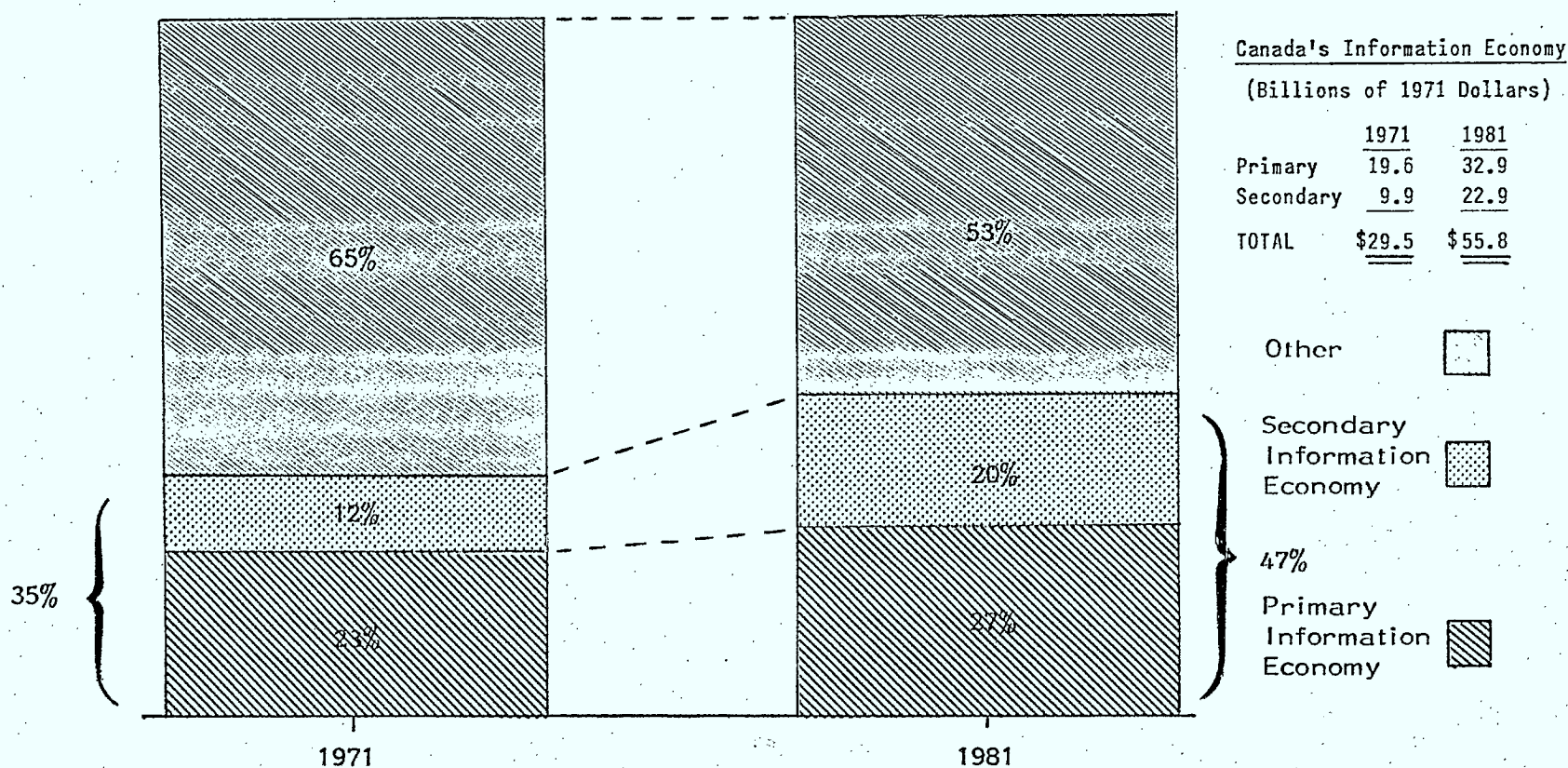
Information-related activities grew from 35% of Canada's Gross Domestic Product in 1971 to 47% by 1981

"Primary" information activities occur in those industries producing information goods or services which are freely exchanged in a market context

"Secondary" information activities relate to information services produced and consumed internally by government and non-information firms - such as the market research activities of an auto manufacturer

INFORMATION-RELATED ACTIVITIES GREW FROM 35% OF CANADA'S GROSS DOMESTIC PRODUCT IN 1971 AND TO 47% BY 1981

PERCENT OF CANADA'S GROSS DOMESTIC PRODUCT
(Based on 1971 Dollars)

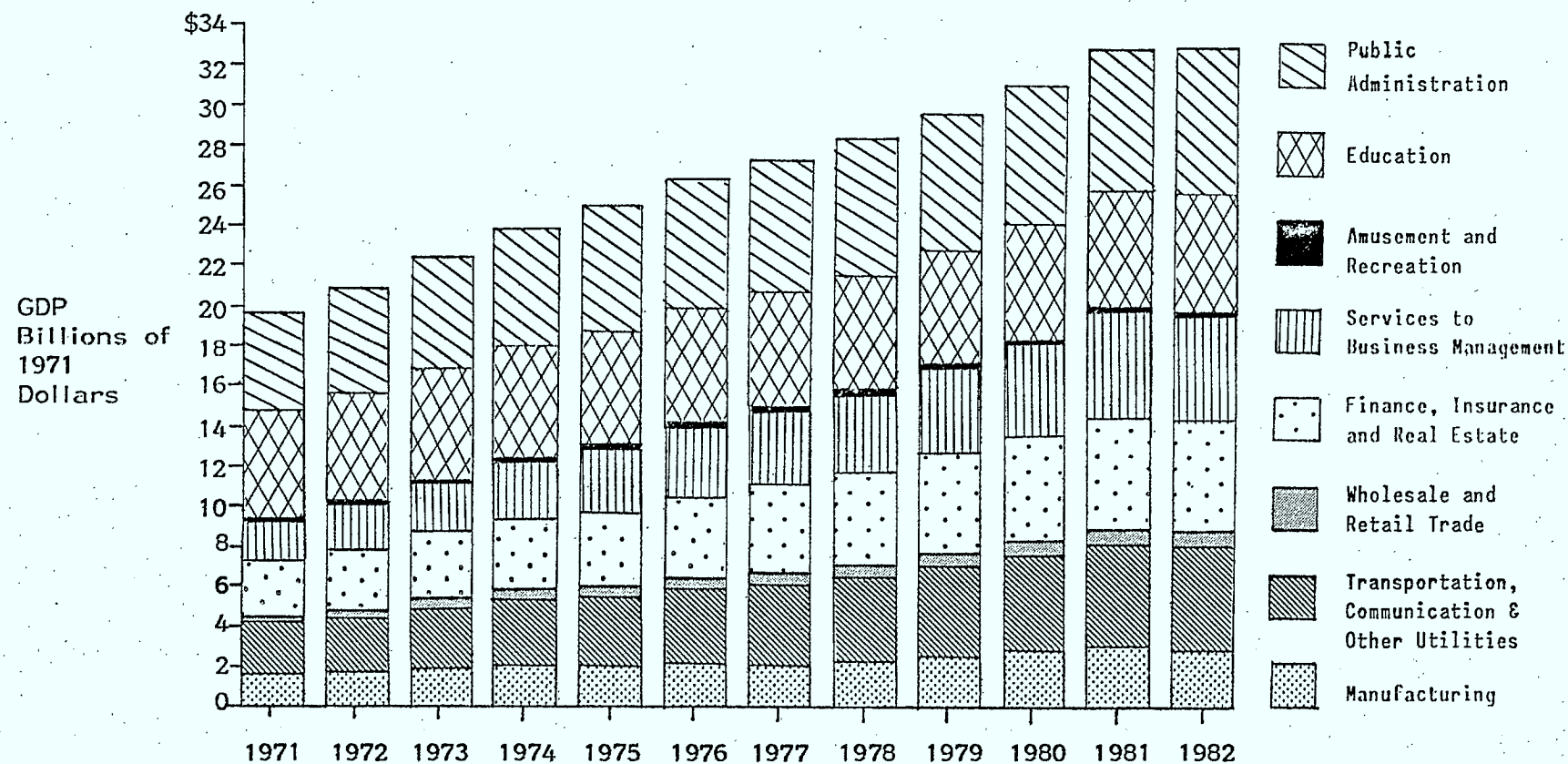


Source: Canada Consulting based on Statistics Canada data.

1. Growth in Information Activities

"PRIMARY" INFORMATION ACTIVITIES OCCUR IN THOSE INDUSTRIES PRODUCING INFORMATION GOODS OR SERVICES WHICH ARE FREELY EXCHANGED IN A MARKET CONTEXT

GROSS DOMESTIC PRODUCT (GDP) OF THE
PRIMARY INFORMATION ECONOMY BY SECTOR



Source: Canada Consulting based on Statistics Canada data.

1. Growth in Information Activities

"SECONDARY" INFORMATION ACTIVITIES RELATE TO INFORMATION SERVICES
PRODUCED AND CONSUMED INTERNALLY BY GOVERNMENT AND NON-INFORMATION
FIRMS - SUCH AS THE MARKET RESEARCH ACTIVITIES OF AN AUTO MANUFACTURER

GROSS DOMESTIC PRODUCT - SECONDARY INFORMATION ECONOMY*

Occupation	Millions of 1971 Dollars 1971	1981	Average Annual Growth Rate
Managerial	2,216.4	8,141.1	13.9%
Natural Sciences, Engineering, Mathematics	1,036.3	2,201.9	7.8%
Social Sciences	231.9	908.4	14.6%
Teaching	91.2	273.6	11.6%
Physicians and Surgeons**	347.5	485.6	3.4%
Nursing**	472.1	1,008.6	7.9%
Medical Lab Technologists**	41.2	101.0	9.4%
Fine and Commercial Art	113.2	205.9	6.2%
Performing and Audio Visual Arts	69.0	151.4	8.2%
Writing	29.9	100.0	12.8%
Coaches**	NA	23.5	NA
Clerical	3,239.4	6,511.2	7.2%
Sales, Commodities**	1,637.2	2,058.9	2.3%
Sales, Services	177.7	345.1	6.9%
Sales, Other**	99.3	230.6	8.8%
Printing	52.8	80.6	4.3%
Equipment Operating, not elsewhere classified	26.9	27.0	0.0%
TOTAL - Secondary Information Economy	9,882.0	22,854.4	8.7%
TOTAL - Canada	83,260.5	115,530.0	
Secondary Information Economy as a % of Total	11.9%	19.8%	

* We estimated the GDP of the Secondary Information Economy by calculating the value of the labour resources used in information related occupations, netting out the compensation paid to those information workers in the Primary Information Economy.

** Only 50% of the compensation paid to these workers was included as part of the information economy.

Source: Canada Consulting based on Statistics Canada data.

2. BUSINESS DEMAND FOR INFORMATION SERVICES HAS GROWN RAPIDLY OVER THE PAST DECADE

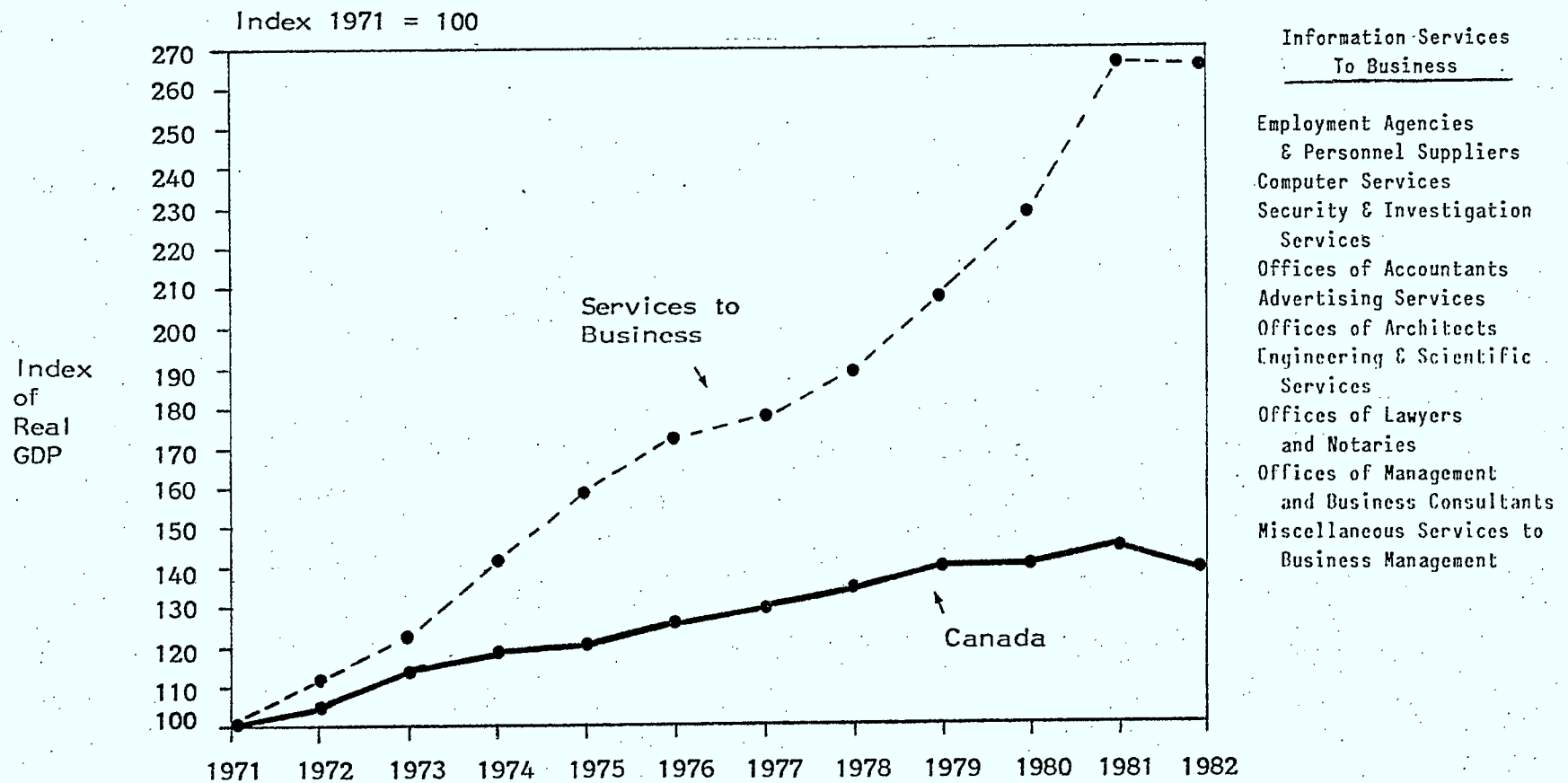
As a sector, information services to business have grown much more quickly than the overall economy since 1971

Information services are creating major opportunities for productivity gains in many industries

Advances in the elements and infrastructure of communications will create even greater demand and capacity for information services

AS A SECTOR, INFORMATION SERVICES TO BUSINESS HAVE GROWN MUCH MORE QUICKLY THAN THE OVERALL ECONOMY SINCE 1971

COMPARATIVE GROWTH - SECTORS OF THE ECONOMY



Source: Canada Consulting based on Statistics Canada data.

INFORMATION SERVICES ARE CREATING MAJOR OPPORTUNITIES FOR PRODUCTIVITY GAINS IN MANY INDUSTRIES

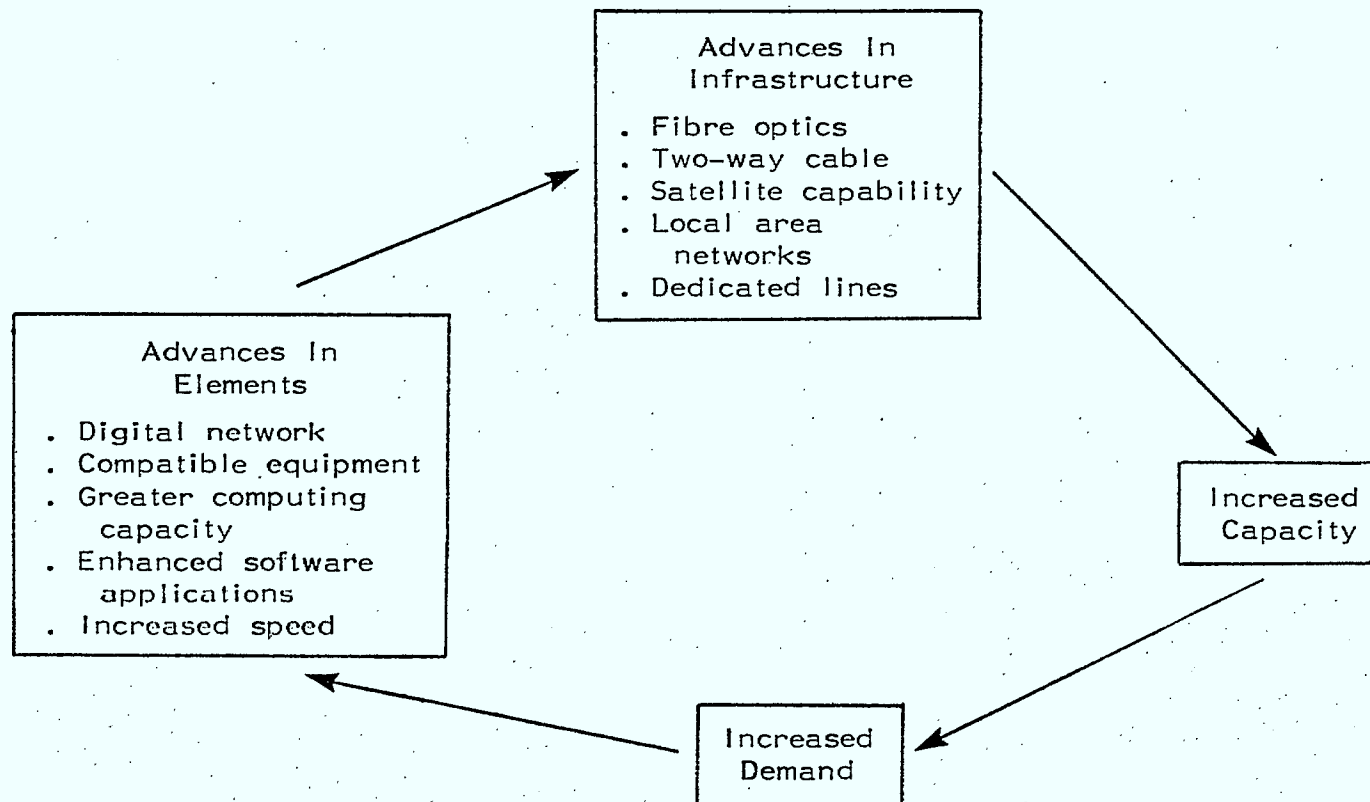
Merged data bases across different industries allow sales representatives to identify high-potential, high-quality customers among all their prospects - persons who may have

- . Made a purchase that then requires several others
- . Made a purchase of a different product from a representative of the same company
- . Proved that he or she has considerable financial resources

Satellite mapping allows oil companies to improve the likelihood of successful oil exploration

Meteorological data bases allow farmers to practise enhanced crop management

ADVANCES IN THE ELEMENTS AND INFRASTRUCTURE OF COMMUNICATIONS WILL
CREATE EVEN GREATER DEMAND AND CAPACITY FOR INFORMATION SERVICES



3. MANY INFORMATION SERVICES ARE BECOMING CRITICAL TO PRODUCTIVITY GROWTH IN OTHER INDUSTRIES

