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Investing in Canada's Semiconductor Industry

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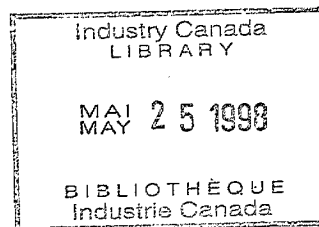
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Industry Canada
Department of Foreign Affairs and International Trade

June 1996

Investing in Canada's Semiconductor Industry



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***Canada's Economy
and
Business Climate***



***Industry Canada
Dept of Foreign Affairs and International Trade***

June 1996

TABLE OF CONTENTS

- **Why Invest in Canada ?**
- **Strong and Growing Domestic Economy**
- **An Economy Open to the World**
- **Highly Educated Labour Force**
- **Sophisticated Infrastructure**
- **Technologically Advanced**
- **Excellent Business Climate**
- **Summary**

Why Invest in Canada ?

- **Canada provides many advantages for investors:**
 - a strong and growing domestic economy;
 - a trade-oriented economy;
 - a highly educated labour force;
 - a sophisticated infrastructure;
 - leading edge technology; and
 - an excellent business climate.





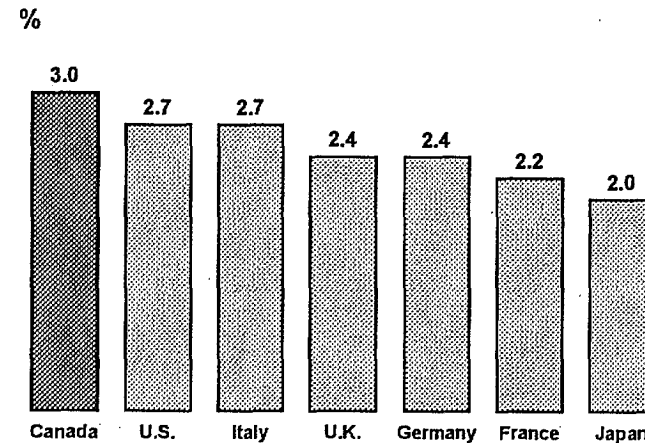
**Strong and Growing Domestic
Economy**



Canada Has a Strong and Growing Economy

- As the 7th largest economy with the second highest standard of living in the world, Canada offers excellent growth potential.
- One of the fastest growing economies in the OECD, Canada grew by 4.5% in 1994 and by 2.2% in 1995.
- The OECD predicts that Canada will top the G-7 in 1996 and 1997 with respective growth rates of 3.0% and 4.0%.

Real GDP growth: 1996



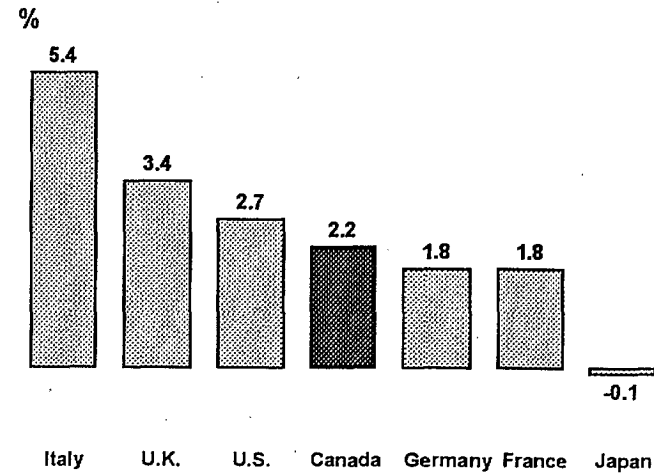
Source : OECD Economic Outlook (Dec/95)



Low Inflation

- The government and the Bank of Canada are committed to low inflation (inflation target range is 1% to 3%).
- Over the last 3 years, Canada has had one of the lowest inflation rates in the world.

1995 CPI Inflation

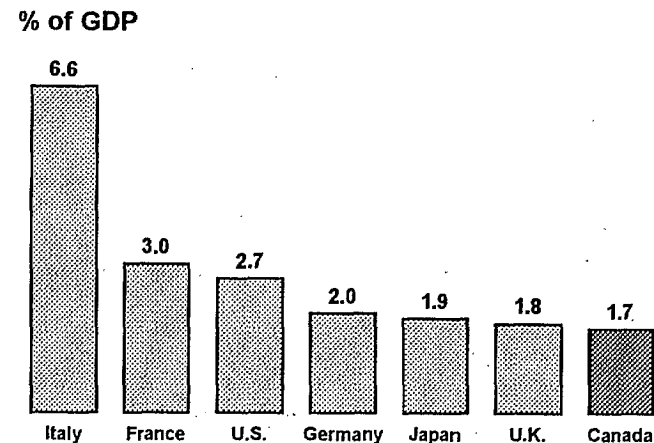


Source: Finance Canada, April 1996

Declining Government Deficits

- The federal government is committed to deficit reduction.
- For this fiscal year, the ratio of federal borrowing requirement-to-GDP will decline to 1.7%; the lowest among the G-7. In 1997-98, requirements are expected to drop to 0.7%, the lowest level since 1969-70.
- By the end of this fiscal year, 7 of 10 Canadian provinces will be in fiscal balance.
- The emphasis is on expenditure reduction, not tax increases.

Projected 1996-97 Financial Requirements



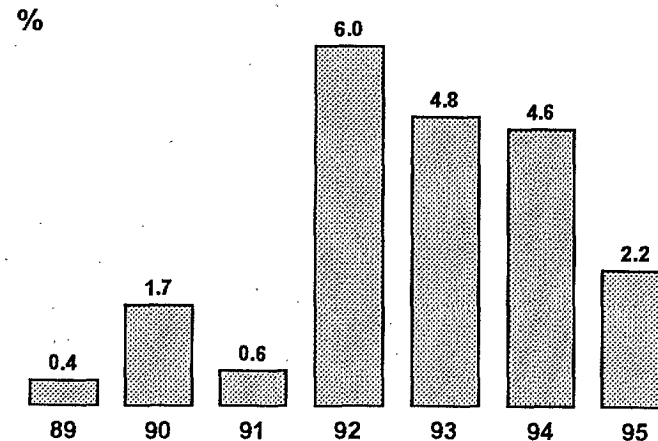
Source : National Budget Plans, OECD



Gains in Productivity...

- Massive business restructuring and record investment in machinery and equipment have produced strong gains in productivity.
- Productivity in the manufacturing sector has improved greatly over the past four years.

Growth in Labour Productivity*
Manufacturing Sector

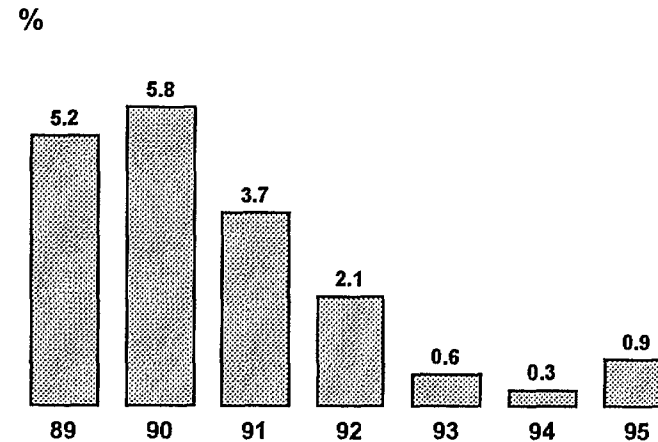


* Real GDP per hour worked
Source: Statistics Canada, Industrial Monitor (Feb/96)

Low Wage Increases...

- Competition and a soft labour market are keeping wage settlements down.

Wage Settlements*



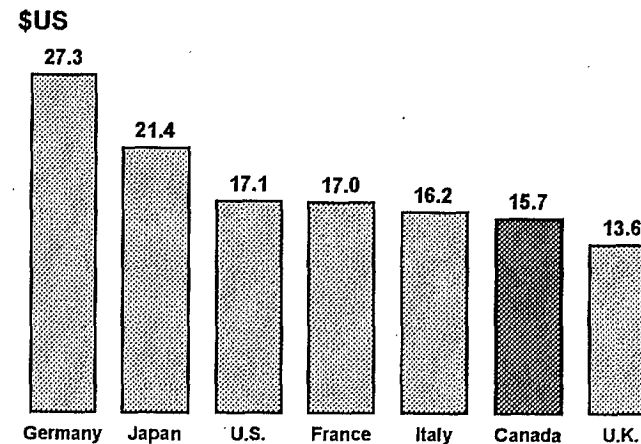
* By large unions (+500 membership)
Source: Human Resources Development Canada



and Competitive Compensation Levels...

- Canada has the second lowest hourly compensation level in the G-7.

Compensation Levels: 1994



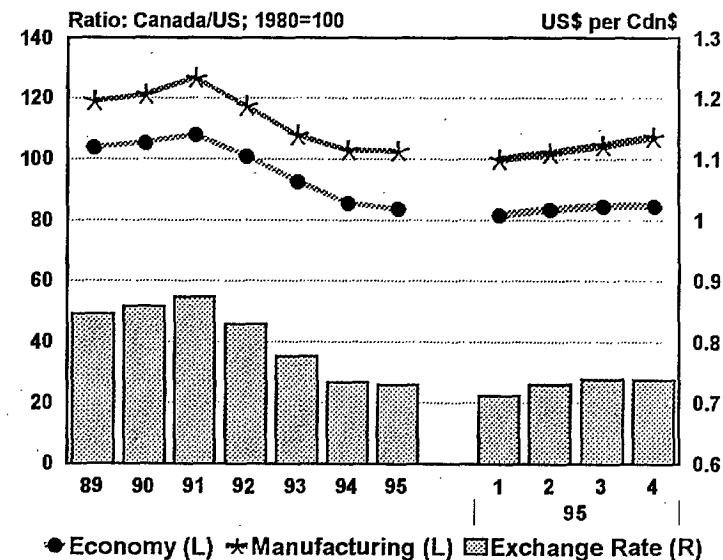
Source: World Competitiveness Report 1995



Result: Increased Competitiveness

- Canada's competitive position vis-à-vis the U.S. has improved substantially (+22%) since 1991.
- Competitiveness gains vis-à-vis Europe have been even more pronounced.
- Profits have also rebounded strongly. In 1995, they were 89% above their level in 1991.

Unit Labour Cost Comparison*



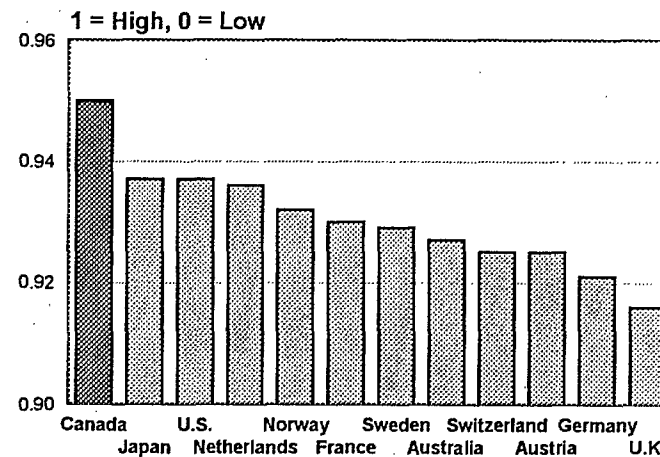
* Common currency basis

Source: DRI Canada & U.S. Dept. of Labor

Best Quality of Life

- Canada ranks first on the UN Human Development Index.
- Canadian advantages include:
 - high educational enrollment levels;
 - high-quality, low cost education;
 - universal health care;
 - clean, safe, cosmopolitan cities; and
 - diverse cultural and recreational amenities.

Human Development Index



Source: United Nations, Human Development Report (1995)





**An Economy Open
to the World**

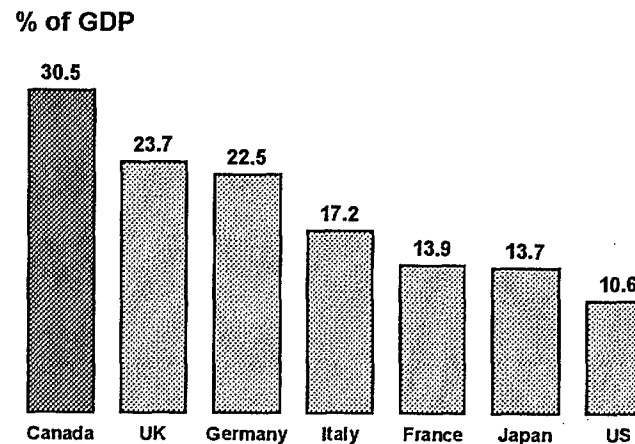


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Trade is Key to Growth

- Canada is an open economy:
 - heavily engaged in trade;
 - the ratio of total trade to economic output is the highest in the G-7.

Merchandise trade: 1994



* $[(\text{Exports} + \text{Imports})/2]/\text{GDP}$
Source: OECD, Dec. 1995



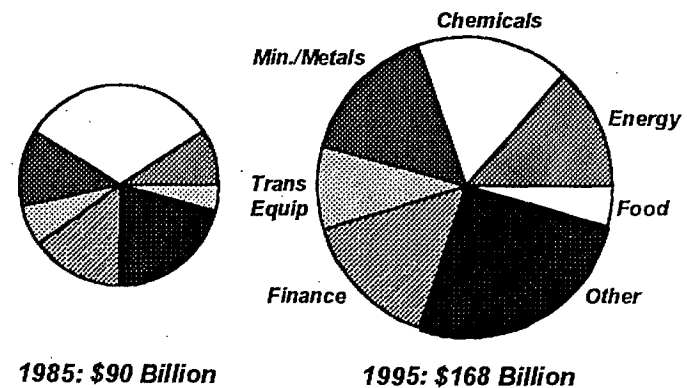
Proximity to the U.S. is an Important Factor

- **Canada lies at the heart of a huge (365 million people), affluent (\$8.5 trillion GDP) and growing (Chile accession to NAFTA) North and South American market.**
- **NAFTA provides procedures for border facilitation, movement of personnel, investment protection and product certification.**
- **Canada also has access to global markets through the World Trade Organization, and unique access to Asia Pacific as well.**
- **All foreign investors gain long-term assured access to the world's richest economy as well as Asia Pacific when they invest in Canada.**

Foreign Investment is Another Welcome Factor

- Foreign direct investment has almost doubled in the last decade; a strong indicator of investor confidence.
- Past preference for resource sectors has given way to increased interest in the services sector.
- While the U.S. investment relationship predominates, the share from Europe and Asia Pacific has increased.

Foreign Direct Investment by Industry



Source: Industry Canada compilation from Statistics Canada data

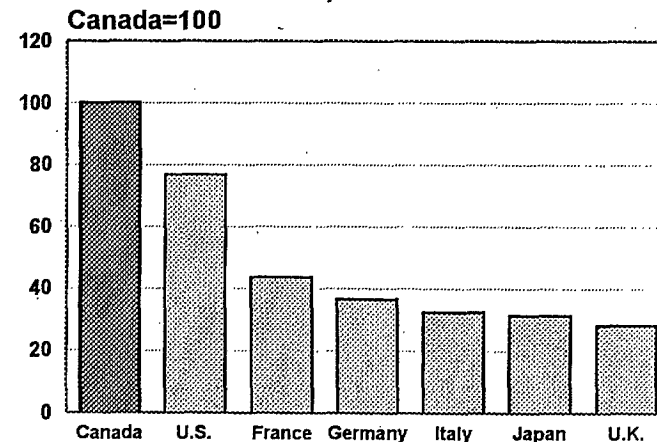


**Highly Educated
Labour Force**

Highly Educated Workforce

- Canada has the highest rate of post-secondary enrollment in the world.
- Canadians have strong multilingual capabilities.

Higher Education Enrollment*



* among 20-24 year olds

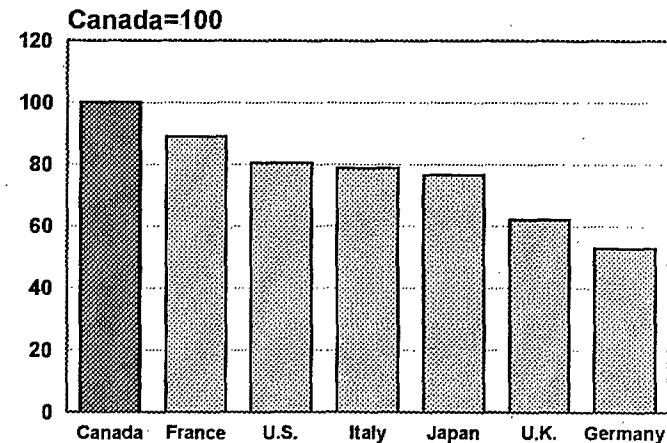
Source : World Competitiveness Report 1995



Well Funded Educational System

- Canada outpaces all other G-7 countries in per capita expenditure on training and education.
- School-work/co-op/ and internship programs have been put in place to match the supply of skills with the needs of industry.

Public Expenditure on Education: 1992



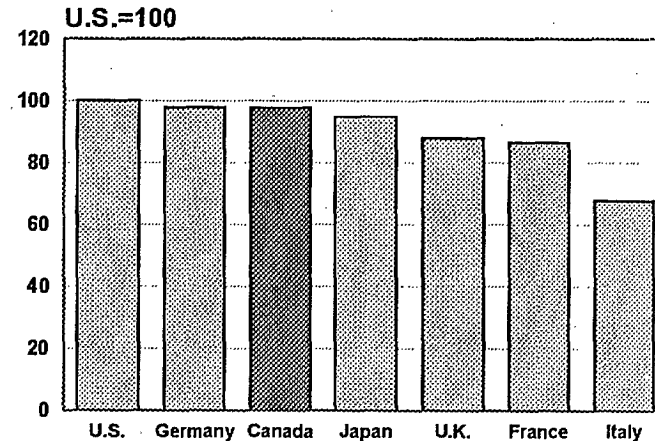
Source : World Competitiveness Report 1995



High Level of Computer Literacy

- The level of computer literacy among employees is high in Canada -- only the U.S. and Germany rank higher among other G-7 countries.
- There are more computers per capita in Canada than in any other G-7 country, except the U.S.

Level of Computer Literacy



Source : World Competitiveness Report 1995





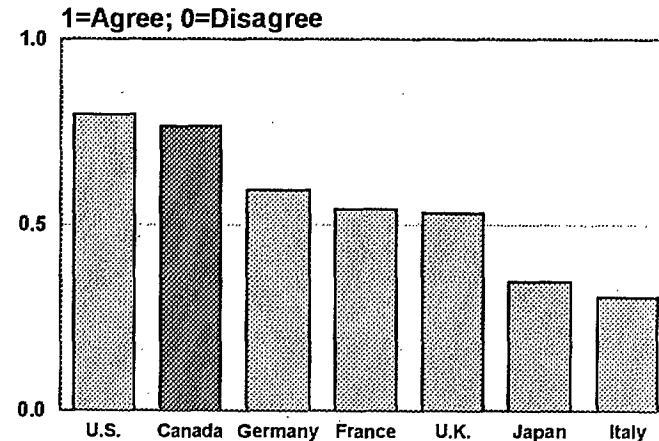
Sophisticated Infrastructure



Excellent Infrastructure

- Canada's infrastructure is ranked second in the G-7 by business executives -- rail, truck and air services are fully integrated with the U.S.
- The "Information Highway" will put a variety of new services within reach of business and consumers.

Infrastructure Meets Needs of Business: 1994

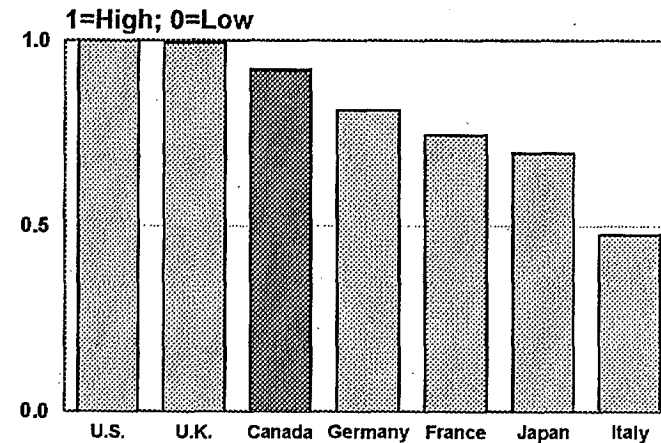


Source: World Competitiveness Report 1995

Sophisticated Financial Markets

- Canada has a well-developed, internationally integrated financial sector -- ranks third in the G-7.

Level of Sophistication of Financial Markets



Source: World Competitiveness Report 1995



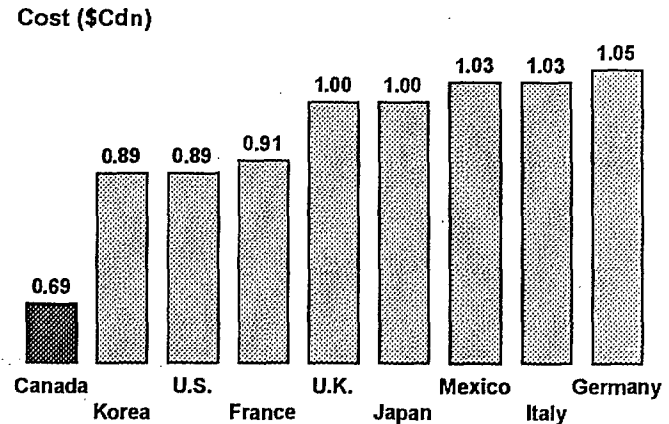
Technologically Advanced



Strong R&D Capabilities...

- Canada provides:
 - a wide range of research support, technology transfer and market development;
 - a strong capability in advanced technologies; and
 - skilled personnel.
- Canada has a very generous R&D tax credit program - immediate and full write-off for most costs, plus 20% to 35% tax credits.
- Because of this, firms can significantly reduce R&D costs through direct investment or sub-contracting in Canada.

Cost of Doing \$1.00 Worth of Research*



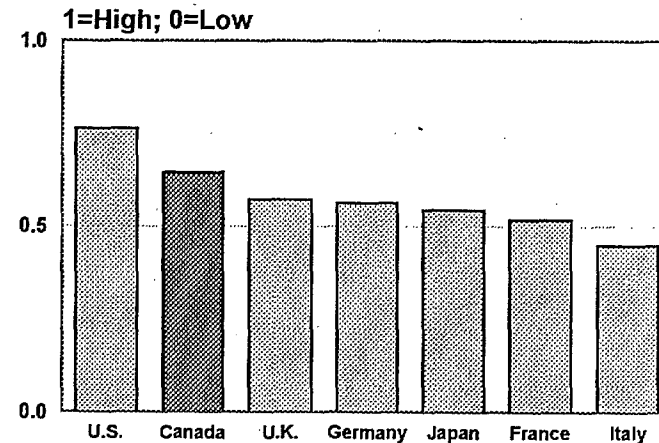
* Represents a ratio of the after-tax cost of \$1 expenditure on R&D divided by 1 less the corporate tax rate.

Source: Conference Board of Canada, 1994

...and a Leader in the Use of Information Technology.

- Canada ranks second in the G-7 in the use of information technology.

Use of Information Technology by Companies.



Source: World Competitiveness Report 1995





Excellent Business Climate

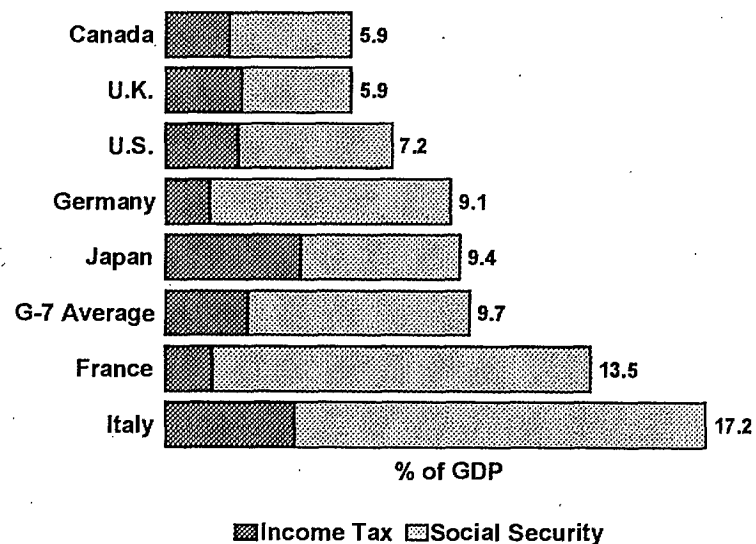


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Corporate Taxes are Internationally Competitive

- Federal and Provincial governments are working to keep corporate taxes at competitive levels.

Corporate Tax Comparison: 1993

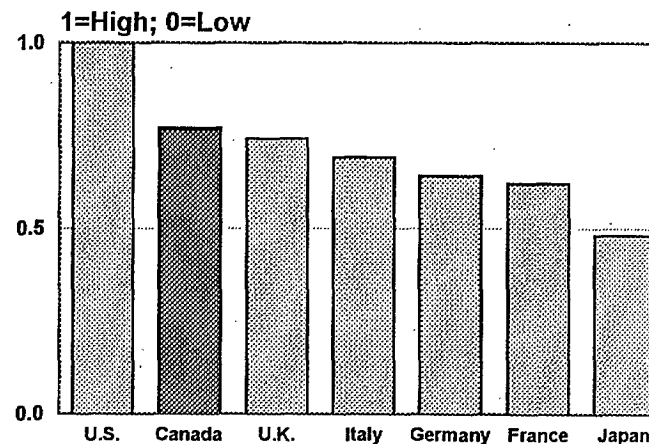


Source: OECD Revenue Statistics

Entrepreneurship is Valued

- According to a survey of business executives, risk-taking and individual initiative are part of the Canadian culture.

Support for Risk-Taking and Individual Initiative



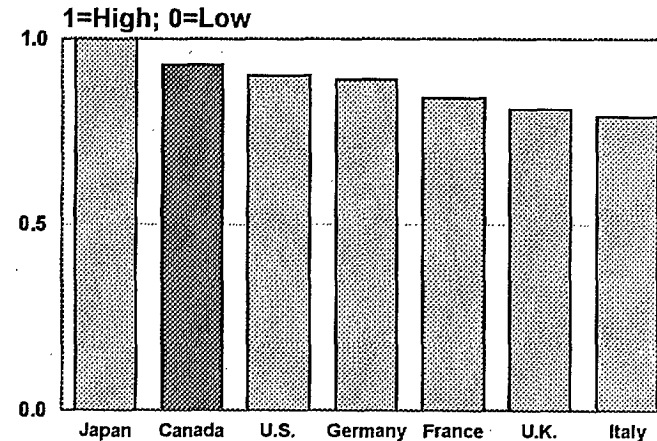
Source: World Competitiveness Report 1995



Positive Environment for Business

- Companies enjoy a great deal of public trust in Canada.
- Canada's legal environment and practices are less litigious than those in the U.S.
- Environmental damage or product liability charges are generally lower and determined more quickly than in the U.S.

Corporate Credibility



Source: World Competitiveness Report 1995



Summary

- **Canada's economic fundamentals are sound -- both macro and micro policies are geared toward competitiveness.**
- **Canada is an active player in global markets.**
- **Canada has a highly educated and productive workforce.**
- **Canada's infrastructure meets the needs of business.**
- **Canada is at the technological forefront.**
- **Canada is an excellent place to do business.**

Canada's Information Technology and Telecommunications Sector

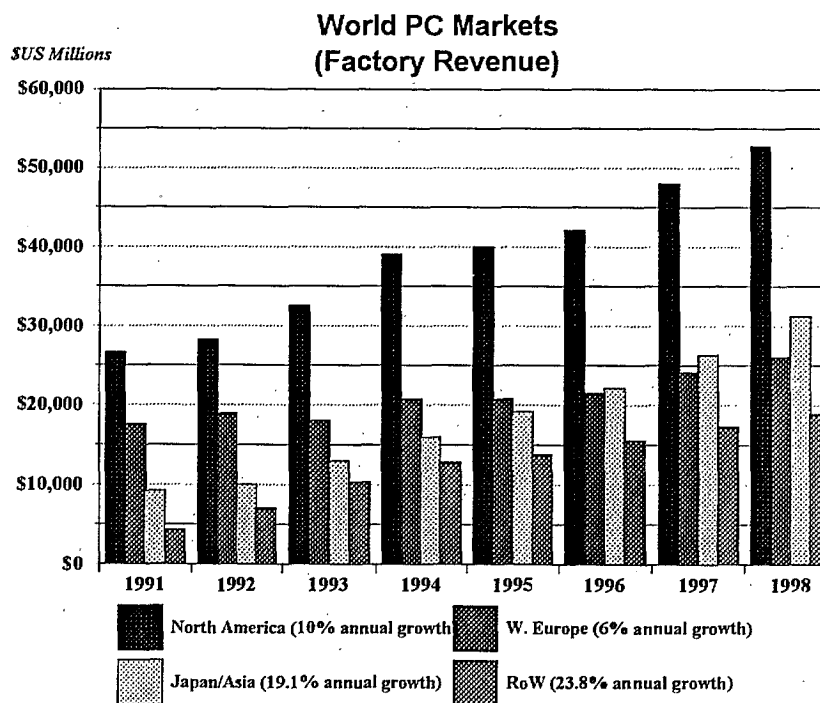


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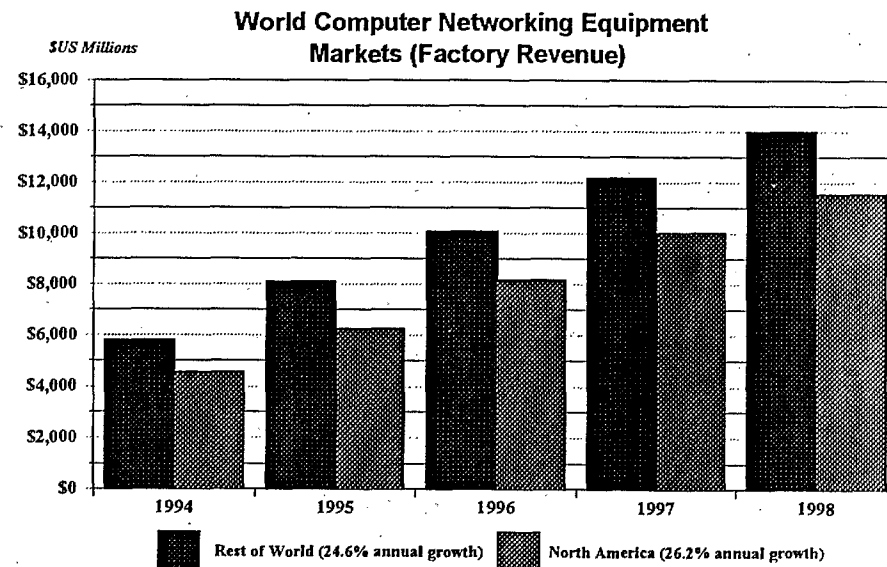
Canadians are major consumers within the world's largest PC market

- North America is already an information society:
 - US\$ 52.5 billion in annual PC sales by 1998
 - over 30.5 million units
- The Canadian business and household PC market:
 - US\$ 3.7 billion in annual PC sales by 1998
 - over 2.2 million units a year



Rising Canadian and U.S. computer usage driving network bandwidth demand

- North American computer networking market:
 - US\$ 12 billion by 1998
- Canadian market:
 - US\$ 500 million by 1998
 - 26% annual growth rate



Source: Dataquest

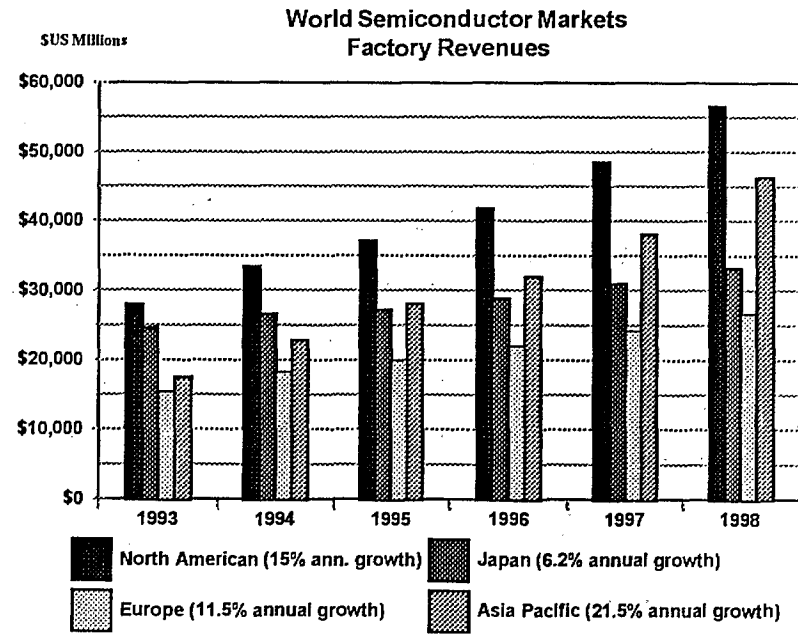


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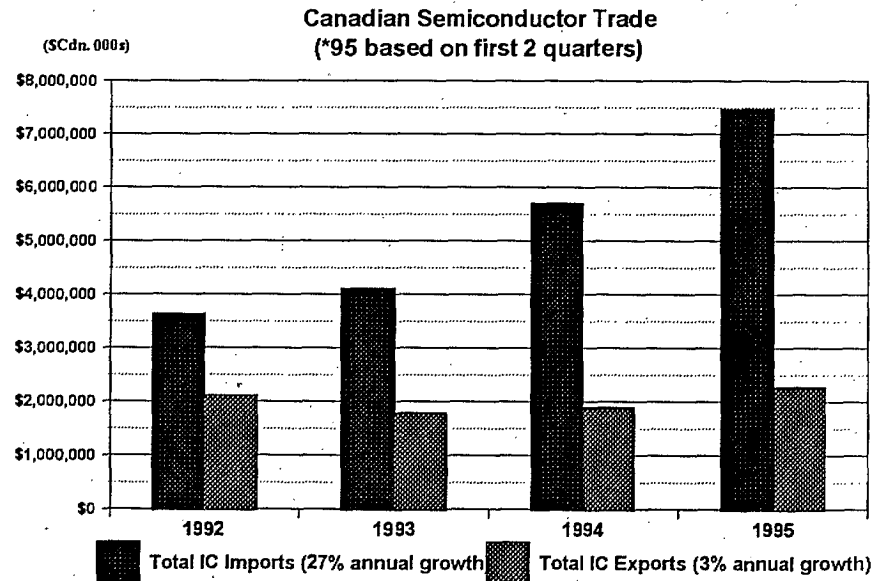
All of which needs to be powered by more and more semiconductors

- Semiconductor demand by North American IT manufacturers:
 - US\$ 57 billion by 1998
 - 15% annual growth rate
- U.S. DRAM imports alone are projected to reach US\$ 13.3 billion in 1995.



Canada's IT industry has also developed a large semiconductor appetite

- Canadian semiconductor imports growing rapidly from C\$ 3.5 billion in 1992 to C\$ 7.5 billion in 1995.
- DRAM imports alone are projected to reach C\$ 2.3 B in 1995.



Source: Statistique Canada

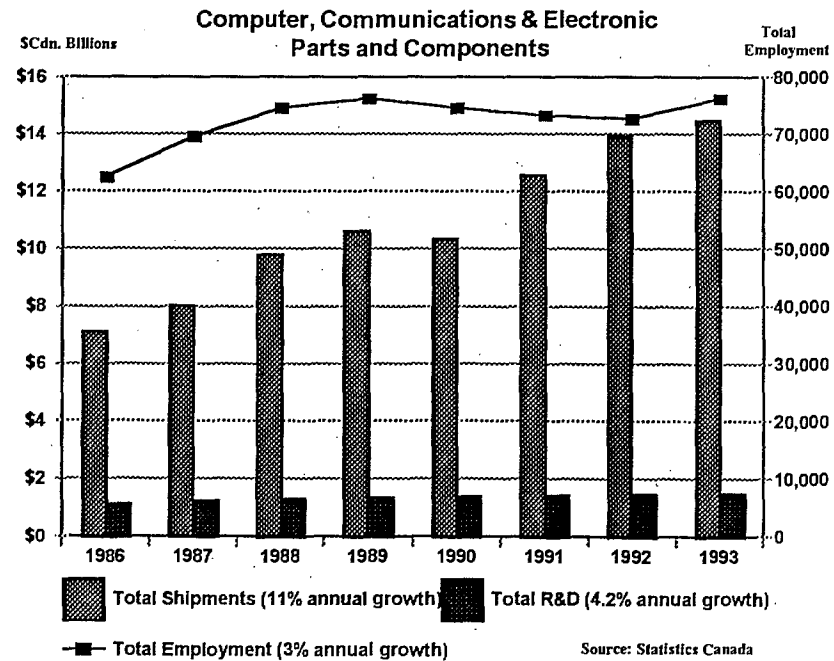


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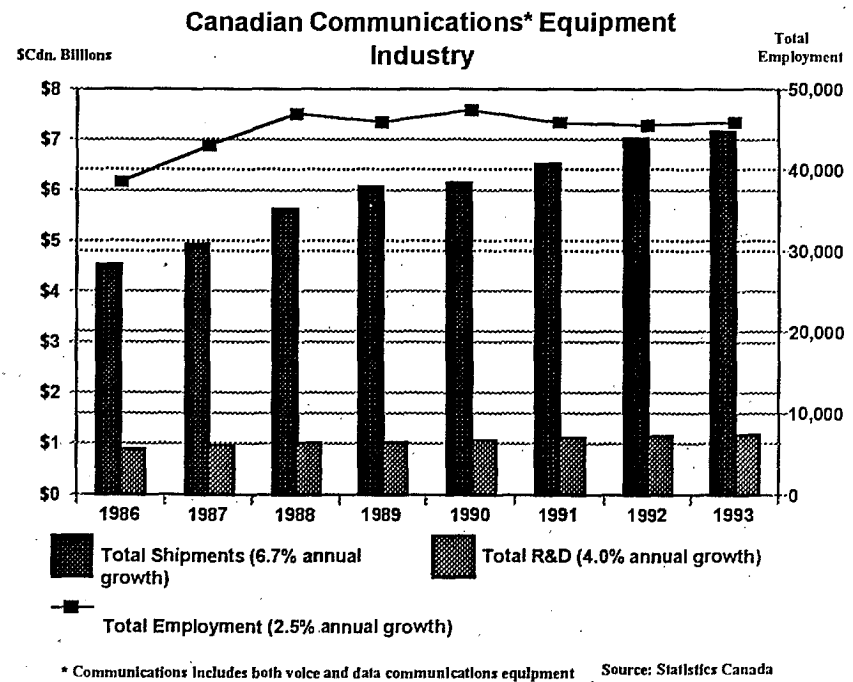
Increasing production of Canada's IT industry fueling semiconductor demand

- Significant shipments of C\$14 billion, and growing.
- Healthy R&D investment rate of 9% of sales.
- The industry employs over 75,000 Canadians.



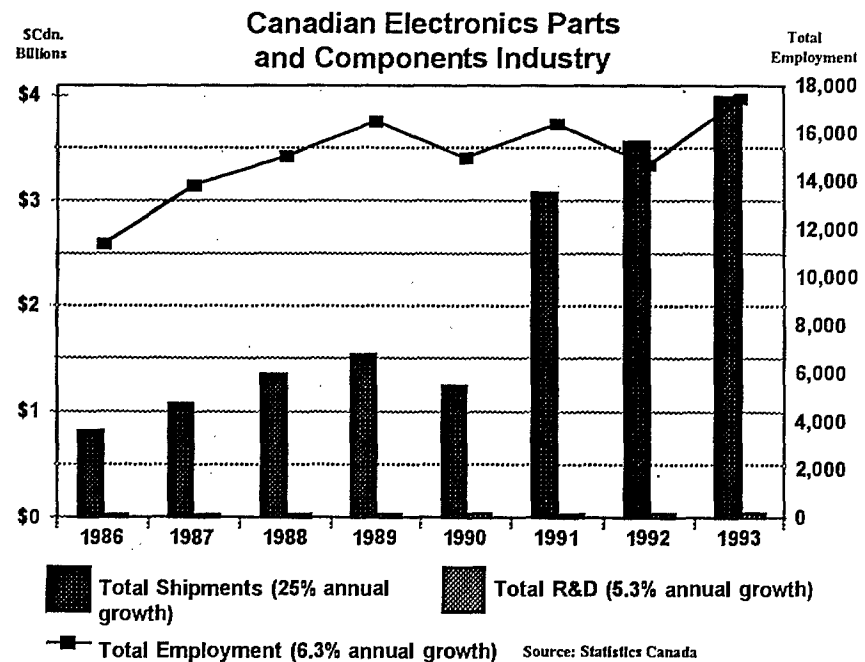
Convergence with computing is helping to spur Canada's communications industry

- Growth in sales of 6.7% per year.
- Canadian enterprises such as Nortel, Mitel and Newbridge developing tomorrow's large bandwidth computer networking products.



The North American trend towards contract manufacturing is significant

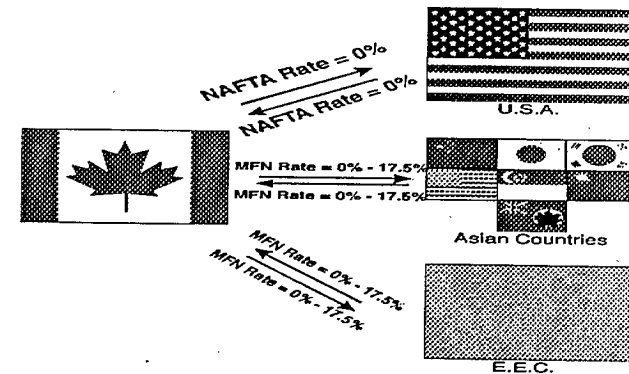
- Canadian electronic parts and component suppliers are meeting the escalating needs of North American equipment manufacturers.



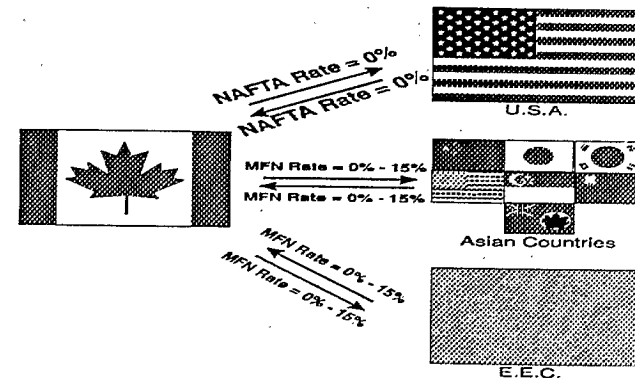
The key to our success is NAFTA's guaranteed access to the U.S. market

- Elimination of most tariffs.
- National treatment for offshore manufacturers based in Canada.
- NAFTA's unique and privileged settlement procedures with the U.S. have been tested but never beaten.

IT EQUIPMENT TARIFFS



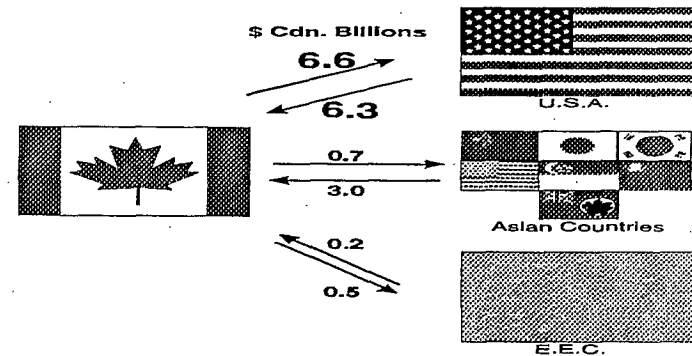
IT PARTS TARIFFS



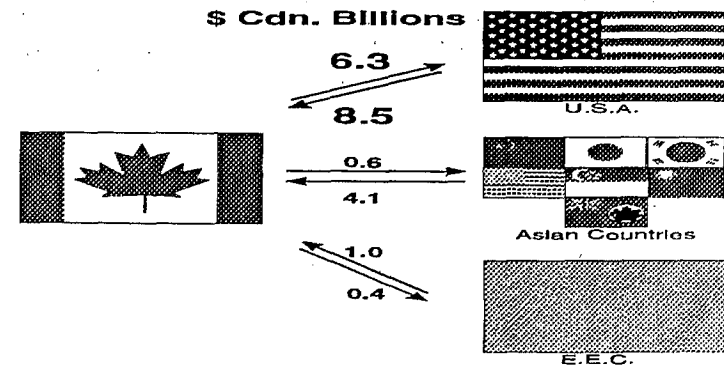
NAFTA has fostered Canadian and U.S. manufacturing inter-dependency

- Canadian and U.S. consumers benefit from a balanced \$12.9 billion in two-way trade of final IT equipment products.
- Canadian and U.S. suppliers exchanged over \$14.8 billion in IT parts.

IT EQUIPMENT TRADE



IT PARTS TRADE



There are world-class players in the Canadian IT Industry

- **Nortel is one of the world's largest telecoms manufacturing companies**
- **Newbridge and Mitel are successful new telecoms equipment suppliers, now in the world's top 50 in their class**
- **Canada has a broad range of specialist suppliers, technical assistance, and other related and supporting industries**
- **37% of Canada's industrial R&D is in the IT&T sector**



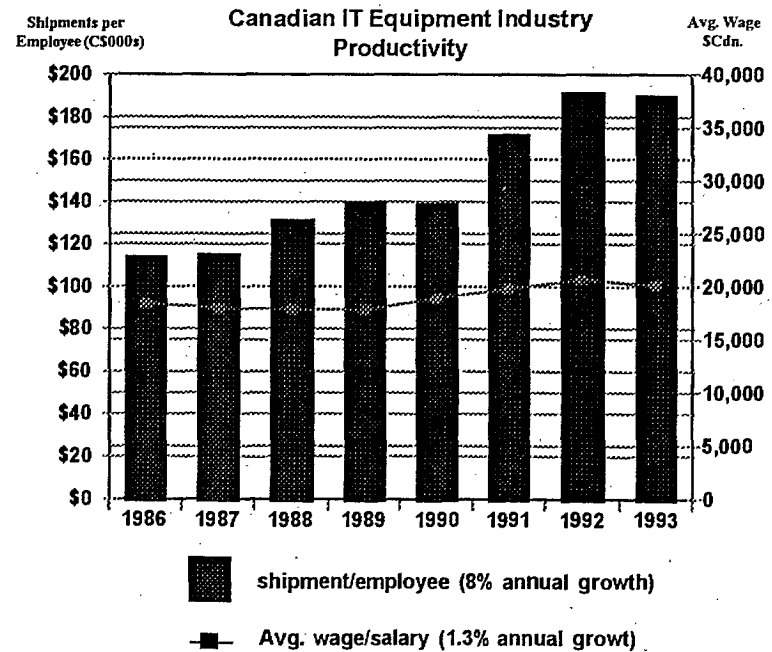
Canada is open to foreign investment

- **Ericsson bases a major corporate R&D centre in Canada**
- **Siemens Canada has a diversified and growing product range**
- **IBM and Digital Equipment have significant trade surplus in Canada**
- **Canada welcomes and supports foreign investment -- the regulatory regime is minimal**



Canadian IT manufacturers have consistently increased productivity

- Shipments per employee are increasing at a rate of 7.6% a year...
- while average wages and salaries paid in the industry have remained virtually unchanged.



Source: Statistics Canada



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Canada has a highly skilled workforce

- The U.S. Gourman report scored 9 Canadian electrical engineering programs in the top 20, and 19 in the top 40.
- Canada's 67 universities and colleges produce more than 25,000 graduates per year in math, engineering and pure and applied sciences.

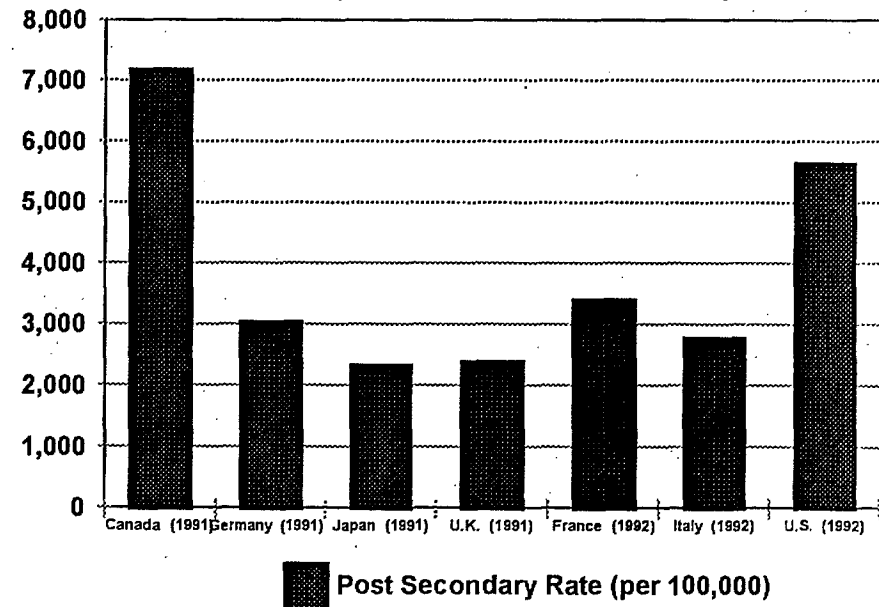
RANKING OF ELECTRICAL ENGINEERING UNIVERSITY PROGRAMS			
		U.S.	Cdn.
Institution	Score	Rank	Rank
M.I.T.	4.93	1	
Stanford	4.92	2	
Berkeley	4.89	3	
Toronto	4.87		1
Illinois	4.85	4	
McGill	4.84		2
McMaster	4.84		3
UCLA	4.83	5	
U.B.C.	4.82		4
Cornell	4.80	6	
Purdue	4.77	7	
Southern California	4.76	8	
Princeton	4.75	9	
Saskatchewan	4.75		5
Michigan	4.74	10	
Calgary	4.74		6
Carnegie Mellon	4.73	11	
Alberta	4.73		7
Polytechnique	4.73		8
Queens	4.73		9
<i>Source: 1993 Gourman Report</i>			



Canadians are training to become knowledge workers of the future

- Canada's post-secondary enrollment rate is the highest in the G7.

Post Secondary participation Rate
(per 100,000 inhabitants)



Source: UNESCO Yearbook, 1994



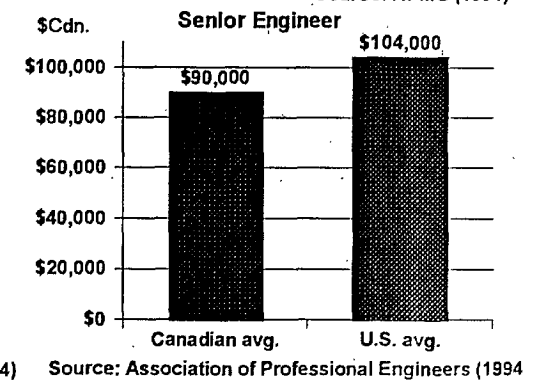
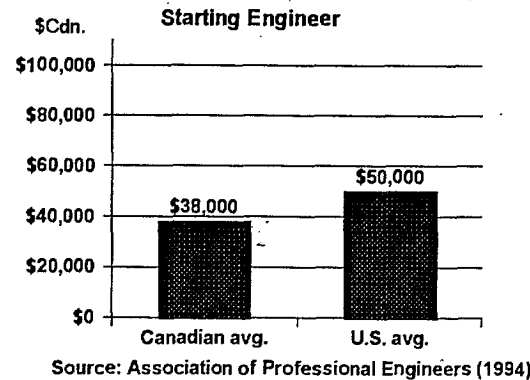
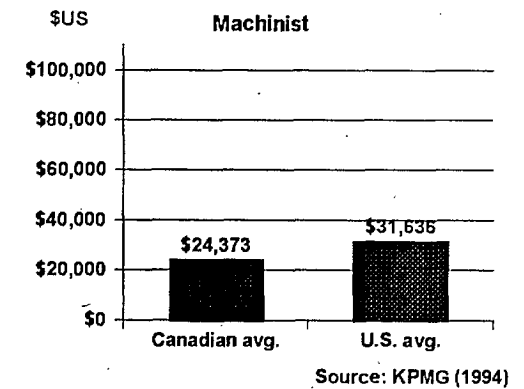
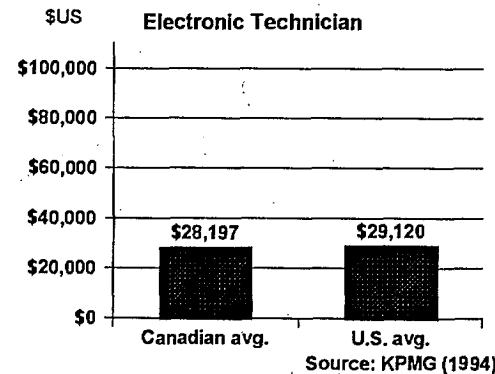
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Canadian labour costs are lower than in the U.S.

- Starting salaries for Canadian engineers are 25% lower.
- While salaries of senior Canadian engineers are 13% lower.

Wages and Salaries U.S. and Canadian Comparative Analysis

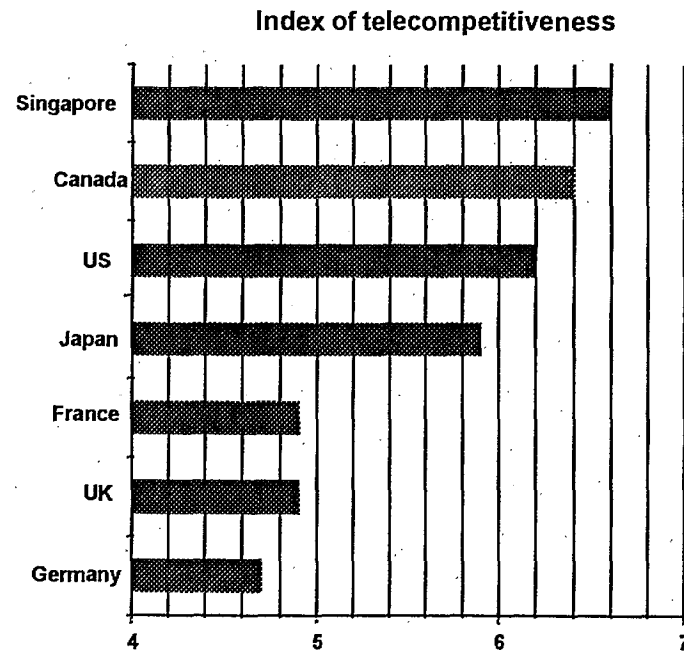


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The Canadian communications infrastructure is world class

- A study of 10 factors ranked Canada's information infrastructure as second best among countries surveyed, after Singapore.
- Canadian enterprises such as Nortel, Mitel and Newbridge developing tomorrow's large bandwidth computer networking products.



Source: Mesa Inc., 1994

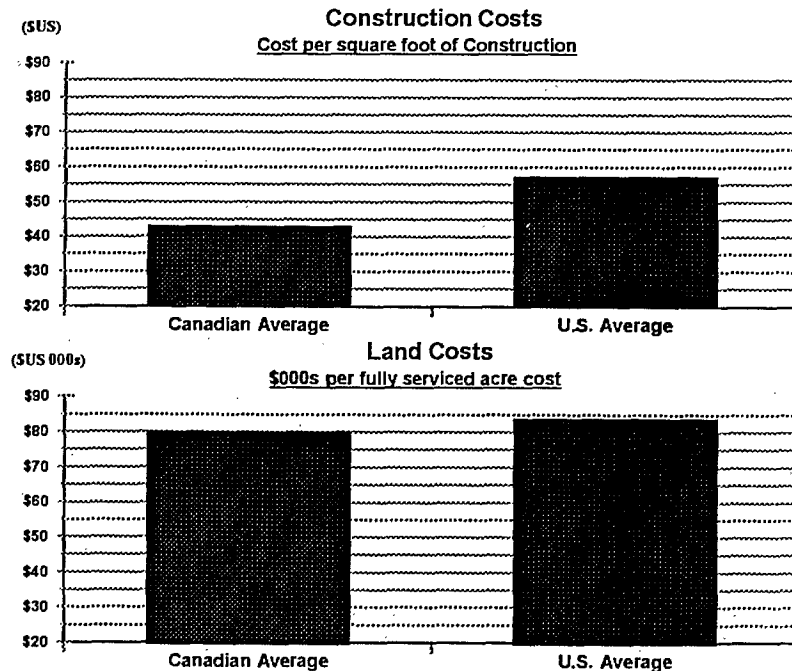


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Canadian land and construction costs are generally lower than the U.S.

- A recent sample study of 15 North American cities, found that on average Canada had:
 - significantly lower construction costs
 - competitive land costs

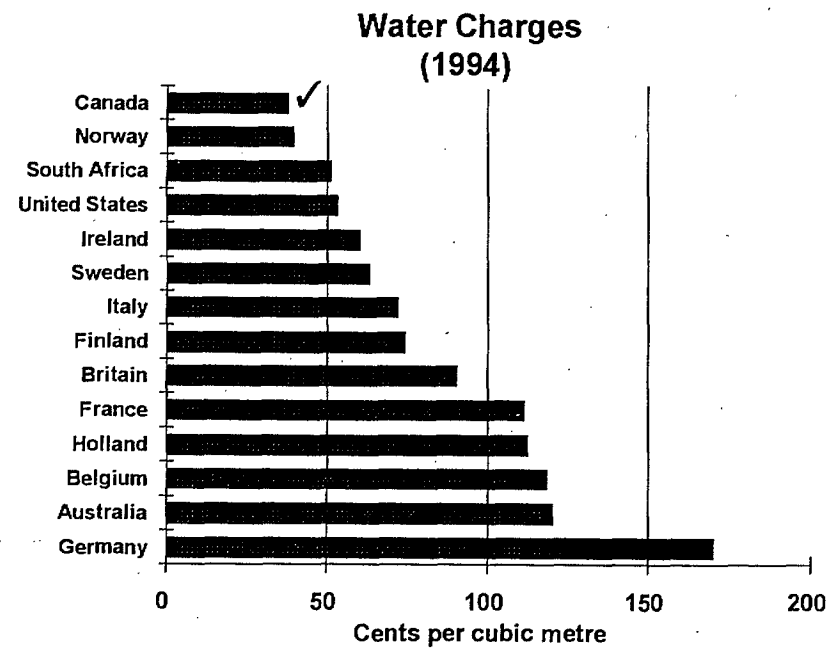


Source: KPMG



Water is abundant and inexpensive

- **Canada has the largest and cheapest water supply in the world**



Source: *National Utility Service*
Economist

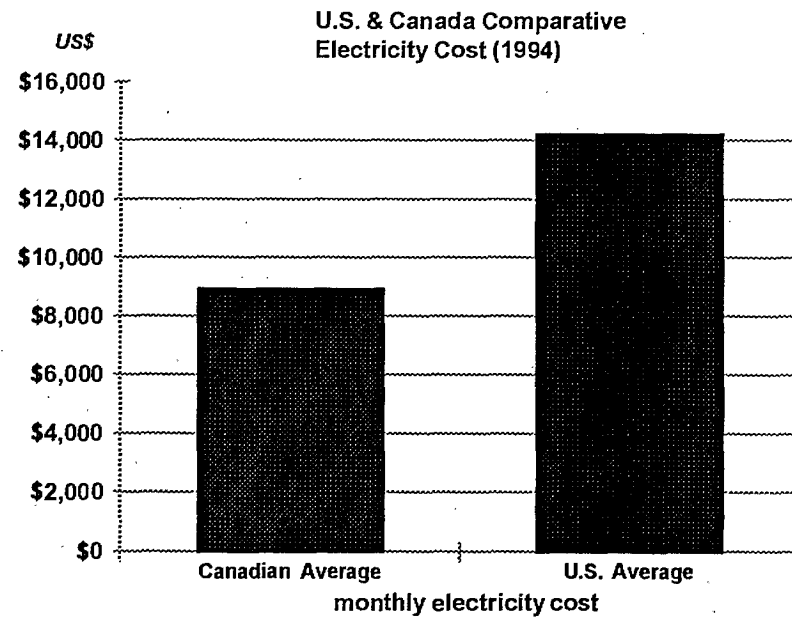


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For energy intensive processing, Canadian electricity is cost effective

- **Canada's natural resources provide an abundant supply of hydro-electricity.**
- **An average sample of 15 North American cities suggest that Canadian costs are almost 40% lower.**



Based on 250,000 Kwh per month & a demand load of 400 KvA

Source: KPMG Management Consulting



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Canada has many advantages ...

- Part of the large and rapidly-expanding North American market
- Possesses a fast-growing IT industry
- Assured North American market access through NAFTA has led to competitive and highly-integrated regional production.
- Canada offers a high quality, skilled and cost effective workforce.
- All round competitive operating costs.
- World-class infrastructure.





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