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Advanced Manufacturing Technologies

Canada's International Business Strategy

1996-1997

Team Canada • Équipe Canada

Canada's International Business Strategy

is made up of an ***Overview*** *highlighting Canada's international business development priorities, and a series of* ***Industry Sector Strategies****, which include lists of planned international activities. The following documents are available:*

Overview

1. Advanced Manufacturing Technologies
2. Aerospace and Defence
3. Agriculture, Food and Beverages
4. Arts and Cultural Industries
5. Automotive
6. Bio-Industries
7. Business, Professional and Educational Services
8. Chemicals, Plastics and Advanced Materials
9. Construction Products and Services
10. Consumer Products
    - *Apparel*
    - *Textiles*
    - *Footwear*
    - *Sporting Goods*
    - *Pleasure Boats and Equipment*
    - *Tools, Hardware and Housewares*
    - *Residential Furniture*
    - *Business and Institutional Furniture*
    - *Giftware and Crafts*
11. Electrical Power Equipment and Services
12. Environmental Industry
13. Fish and Seafood Products
14. Forest Industries
15. Information Technologies and Telecommunications
    - *Overview*
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    - *Software Products, Computer Services and New Media*
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    - *Computers, Peripherals and Instrumentation*
    - *Electronic Components*
16. Medical and Health-care Products and Services
    - *Medical Devices*
    - *Pharmaceuticals*
    - *Health-care Services*
17. Metals, Minerals and Related Equipment, Services and Technology
18. Oil and Gas Products and Energy Equipment
19. Resource Equipment and Technology
    - *Agricultural Technology, Machinery and Equipment*
    - *Ocean and Marine Shipboard Technology*
20. Space
21. Tourism
22. Urban Transit and Rail Equipment

For information on how to receive the Overview, or additional Industry Sector Strategies, please call: 1-800-267-8376.

All monetary figures in this document are expressed in Canadian dollars unless otherwise indicated.

Cat. No. C2-226/1-1996E ISBN 0-662-24036-7

Aussi disponible en français sous le titre Technologies de fabrication de pointe.

ADVANCED MANUFACTURING TECHNOLOGIES

Advanced manufacturing technologies (AMT) are used in the design, scheduling, production, storage and distribution of manufactured products. They include "hard" technologies such as computer-aided design (CAD) software, robotics, machine vision and computer-controlled (CNC) machine tools; and, "soft" technologies such as concurrent engineering and just-in-time production.

Canadian Position

Canadian AMT companies include systems integrators and producers of machine tools, robots, machine vision, automated manufacturing systems, plastic processing machines, instrumentation, process control systems and manufacturing software. They provide a wide range of products and services, including the design of automation systems, the supply of equipment, the building of complete factories, and the provision of training and servicing.

There are approximately 500 AMT producers in Canada, and shipments in 1994 were estimated at $2.5 billion. Exports are about 60 percent of output. The domestic market for AMT is about $4 billion. The sector employs some 19 000 persons, including many skilled workers and professionals, and invests 3 percent to 5 percent of its revenues in research and development (R&D).

The major markets for Canadian products and services are those countries with a modern manufacturing base. Significant opportunities for increased exports exist in the United States, which accounts for about 75 percent of Canadian exports, and in Europe where manufacturers are investing heavily to upgrade facilities. Countries where demand is high include the United Kingdom, Germany, Italy and the Benelux countries. Japan is a large and sophisticated market and is being served by a few Canadian firms, particularly in the areas of robotics and vision systems.

Excellent opportunities also exist in expanding markets in Southeast Asia, and in South America. Countries that stand out include Taiwan, Hong Kong, Korea, Singapore, India, China, Brazil and Mexico. In the South Pacific, Australia is an emerging market for Canadian products.

Canadian manufacturers of AMT products are generally smaller than their competitors in other countries. The largest Canadian firm reports annual sales of about $700 million. The vast majority of Canadian firms are small and medium-sized enterprises (SMEs).

Successful Canadian firms have invested in developing proprietary technologies, pursued niche marketing strategies, and sell the bulk of their products in overseas markets. Fast-growing firms in the sector include ATS Automation Tooling Systems Inc., CRS Plus Inc., Orchid Automation Inc., and Husky Injection Molding Systems Ltd. The latter produces custom-engineered plastic injection moulding machines and moulds for clients around the world. Husky stands apart from competitors due to its ability to design and build complete factories. Its five-year growth rate is 22 percent, and for 1995 it projects sales of $700 million. About 90 percent of Husky sales are exports.

Characteristics of fast-growing firms are the high value and sophistication of their products and the inclusion of services such as software, systems integration, training and servicing.

International Environment

Technology innovation, trade liberalization and the globalization of business are transforming the nature of manufacturing, particularly in sectors such as electronics, aerospace and automotive. These sectors rely heavily on AMT to maintain their competitive edge. Successful firms in many other sectors of industry are using AMT to introduce new, high-quality products, faster, cheaper, in smaller lot sizes and with more features, for global markets. AMT has become an enabling technology, and is radically changing the nature of manufacturing. The use of AMT in non-industrial sectors such as transportation, power generation and laboratories is increasing.

In 1990, worldwide investment in AMT products, services and systems was $57 billion. It is increasing at a compound annual growth rate of about 14 percent and, by the year 2000, the market is forecast to be $202 billion. North America represents 53 percent of the world market.

Table 1 projects AMT markets in major user countries to the year 2000.

Japan, Germany and the U.S. are leading exporters of AMT products. Japan is a leader in producing machining centres, industrial robots and flexible manufacturing systems, while Germany has established a lead in precision machining technologies and has built a strong export machine tool industry. The U.S. dominates the factory systems market, primarily due to its strengths in software and computer hardware development. All three countries are focussing on manufacturing as key to the growth of their economies, and governments provide support for the development of AMT. Despite strong competition from these and other AMT producer countries, Canadian firms continue to have success by focussing on high value-added products and niche marketing strategies.

The next generation of manufacturing, referred to as "agile manufacturing," brings design, production and inventory control together into integrated systems, able to quickly and economically change production from one product to another, both within a production facility and between facilities. The use of new materials is accelerating, requiring advanced processing machinery.

Following completion of a two-year feasibility phase, Australia, Canada, Europe, Japan and the U.S. are co-operating in the Intelligent Manufacturing Systems (IMS) Program. IMS will develop new manufacturing and processing technologies, and establish international standards for the next generation of industrial technologies, while sharing the costs and risks. Canada is hosting the IMS world secretariat until December 1996. Participation in IMS projects is open to technology users, AMT producer firms, and to universities and government research institutes.

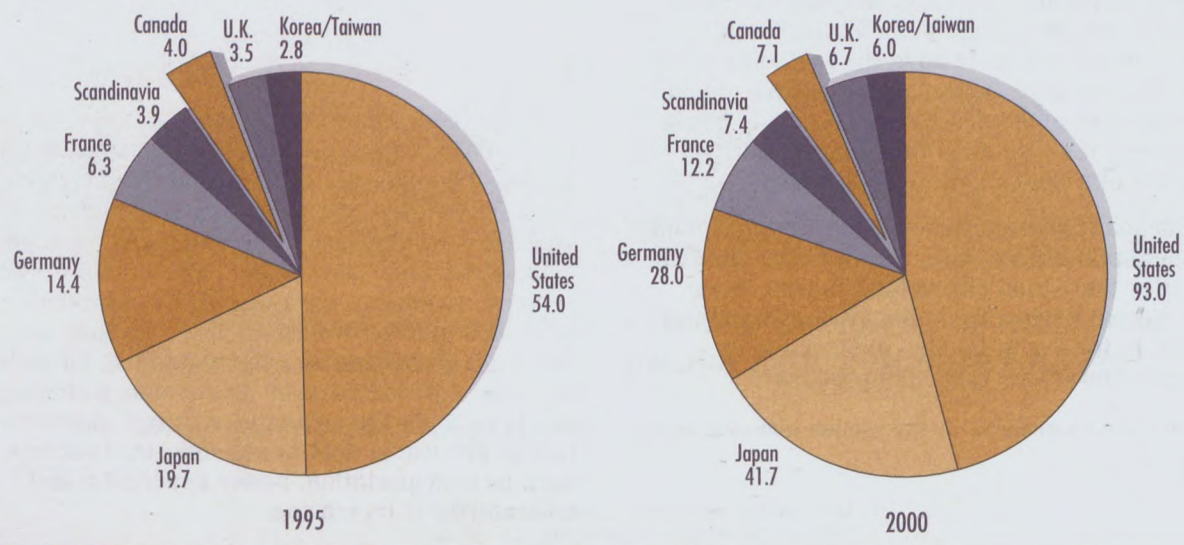
Main Challenges

The AMT sector is made up of many small firms with leading-edge technologies, often without the market intelligence or resources to take advantage of specific foreign business opportunities.

The availability of capital, including equity and bank financing, for the conduct of R&D and for expansion, are ongoing problems. R&D tax credits are an important source of capital but are uncertain due to the uneven application of guidelines.

Table 1
World AMT Market

Chart Data ($ billion)



Firms of all sizes are faced with the need to find qualified staff, and to provide on-the-job training.

Companies are finding it difficult to send service personnel on short notice into the U.S., due to problems at the border with customs procedures.

Strategic Direction

The continued growth of the AMT sector depends on the development of leading-edge products, through research conducted individually and within domestic and international consortia, coupled with market research and intelligence and aggressive sales efforts in existing and new market areas. Governments must also do their part to serve the needs of the sector.

Goal: to increase shipments by the year 2000 to $4 billion, through sales to existing markets in Canada and the United States, and through the development of new markets in Europe, Mexico, South America and Asia.

To achieve this goal, the Government, in co-operation with industry, will:

- help companies to identify and take advantage of emerging markets and specific market opportunities, through market watch efforts in missions abroad. This will be enhanced through a program to better acquaint trade commissioners in key foreign markets with Canadian firms and their capabilities (Industry Canada [IC], Department of Foreign Affairs and International Trade [DFAIT], Sectoral Advisory Group on International Trade [SAGIT]);
- work with DFAIT and other relevant departments to address problems affecting the sector, such as cross-border irritants for Canadian technicians entering the U.S. (IC, DFAIT, other relevant departments);
- develop a better appreciation among domestic and foreign manufacturers of Canadian capabilities, through the production of a "Canadian Tool Box" of AMT firms (IC, DFAIT);
- compile a list of "Best Practices" in Canada, featuring successful networks and technology transfer mechanisms. These will become part of departmental INSIGHT products, and will be available electronically to trade commissioners and others around the globe on the Internet (IC);
- focus in the United States, the European Union (EU) and Asia on value-added technology and trade-related activities with small and medium-sized technology-driven firms (IC, DFAIT);
- encourage AMT research projects by Canadian companies in conjunction with companies, universities and technology institutes abroad. Examples include collaborative research projects and manufacturing engineer exchanges, which are supported either through the Japan Science and Technology Fund or through the Canada/Germany S&T agreement, which has sponsored more than 300 projects over the past 25 years (IC, DFAIT);
- establish closer links with the National Centre for Manufacturing Science (NCMS), in Ann Arbor, Michigan, which receives funding from the U.S. Air Force and undertakes collaborative R&D projects in new manufacturing technologies and processes. It is the intention to place a Canadian government official in the U.S. offices of NCMS for a period of one year, to help Canadian firms gain entry to projects (IC, DFAIT).

Further Information

Material relevant to the sector analysis and the strategy: "Phase III Implementation Proposal," available through the Manufacturing and Processing Technologies Branch (MPT) of Industry Canada; News Release dated October 19, 1994, "Canadian to Chair Steering Committee for International Program of R&D in Manufacturing Systems," available through the MPT Branch; and, "The Year 2000 Report," available through the MPT Branch.

Contacts

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ADVANCED MANUFACTURING TECHNOLOGIES

(The activities listed below also include those relating to sectors associated with advanced manufacturing technologies, such as tools, dies and moulds, materials handling, and packaging.)

Activity	Date	Location	Dept.	Contact
Africa and the Middle East				
Interpack '96: Saudi Buyers	09-May-96	Dusseldorf	DFAIT	613-944-5984
Asia-Pacific South				
Manufacturing Surabaya Expo: Info Booth	01-May-96	Surabaya, Java	DFAIT	613-992-0959
Foodpro '96 Australia: Info Booth	01-Jul-96	Sydney	DFAIT	613-995-7692
East Asia				
Instrumentation Mission	12-May-96	Islamabad/Karachi	DFAIT	613-992-0952
Industrial Machinery Study Update	01-Jul-96	New Delhi	DFAIT	613-996-5903
Hong Kong/South China Industrial Technologies: Market Profile Study	01-Sep-96	Hong Kong/ Southern China	DFAIT	613-996 6987
Advanced Technology Buyers' Mission from India	24-Sep-96	Ottawa/Montreal/ Toronto	DFAIT	613-996-5903
Canadian Machine Tool Show: Buyers from India	25-Sept-97	Toronto	DFAIT	613-996-5903
Manufacturing Technology South China: Market Study	01-Jan-97	South China	DFAIT	613-996-6987
Latin America and the Caribbean				
Semana Mexicana de la Manufactura: Info Booth	01-June-96	Mexico City	DFAIT	613-995-8742
Expo Metal Mecanica/Ambiente: Info Booth	31-Aug-96	Guadalajara	DFAIT	613-995-8742
Canadian Manufacturing Week: Mission from Mexico	01-Oct-96	Toronto	DFAIT	613-995-8742
Technos '96: Info Booth	01-Oct-96	Monterrey	DFAIT	613-995-8742
Pac Ex: Mission from Trinidad and Tobago	01-Dec-96	Toronto	DFAIT	613-943-8807
Expo Manufactura: Info Booth	13-Mar-97	Monterrey	DFAIT	613-995-8742
United States				
Technology Transfer Mission	10-Apr-96	Ann Arbor/Cleveland	DFAIT	613-944-2375
North American Material Handling Show: Mission	14-Apr-96	Detroit	DFAIT	613-944-6576
International Programmable Controls Conference: Mission	13-May-96	Detroit	DFAIT	613-944-6576
Advanced Tooling Mission from the U.S.	22-May-96	Windsor	DFAIT	613-944-6576
AMT Strategic Alliance Mission from the U.S. Midwest	01-Jun-96	Toronto	DFAIT	613-944-6576
Process Control Instrumentation Opportunities: Study	01-Jun-96	Seattle	DFAIT	613-944-6576
IMTS '96: Strategic Alliance Mission	05-Jun-96	Chicago	DFAIT	613-944-6576
Montreal Fabricating and Machine Tool/National Factory Automation Show: Mission from the U.S.	14-July-96	Montreal	DFAIT	613-944-6576

Note: Dates and locations are subject to change.

Activity	Date	Location	Dept.	Contact
IMTS '96: NEBS Mission	04-Sep-96	Chicago	DFAIT	613-944-6577
IMTS '96: Info Booth	04-Sep-96	Chicago	DFAIT	613-944-6576
Centres of Excellence/Selected Associations: Mission from the U.S.	01-Oct-96	Toronto/Windsor/ Montreal	DFAIT	613-944-6576
Canadian Manufacturing Week: Mission from the U.S.	01-Oct-96	Toronto	DFAIT	613-944-6576
Toronto Maintenance/Design Engineering Show: Mission from the U.S.	01-Oct-96	Toronto	DFAIT	613-944-6576
Canadian Machine Tool Show: Mission from the U.S.	10-Oct-96	Toronto	DFAIT	613-944-6576
Rep Locator Solo Shows	05-Dec-96	Cleveland/Detroit	DFAIT	613-944-6576
Centres of Excellence: Mission from the U.S.	15-Dec-96	Toronto	DFAIT	613-944-6576
Machine Tool Buyer's Mission from the U.S.	05-Feb-97	Windsor	DFAIT	613-944-6576
General Industrial Buyers' Mission from the U.S.	06-Mar-97	Toronto	DFAIT	613-944-6576
National Manufacturing Week: NEBS Mission	15-Mar-97	Chicago	DFAIT	613-944-6577
Western Europe and the European Union				
European Strategic Alliances Program: Seminars	Ongoing	TBD	DFAIT	613-995-7941
Interpack '96: Info Booth	09-May-96	Dusseldorf	DFAIT	613-9963774
HET Instrumentation '96: Info Booth	01-Oct-96	Utrecht	DFAIT	613-995-6435

For up-to-date and detailed information on the activities in this document and those contained in other sectors, you may consult the CIBS Compendium. This on-line compilation of activities planned by the federal and provincial governments is continuously revised and is accessible via the Department of Foreign Affairs and International Trade World Wide Web site, at the following address: http://www.dfait-maeci.gc.ca

Acronyms and ini…ialisms used in Canada's Inter…national Business Strategy

(This list does not include sector-specific references.)

AAFC	Agriculture a…
ACOA	Atlantic Cana…
APEC	Asia-Pacific … forum
ASEAN	Association o…
BBS	electronic bul…
BOOT	build, own/op…
BOSS	Business Opp… System
CCC	Canadian Com…
CIBS	Canada's Inter… Strategy
CIDA	Canadian Inter… Agency
CIS	Commonwealth…
CSA	Canadian Stan…
DFAIT	Department of … International T…
DFO	Department of …
DND	Department of …
EC	Environment Ca…
EDC	Export Develop…
EU	European Union
FITT	Forum for Inter…
FORDQ	Federal Office of Regional Development — Quebec
FSU	former Soviet Union
FTA	Canada-U.S. Free Trade Agreement
GATT	General Agreement on Tariffs and Trade
GDP	gross domestic product
GNP	gross national product
HRDC	Human Resources Development Canada

…rnational Business Opportunities …tre	
…stry Canada	
…rnational Development Research …re	
…national financial institution	
…rnational Standards Organization	
…national Trade Advisory …nittee	
…national Trade Centre	
…try of Agriculture, Fisheries and … of Quebec	
…lateral development bank	
…national enterprise	
…American Free Trade Agreement	
…Atlantic Treaty Organization	
…al Research Council	
…l Resources Canada	
…l Resources Canada — …ian Forest Service	
…al Sector Team	
…zation for Economic …ration and Development	
…rogram for Export Marketing Development	
R&D	research and development
S&T	science and technology
SAGIT	Sectoral Advisory Group on International Trade
SME	small and medium-sized enterprise
UNEP	United Nations Environmental Program
WED	Western Economic Diversification
WTO	World Trade Organization

Acronyms and ini ational Business Strateg

(This list does not include

AAFC	Agriculture and Agri-Food Canada
ACOA	Atlantic Canada Opportunities Agency
APEC	Asia-Pacific Economic Co-operation forum
ASEAN	Association of Southeast Asian Nations
BBS	electronic bulletin board system
BOOT	build, own/operate, transfer
BOSS	Business Opportunities Sourcing System
CCC	Canadian Commercial Corporation
CIBS	Canada's International Business Strategy
CIDA	Canadian International Development Agency
CIS	Commonwealth of Independent States
CSA	Canadian Standards Association
DFAIT	Department of Foreign Affairs and International Trade
DFO	Department of Fisheries and Oceans
DND	Department of National Defence
EC	Environment Canada
EDC	Export Development Corporation
EU	European Union
FITT	Forum for International Trade Training
FORDQ	Federal Office of Regional Development — Quebec
FSU	former Soviet Union
FTA	Canada-U.S. Free Trade Agreement
GATT	General Agreement on Tariffs and Trade
GDP	gross domestic product
GNP	gross national product
HRDC	Human Resources Development Canada
IBOC	International Business Opportunities Centre
IC	Industry Canada
IDRC	International Development Research Centre
IFI	international financial institution
ISO	International Standards Organization
ITAC	International Trade Advisory Committee
ITC	International Trade Centre
MAPAQ	Ministry of Agriculture, Fisheries and Food of Quebec
MDB	multilateral development bank
MNE	multinational enterprise
NAFTA	North American Free Trade Agreement
NATO	North Atlantic Treaty Organization
NRC	National Research Council
NRCan	Natural Resources Canada
NRCan-CFS	Natural Resources Canada — Canadian Forest Service
NST	National Sector Team
OECD	Organization for Economic Co-operation and Development
PEMD	Program for Export Marketing Development
R&D	research and development
S&T	science and technology
SAGIT	Sectoral Advisory Group on International Trade
SME	small and medium-sized enterprise
UNEP	United Nations Environmental Program
WED	Western Economic Diversification
WTO	World Trade Organization

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