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The Multinational Firm, Foreign Direct Investment, and Canadian Science Policy

by Arthur J. Cordell

December 1971

The Multinational Firm, Foreign Direct Investment, and Canadian Science Policy

The human race, to which so many of my readers belong, has been playing at children's games from the beginning. . .And one of the games to which it is most attached is called, "Keep to-morrow dark," and which is also named (by the rustics in Shropshire, I have no doubt) "Cheat the Prophet." The players listen very carefully and respectfully to all that the clever men have to say about what is to happen in the next generation. The players then wait until all the clever men are dead, and bury them nicely. They then go and do something else. That is all. For a race of simple tastes, however, it is great fun.

G.K. Chesterton, *The Napoleon of Notting Hill*

The truth shall make ye free—but first it shall make ye miserable.

Proverb.

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Arthur J. Cordell taught economics as a teaching assistant at Cornell University; was a staff economist with the National Commission on Food Marketing, Washington, D.C., a U.S. Presidential Commission organized to report on the structure, behaviour and performance of the food distribution sector within the United States; was Senior Associate with Joel Dean Associates, a firm of economic and management consultants, New York; served as Assistant Manager of economic analysis at General Foods Corporation, White Plains, New York; and since October 1968 has been a Science Adviser with the Science Council.

Publications:
A number of academic publications dealing mainly with various aspects of the theories of imperfect and monopolistic competition and the changing nature of the analysis of industrial organization.

Other:
Participant in a number of symposia concerned with economic growth in relation to environmental deterioration.

Foreword

Since joining the staff of the Council as a Science Adviser some three years ago, Dr. Cordell, the author of this report, has had an interest in the impact of multinational firms on the Canadian economy. Just over a year ago the Science Council Committee on Industrial Research and Innovation authorized a number of studies on various aspects of the industrial community in Canada. This background study report, The Multinational Firm, Foreign Direct Investment and Canadian Science Policy, was one of those prepared for the Committee as a result of this decision, and served as one of the major sources of information for Science Council Report No. 15, Innovation in a Cold Climate.

The subject of ownership of industry is seen to have important implications for a national science policy, especially that part of the policy which is aimed at increasing the effectiveness and innovative capability of Canadian science-based manufacturing industry. The propositions put forth as regards product and process innovation, effectiveness of Canadian management and export capability, as well as the possibility of Canada spawning multinational firms of its own will, I feel, serve to advance and enhance the level of national and international debate and discussion about this very timely issue.

As with all background studies published by the Council, this report represents the views of the author, which are not necessarily the views of the Council. The Council is publishing this report because it thinks it makes an important contribution to our understanding in this area.

We are most grateful for the wholehearted cooperation of those industries which were contacted during the study.

P.D. McTaggart-Cowan,
Executive Director,
Science Council of Canada.

October 1971

Acknowledgements

Much of this report rests on a study carried out by members of the Staff of the Science Council. While other results of the study will appear in forthcoming background reports, I would like to thank Dr. J.R. Armstrong (now of Canadian Industries Limited), Dr. P.L. Bourgault (now Dean of Applied Sciences, University of Sherbrooke), Dr. F. Kelly, and Mr. A.H. Wilson, for ideas, insights, help and encouragement. I would also like to thank others, on Staff and elsewhere, who read early drafts of the report and whose comments have helped to make it a more readable document. Finally, I would like to thank both Mrs. E.E. Chapman and Miss S.J. Booth, who had the unenviable task of typing the report.

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Introduction

The purpose of this study is to examine the question of foreign direct investment in Canada in the context of the formation of science policy. An examination has been made of the ways in which the behaviour of Canadian affiliates is affected by the policies of their multinational parent companies, with special emphasis on those activities which are, and can be, related to science policy.

This report is based primarily on a study of over 50 firms in Canada and a representative number of head offices in the United States, United Kingdom and Europe.[1] The study was carried out employing an interview and questionnaire technique. The questionnaires were designed to probe a wide variety of corporate behavioural areas. In addition, the questionnaires served to direct the interviews and to make them more stimulating and informational. It was thought to be important to interview actual firms rather than deal with published government data. We wanted to find out more about how and why the firms behaved as they did.

In addition to the study, this report draws on research for the Science Council on the nature of the multinational firm. A wide variety of business and academic literature has been read and scanned, and is cited whenever it serves to illuminate a particular section of the report. The author has also attended two very valuable and informative meetings of the American Management Association, which were designed to help corporations to be more successful in their international operations.

At the outset it was considered necessary to avoid handling aggregate data. Employing such data, an earlier study suggests that in some cases subsidiaries of non-resident owned firms perform relatively more research and development (R & D) than their Canadian counterparts.[2] Another researcher concludes that there is no relationship between ownership patterns and R & D.[3] In the course of examining the innovative behaviour and performance of non-resident subsidiaries it has become clear that published R & D data can be very misleading.

In particular, the relationship between a Canadian subsidiary's R & D and its capacity for innovation may be deceptive or obscure. To cite just one example which was uncovered by our research: a major subsidiary in Canada maintains a very impressive R & D establishment besides its equally impressive manufacturing facilities; to the casual observer there appears to be a "normal" laboratory and manufacturing operation; thus it is assumed that the lab reports to management and works with various entities of the total plant – production, market research, sales, etc.; upon further analysis and interviewing it was discovered that the head of R & D has little to do with the president of the subsidiary; in fact, both individuals report to different people in corporate headquarters abroad. R & D, in this case, is tied into the worldwide multinational research program, and production is primarily for

[1] The study upon which much of this report is based is described in Appendix A.

[2] cf. A.E. Safarian, *Foreign Ownership of Canadian Industry*, McGraw-Hill, 1966, pp. 280-286; and A.E. Safarian, *The Performance of Foreign-Owned Firms in Canada*, Private Planning Association, 1969, pp.49-53. The same thesis is developed in *Reviews of National Science Policy, Canada*, OECD, Paris. 1969, p. 251.

[3] N.H. Lithwick, *Canada's Science Policy and the Economy*, Methuen, 1969, pp. 82-83.

the Canadian market, with an international product mandate for items which account for less than 5 per cent of Canadian sales. The research program and results are coordinated with head office. Consequently, process or product innovations can be developed in Canada, the home country, or a third country. It is likely that, in an aggregate survey of this industry, the research and development expenditures of the laboratories would be counted as an expenditure by the particular subsidiary for R & D. This, however, is misleading. The expenditure does take place in Canada and is paid for by some part of the worldwide firm. Beyond that little can be said. Since there is little or no interaction between R & D and manufacturing, it is conceivable that a zero expenditure of an $X expenditure can have the same final impact on innovative ability, design capability and export potential in Canada.

The key to understanding why and how non-resident subsidiaries behave as they do lies in remembering that they are part of a larger entity. The Canadian component interacts closely with the larger entity. Technology transfer, capital, marketing plans, salary increases for top management, transfer of personnel to head office and to third countries, remittance of profits, transfer prices, export markets, and so on make up the bulk of the interaction. The relationship with a world- or continent-wide parent firm at once expands and contracts the potential of the subsidiary. Transfer of technology and management systems can make it a very effective competitor in the Canadian market; but these same transfers also make it a dependent entity. Impact in the market is paid for by inhibition of the entrepreneurial function. The investigator should bear in mind that top management in the subsidiary is rewarded by, and often advances to, the top corporate function in head office. Aims and aspirations are conditioned by this fact.

I. Patterns of Direct Investment in Canada

This report is deliberately aimed at an examination of direct, rather than portfolio, investment. While the two types do overlap, they can be differentiated according to the underlying intent.

In international business, direct investments are those made for the purpose of effective control over some foreign operation. The Dominion Bureau of Statistics (DBS) describes direct investment in the following way:

"Direct investments. . .are those investments in business enterprises which are sufficiently concentrated to constitute control of the concerns. The nature of the classification is such that potential control is implied rather than an actual exercise of control over business policy, although the latter may be present as is usually the case. Direct investments are usually in the form of equity ownership. The investors supply the capital assuming the largest burden of risk, technical knowledge and skills."[1]

The major reasons for direct investment are[2] (1) intensive cultivation of a foreign market, which can most efficiently be done by an arrangement which requires investment and direct, active control; (2) manufacturing abroad in order to enter a country or an area under a tariff or non-tariff barrier (automobiles, pharmaceuticals, food), or because of lower costs; and (3) to develop or protect a source of raw materials (rubber, copper, oil).

In contrast, portfolio investment is oriented toward a degree of risk consistent with a return on funds invested. Typically, a portfolio investment takes the form of bonds or debt capital, while direct investment takes the form of equity or ownership capital.

DBS defines portfolio investment as: "typically scattered minority holdings of securities which do not carry with them control of the enterprises in which the investments occur. Usually securities are public issues such as bonds and debentures of governments, municipalities and corporations and the stock of companies listed on stock exchanges, although less marketable issues may also constitute some parts of this type of investment."[3]

Direct investment is related to and associated with ownership and control. Portfolio investment is usually concerned with return on investment; here, ownership or control is not desired and, when the debt is paid, the portfolio investment is terminated. But in the case of direct investment there is no neat institutional way to sever the outside links. The relationship, since it is one of ownership, can continue in perpetuity.

The earliest evidence of outside direct investment in Canada dates from the middle of the nineteenth century. United States investment in the Canadian lumber trade occurred before 1840, and American capital and technical assistance helped to found a cotton mill in Sherbrooke Québec, in 1844.[4] Because of a growing awareness that the development of Canadian

[1] *Canada's International Investment Position, 1926-1954,* DBS, Ottawa, February 1956, p. 21.

[2] cf. Harold J. Heck, *The International Business Environment,* American Management Association, 1969, p. 31.

[3] *Canada's International Investment Position, 1926-1954,* DBS, Ottawa, February 1956, p. 21.

[4] Herbert Marshall, Frank A. Southard Jr., and Kenneth W. Taylor, *Canadian American Investment: A Study in International Investment,* Toronto, The Ryerson Press, 1936.

Table I.1–Book Value of Long-Term Investment in Canada by Foreigners, Selected Year Ends from 1900 to 1945

Year	Long-Term Investment					
	Total		Direct Investment		Portfolio Investment	
	$ millions	% of total	$ millions	% of total	$ millions	% of total
1900	1 232	100.0	–	–	–	–
1914	3 837	100.0	–	–	–	–
1918	4 536	100.0	–	–	–	–
1926	6 003	100.0	1 782	29.7	4 221	70.3
1930	7 614	100.0	2 427	31.9	5 187	68.1
1933	7 365	100.0	2 352	31.9	5 013	68.1
1939	6 913	100.0	2 296	33.2	4 617	66.8
1945	7 092	100.0	2 713	38.3	4 379	61.7

Source: Foreign Direct Investment in Canada, Selected Years from 1900 to 1945. Foreign Investment Division, Office of Economics, Department of Industry, Trade and Commerce.

natural resources required outside capital, a bill designed to invite American capital into Canada, and American participation in Canadian business, was introduced into the legislature of Upper Canada. Although this bill failed, others were passed which removed certain impediments to foreign participation. The flow of capital from south to north soon began in earnest:

"In 1874 Boston speculators bought the island of Campobello, New Brunswick, with a view to exploiting its timber and later developing it as a summer resort. In 1880 the New Brunswick Land and Lumber Company was organized by wealthy Montreal and New York men, with an original capital of $1,500,000. In 1885 Messrs. Todd and Company, of Calais, Maine, are reported to be rebuilding their fine mill at St. Margaret's Cove, Nova Scotia, where they have a large stock of logs. In Quebec we find in 1880 a Boston firm buying 1,400 acres of woodland as a reserve for its butter-tub factory, and in 1881 a Vermont lumber company building a fine subsidiary mill a few miles inside the Quebec border. In Ontario, W.E. and A.M. Dodge, of the Lackawanna Iron and Steel Company, established the Collingwood Lumber Company in 1879 which, within a few years, became one of the prominent firms engaged in the Northern Ontario lumber industry. In 1882 John Dollar was the manager of the large sawmill of the American Lumber Company at French River, Ontario. In 1885 a Michigan syndicate purchased limits containing 200,000,000 feet of pine on the north shore of Lake Huron. The first reference to Americans acquiring British Columbia limits is in 1887, when the Minneapolis and Ontario Lumber Company bought 1,500,000,000 feet of standing timber in that Province."[5]

The earliest investment in Canada was, in the main, connected with logging. But in 1886, Canada increased the export duty on logs to $2.00 per thousand feet. The intent was to force American timber companies to establish sawmills in Canada. The strategy worked, and soon a number of

[5] *Ibid.*, pp. 6,7.

American companies erected mills in Canada.[6]

In the manufacturing sector, scattered indications of foreign investment (chiefly American) date back to the early nineteenth century. The earliest recorded evidence of a "branch plant" is in 1870.[7] By 1887, there were 48 "branch and controlled" plants in Canada. Another 34 firms were affiliated with American companies to some extent. These 82 firms were mainly in the metal and textile industries.

In addition, a wide variety of other ventures were undertaken in Canada.

"In 1876 the Windsor and Hamilton Powder Mills were purchased by the American powder trust, the later Canadian properties of which are now part of Canadian Industries Ltd. In 1877 Belding Brothers, silk manufacturers, opened a plant in Montreal with 90 employees. In 1879 Wyeth and Son, pharmaceutical manufacturers of Philadelphia, opened a Montreal plant; Meriden Britannia Ware of Connecticut (now International Silver Company) established its Hamilton factory; and Cleveland capitalists apparently acquired control of the Ontario Rolling Mills and the Hamilton Nail Works (which after various changes of name and ownership became part of the Steel Company of Canada). In 1882 the Ingersoll Rock-Drill Company (now Canadian Ingersoll-Rand) was incorporated in Montreal. In 1883 the North American Agricultural Implement and General Manufacturing Company was formed with a capital of $1,000,000 and was a merger of two London, Ontario, factories and a Winnipeg selling organization. The 2 American directors (out of a total of 7) were Charles Deere, President of the John Deere Plough Company, Moline, Illinois and M. Rosenfield, President of the Moline Waggon Company. Also in 1883 there were established the Edison Electric Light Company in Hamilton (later one of the constituents of Canadian General Electric), and the Singer Sewing Machine Company in Montreal. In 1884 Chase and Sanborn opened a Montreal factory and warehouse."[8]

By 1900 some 70 of the "branch plant" type of plants were to be found in Canada. During the first half of the twentieth century the value of foreign direct investment grew consistently, with the manufacturing sector predominating in share of dollars. The book value of direct investment increased from $1 782 million in 1926 to $17 208 million in 1965. From 1946 to 1965 there was an average annual growth rate of 10.0 per cent. Portfolio investment rose from $4 221 million in 1926 to $10 128 million in 1965. The growth rate was much slower, and consequently, by 1952, direct investment came to be a relatively more important component of total foreign investment.

The predominant home for direct investment in Canada has been the manufacturing sector. From a high point in 1948 of almost 60 per cent, though, the manufacturing sector's share of foreign direct investment has declined statistically–to 42 per cent in 1965. In the main, this is attributable to the establishment of petroleum and gas as a separate analytical sector, and the withdrawal from the manufacturing sector of petroleum refining. (See Table I.4)

[6] *Ibid.*, p. 6.
[7] *Ibid.*, p. 11.
[8] *Ibid.*, pp. 13, 14, 15.

Table I.2–Book Value of Long-Term Investment in Canada by Foreigners, Year Ends 1946-1967

Year	Long-Term Investment							
	Total		Direct Investment		Portfolio Investment		Miscellaneous Investment[a]	
	$ millions	% of total	$ millions	% of total	$ millions	% of total	$ millions	% of total
1946	7 178	100.0	2 826	39.4	4 070	56.7	282	3.9
1947	7 188	100.0	2 986	41.5	3 912	54.4	290	4.0
1948	7 506	100.0	3 270	43.6	3 938	52.5	298	4.0
1949	7 960	100.0	3 586	45.1	4 072	51.2	302	3.8
1950	8 661	100.0	3 975	45.9	4 366	50.4	320	3.7
1951	9 477	100.0	4 520	47.7	4 629	48.8	328	3.5
1952	10 385	100.0	5 218	50.2	4 720	45.5	447	4.3
1953	11 461	100.0	6 003	52.4	4 991	43.5	467	4.1
1954	12 544	100.0	6 764	53.9	5 219	41.6	561	4.5
1955	13 473	100.0	7 728	47.4	5 104	37.9	641	4.8
1956	15 569	100.0	8 868	57.0	5 883	37.8	818	5.3
1957	17 464	100.0	10 129	58.0	6 456	37.0	879	5.0
1958	19 010	100.0	10 880	57.2	7 067	37.2	1 063	5.6
1959	20 857	100.0	11 906	57.1	7 666	36.8	1 285	6.2
1960	22 214	100.0	12 872	57.9	7 914	35.6	1 428	6.4
1961	23 606	100.0	13 737	58.2	8 173	34.6	1 696	7.2
1962	24 889	100.0	14 660	58.9	8 476	34.1	1 753	7.0
1963	26 134	100.0	15 434	59.1	8 929	34.2	1 771	6.8
1964	27 367	100.0	15 889	58.1	9 441	34.5	2 037	7.4
1965	29 507	100.0	17 208	58.3	10 128	34.3	2 171	7.4
1966	32 090	100.0	19 008	59.2	10 818	33.7	2 264	7.1
1967	34 702	100.0	20 699	59.6	11 572	33.4	2 431	7.0

[a]Miscellaneous investments are similar in effect to portfolio investment and consist of holdings of securities by private investment companies in Canada on behalf of non-residents. They include estate and trust funds, real estate and mortgages.

Note: Data for 1966 and 1967 are not strictly comparable with earlier years.

Source: Foreign Direct Investment in Canada Since the Second World War. Foreign Investment Division, Office of Economics, Department of Industry, Trade and Commerce, January 1970. Table A-3, and Amendment List Number 2, November 1970.

Table I.3–Book Value of Direct Investment in Canada, by Industrial Group, Selected Year Ends from 1926 to 1967 (millions of dollars)

Year	Total	Industrial Group						
		Petroleum and natural gas	Other mining and smelting	Manufacturing	Merchandising	Financial	Utilities	Other enterprises
1926	1 782	169		944	134	209	275	51
1930	2 427	237		1 199	173	304	450	64
1933	2 352	238		1 122	165	311	455	61
1939	2 296	228		1 142	168	284	415	59
1945	2 713	277		1 453	208	339	376	60
1946	2 826	264		1 534	225	358	385	60
1947	2 986	272		1 680	247	356	367	64
1948	3 270	294		1 938	260	339	368	71
1949	3 586	349		2 146	281	336	397	77
1950	3 975	476		2 331	313	364	399	92
1951	4 520	627		2 619	372	378	412	112
1952	5 220	850		2 995	431	417	404	123
1953	6 003	1 129		3 320	471	506	436	141
1954	6 695	1 300		3 657	506	626	467	139
1955	7 728	1 754	811	3 434[a]	538	706	320[c]	165
1956	8 868	2 144	908	3 906	605	818	292	195
1957	10 129	2 559	1 044	4 376	621	1 026	286	217
1958	10 880	2 816	1 116	4 668	684	1 073	287	236
1959	11 906	3 082	1 223	5 011	761	1 289	282	258
1960	12 872	3 313	1 439	5 342	757	1 464	285	272
1961	13 737	3 534	1 549	5 589	804	1 660	289	312
1962	14 660	3 901	1 686	5 819	859	1 769	294	332
1963	15 434	4 119	1 758	6 182	883	1 867	299	326
1964	15 889[b]	4 201	1 915	6 545	967	1 596[b]	301	364
1965	17 208	4 530	2 018	7 185	1 057	1 685	306	427
1966	19 008	5 012	2 279	7 890	1 132	1 889	318	488
1967	20 699	5 269	2 547	8 599	1 252	2 170	344	518

[a]Petroleum refining has been excluded since 1955.
[b]New series not strictly comparable with earlier years.
[c]Since 1955 pipe lines are excluded.
Note: Total may not add up because of rounding.
Sources: |*Foreign Direct Investment in Canada, Selected Years from 1900 to 1945,* pp.17-18 and *Foreign Direct Investment in Canada Since the Second World War.* Foreign Investment Division, Office of Economics, Department of Industry, Trade and Commerce, January 1970; and Amendment List Number 2, November 1970. Data for 1966 and 1967 are not strictly comparable with earlier years.

Table I.4–Percentage Distribution of Book Value of Direct Investment in Canada, by Industrial Group, Selected Year Ends from 1926 to 1967 (per cent)

Year	Total	Industrial Group						
		Petroleum and natural gas	Other mining and smelting	Manufacturing	Merchandising	Financial	Utilities	Other enterprises
1926	100.0	9.5		53.0	7.5	11.7	15.4	2.9
1930	100.0	9.8		49.4	7.1	12.5	18.5	2.6
1933	100.0	10.1		47.7	7.0	13.2	19.3	2.6
1939	100.0	9.9		50.1	7.3	12.4	18.1	2.6
1945	100.0	10.2		53.6	7.7	12.5	13.8	2.2
1946	100.0	9.3		54.3	8.0	12.7	13.6	2.1
1947	100.0	9.1		56.3	8.3	11.9	12.3	2.1
1948	100.0	9.0		59.3	8.0	10.4	11.2	2.2
1949	100.0	9.7		59.8	7.8	9.4	11.1	2.1
1950	100.0	12.0		58.6	7.9	9.2	10.0	2.3
1951	100.0	13.9		57.9	8.2	8.4	9.1	2.5
1952	100.0	16.3		57.4	8.2	8.0	7.7	2.4
1953	100.0	18.8		55.3	7.8	8.4	7.3	2.3
1954	100.0	19.4		54.6	7.6	9.4	7.0	2.1
1955	100.0	22.7	10.5	44.4[a]	7.0	9.1	4.1[c]	2.1
1956	100.0	24.2	10.2	44.0	6.8	9.2	3.3	2.2
1957	100.0	25.3	10.3	43.2	6.1	10.1	2.8	2.1
1958	100.0	25.9	10.2	42.9	6.3	9.9	2.6	2.2
1959	100.0	25.9	10.3	42.1	6.4	10.8	2.4	2.2
1960	100.0	25.7	11.2	41.5	5.9	11.4	2.2	2.1
1961	100.0	25.7	11.3	40.7	5.8	12.1	2.1	2.3
1962	100.0	26.6	11.5	39.7	5.8	12.1	2.0	2.3
1963	100.0	26.7	11.4	40.0	5.7	12.1	1.9	2.1
1964	100.0[b]	26.4	12.0	41.2	6.1	10.0[b]	1.9	2.3
1965	100.0	26.3	11.7	41.8	6.1	9.8	1.8	2.5
1966	100.0	26.4	12.0	41.5	5.9	9.9	1.7	2.6
1967	100.0	25.4	12.3	41.5	6.1	10.5	1.7	2.5

[a]Petroleum refining has been excluded since 1955.
[b]New series not strictly comparable with earlier years.
[c]Since 1955 pipe lines are excluded.
Note: Totals may not add up because of rounding.
Sources: Foreign Direct Investment in Canada, Selected Years from 1900 to 1945, pages 17-18 and *Foreign Direct Investment in Canada Since the Second World War,* Foreign Investment Division, Office of Economics, Department of Industry, Trade and Commerce, January 1970; and Amendment List Number 2, November 1970. Data for 1966 and 1967 are not strictly comparable with earlier years.

The Canadian tariff has been the major force in attracting direct investment over the years. Rising Canadian tariffs over the years made it almost inevitable that an increasingly significant amount of foreign direct investment would flow into Canada. Early Canadian policymakers saw this as the success of the tariff policies. Tariffs were designed to encourage production of goods in Canada. Little thought was apparently given to ownership; rather, growing aggregate production figures were cited, as criteria of success.[9]

Another early attraction for a Canadian location lay in the ability to operate inside the British system of preferential tariffs for the countries of the old British empire. But over time, as Imperial (later Commonwealth) preferences have diminished, and as United States firms have become more multinational in structure and established operating subsidiaries in the United Kingdom and in many Commonwealth countries, the advantages offered by a Canadian location have diminished considerably. A less often cited reason for locating in Canada, and probably one of minor importance, was the response to various "buy Canadian" policies which were, intermittently, a part of the early Canadian industrial scene.

It is important to reiterate that the most important reason for establishing in Canada was the tariff. Setting up operations primarily to service a protected Canadian market had a profound impact on management or ganization, reporting relationships, subsidiary autonomy, potential capacity to export, and the quantity and quality of research and development activities.

There does not appear to have been a predominant form of structural relationship between the subsidiary and the parent. However, there is some historical evidence that Canada has been considered by United States firms more as a division of their domestic market than as part of the world-wide foreign market. In 1936 a major work on Canadian industry noted that, "Head offices in the industrial northeast United States are, in many cases, in easier contact with their Canadian than with some of their more distant American branches."[10]

While it is only in the post-World War II period that the concept of the multinational corporation has been developed, the Canadian experience with foreign ownership makes it an interesting test case in which to view the costs and benefits of this type of activity.[11] Canada currently has examples of a wide variety of foreign operations, extending from apparently autonomous operations to completely captive branches that do not even possess a financial function. One Canadian subsidiary maintains such close contact with the parent operation that, when products are sold by the Canadian subsidiary, payment is made directly to the United States parent operation. But historically, there has been little examination of the costs and benefits of foreign ownership to Canada. As Professor Donald Creighton notes:

[9] Donald Creighton, *Canada's First Century,* MacMillan of Canada, Toronto 1970, p. 76.

[10] Marshall, Southard, Taylor, *op. cit.,* p. 23.

[11] One writer notes "The significance of the Canadian ventures was that for the first time in history, foreign-owned companies were accorded substantially the same rights and privileges under formal charters of incorporation as were domestic firms. *This was a large step toward multinational enterprise.*" (emphasis supplied). Endel J. Kolde, *International Business Enterprise,* Prentice-Hall, 1968, p. 226.

"Canada had always welcomed the influx of foreign capital on terms more liberal than those offered by any other industrialized nation in the world. Canadians assumed that American capital had enabled them to develop their resources and expand their industries more quickly than they could have done with their own means. They were equally convinced that American scientific knowledge, technological expertise, and managerial skill had helped to lift Canadian industrial productivity to a high level otherwise impossible of attainment. . . .The great American multinational corporation had never yet come under critical scrutiny in Canada. Canadians had scarcely begun to suspect that massive American investment might be impeding the growth of a native Canadian capital market, lowering the quality of Canadian industrial management and entrepreneurship, reducing the time and money spent in Canada on scientific and technological research. . . ."[12]

Viewed from the perspective of the 1970s, the early Canadian policy-makers might seem to have been myopic. But those who are now concerned with exploring the implications of foreign direct investment should avoid taking an unduly harsh approach to decisions that date back to the early years of the Confederation period. The legislators who first encouraged American investment and ownership were reflecting ideas that seemed perfectly sound at the time, and that have been prevalent right down to the last few years. By any contemporary standard, they were well-motivated—particularly if one focuses on short-run policy considerations. For the past 150 years industrialization has been the basis on which Great Power status among nations has been achieved. Little wonder, therefore, that industrialization was sought as an end in itself, and that quantitative criteria of success were seldom diluted with a qualitative evaluation of who owned what and of the implications of the prevailing pattern of development.

We are currently in the midst of a re-evaluation of many notions which have been accepted in the past without question. Such familiar concepts as "employment", "productivity", "economic growth", "industrialization" and "economic development" have begun to alter in meaning in recent years as the definition of Great Power status has changed. In the age of science and technology, Great Power status seems to be associated less directly with crude indices of industrial prowess and more with achievements associated with technological innovation. In the age of ecology and concern for the environment, technological achievements take precedence over belching smokestacks which, in the not so distant past, were regarded as *prima facie* evidence of progress.

The Great Power possesses technological sovereignty. By definition the technological leaders have design capability. For these nations, a national objective to reach the moon can be set and realized; and it can be realized, in large measure, without depending on outside scientific or technological help. As Professor Robert Gilpin has noted:

"Today Great Power status accrues only to those nations which are leaders in all phases of basic research and which possess the financial and managerial means to convert new knowledge into advanced technologies. In

[12] Creighton, *op. cit.*, pp. 286-287.

the case of the two superpowers, eminence in science and technology go hand-in-hand, and it appears most unlikely that any nation or group of nations can ever again aspire to a dominant role in international politics without possessing a strong, indigenous scientific and technological capability. International politics has passed from the era of traditional, industrial nation-states to one dominated by the scientific nation-states."[13]

Those who are not among the Great Powers lack this high degree of technological sovereignty. In earlier times, colonial or dependent status was manifest in the export or raw materials and the import of finished products. Today, a kind of "colonial status" may consist of the import of technology in the context of foreign direct investment.

These days, many question whether a high degree of industrialization, a high and rising gross national product, and a favourable balance of payments can be accepted uncritically as signs of national success. Internationally we note a new preoccupation with "technology gaps" and how these can be overcome. The rules of the game and the standards of success have shifted away from industrialization and trade *per se* to a more subtle and sophisticated kind of development. While few countries can achieve the degree of technological sovereignty associated with the Great Powers, most countries would nevertheless like to decrease their absolute or relative degree of technological dependence. A recent report on the subject by the Organisation for Economic Cooperation and Development (OECD) sums up the problem:

". . .it is the apparent predominance of the latter mechanism [U.S. firms and subsidiaries] in certain sectors which is a cause for concern in certain Member countries, who feel that they may thereby have little influence in future on the pace and direction of technological advance, and will not be able to relate such technological advance to the fulfillment of certain economic, social and other national objectives."[14]

The ball game has indeed changed. We are now, as a nation, concerned with the qualitative aspects of life. We have produced a great number of scientists and engineers in the expectation that Canadian "science-based" industry would be developing and would in turn be developed by their presence. For a wide variety of reasons, this expectation has not been realized. At the same time, we have begun to reassess what it is we want as a nation.

Canada has mounted an effort at the various governmental levels to curb the more deleterious effects of pollution. This may lead to a national decision to trade off some degree of economic growth to achieve a more desirable environment. Or, to take another case: past preoccupation with a favourable balance of trade in aggregate terms has given way to a new concern with composition of exports and imports. Are we importing technologically sophisticated products and exporting primary, or labour-intensive, manu-

[13] Robert Gilpin, *France In the Age of the Scientific State,* Princeton, N.J., 1968, p. 25. See also, Robert Gilpin, "European Disunion and the Technology Gap", *The Public Interest,* Winter 1968, pp. 43-54.

[14] OECD, *Gaps in Technology,* General Report, Paris, 1968, p. 31.

factured products? Again, a more sophisticated version of the "hewers of wood and drawers of water argument" had to do with a concern with the problem of the "brain drain". Much has been written on both sides of the argument. One can only note that the results of an outflow of highly talented people can have an impact on the pattern of national, economic, scientific and cultural development. A recently completed study of physics in England in the nineteenth century showed that more than half of all the significant work came from 3 per cent of the English physicists, and a further 25 per cent came from their students. If these results can be generalized, one can ask: What happens to a country when, for lack of challenging opportunity, the critical 5 per cent of industrial scientists, engineers, management and scholars of all types emigrate to a foreign country?

II. Structure of the International Corporation:

Introduction

Many of the foreign corporations that invest in Canada are relatively small and, outside their home markets, maintain few if any investments other than in Canada. But the predominant corporations, measured in terms of sales and investment, are large, and maintain investments in many areas of the world. A wide variety of names has been suggested to identify such firms: transnational, international and multinational.[1] In academic circles, a widespread debate is underway as to how best to define the multinational firm. Some have hypothesized that the particular firm goes through various development stages as it advances, from a firm with uncoordinated overseas operations, to one with a higher degree of worldwide planning and coordination, and finally to a corporation characterized by worldwide rationalization of production activities with a concomitant centralization and decentralization of the various corporate tasks.[2]

In this chapter we are not concerned with developing labels to describe international business activity. Rather, we are concerned with some of the implications for Canada which arise from the various international business structures which appear to be developing. We will use the words international and multinational interchangeably. The really significant development appears to be the extent to which the large corporations increasingly view themselves as becoming multinational.[3] This usually involves a change in the perspective of top management. The older division of a home and an export market gives way to a view of the world as one large self-contained market. The analogy often used is that of the United States. Companies do not see themselves as doing business in any *one* of the States, but rather, in *all* of the States. To do this efficiently it becomes necessary to centralize some operations (particularly headquarters functions) in or near the big cities such as New York, and to decentralize others on a regional basis (production, sales and distribution). Within a global market, the operations that lend themselves to centralization will be located in the "metropolitan" countries (in most cases, the home country). Decentralized activities can be located in any number of geographic regions.[4]

Some argue that the future of an industrialized world dominated by multinational corporations can be projected by looking at the activities and effects of national firms within the United States today. The relationship of New York to Montana within the United States may foreshadow the relationship of the United States to Australia or Canada. In Montana there is only a narrow range of activities in which the indigenous population can become involved. The nuclear physicist, corporation lawyer, machine tool designer, industrial and commercial artist must leave in order to achieve a modicum of self-fulfillment. The pull is to the centres of activity—usually

[1] cf. Virgin Salera, *Multinational Business*, Hougton-Mifflin, 1969, pp. 11-12.

[2] Sidney E. Rolfe, *The International Corporation*, Report to the 22nd Congress of the International Chamber of Commerce, Istanbul, 31 May-7 June, 1969, pp. 11-15.

[3] cf. "The Rewarding Strategies of Multinationalism", *Fortune*, Sept. 15, 1968.

[4] There is some evidence that the success of United States firms in establishing viable international operations is due to their having had the experience of managing complicated production, financial, marketing and management strategies on a regional basis within the United States. cf. Salera, *op. cit.*, p. 21. For an economic analysis of the U.S. history of overseas investment, see "Direct Foreign Investment of the United States", *Economic Review*, Federal Reserve Bank of Cleveland, March, 1971.

near the major population areas of the country as a whole.

When population movement of this type takes place, the State of Montana is depleted of its human capital, but the United States is enriched as a whole. On a world scale there is a different outcome. Internationally the pull is to the headquarters nations. Countries dominated by a high degree of direct foreign investment may increasingly be characterized by a diminishing potential for challenging career opportunities.[5]

The Canadian Subsidiary and the Multinational Corporation

In the course of carrying out the study of foreign direct investment in Canadian manufacturing industry, we discovered that subsidiaries in this sector are of two general types.

1. The first, and currently the most common type, is a branch plant, which is in many respects a "miniature-replica" of the parent operation. A wide variety of products is manufactured, and a variety of activities undertaken. The product line tends to resemble the parent product line, and the management structure resembles that of the parent as well. Thus such subsidiaries usually possess a divisional structure, a head office, a financial function, a planning function, and a research and development function. In a subsidiary of this type[6], the role of research and development is often to adapt the parent company's production technology to the smaller Canadian market, and to adapt products from the parent product line to the peculiarities of Canadian tastes and climate.

2. The second type of subsidiary is organized so as to be part of a larger market area. Its operations are rationalized in the context of a larger market area—usually the North American market. Sometimes, however, the rationalization encompasses other market areas as well. Thus the Canadian subsidiary may be responsible for sales not only in Canada, but also in parts of Europe or in selected countries such as South Africa and Australia.

In rationalized subsidiaries production is concentrated, usually in one or two product lines.[7] Management functions are skeletal. The chief executive holds the title of president but, with limited functions and authority, there are instances where he is indistinguishable from a plant manager. This type of operation usually involves a great deal of importing and exporting activity. Specific products are manufactured in Canada for shipment to allocated markets either in the United States or in the rest of the world. Research and development is either non-existent, or very sophisticated and highly developed. It is important to note, however, that even if the latter is the case, the

[5]This point is developed in the following: Stephen Hymer, "The Multinational Corporation and the Law of Uneven Development", *Economics and World Order*, J.N. Bhagwati, editor, New York, World Law Fund, 1970; and by Stephen Hymer and Paul Semonin, "Multinational Corporation and the International Division of Labor", Report to the Science Council of Canada (unpublished), July 1970.

[6]Throughout this report this type of subsidiary will be referred to as "miniature-replica" or as semi-autonomous.

[7]The "miniature-replica" and "rationalized" dichotomy in manufacturing has been found by others. cf. "The Costs and Benefits of Foreign Ownership", a paper presented to The Financial Executives Institute, Montreal, April 21, 1971, by Prof. Henry Mintzberg, Faculty of Management, McGill University, Montreal. See also Michael Z. Brooke and H. Remmes, *The Strategy of Multinational Enterprise*, London, Longman, 1970, pages 40-42, where the replication of functions in the subsidiary is described as the "mirror effect".

mere existence of such a research and development facility and the degree of sophistication of that facility do not necessarily benefit the Canadian economy. To evaluate the effect of R & D in operations of this sort, one must further examine the reporting relationships which are established within the subsidiary and between segments of the subsidiary and the parent operation.[8]

The way in which a subsidiary is organized in Canada is intimately related to the worldwide corporate organization. For example, a miniature-replica or semi-autonomous type of operation cannot be sustained in Canada for very long, once the parent firm reorganizes on a worldwide (or continent-wide) basis to rationalize management or production activities. Thus it is important to review the general modes of organization of international business operations, so as to view Canadian operations in a larger perspective.

Currently, international business structures are in a state of flux. According to an interviewee in the corporate planning department of an international division located at a world corporation's headquarters in New York, "we re-evaluate our corporate structure every six months as to whether we should reorganize along different lines".

Structure of both the Canadian operation and the global activities of the corporation reflect the characteristics of the particular business engaged in by the corporation. Structure is also determined by historical circumstances, such as the way in which the firm expanded its foreign operations–by acquisition or through the setting up of a wholly owned subsidiary. In addition, over time, the international segment of corporate activities changes in importance, vis-à-vis domestic sales. In order to achieve a greater degree of financial control, reorganizations are implemented on a worldwide scale. Any major reorganization has a profound effect on all subsidiaries–including, of course, the Canadian operations.

A key point is, however, that, as the corporations engage in their frequent re-evaluation of organizational strategies, they evolve toward a more logical (for them) international allocation of production, research, and planning centres. Each move will have implications for the subsidiaries. Rationalization for a world market implies that the Canadian operations will be, increasingly, either integrated into a North American structure or grouped with the international division. In either case there are implications as regards the potential for autonomous behaviour in *all* activities, including research and development and the capacity to export.

Possible Multinational Structures[9]

There is a wide variety of international organizational structures, and textbooks written for international managers usually state rather explicitly that there is no one way to organize an international business. In fact, some consultants in the field state explicitly that no two firms should have identical organizational structures.[10]

[8]The role of research and development in both types of subsidiaries will be studied in detail in Chapter III.

[9]For a thorough discussion of international organizational structure, see Endel J. Kolde, *International Business Enterprise,* Prentice-Hall, 1968, pp. 240-258.

[10]*Organizing the Worldwide Corporation,* Business International Corp., New York, 1970, pp. 1-5; and also, Myles L. Mace, "The President and International Operations", *Harvard Business Review* 44, No. 6 (November-December 1966).

The IBM structure of worldwide production and research evolved from a corporate policy which attempted to increase sales abroad and at the same time lessen the foreign exchange burden of each country. Shortly after World War II, many European countries imposed severe import restrictions because of the great shortage of foreign currency, especially U.S. dollars. IBM reasoned that if it set up a manufacturing activity in a foreign country, and exported some of the product to another country, then it could bargain with the host government to allow it to import some products from the United States or from a third country. A strong selling point was established for having an IBM subsidiary. The presence of an IBM facility would aid in technological transfer, employment and exports, and it would aid the balance of payments of the country in general. The country would not mind importing computers in finished form as long as it had something to do, somewhere along the line, in the production of the computer or in the production of peripheral equipment.[11]

Other multinational structures evolved from a mix of tradition and planning. The nature of the product, the consumers and the market in general all serve to influence the structure over time.

A corporation just beginning to experiment with overseas sales will probably choose to export. As it develops overseas markets it will then choose to service the markets through an international division. The growth of overseas business can lead to further streamlining, as the sales of the international division grow vis-à-vis the domestic corporation. This is especially true when overseas sales become a significant aspect of the corporation's total sales. A decision then has to be made as to how to approach the integration of overseas markets with the ongoing activities of the domestic corporation.

The domestic corporation possesses an organization which is geared to its specific needs. A wide variety of domestic approaches is possible, depending on the range of the product line and the complexity of the product sold. Thus a corporation that is organized with product divisions at home may decide to set up product divisions internationally. On the other hand, a domestic corporation which is established on a regional geographic divisional approach may try to establish a geographic structure on an international basis. A number of structures are possible, and combinations of geographic and product structures can be employed, especially when the corporation is a conglomerate engaged in different types of activity around the world. In this case, it may choose to maintain a very loose arrangement as regards the subsidiaries, and act, in effect, like an international holding company.

The attempt to delineate systematically the various organizational archetypes of world corporations is difficult, since even within one multinational company there are differences among subsidiaries. Large and small subsidiaries are found in developed and less developed countries of the world. To complicate the matrix there are differing degrees of local management skills. The lines dividing headquarters and subsidiary responsibilities are fuzzy—sometimes kept so deliberately. On top of all this, the centralization-decentralization debate continues.

[11] As described by Mr. K. Hendricks, Director of Treasurer Services, IBM World Trade, at the American Management Association International Management Course, January 26-30, 1970, New York.

Notwithstanding the above, it is useful to delineate briefly the main forms of multinational organization, since most firms do have a conscious organizational picture to which they aspire or which they think adequately mirrors their actual activities.

The three major forms of multinational organization are:

a) *the international division*–all sales outside the home market are the responsibility of the international division;

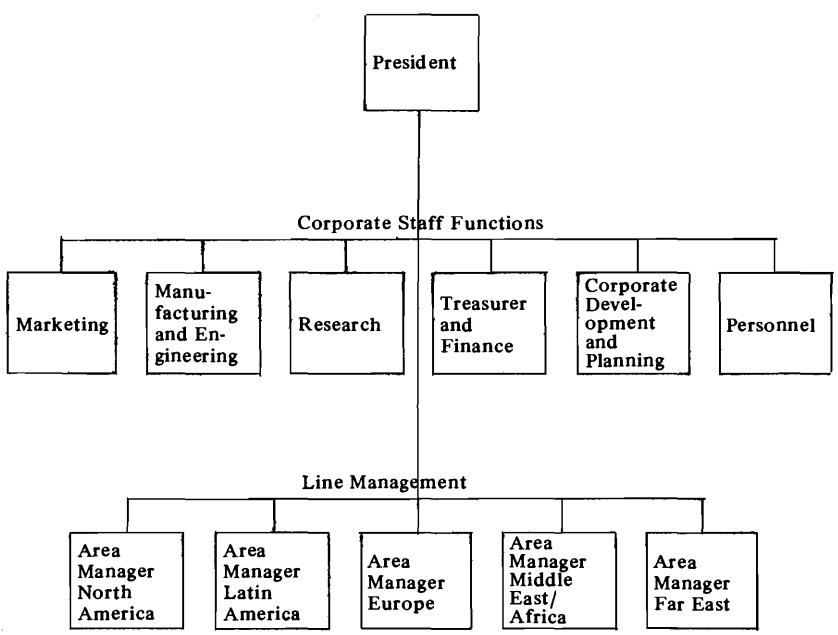
b) *the geographic structure*–area managers are responsible for all product lines within their region;

c) *the product structure*–product managers are responsible for a particular product line on a global basis.

The decision to move to a geographic- or product-oriented global approach is very often related to the nature of the particular product. Low-technology products which are geared toward the needs and tastes of the final consumer usually tend to be distributed in the context of a very specific market; in this situation the geographical market structure is often chosen. H.J. Heinz employs such an organizational structure. However, where the product is one of high technology, and where after-sales servicing is important, a product orientation is often chosen. Both General Electric and Monsanto have chosen an approach of this type.[12]

[12]The change from an international division to a geographic or product structure is not necessarily evolutionary. Many firms choose to maintain an international division–especially where the foreign market is fundamentally different from the domestic market. Fiat, Bristol-Meyers, Pirelli, General Telephone and Electronics (GT&E), as well as IBM (where IBM World Trade is the international division), all maintain international divisions. See *Organizing The Worldwide Corporation*, pp. 6-17.

Chart II.1–Geographically Oriented Structure: Area Managers with Responsibility for Appropriate Produce Line in a Particular Geographic Area



The final choice in a reorganization geared to a global approach is not as decisive as the underlying motivations. "The really decisive point in the transition to world enterprise is top management recognition that, to function effectively, the ultimate control of strategic planning and policy decisions must shift from decentralized subsidiaries or division locations to corporate headquarters, where a worldwide perspective can be brought to bear on the interests of the total enterprise."[13]

Both product and geographic structures tend to treat North America as a common marketing area. Either of these forms of corporate organization is consistent with a wholly or partially rationalized subsidiary (the second of the types defined on page 25). In contrast, the international division allows for either type of subsidiary operation–semi-autonomous or rationalized. A change from an international division approach, which groups Canadian operations with other international operations, to a global corporation organized along product or geographic lines, has the potential to inhibit significantly the degree of autonomy attainable by Canadian subsidiary management.

Autonomy of Canadian Subsidiaries

Many Canadian subsidiaries have been established by United States firms to service the Canadian market. The chief executive of an electrical products subsidiary formally stated that the central role of his firm is to transfer products and technology into the Canadian marketplace:

[13]G.H. Clee and W.M. Sachtjen, "Organizing A Worldwide Business", *Harvard Business Review*, Vol. 42, November-December 1964, p. 67.

Chart II.2–International Division: All Sales Outside Home Market the Responsibility of the International Division

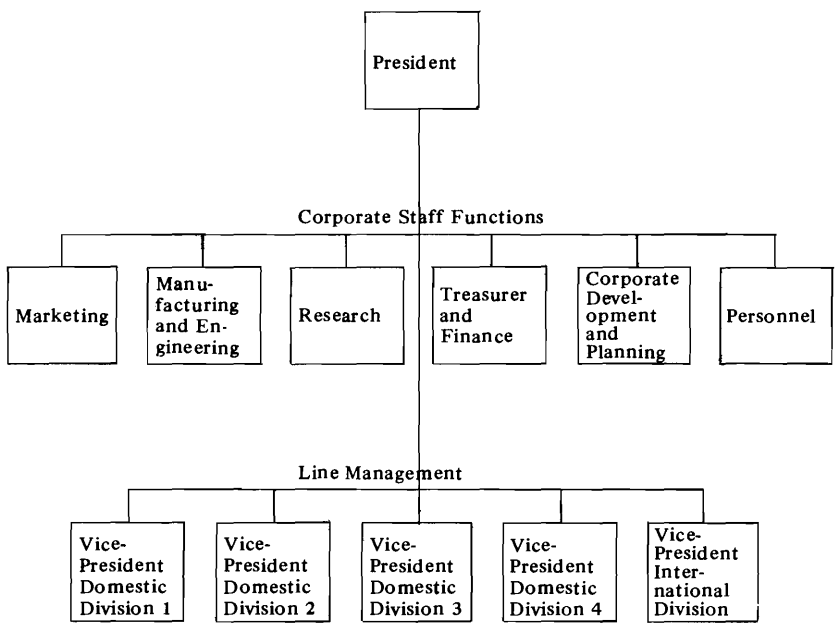
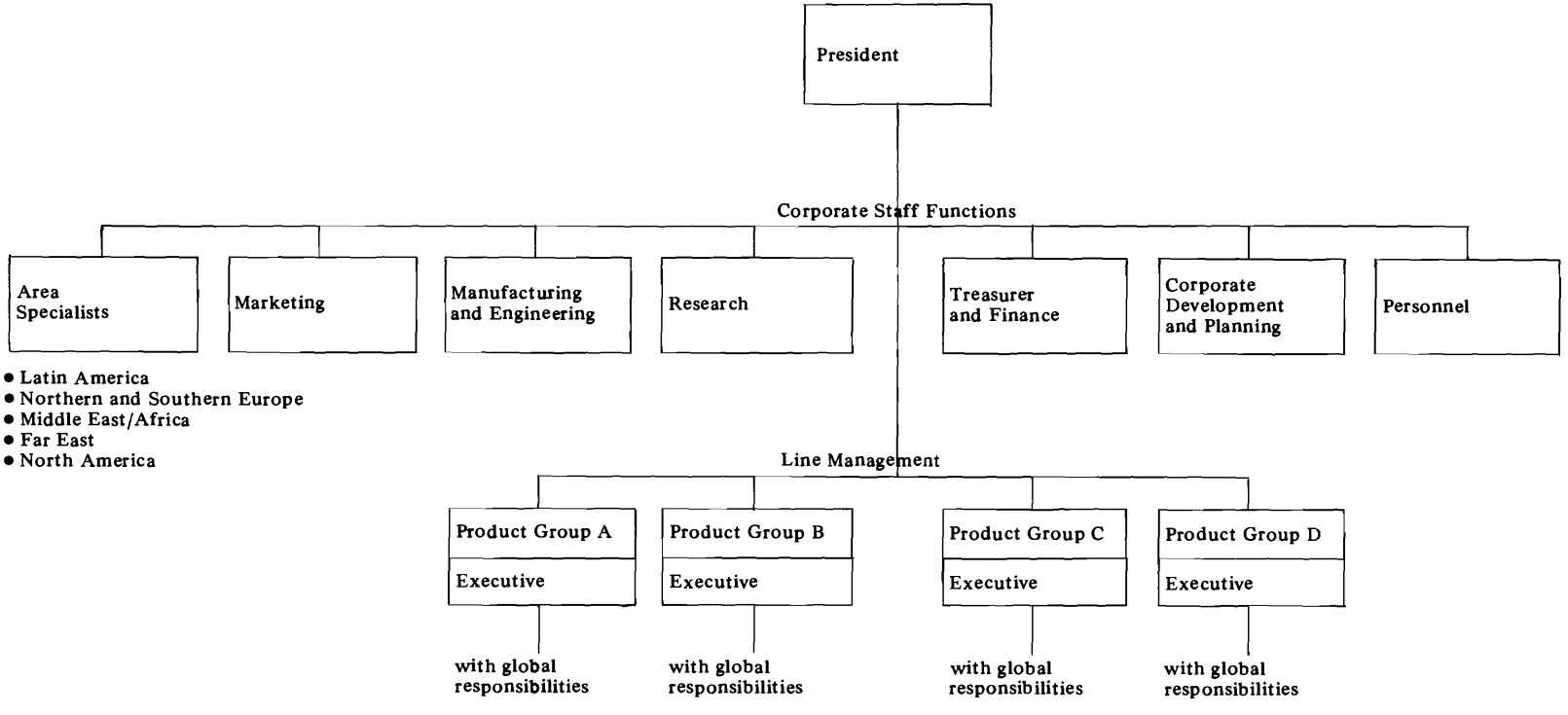


Chart II.3–Product-Oriented Structure: Each Product Group with Global Responsibilities



"The relationship between [the parent company] and [the Canadian company] is in harmony with Canada's national objectives because it is contributing to the welfare of the economy by effectively coupling parent company design, process technology and business knowledge with a company incorporated and operating under Canadian law."

An additional historical reason for establishing operations was to service the Commonwealth market from Canada. Before the era of rapid communications, United States firms used the Canadian operation to service overseas markets in lieu of establishing a subsidiary directly in the market in question. In many cases sales in the overseas markets were not sufficient to justify establishment of an entire plant behind the tariff wall overseas. Thus a large plant in Canada could service both the Canadian and certain overseas markets, especially where Canadian products could enter under preferential tariffs.[14] In other cases United States firms chose to establish a manufacturing outlet in Canada so that the Canadian market would not be pre-empted by a competitor.

A wide variety of reporting relationships with the parent operation has been established. In some cases, the chief executive of the Canadian operation does not formally report to any particular individual in the parent operation. Rather, he is given a profit objective and he then determines how his subsidiary can best meet that objective. Autonomy of this sort can take place only in a "miniature-replica" type of operation. Few examples of this degree of autonomy were found in our survey of the 50 firms. One firm that operates this way is a subsidiary of an international oil company. The interests of the parent operation are maintained by a leading figure in the parent firm who was appointed to the board of directors of the Canadian company. The subsidiary can undertake a wide variety of resource development activities *within the Canadian market* and within certain offshore limits. We were told that it can develop new markets, or acquire subsidiaries in fundamentally different markets and, in effect, could ultimately become a conglomerate. The simple test was to meet the profit objective set by headquarters.

A firm at the opposite extreme makes and sells a very high-technology product for the entire North American market. Though it maintains little research activity in Canada, it does have a considerable engineering complement here. The firm is little known in Canada and maintains a rather inconspicuous sales office. It doesn't even bother to create the fiction of a company president and other "top management" positions in Canada. One discrete product line has been allocated to the Canadian operation. The company's sales result in direct payment to the head office in the United States. The head office transfers funds as required to the subsidiary's Canadian bank in order to pay local suppliers and the wages and salaries of the plant management and workers. This is a polar example of a rationalized North American operation. The degree of autonomy is that of any other North American branch plant of the same corporation.

Three firms in our study were polar examples of rationalized subsidiaries.

[14] This has ceased to be of importance as subsidiaries have been established in Commonwealth countries formerly serviced by Canada. For example, United States automobile companies now have wholly-owned subsidiaries in England and Australia.

Officers of all three subsidiaries said that sales and marketing plans had to be approved by parent company management. In two of the cases, approval of the president or general manager of the subsidiary had to be obtained. In one case, the company was organized in such a way that, while headquarters approval had to be obtained, there was no need to obtain the approval of either the president or general manager of the subsidiary. In contrast, in the semi-autonomous firms in our study, the sales and marketing plans had to be approved by either the president or general manager of the subsidiary; it was not necessary to obtain the approval of parent company management.

In a great many of our interviews, Canadian management indicated that autonomy was not a problem in their cases. Their parent operation had given them a relatively free hand to allocate resources within Canada. Further discussion usually revealed a number of ways in which control is exercised by headquarters.[15]

1. One or more representatives of the parent firm are on the Canadian board of directors. In most cases the individual who sits on the board either is a member of the parent firm executive committee or is, in fact, the individual to whom the Canadian chief executive officer reports.[16] One company in a printed statement, notes explicitly that the parent company's "interest in subsidiaries is through its stock ownership, which it can vote as a shareowner to elect the Board of Directors and to pass on matters properly within the province of shareowners to act upon. *Of course, the directors* [*the parent company*] *elects to the Board of the subsidiary can be* [*parent company*] *employees, including managers of particular components.*" (emphasis supplied).

2. Discretionary expenditure is limited. The subsidiary cannot hire an individual beyond a fixed level of compensation without first obtaining approval of headquarters. Or a limit is set to discretionary capital expenditure. One president of a subsidiary operation laughed off this type of control with the remark, "I am pleased that a review is made prior to capital expenditure of this magnitude. I sure wouldn't want to be solely responsible for such a decision."

A significant number of managers in Canadian subsidiaries hold the view that they don't relate well with the management of the total corporation. A feeling expressed very often was that "they don't understand us here in Canada". There is some tendency for subsidiary management to attempt to build power bases in Canada and to try to persuade their head office that the Canadian market is sufficiently different to justify a wide variety of activities.

In this regard, there appears to be a difference between Canadian subsidiaries which are controlled by United States corporations and those

[15]The question of autonomy in foreign subsidiaries is extensively dealt with in the National Industrial Conference Board (NICB) publication, *Integrating Foreign Subsidiaries Into Host Countries*, 1970, pp. 38-48. The discussion covers the wide range of problems that occur between subsidiary and headquarters. The conclusion appears to be that the subsidiary is part of the worldwide corporation, and conflicts between subsidiary and headquarters must be negotiated and resolved in a manner which is consonant with overall corporate interests. As one company put it (p. 46) "We can only go so far in operating as a local national company—which we are not. When the subsidiary's goals as a local company conflict with the global corporate goals, the subsidiary must come out the loser."

[16]See also Howe Martyn, "Effects of Multinational Affiliation on Local Management", *Michigan Business Review*, March 1967.

which are controlled by overseas corporations in the United Kingdom and continental Europe. The subsidiaries of American firms tend to a much greater degree to be less autonomous and to have much less freedom for action. The Canadian subsidiaries of continental European and U.K. firms tend to be more autonomous; they may have greater freedom to innovate and to produce new products for the Canadian market, and even to get into whole new businesses in the Canadian market, as long as they meet the profit objectives set by the parent corporations. The difference in autonomy appears to be a function of the level at which the Canadian subsidiary reports to the headquarters operation. Generally, reporting to a European or U.K. parent occurs at a much higher level, and in some cases the Canadian operation is considered as an autonomous investment unit which functions best by meeting a profit criterion. It is almost as though the parent has a portfolio investment rather than one which is direct in nature. United States firms tend to establish reporting relationships at a lower level, and the Canadian subsidiary is, in most cases, looked to not as an investment centre but simply as one arm of a total continental manufacturing and distribution complex. The differences in reporting patterns became very evident when we interviewed those executives in the parent firm who were "responsible" for the Canadian operations. In general the U.S. corporations allocate responsibility for Canadian operations to executives of middle and upper-middle management status. The interviews with U.K. and European firms revealed a rather different picture. Here the man responsible was often a senior member of the executive committee and, in one case, was the chairman of the board of the worldwide corporation.[17]

It should be noted that generalization is difficult, since a wide variety of reporting relationships is found in international companies. In one case, after interviewing top management in Canada—a management which argued that it was so autonomous that little could be learned from an interview at headquarters—we met with the responsible executive in the United States. We found that, though top Canadian management reported formally to a man who had operating responsibility for all of the corporation's non-United States activities in North and South America, the Canadian operation was actually the concern of his assistant, a man who seemed to possess little knowledge of the Canadian market. Further interviews revealed that in this company the head of research and development in Canada reported separately to the vice-president of research and development in the U.S. Dual, triple and multiple reporting relationships indicate that the Canadian operation has little autonomy.

The differences identified between the subsidiaries of U.K. and European firms and those with U.S. head offices may disappear over time. The Canadian subsidiaries of European firms tended to have been set up some time ago, when the three thousand miles of ocean indicated that a great deal of autonomy would be present in Canada. Sales managers, vice-presidents and other top management could not take an overnight train, or fly up in an hour or two, to see how things were going in the Canadian operation. Thus, the

[17] For a discussion of some possible reasons why there are differing ways in which U.S. and European firms view direct foreign investment, see E.T. Penrose, "Foreign Investment and the Growth of the Firm", *The Economic Journal*, Vol. LXVI, June 1956.

distance between Europe and Canada allowed for a degree of autonomy in subsidiaries of European firms which is not found in their American counterparts.

Now the development of communication links removes, in large part, the barrier of the ocean. In addition, the management philosophy of the European and United Kingdom parent firms appears to be changing as the concept of the multinational corporation takes hold in those countries. The concept of the multinational corporation has been developed most thoroughly in the United States. This management philosophy permeates many United States firms, and is now beginning to penetrate British and European management. Organizational changes appropriate to the multinational firm may be expected in European and U.K. companies. That the two types of subsidiaries will more closely approximate each other means that the rationalization concept which is inherent in the multinational philosophy will begin to be seen to a much greater degree in the U.K. and European subsidiaries operating in Canada.[18]

Many overseas corporations with Canadian operations have entered or are planning to enter the U.S. market. The question then becomes: What will be the role of their Canadian operation? A preliminary answer is that the role will be a minor one. Overseas firms find little reason to establish headquarters in Canada for North American operations. In the few cases where this process has been observed, the firm chose to establish its North American headquarters in the United States and to have the Canadian subsidiary either continue reporting separately overseas, or report to both the North American headquarters and overseas, or report solely to the North American headquarters in the United States. This trend seems to indicate that overseas firms will approach Western Hemisphere markets in much the same way as many U.S. firms. The tendency will be to treat North and South America as different market areas and to centralize North American operations in the United States.

The implementation of the multinational philosophy by global corporations increases the possibility and desirability of rationalization of production in North America. The adoption of a product-oriented or a geographical international corporate structure appears to present a problem for those Canadian subsidiaries that currently enjoy a degree of autonomy.

What does production rationalization mean at the level of the individual Canadian operation? An example from our study may provide a useful illustration of the impact, in practice, on the management of the subsidiary in Canada. During an interview with a large United States leisure products firm, mention was made of the similarity of the product line in the Canadian and United States operations. A question was raised as to whether the company

[18]This is indicated in the February 1970 issue of the Italian business magazine *SUCCESSO*. The chief executives of a number of multinational corporations were asked the following questions:

—What is the level of autonomy, decentralization and decisional power in local branches?

—Are there typical management problems in a multinational group; is it necessary to create multinational managers?

—Is there a feedback of ideas, R&D etc., from national branches to company headquarters? How do you see the future of multinational companies?

The answers given by the European and U.K. based companies tended to be rather similar to the United States-based companies.

looked at the Canadian operation as a separate entity or whether, in fact, a North American approach is taken. The reply was that within the past few weeks a major corporate reorganization had been instituted. This resulted in the creation of a combined United States and Canadian division. The production of the main product of the corporation is in two plants–one in Canada and one in the United States–and it was awkward to have the Canadian operation report to the international division as had hitherto been the case.

Interviews at the Canadian operation revealed the closeness of the U.S. and Canadian management. The following statements quoted are typical of a closely integrated North American organizational approach: "We have an export market...but it is a dictated market."; "Most innovative work is done in the parent firm and in [a third country subsidiary]."; "Market research has a dual reporting function–Canada and [headquarters]."; "Canadian and U.S. marketing problems are almost identical and Mr. [the head of the marketing department] is at headquarters every two weeks and is in contact almost every day on a direct telephone tie-line."

Interviews carried out in Canada and the U.S. serve to reinforce the fact that Canada is located next to the major source of international business activity. The logical pressures which exist to rationalize North American activities are overwhelming. And support activities of all types can be rationalized even if, in many cases, production will still be located in the respective market areas. Reasonably similar tastes, incomes and aspirations all reinforce an increasing tendency to regard the Canadian market (possibly subdivided into 4 or 5 marketing regions) as part of one North American market.

The effect of these trends is to continually reduce the potential for innovation in Canadian subsidiary operations. In the following chapter we will note the gaps in the innovative chain in these operations. The rationalizing of certain functions will lead to an exacerbation of these gaps. For example, the rationalized firms in our study already have their sales and marketing plans approved by parent company management. A next logical step may be to centralize the marketing function. Unless some action is taken to guarantee the existence of certain managerial and research functions in Canadian subsidiaries, the creation of a North American market (on a regional or product basis) may lead to the ironic outcome where Canadians will look back at the "good old days", when semi-autonomous branch plants, with a wide variety of employment opportunities, operated in the Canadian market.[19]

[19] In the August 1971 issue of *Executive*, p. 30, an unemployed Canadian executive notes the reduction in management positions in subsidiaries. He cites one foreign company which had planned to appoint a president for its Canadian subsidiary. It then decided to settle for a vice-president, later decided in favour of a general manager, and finally opted for a product manager. The discouraged executive concluded, "U.S. companies used to consider Canada as a land of Eskimos and Indians requiring a distinct and separate corporate structure. Now they think of us as being just another state, another market. Consequently, they reduce the market here for managers. However, we are still a bit of a mystery to British firms, so they want local management."

III. Research and Development, Technology and Innovation in the Subsidiary

Introduction

For some time, industrial research and development has been seen as an activity which leads to innovation and, ultimately, to economic growth. Some doubt is now being cast on the validity of the suggested relationship.[1] In the case of research and development activities in a subsidiary, the relationship between R & D, innovation and economic growth is even less clear. To understand the role of research and development in the subsidiary, one must always remember that it is but one part of an international firm whose activities may be North American, North Atlantic or worldwide. The role of R & D and the capacity for innovation are determined in almost every case by the organizational model chosen for the total firm and the extent to which North American operations are rationalized.

R & D in International Firms: The Role of the Canadian Subsidiary

In the total mix of activities which are undertaken by an international firm, some are centralized and others are decentralized. Some operations lend themselves to tighter control than others. Over two years ago, in a speech to the American Chamber of Commerce in the Netherlands, Jacques Maisonrouge, the president of IBM World Trade, concluded:

"It is simply not possible for the multinational company to be completely centralized or completely decentralized. There must be different levels of centralization–and these will vary with different functions. In general, *I believe that long range planning, finance, research and development could be centralized from a management viewpoint*–but on the basis of worldwide input of data. *On the other hand, sales, service, personnel, public relations–all the functions that are most concerned with the outside world–should be decentralized...*" (Emphasis added).

The multinational firm will seek to centralize control of the R & D program. Central control does not conflict with the operation of laboratories around the world which respond to, and feed information to, the central laboratories. An international research capability may be undertaken for a wide variety of reasons: to take advantage of local skills, obtain access to lower costs, to establish "listening posts" abroad, etc.[2] Research capability is also a necessary part in the process of transfer of technology.

For purposes of analysis, one can identify two types of R & D operations which are predominant in subsidiary operations in Canada:

The international interdependent laboratory

This is a laboratory which mainly conducts research (with little development) and which is closely connected to the international research program. This operation may or may not interact with the Canadian manufacturing

[1] cf. Barry Carin, "A Survey of the Literature of the Economics of R & D", (unpublished); and OECD, Report of the Secretary General's Ad Hoc Group on New Concepts of Science Policy, "Science, Growth and Society: A New Perspective", Paris, April 13, 1971, C(71)71.

[2] cf. David B. Hertz, "R and D as a Partner in World Enterprise", *European Business*, October 1967.

facilities, depending on a number of circumstances including the extent to which there is production rationalization.

The support laboratory
In this operation the main activity is:

a) to act as a technical service centre, i.e., to examine why a product may fail to operate in the Canadian market or to help with the adaptation of the product to the Canadian market; and/or

b) to be the translator of foreign manufacturing technology, i.e.: to implement the process of "technology transfer"; to adjust production technology for shorter runs in the Canadian market, to "scale down" production engineering designed for longer production runs than are possible in the Canadian market.

The International Interdependent Laboratory

Many international firms maintain an international research capability. The central theme of such an operation is to allocate projects and integrate results in such a way that profits to the overall corporation are maximized. Worldwide Eastman Kodak research is organized in this fashion.

"Each laboratory is responsible to the local management, not the local plant management but the local division management, and each is located at a manufacturing plant site.

"With this type of arrangement the research programs are well directed to Company objectives, and with proper research management the laboratories do not become strictly service and trouble-shooting organizations. Long range programs are established and supported. And the results of these research programs can be easily transferred to manufacturing organizations".[3]

The results of such research can be transferred to manufacturing operations around the world for further product development, pilot plant operation, production engineering and eventual production. The critical aspect of a laboratory of this type is that, while it is physically in Canada and may be located adjacent to the plant site, there may in fact be little interaction between the R & D personnel and the plant management. The head of the research operation may or may not report to Canadian management. There is often dual reporting to the parent operation, or dual reporting with some lateral exchange of information to Canadian management on an "as needed" basis.

Another example of such an operation is IBM. This corporation claims to "internationalize research and development, continentalize manufacturing, and nationalize marketing". There is great logic in such an ordering of activities; a typical IBM product development may involve many countries. An IBM executive describes this process:

"The problem of transferring technology across boundaries is not a simple one and one has to become familiar with it through practical experimentation

[3]W.T. Hanson (Assistant Director, Research Laboratories, Eastman Kodak Corp.), *Research Management*, January 1971, p. 48.

to realize that transfer of a technology between different laboratories in different countries is not just a matter of course. To illustrate, let me cite the history of IBM 7772 audio response unit, which is used in voice answer-back applications. The original idea came from our Zurich Research Laboratory, feasibility was proven in our German Development Laboratory. The actual product was developed in our French Laboratory and the end product is now manufactured in our Kingston, New York, plant. The programing support for this machine had to be included in an overall programing package developed in our British Laboratory. We did not plan it as I just described, but it is typical. One must go through the trouble and anguish of such an experience to understand how difficult it is to completely integrate R & D and production across country boundaries. But obviously, there is no multinational R & D unless such transfers are feasible."[4]

Research programs of an international interdependent type may have little to do with the capacity for new product innovation in Canada. Specialized research of this type is often confined to a specific stage of the R & D process. For example, one such laboratory reports that it spends 60 per cent of its resources on research–a far higher proportion than is typically found in an indigenous or support type of research (here, the proportions are 20-30 per cent on research, with the remainder on development). While innovation capability (both product and process types) is increased for the international firm as a whole, there is little obvious benefit which accrues to the Canadian economy. Employment of highly qualified manpower is, admittedly, increased in this sort of operation. However, in periods when there is a tight labour market, sophisticated research of this type may draw some of Canada's most talented people away from indigenous research programs. An "enclave" operation of this type may, on balance, turn out to be a form of "brain drain". On the other hand, if there is slack in the labour market, the employment opportunities provided by research of this type should be welcomed by Canadians.

The general problem of laboratories of this type is summed up by Professor J.B. Quinn of Dartmouth College:

"If the laboratories work on problems of the local environment, participate in university programs, enter joint research relationships with other national laboratories, or rotate their personnel to other company locations for training, the country gains greatly from the laboratories' presence.

"But if the laboratories merely work in isolation and transmit their results to the parent company for worldwide exploitation, the country gains little more than some jobs for its science graduates. *It may actually sustain a net loss if these graduates' services could have been better used on other problems of higher priority in the country.*

"Yet seldom do countries either investigate a company's policy structure to see if the laboratories will offer desired side benefits, or take any positive action to encourage constructive contacts between the laboratories and the countries' technical-intellectural communities. When proper relationships are

[4]Mr. Papo, (Director of Standards, IBM World Trade Corp.), *Research Management*, January 1971, p. 19.

not established, some company laboratories become little more than subsidized "brain drains" from the country." (emphasis supplied)[5]

In Canada we have found some international interdependent research operations which interact closely with the manufacturing plant, and others which do not interact at all. The first case is one of continental rationalization of manufacturing. Here research is related to the production underway in Canada, since the Canadian subsidiary is responsible for turning out one component of a total package. A "breakthrough" in such research can and often does result in a greater amount of production in, and export from, Canada. In an interview with headquarters management, we posed the question not in terms of a "breakthrough" but, rather, in terms of what would happen if a product innovation with great sales potential were identified in the Canadian laboratory. The answer, in this case, was that it was unlikely that the Canadian subsidiary would be designated as the center of excellence for complete development, engineering and production. Why? The production and allied research has become so rationalized on continental lines that the subsidiary does not have the operational capability to diversify into other areas, even if great sales potential is possible. Additional considerations must also be taken into account. These would involve possible excess capacity in other plants of the worldwide corporation and whether, for policy purposes and for "good corporate citizenship" considerations, additional research and production should be channelled into a third country.[6]

One often notes the element of a dual management structure in a visit to operations of the type discussed above. The manufacturing and operations people generally deal with standardized and, in some instances, outmoded technology. Their colleagues in research, on the other hand, are tied into the broad research program of the worldwide corporation. The subsidiary corporate organization chart presents a picture which in fact does not exist. The president of such a subsidiary may have a rather low status in the overall corporation. On the other hand, the head of the research program generally maintains a closer liaison with parent corporate research and, especially in the case of very high technology products, the research manager in the subsidiary usually has a better idea of overall corporate goals and development plans than does the "president" of the subsidiary.

This condition is often exacerbated when the Canadian subsidiary is grouped with the international division for reporting purposes. Since worldwide corporate research is a head office function, the usual outcome is that the president of the subsidiary reports to a vice-president in the international division, and the subsidiary research manager reports to the vice-president for research and development at the corporate level. There is an inherent contradiction in the maintenance of such reporting relationships; a

[5] "Technology Transfer by Multinational Companies", *Harvard Business Review.*

[6] One student of international business makes the case for "window dressing" research and development. ". . .opening a small research laboratory may generate enough beneficial goodwill among local scientists, the government and the public to compensate for some loss in direct research productivity as compared with an equal outlay in some other country as part of a unified R & D scheme." Thus centralization of R & D, while desirable for economic reasons, may, for reasons of "good corporate citizenship", be offset by some attempt at apparent decentralization. See John Fayerweather, *International Business Management: A Conceptual Framework,* McGraw-Hill, 1969, pp. 150-151.

not uncommon result is a communication barrier between management and research in the subsidiary.

This is not to say that when subsidiary manufacturing is rationalized, R & D will automatically work more closely with Canadian management. Under rationalization, the research program allocated to the specialized labs of the subsidiary operation might not coincide with, or might coincide with only part of, the rationalized manufacturing activities which are underway in the plant.

The Support Laboratory

The support type of research operation is by far the most common type to be found in subsidiaries in Canada. Typically, support laboratories are associated with a "miniature-replica" or semi-autonomous branch plant which has a wide variety of functions complementary to the parent. Usually, research operations of this type are smaller in scale than those we have already discussed, and may lack the critical size to conduct "breakthrough" type of innovation.

In support research, the manager of the research program is generally kept abreast of the overall corporate research program, but has little or no work allocated from world headquarters to his laboratories. The chief functions of research of this type are:

a) to adapt the product to the Canadian tastes and/or climatic conditions or to make other changes which will improve product performance; and

b) to act as the vehicle by which the transfer of production technology is made possible.

The first task requires little explanation. Where the extremes of the Canadian climate can have an impact on product performance, subsidiary laboratories often play an important role in adapting the product to the new environment. The results of research of this type may then be used in other markets of the multinational corporation where similar climatic conditions are found. Thus an important and not to be understated role is one of product improvement and adaptation. For activities of this type, some communication is maintained with headquarters research so that a continuing flow of product specification information is maintained.

However, the subsidiary which is actively adopting elements of the parent product line into the Canadian market often takes a very limited view of the role of R & D and innovation. An innovation is often regarded merely as the successful introduction of a product in Canada which has been designed and successfully marketed elsewhere. The president of a large subsidiary stated his company's position as follows:

"If the maximum incremental value is to be obtained from [parent company] investment in design and process knowledge, it follows that subsidiary companies, such as [ours] should manufacture the products offered by the parent when local costs make this profitable."

In this company there is a standardized way in which products are selected for introduction in Canada. The Canadian market is normally tested by direct importation of the finished product from the parent company in the United

States. Once consumer acceptance of the product is established by the Canadian market research department, the sales volume must be established with reasonable accuracy. When manufacturing is undertaken in Canada, the first stage is to set up an assembly operation and import most of the components from the parent company. After about two years of assembly a complete evaluation of the product is undertaken. Market prospects are weighted along with competing products offered by other firms in the industry. The final stage is the complete production of the item in Canada. If the process continues to the final stage, then production engineering is asked to produce unique Canadian production designs.[7]

The great majority of the firms in our study claimed to derive 60-80 per cent of product and production technology from the parent operation. Information on market conditions, on the other hand, is substantially acquired in Canada. Most firms derived 90 per cent of their marketing information in Canada. One large subsidiary, which is predominantly of the "miniature-replica" type and which maintains support type of R & D, reported that, of the new products it introduced during the past five years, 10 per cent were developed primarily as a result of R & D activities in Canada, 50 per cent were obtained primarily as a result of R & D activities in parent and affiliated companies, 5 per cent were obtained through licensing or purchase, and the remaining 35 per cent either were not based on specific technological knowhow or were based on technological information which is widely available.

This leads to a second, and perhaps more important, type of activity found in support type of R & D laboratories: to act as the agent broadly responsible for transfer of product and manufacturing technology. This role is complex and demanding. A very important task is to "scale down" parent production technology that was designed for long productions runs. It is exceedingly difficult to ascertain what proportion of the research program is allotted to this type of activity. Interviews with Canadian research managers of support-type labs always brought an emphatic and positive response when this topic was raised. This activity is especially important in those industries which are characterized by great economies of scale.

In a written statement, the chief executive of a large semi-autonomous type of subsidiary gives his company's view of this type of R & D:

"The next decision, and one of national interest in this country, relates to the scope of research and development work that should be performed by a subsidiary. It would seem to be economically desirable to import product designs from the parent Company and do only a production engineering job in a subsidiary. As a theory, this is sound and it is the policy of [the Canadian subsidiary] to do original product and process design only if market needs cannot be met by [parent company] designs. Despite this policy, the amount of original research and development work done in the Canadian Company is very large and there are a number of compelling reasons for this. First, there is the effect on design of production volume. Volume in Canada on most products is between 1/10th and 1/20th of the production volume in the

[7]Prof. H. Crookell of the University of Western Ontario finds this type of behaviour to generally prevail in the appliance industry. See "From Auto Pact to Appliance Pact–Steps Toward a Legislated Economy", *Business Quarterly,* Spring, 1970.

United States. It is simply not economically feasible to produce in Canada many American designs developed for high volume production with expensive and sophisticated tooling. Secondly, Canadian material and labour costs differ from those in the United States. Some materials are higher in price and some lower. Labour rates are generally below those prevailing in the United States."

"Scaling down" is an activity which requires skill and sophistication; but the successful outcome to which this skill is directed is *adaptation* of the production process to the Canadian market. Research personnel in both parent and subsidiary emphasized the extent to which cooperation is desirable and necessary, to effectuate the transfer of technology and scale down processes. There is frequent travel between subsidiary and central corporate laboratories or, in many cases, to third country research operations. Problems that arise in the small Canadian market may already have been encountered and overcome elsewhere (South Africa or Australia). Conversely, research personnel from third countries often visit Canadian plant sites for a similar purpose. Valuable experience is shared, and one subsidiary can profit from the experience of another subsidiary.

Scaling down outside technology to produce for the Canadian market is a necessary concomitant of the transfer of technology process itself. One of the chief benefits claimed for the multinational firm is that technology is transferred around the globe with apparent ease.[8] In different "host countries", such an activity can have substantially different outcomes. It can act as a stimulant to indigenous industry; it can act as a training ground for indigenous technical personnel, etc. A wide variety of both positive and negative effects has been identified as being associated with the process of transfer of technology.

However, one must distinguish the benefits which accrue when the R & D is undertaken in the process of transferring technology from those that accrue when R & D is undertaken in an indigenous firm. The latter case may also involve transferring technology, but via licensing, rather than the ownership link. The potential benefit to the Canadian economy arising from exploitation of either product or process innovations is great in indigenous firms and almost non-existent in subsidiary operations.

Proponents of research and development in subsidiaries do not appear to recognize the wide variety of activities that can take place under this broad subject heading. Explicitly or implicitly, the advocates of increased research activity in subsidiaries automatically assume that productivity gains will arise from process innovations and the firm will be more competitive in world markets, and/or product innovations will be forthcoming and the firm will become increasingly involved in export markets and increasingly competitive in the home market as well.

The National Industrial Conference Board (NICB) has recently completed a survey of senior American international executives[9] to determine, among

[8] *Saturday Review,* November 22, 1969; *The International Corporation,* by Sidney F. Rolfe, International Chamber of Commerce, 1969; Brian Quinn, "Technology Transfer by Multinational Corporations", *Harvard Business Review,* November-December, 1969. pp. 147-161.

[9] NICB report, *R & D in the Multinational Company,* NICB series on Managing International Business, No. 8, 1970.

other things, where their companies conduct research and how the international R & D function is organized and coordinated. The results of the NICB survey are substantially in accord with the findings in this report.[10] Thus, it was found that R & D cannot be easily decentralized. And in spite of pressures to decentralize research activity, most American-owned international companies carry out the bulk of it in the United States:

"There are several reasons for this. In these foreign operations companies usually rely on technology that has been developed in the United States, originally for the domestic market; and their continuing efforts depend largely on people and facilities in the United States. Research is conducted best, many of these companies feel, when scientists work in close proximity and intercommunication is easy. The problem of coordinating research programs increases with distance, executives say, and the costs of duplicating effort are great.

"When R & D work is done overseas, it most often takes the form of product modification or adaptation to meet the particular needs of local markets. The more basic research programs are usually centered in the U.S. laboratories. Some companies, however, report that they have made excellent use of foreign research facilities in specialized fields in which foreign technology is either superior to domestic or just as good and, at the same time, less expensive."[11]

The most commonly reported form of R & D in subsidiaries in the NICB study involves adapting the product or process for the local market. A vice-president of a firm specializing in industrial chemicals stated:

"In my opinion, for most of our business it is more efficent to develop local R & D capabilities involving product application techniques to adapt such products as plastics and resins to the capabilities and limitations of the fabricating techniques and machinery available in various foreign markets. Such equipment is frequently different from the U.S. machinery, and it requires a different product. Our operating companies are developing a capability for modifying U.S. formulations."[12]

Effects of Dependence on Outside Sourcing of Technology: Northern Electric, a Case Study

From its founding in 1895 until 1956, Northern Electric's (NE) major sources of product design and manufacturing information were Western Electric (WE) and Bell Telephone Laboratories of the United States. Because of a United States anti-trust consent decree in 1956, which affected the Western Electric system, Northern was put into a position of gradually having to self-develop increasing amounts of its technology. Although some technology flow is still in evidence from Western Electric to Northern Electric, it is expected to decline increasingly over time. This case study demonstrates the extent to

[10] See also Jack N. Behrman, *National Interests and the Multinational Enterprise: Tensions Among the North Atlantic Countries*, Prentice-Hall, 1970, pp. 55-69.

[11] NICB report, *op. cit.*, p. 2.

[12] NICB report, *op. cit.*, p. 10.

which dependence on technology from Western led to both an underdevelopment of the NE research function and a situation of management dependence at Northern Electric. While Western owned a significant amount of NE Stock (43 per cent), the critical controlling force lay in technology. In effect, NE was in a position similar to that of a semi-autonomous subsidiary. Dependence on outside technology and the lack of design capability meant that NE was limited, in the actions it could undertake in the areas of product and process innovations, and in the ability to function competitively and aggresively in export markets.

As a result of the limitations imposed on Western Electric by the 1956 consent decree, and the recognition of a growing need to undertake design development for specific market needs, Northern's new R & D laboratories came into active being in July, 1958. Since then Northern has passed through a period of transition from being a large purchaser of foreign technology to its current position, where most of the design information for new products originates from within the company. Of course, while design capability within Northern has increased, any laboratory, large or small, can generate only a very small percentage of wholly new technology. Design capability, however, allows the staff to make the best use of available literature and personal contacts in the laboratories of other communications firms elsewhere in the world, so as to distinguish information that can be acquired by licence or trade from new information that must be generated indigenously.

There are three broad stages of industrial activity:

a) design
b) manufacturing
c) selling

Prior to 1956, Northern concentrated only on manufacturing and selling. When the U.S. decree came into effect and curtailed the flow of technology from WE, Northern Electric began to develop its own design capability.

There was early recognition that the decision to generate design information internally would be expensive. In order to pay for the added overhead of a growing research and development facility, NE management concluded that other activities would have to be undertaken. In order to spread the overhead costs caused by the creation of design capability, a decision was made to attempt to enter foreign markets by exporting from Canada. As the company began to evaluate potential orders from abroad, it found that it had to have a competent design capability in order to meet specific overseas orders. Thus, NE found an interesting circularity at work: while it needed to export to spread the overhead of its R & D facility, it also found that design capability was a *sine qua non* of manufacturing a product that met the particular needs of a customer in a specific market abroad. As one executive at NE stated the relationship, "you can't have one without the other". The implication is clear: prior to 1956 and without design capability, NE could not have gone into export markets even if it had wanted to.[13]

The change in Northern Electric over the past decade has been quite

[13] Northern Electric is now selling a Canadian-designed switching system to U.S. telephone companies. The equipment, known as the SF-1 Switching System, is a small, modern, common-control central office capable of economic operation in the 500 to 3 500 line range. The first U.S. customers were A.T.&T. operating subsidiaries. *Industrial Canada*, September 1969, page 42.

dramatic.[14] In 1960, about 90 per cent of the designs originated from a foreign source. by 1970, foreign designs accounted for only about 1 per cent of the overall total. Northern Electric designs rose from 5 per cent to 80 per cent over the same period. About 20 per cent of the current designs are a hybrid of Northern Electric and foreign sources. The professional R & D staff in 1961 consisted of 60 at the bachelors degree level, 19 masters, and 4 Ph.D.s. In 1969, there were 540 bachelors, 135 masters and 52 Ph.D.s. Employees in the entire R & D division rose from 153 in 1960 to over 2 000 in 1970. Gross research and development expenses increased over the same time period. In the R & D division, expenses rose from $2.5 million in 1960 to over $37 million in 1970. Total R & D expense in the entire company is now over $50 million per annum.

Exports now account for a significant portion of company sales.[15] In 1963 exports accounted for 2.5 per cent of sales. By 1970 this had grown to almost 18 per cent. Projections indicate that by 1974 the company will be exporting almost 25 per cent of sales.

Since 1958, Northern Electric has also increased the Canadian content of its products. In 1958 raw materials and sophisticated components were 88 per cent and 62 per cent respectively from Canadian sources. The remaining needs were satisfied from outside Canada, usually from United States sources. By 1968 raw materials and sophisticated components were 93 per cent and 85 per cent respectively from Canadian sources.

In interviews with executives of Northern Electric, a number of areas were discussed in some depth. Among the points that emerged were the following:

1. Reliance on Western Electric for technology led to a situation where, even though Northern Electric was neither owned nor controlled by WE, a "branch plant mentality" developed among NE management. Technological dependence undermined management initiative and did not allow for the creation of an independent decision-making capability in other areas such as marketing.

2. In the past NE received engineering drawings from Western Electric. The only design modifications made were those connected with adaptation to the smaller Canadian market. Access to Western Electric and Bell Labs development and engineering personnel was readily available to permit checking of design modification proposals. Thus, prior to 1956, manufacturing and process innovation was the principal engineering work undertaken–including that involved in the scaling down of WE production techniques to fit the Canadian market.

3. The creation of a substantial research and development facility with indigenous design capability has allowed Northern Electric to offer a more challenging environment to its employees. The result is that NE now can attract more talented and more creative people than had previously been the case.

4. The creation of a sophisticated research operation was found to be necessary, to provide technological inputs to manufacturing operations and, equally important, to provide an in-house understanding of the state of the

[14] For a comprehensive analysis of changed employment patterns, design capability and export activity in Northern Electric over the past decade or so, see Appendix C.

[15] The company now exports to 27 countries.

art and of developments taking place in other companies. The ability to understand and forecast international technological developments has helped Northern Electric to identify a particular role for itself in the total industry framework.

5. The existence of in-house technical competence allows Northern Electric to seek out lower-cost design developments and production techniques. In particular, the company can engage in "Value Analysis". This activity involves a specification of the function for which a system has been designed and an analysis of whether an alternative system can be produced at a lower cost without sacrifice in quality. Without a high degree of competence and technical design capability, the company could not properly evaluate less costly product design and production techniques.

6. The research and development costs of entering a new area such as electronic switching can be essentially the same, whether the company develops its own system or whether it licenses a system developed by another company. Complex technology can be intelligently purchased only by a sophisticated buyer. After all, if the complications surrounding the purchase decision are resolved, it may be advantageous in terms of costs for the company to enter the new field with a design of its own.

Terminating a long-standing reliance on others appears to have given Northern Electric a new self-perception. Others also view it as having become a more dynamic firm. One Northern vice-president summed up the change in the following way:

"It is probably correct to say that as a result of its direction of growth of the past several years, Northern has changed from a manufacturing and supply company to a design, manufacturing and marketing company, and the change and growth is continuing and must continue. I am satisfied this has had a significant impact on the attitude of our employees and managers, and has enabled us to attract and retain more competent people, and offer more challenging careers to them."

The development of an indigenous design capability has led to the creation of employment opportunities for highly qualified Canadian manpower. This and other changes seen in Northern Electric's performance may represent the "opportunity costs" of extreme reliance on foreign technology in Canadian "science-based" industry. Northern's gain in employment opportunities and export activities gives a measure of what a country loses when many firms rely on sources abroad to develop its technology. Stating it another way, the Northern Electric case appears to be an interesting example of possible gains to Canada from *indigenous* science-based industry.

Indigenous Canadian Firms Perform Less Research than Their Subsidiary Counterparts: One Possible Explanation of the Phenomenon[16]

While inherently small, the Canadian market is made much smaller by the

[16]The thesis developed in this section owes much to the ideas generated in discussion with Dr. Pierre Bourgault, formerly of the Staff of the Science Council and now Dean of Applied Sciences, University of Sherbrooke, Quebec.

entry of many subsidiaries into particular industries. In many cases, the major competitors in the U.S. market seek to establish a foothold in the Canadian market so as to pre-empt their competitors and/or to exploit the advantages which accrue from advertising "spillover". This leads to a situation which is described as "fragmentation of the market". A great number of firms occupy a market sector which economically should only accommodate a smaller number. Supplying a small part of a small market can be sustained over time if overhead costs are spread over a global market, in which case the Canadian segment bears a proportionately lower cost, and/or some subsidization of Canadian activities is implicitly or explicitly taking place.

The rules and regulations of the U.S. Internal Revenue Service explicitly preclude subsidization.[17] A detailed account is given on how subsidiaries are to be charged for services rendered. In our interviews, many Canadian subsidiaries were found to be paying an explicit fee for technology provided by the parent. The fee can be fixed ($X per year) or it can fluctuate (X per cent of sales). Notwithstanding such arrangements, a great deal of subsidization is probably taking place. In this case, payments for technology would be less than the value of the technology transferred to the subsidiary.

The National Industrial Conference Board notes in its survey[18] of R & D in multinational firms that there is apparently no single method of charging the subsidiary for technology.

"In recovering the costs of R & D work performed by U.S. laboratories in support in international operations, most companies cooperating in the survey draw a distinction between work that is requested specifically by overseas units and work that is performed for the benefit of the company as a whole. Often, the costs of work that is requested by an overseas unit are charged directly to that unit, while the costs of work that will benefit the whole company are recouped indirectly from the overseas units—through royalties fees, or company-wide allocations.

"Some companies consider, however, that the payment of royalties and fees entitles overseas units to make full use of U.S. research facilities with no further charge. A few companies use other ways to recover R & D costs incurred by the parent, and some make no attempt to collect at all, reasoning that their costs are recovered through increased profitability of their overseas units."

Most companies are reported to rely on royalties, fees and some type of allocated charge.

Often a management fee is charged which covers a great many services given to the subsidiary. The NICB report cites the way in which a machinery and equipment firm solves the problem.

"Each subsidiary pays the parent company a technical assistance fee that covers a great many services and benefits provided to the subsidiaries by the parent company. Participation in the results of U.S. research and development is only one of the many benefits covered by the fee, and there is no

[17] See Regulation No. 1. 482-2(b)-(d) of the United States Income Tax Regulations, Commerce Clearing House, Inc., 1969.

[18] NICB report, *R & D in the Multinational Company*, NICB series on Managing International Business, No. 8, 1970, pp. 65-74.

segregation or breakdown of the fees according to the benefits and services rendered."[19]

Often the method of allocating charges becomes quite vague. In this case it is not inconceivable that a particular subsidiary could have access to technology at a price lower than could an independent firm which negotiated the licensing of the technology on an "arms length basis".

Furthermore, some firms so consolidate their domestic and overseas operations that they see no need to explicitly charge subsidiaries for services rendered. One firm notes that "Costs are recovered via the profits, which are consolidated for a global profit center to include both foreign and domestic earnings".[20]

There are many payments for service configurations in which an indigenous Canadian corporation would find itself at a disadvantage in competition with a non-resident controlled subsidiary. It does not have access to technology as does its subsidiary counterpart. To compete in price it must have equally low overhead costs. If it maintained a research operation similar to the support type of operation of its non-resident owned counterpart it could conceivably be competitive. But, by definition, the support type of research would not be sufficient to generate the needed technology in an indigenous operation. Indigenous Canadian management has two options:

1. To maintain a research program of "critical" size. While "critical" size will vary from industry to industry, it is clear that it will always be a larger size than the support type of operation that its multinationally connected competitors maintain. In some cases it will have to be similar to the research program of the global firm itself. If it mounts such an operation, the indigenous corporation will inevitably operate at a price disadvantage, since it will have to sustain greater overhead costs than its subsidiary competitors.

2. A decision can be made to conduct little or no research at all.

In the light of the above, it is not surprising that some investigations[21] have found that subsidiaries of multinational firms sometimes conduct more research that their indigenous counterparts. Canadian management desiring to remain in business may have to opt for little or no research, rather than assume a proportionately higher burden of R & D expenses than its multinationally connected competitors (assuming that "critical" R & D is more costly than support R & D). The second option involves running the risk of being priced out of business, while the first option means that, while the technology will be undeveloped or retarded, the firm itself will still be able to remain in the market.

A similar problem exists when the subsidiary's research program is of the international interdependent type. In this case the research program in the subsidiary is usually financed directly from the central corporate research budget. Inevitable spillover often leads to some subsidization of the support activities which are inevitable in any high-technology industry. Here the indigenous Canadian operation is at an even greater disadvantage.

[19] NICB report, *op. cit.*, p. 70.

[20] NICB report, *op. cit.*, p. 73.

[21] cf. A.E. Safarian, *Foreign Ownership of Canadian Industry*, McGraw-Hill, 1966, pp. 280-286; and A.E. Safarian, *The Performance of Foreign-Owned Firms in Canada*, Private Planning Association, 1969, pp. 49-53. See also *Reviews of National Science Policy, Canada*, OECD, Paris, 1969, p. 251.

IV. Innovation and Exports

Innovation and Export Capability

The reader may wonder why a report on science policy and the multinational firm should include a discussion of exports. The reasoning is based on some of the assumptions which underlie the perceived need for industrial research and development.

Typically, a great many of the ultimate benefits of research and development are seen to be process or product innovations. The latter may involve the development of a new product or a change in a product which can then be marketed more economically. Process innovations have to do with productivity and efficiency. Process innovations usually result in ways to manufacture products at lower costs or, another way of saying it, with greater efficiency. One final outcome of innovations of all types is that they help the company (and therefore the country) to be more competitive in world markets.

Thus, product innovation often leads to the development of new products which can be used to break into new markets abroad, even where long-established corporations have been dominant. Process innovation often lowers costs so dramatically that, on the basis of price alone, the company can enter and achieve a significant position in markets abroad.

A Limited View of Innovation in the Subsidiary Does Not Preclude Exports

The evidence in the preceding two chapters indicates that many non-resident Canadian operations take a limited view of the innovative process. Innovation, for many, consists in successfully adapting process technology and/or manufacturing a product previously introduced by the parent company elsewhere. Many of the market research departments limit their activities to identification of those goods produced by the parent firm which can be introduced in Canada. If the role of market research is to identify a needed new product, relate this need to the R & D department and, in concert with the responsible corporate departments, design, test, engineer and set up pilot production of the new product, then a market research department with a limited view (and therefore the subsidiary itself) represents a significant gap in the innovative chain.

Thus, it is important to recognize that, for a large percentage of subsidiaries in Canada, there is no attempt made to innovate and dynamically use the new product or process to secure a position abroad. It is equally important to realize, however, that on the basis of comparative costs or intra-corporate excess capacity, the non-innovating subsidiary may still be designated as an important export center for the corporation. A particular subsidiary may be assigned export markets for a wide variety of reasons. The executive vice-president for international automotive operations of Ford Corporation is reported to have said, "We are a multinational company. And when we approach a government that doesn't like the U.S. we always say, 'Who do you like? Britain? Germany? ' We carry a lot of flags. We export from every country."[1]

[1] *Business Week,* December 19, 1970, p. 59.

Thus, many non-resident companies engage in significant export activities. In terms of dollars the great majority of this activity takes place on the basis of an understanding within the corporation as to which subsidiary can best service a particular market. In some cases the export activity arises from a strong desire on the part of Canadian management to develop a unique capacity for innovation and, in general, to become the worldwide center of excellence for a particular product. Proving that it is the best subsidiary to manufacture product X sometimes leads to a continental or international product mandate.

However, for the individual subsidiary it can generally be said that exports and the capacity for innovation are not necessarily related; an innovational capability is neither a necessary nor a sufficient condition to enter markets abroad. Similarly, the development of a process or product innovation does not guarantee the subsidiary the right of exploitation anywhere in the world. Thus, *in no case did we find a Canadian subsidiary that felt it had the freedom to enter foreign markets at will with a product which it thought could be produced in Canada and competitively exported.* And, alternatively, we found only one instance of a process innovation developed in a subsidiary where the technology was, or could be, licensed by the subsidiary to a non-affiliate anywhere in the world. This is not to say that such activity on the part of subsidiaries never takes place; it is just that our study found negligible evidence of such activity.[2]

Rationalized subsidiaries export a large percentage of their total production. One firm exports 84 per cent of its output, while another claims to export 100 per cent of its production. Indigenous firms in our study had a wide range of exports relative to total production: one resource-based company exports 90 per cent of its output; a manufacturing company exports 65 per cent of its output; another manufacturing company exports 22 per cent of its production; while a third exports 5 per cent of production. The semi-autonomous or "miniature-replica" type of subsidiary typically exports a smaller percentage of its output; exports in such cases ranged from 8 per cent to 22 per cent (of total production).

The Quest for an International Product Mandate: Some Cases

Except for those few cases where the Canadian operation has been granted an international product mandate, it can generally be said that export markets tend to be allocated on the basis of an intra-corporate decision. The basis for allocation varies widely. In one case, a Canadian subsidiary with excess capacity supplies a product to its counterpart subsidiary in the European Common Market (EEC). In another case certain Commonwealth countries were allocated to a Canadian subsidiary. Over the years, the special relationship has persisted, and exports to these markets continue to be made from the Canadian operation.

This is not to say that innovative effort does not pay off for the Canadian

[2]One subsidiary of an international oil company licenses product technology to a non-affiliate company in the United States. However, we were unable to determine the conditions surrounding the licensing procedure: Did the subsidiary have to obtain prior permission to enter negotiations? Did the subsidiary or headquarters negotiate the terms of the agreement?

subsidiary; rather, once the export market is assigned, innovational efforts can then yield increments in sales. The commonly-assumed causal arrows are often, in fact, reversed: the capacity for R & D and innovation is developed only *after* the assignment of a particular export market.

The view in many headquarters is that the Canadian subsidiary has established solely to service the Canadian market. This view appears to raise a problem when an "international product mandate" is desired by the subsidiary. A case in point is that of a subsidiary that developed a new consumer product which was in demand in the Canadian market and had a strong likelihood of being adopted in the United States and overseas. The new product was totally designed in Canada and had a rather unique feature which made it particularly desirable. The chief executive of the Canadian operation told us of his efforts to get a North American product mandate from the parent operation to manufacture the entire product in Canada and export it to the United States. It was felt that, while the market for this product in the United States was at the time very small, it would probably increase in the near future, and if consumer acceptance in the United States rose to the extent that this product is presently demanded in Canada, then the contribution of the subsidiary would rise, and benefit would accrue to both the subsidiary and the Canadian economy.

Some months later, we interviewed the parent management in the United States to find out their view of the new product. The chief executive of the division in the United States told us that, while the design of the new product in Canada was very good, it was felt by the corporation that the entire product could not be manufactured in Canada. We asked him why. He told us that the head office had concluded that there was an inadequate machine tool industry in Canada, i.e. where the appropriate machines could be obtained to manufacture the product; this included machines to produce metal and plastic injection moulding equipment. Furthermore, there were some activities in other parts of the corporation which were running at less than full capacity and some of the components of this product could be manufactured in the United States on existing machines. He asked us why he should build a whole new plant in Canada when he could produce some of the new product in Canada, some parts of the product in the United States on existing machines, and put the whole thing together either in Canada or in the United States. As it turned out, some parts of the product are being made in Canada, most are being produced in the United States from components produced by the Canadian subsidiary and the American operation. This is an example of a new product, designed in Canada, for which an international product mandate was desired but not found acceptable by the parent management because it is rationalizing its production activities in a way that is most profitable for the entire corporation.

Head office managements in the various firms which we visited were asked whether and to what extent the subsidiary Canadian operation would be allowed to develop an increasing role in the total corporation. In general, we were told that the Canadian operation has to prove itself in the total corporation. Several executives told us, however, that the fundamental innovation, the radically new product that is going to make a tremendous success in world markets, will be "pulled back" to the parent operation for complete design and engineering, and possibly for production as well. The

facilities for activities of this type are more highly developed in the parent operation and thus it is more efficient in terms of the optimization process for the total corporation to behave in this manner.

One company, with a well developed global approach, declared that an innovation which is developed in the Canadian subsidiary could be exported from the Canadian operation, the United States or from a third country subsidiary. Many policy criteria would be explored before a final production location decision was taken. Among the most important would be the degree of excess capacity in the Canadian subsidiary. Another production allocation criterion is the impact that the particular firm has on the balance of payments positions in the various countries in which it is active around the world; it attempts to have a neutral-to-favourable impact on the balance of payments positions in the host countries where it is active. In terms of its definition of global "good corporate citizenship", the corporation may decide that an innovation developed by the Canadian subsidiary should be produced by a subsidiary in a "deficit" country, in order to increase the exports from that country.

The form of organization adopted by a world corporation can have an impact on the export autonomy of the Canadian operation. As described in Chapter II, the Canadian subsidiary may be grouped in the North American Market (i.e., when the corporation has a world-wide geographic or product division orientation) or it may be part of the international division. The following case highlights the way in which a change in the organizational structure can effect export potential. The Canadian subsidiary of a multinational corporation has been given the opportunity to ship to certain third country markets, i.e., outside both Canada and the United States. The global corporation's organizational structure consists of a continental United States management and an international division responsible for all sales outside of the United States. In order to properly service the export market, albeit an allocated one, the subsidiary has developed a high degree of design capability based on a strong research and development facility. The specific strength of the subsidiary is reflected in an increasing flow of export orders. The opportunity for export and design capability (and therefore for employment of highly qualified manpower) offers a unique challenge to the management in this Canadian operation.

The circumstances of these activities were discussed in great detail with management at corporate headquarters in New York. In particular, we asked what might happen if reporting relationships changed and Canadian management reported, not to an international division, but directly to the United States management. What, in other words, would be the impact on the export potential of the subsidiary if a North American orientation were instituted? The executive responsible for Canadian operations told us that it is very likely that in this case the Canadian subsidiary would not be selected to produce goods for third country markets. For accounting and organizational purposes, another subsidiary in the international division would be employed to service these markets.

Among the firms in our study, some specific sources of Canadian strength which have led to increased exports are: a particular Canadian expertise, a Canadian resource that can be exported, excess capacity in the Canadian operation vis-à-vis other subsidiary operations throughout the world, a case

where the Canadian government has given a particularly enticing export guarantee or export loan of a low-interest nature, or a situation where the subsidiary makes a particular item not produced by the parent company. In the latter case a link with a multinational company can be advantageous, since the worldwide sales and distribution facilities and use of the corporate name of the multinational firm itself can be used by the subsidiary in securing and servicing markets abroad. There are several Canadian successes, where subsidiaries have developed, and now produce and export, a particular item in world markets.

A good example is the PT6 gas turbine engine designed and manufactured by United Aircraft of Canada, Longueuil, Quebec. United Aircraft (formerly Canadian Pratt and Whitney) was originally established to manufacture spare parts and to provide service facilities for Pratt and Whitney engines used in aircraft in Canada. The company relied on U.S. parent technology and had no design capability until 1956. At that time the management put together a team that successfully designed a jet engine for the Lockhead Jet Star executive aircraft. The engine was designed in Canada and built by the parent firm in the U.S. Intra-company negotiations resulted in the engineering team's establishing a permanent location in Canada and winning the mandate to design a turpoprop engine.

The first prototype of the PT6 was tested in February 1960 and was found to be an outstanding success. The engine has been used on deHavilland aircraft (a subsidiary of Hawker-Siddeley, U.K.) designed and built in Canada–e.g., the Beaver and Twin Otter. Variations of the PT6 are being used to provide power in non-aircraft applications as well.

United Aircraft has succeeded in establishing one of the most modern design, development and manufacturing operations in Canada. There are over 3 000 PT6 type engines in use in 53 countries around the world.[3]

In summary, there appears to be no set behavioural pattern in the case of exports and Canadian subsidiaries. Innovation *per se* does not guarantee an international product mandate. When a new product is developed by a subsidiary, the decision when and where to export will be made in world headquarters. The lack of pattern indicates that a wide variety of forces lead to the decision, which can have a profound effect on Canadian management and on the potential for employment of highly qualified manpower in a sophisticated research and design team.

It appears that a strong case may be made for a governmental role in securing increased autonomy for the Canadian operation. Federal or provincial governmental assistance, intervention, or a passive but visible role as *amicus curiae*, could be of great help in intra-corporate negotiations of this type.

The negotiation for access to export markets should ideally be aimed at securing for the subsidiary the total design, engineering and production process of a discrete product or range of products. In terms of *total* benefits to be derived, it is probably worthwhile to trade off export dollars for the ability to have a greater role in the R & D, design and engineering activities.

[3]See "Canadian Turbine Engine Wins World Markets", *Industrial Canada*, December 1970.

A Negotiated Export Agreement: The Automobile Trade Pact

The automotive trade agreement between the United States and Canada was signed in January, 1965. The agreement reciprocally eliminates duties on cars, buses and trucks, as well as on parts and accessories used on original equipment.

The agreement has had a profound effect on production and trade in automotive products in the two countries. Canadian subsidiaries have undertaken large investments to increase Canadian value-added. Some estimates suggest that Canadian assembly capacity has been increased by more than 50 per cent. Production of some models has been discontinued in Canada, and demand for them is supplied by duty-free imports from the United States. At the same time, production of other models has been increased for export to the United States.

The export of automobiles to the United States has contributed to the strong Canadian dollar and may have had an impact on the decision to unpeg the dollar.[4] Automobile exports also changed the configuration of Canada's exports. DBS felt moved to comment, in March 1971, that "figures illustrate how end products have gained steadily as a proportion of total exports in the seven year period, to move ahead of crude materials during that time span".[5]

Table IV.1 shows Canada's foreign trade, with all countries and with the United States alone, by stage of fabrication for the period 1964 through 1970. In Tables IV.2 and IV.3, the influence of auto exports as a percentage of all end products is demonstrated. Note that in 1970, autos to the U.S.A. accounted for slightly over 60 per cent of total Canadian end products exported to all countries. For the year 1970, exports of end products, including automobiles, amounted to almost 37 per cent of all our domestic exports. If we subtract the automobile component, the export of end products as a percentage of total exports drops to slightly less than 15 per cent. In Table IV.4, automobile exports are subtracted from both total exports and exports of end products. Here we see a slight increase in per cent of end products (from 16.4 per cent in 1964 to 19 per cent in 1970).

The data indicate that intergovernmental negotiation can lead to a considerable export role for the Canadian subsidiary. The success of the auto pact has been to create industrial employment and generate U.S. dollars. However, these successes represent only two of the objectives to be derived from exports. Of equal importance is the creation of sophisticated research and design teams, the posing of a challenge to Canadian management such that entrepreneurial skills are developed and sharpened, and, in general, an energizing of the entire operation.

The automotive trade agreement is an archetypal case of an allocated market. The increase in exports was not a result of entrepreneurial initiative. Rather, decisions regarding design, purchasing and much of the engineering, and the export decision itself, were not made in Canada. These decisions were made, in the context of a North American market operation, in industry headquarters in and near Detroit, Michigan.

Thus, the success of a trade agreement of this type must be tempered by a

[4]Ironically, de-pegging the dollar led to the loss of export markets by a great number of small indigenous Canadian firms.

[5]DBS *Daily*, March 4, 1971.

consideration of the benefits that could have accrued to Canada in terms of challenging employment opportunities and the like. For example, in Chapter III there is a discussion of the type of research operations that one can expect to find in a company (or industry) where global or continental manufacturing rationalization has been established. The conclusion was that research would be either present or absent: if present, it would be very sophisticated and tied in with the global research program of the entire corporation; in the case of the Canadian auto industry, research is conspicuous by its absence.

Table IV.1–Canada's Foreign Trade, 1964-1970, by Stage of Fabrication, Domestic Exports

Year		Total Domestic Exports	Crude Materials	Fabricated Materials	End Products
All Countries					
1964	$ millions	8 904	2 959	3 714	1 421
	% of total		36.6	45.9	17.6
1965	$ millions	8 525	2 995	3 923	1 606
	% of total		35.1	46.0	18.9
1966	$ millions	10 071	3 399	4 217	2 455
	% of total		33.7	41.9	24.4
1967	$ millions	11 121	3 227	4 417	3 476
	% of total		29.0	39.7	31.3
1968	$ millions	13 270	3 540	5 028	4 702
	% of total		26.7	37.9	35.4
1969	$ millions	14 504	3 330	5 345	5 828
	% of total		23.0	36.9	40.1
1970	$ millions	16 458	4 304	6 083	6 071
	% of total		26.1	37.0	36.9
United States					
1964	$ millions	4 271	1 161	2 287	823
	% of total		27.2	53.5	19.3
1965	$ millions	4 840	1 256	2 530	1 054
	% of total		25.9	52.3	21.8
1966	$ millions	6 028	1 354	2 813	1 861
	% of total		22.4	46.7	30.9
1967	$ millions	7 088	1 374	2 873	2 841
	% of total		19.4	40.5	40.1
1968	$ millions	8 942	1 603	3 401	3 938
	% of total		17.9	38.0	44.1
1969	$ millions	10 274	1 607	3 627	5 039
	% of total		15.6	35.3	49.1
1970	$ millions	10 641	1 903	3 668	5 069
	% of total		17.9	34.5	47.6

Source: DBS Daily, March 4, 1971.

Table IV.2–Exports of End Products: Influence of Automobiles

Year	Exports of End Products	Exports of Autos	Exports of Autos to U.S.A.	Exports of End Products (*except* autos) to U.S.A.	Autos to U.S.A.	Autos to U.S.A.
	$ millions U.S.				% of total Autos	% of total End Products
1964	1 421	203	110	1 311	54.2	7.7
1965	1 606	407	263	1 343	64.6	16.4
1966	2 455	1 142	968	1 487	84.8	39.4
1967	3 476	1 884	1 821	1 655	over 90%	52.4
1968	4 702	3 031	2 808	1 894	↓	59.5
1969	5 828	4 026	3 804	2 024		66.9
1970	6 071	3 940	3 658	2 413		60.2

Source: DBS 65-004 Monthly exports by commodities, various years.

Table IV.3–Exports of End Products: Impact of "Auto Pact"

Year	Total Exports	Exports of End Products	Exports of End Products (*except* autos) to U.S.A.
	$ millions U.S.	% of Total Exports	% of Total Exports
1964	8 094	17.6	16.3
1965	8 525	18.9	15.7
1966	10 071	24.4	14.7
1967	11 121	31.3	14.9
1968	13 270	35.4	14.2
1969	14 504	40.1	13.9
1970	16 458	36.9	14.6

Source: Tables IV.1 and IV.2

Table IV.4–Exports of End Products: Absence of the Auto Pact

Year	Total Exports (*except* autos) to U.S.A.	Crude Materials	Fabricated Materials	End Products (*except* autos) to U.S.A.
	$ millions U.S.	% of Total	% of Total	% of Total
1964	7 984	37.	46.5	16.4
1965	8 262	36.3	47.4	15.9
1966	9 103	37.3	46.3	16.3
1967	9 300	34.7	47.5	17.8
1968	10 462	34.	48.	18.1
1969	10 700	31.	49.9	19.
1970	12 800	34.4	47.	19.

Source: Tables IV.1 and IV.2.

While difficult to document with certainty, the allegation has been made by various sources that, after the 1965 auto production rationalization agreement, what little design and research capability that existed in Canada was transferred to the United States.[6] Management functions in Canada were also cut back or terminated. One alleged effect of the pact has been to trade "white collar" jobs for more "blue collar" jobs. Another alleged outcome is the loss of whatever advanced automobile expertise existed in Canada previously. While numerically Canada is among the major auto-producing nations of the world, there is no one design team in Canada that could actually design and put into pilot production a complete automobile.

The experience of the automotive trade pact should be of great value in the event that trade pacts are negotiated for other industries. A strong balance of payments position has led to a de-pegging of the Canadian dollar. It is not suggested that the auto pact was the only factor that led to the pressures on the Canadian dollar; it is suggested, however, that future pacts should not place such a high priority on balance of payments considerations. Rather, export dollars should be "traded off" if possible, in order to obtain more balanced employment for Canadians–including employment opportunities for Canadian management, scientists and engineers.

Currently, the Canadian plants do not appear to bear a markedly different relationship to Detroit than do other automobile assembly plants in California and Ohio. It takes little imagination to predict the long-term consequences of a series of similar pacts in other industries in Canada.

"But the integration has proceeded, and now the United States and Canada are one market to the extent that the large U.S. companies can plan a unified United States-Canadian operation. They allocate functions to an Ontario-based assembly plant as they would to one in Ohio or in California. The program has resulted in such a degree of integration that it could hardly be dropped. The real question is: Is this a forerunner of the future? Have we, via the automotive industry, the beginning of a truly economic integration of the United States and Canada? "[7]

Even without formal pacts, there appears to be a trend toward rationalization of production and support functions in North America. This could come about as tariffs continue to decline over time, or in some instances are entirely eliminated. Our study asked chief executives for their prediction on tariffs vis-à-vis the U.S.A. within their industry groups in 1980. Most were of the impression that tariffs would be eliminated or would be lower. A minority predicted little change. When asked what would be considered desirable, a clear majority were in favour of entirely eliminating tariff barriers. Some wanted to hold tariffs at present values, and one semi-autonomous subsidiary expressed a desire for higher tariffs in 1980.

Lower tariffs could make North American production rationalization

[6] cf. H. Crookell, "From Auto Pact to Applicance Pact–Steps Toward a Legislated Economy", *Business Quarterly*, Spring 1970. See also Appendix B of this report, "Comparison of Intensity of R & D By Sector: United States and Canada, 1967", Table B.2. Note in particular the difference in "R & D per $1,000 sales" in item 19(b) "transportation equipment other than aircraft and parts".

[7] J. Wolner Sundelson, "U.S. Automotive Investments Abroad", in *The International Corporation*, edited by C.P. Kindleberger, MIT Press, 1970, p. 253.

more attractive. If this were so there would, increasingly, be movement away from the branch plant, which manufactures a wide range of products similar to the parent company and which maintains a wide variety of activities complementary to the parent company, to a more rationalized production consistent with a view of Canada and the United States as being one North American market. For example, some of the electrical and consumer appliance products companies are beginning to phase out certain product lines in Canada and are sourcing Canadian sales from U.S. or overseas production units. Support functions such as purchasing and marketing, not to mention research and development, can also be rationally allocated on a specialized basis among North American operations.

If the North American rationalization concept assumes prominence, we may find longer and more efficient production runs taking place in Canada, with lower costs and more exports to the United States and, possibly, to third countries. Some autonomy will be given up. Established research and development operations, which were geared to making either the product or the process compatible with the Canadian market, will be either discarded entirely or made very intensive but closely integrated with the overall continental or worldwide research activities of the firm.

The net effect will be increasingly to diminish the potential for innovative autonomy in Canadian subsidiaries and related management. Published statistics may show increased exports and, where a decision has been taken to locate research in Canada, research and development outlays may show an increase as well. In effect the net outcome is that the Canadian operation vis-à-vis head office in New York, Pittsburgh or Detroit becomes increasingly indistinguishable from any other branch office in the United States. As Professor Crookell succinctly notes, "Furthermore if the other rationalized industries behave like the auto makers and rationalize operations from a production standpoint only, then another Canadian industry would lose its managerial and professional staff and with them any hope of innovating in the future. *To lose the power to innovate in a changing environment is to yield control of the future to those who retain that power."*[8] (Emphasis supplied)

[8] *Ibid.*, p. 70.

V. Canada as a Headquarters for the Multinational Corporation

Canadian Investment Abroad Increasing

One response to the growing amount of multinational investment activity in Canada is to urge that Canada engage in some multinational ventures of its own. In fact Canada does have a few indigenous firms that can be classified as multinational corporations; there are also many more with substantial foreign investments and sales.

Direct investment abroad by residents of Canada has been increasing at a rapid rate. Between 1946 and 1953-54 it doubled; it doubled again by the mid-1960s (see Table V.1).

Table V.1-Book Value of Direct Investment Abroad by Canada, Year Ends 1946-1967

Year	$ millions
1946	772
1947	822
1948	788
1949	926
1950	990
1951	1 166
1952	1 265
1953	1 477
1954	1 619
1955	1 742
1956	1 891
1957	2 073
1958	2 149
1959	2 286
1960	2 467
1961	2 596
1962	2 784
1963	3 082
1964	3 272
1965	3 469
1966	3 711
1967	4 030

Source: Direct Investment Abroad by Canada 1946-1967, p. A-2, Foreign Investment Division, Office of Economics Department of Industry, Trade and Commerce, Ottawa, Feb. 1971.

Direct investments outside Canada are divided among a larger number of Canadian corporations, but relatively few of the corporations account for the great majority of investment. For example, in 1963, 59 enterprises, each with $5 million or more of direct investments outside Canada, accounted for 89 per cent of all our direct investment abroad ($2 779 million of a total $3 082 million).[1] While Canadian investment abroad is directed to many countries, there is a tremendous concentration in the United States.

It is important to recognize that investment abroad by Canada does not necessarily mean investment abroad by Canadians. Non-residents play an important role in direct investment abroad through their ownership of some of the Canadian companies which do the investing.

From the end of 1954 to the end of 1964, direct investment abroad more

[1] *Direct Investment Abroad by Canada 1946-1967*, p. 9.

Table V.2-Book Value and Percentage Distribution of Direct Investment Abroad by Canada*, Year Ends 1946-1966

Year	Total	United States		United Kingdom		Europe		Latin America and Carribean		Africa and Asia		Australia	
	$ millions	$ millions	%	$ millions	%	$ millions	%	$ millions	%	$ millions	%	$ millions	%
1946	772	–	–	–	–	–	–	–	–	–	–	–	–
1947	822	531	64.6	64	7.8	–	–	–	–	–	–	–	–
1948	788	–	–	–	–	–	–	–	–	–	–	–	–
1949	926	721	77.9	59	6.4	19	2.0	72	7.8	30	3.2	25	2.7
1950	990	–	–	–	–	–	–	–	–	–	–	–	–
1951	1 166	912	78.2	74	6.4	–	–	–	–	–	–	–	–
1952	1 265	962	76.1	81	6.4	–	–	–	–	–	–	–	–
1953	1 477	1 119	75.8	104	7.0	–	–	–	–	–	–	–	–
1954	1 619	1 231	76.0	119	7.3	34	2.1	132	8.2	63	3.9	40	2.5
1955	1 742	1 293	74.2	131	7.5	–	–	–	–	–	–	–	–
1956	1 891	1 394	73.7	139	7.4	–	–	–	–	–	–	–	–
1957	2 073	1 451	70.0	172	8.3	–	–	–	–	–	–	–	–
1958	2 149	1 440	67.0	200	9.3	62	2.9	292	13.6	99	4.6	56	2.6
1959	2 286	1 489	65.1	235	10.3	77	3.4	329	14.4	91	4.0	65	2.8
1960	2 467	1 618	65.6	257	10.4	90	3.6	331	13.4	100	4.1	71	2.9
1961	2 596	1 724	66.4	288	11.1	91	3.6	331	12.7	88	3.4	74	2.8
1962	2 784	1 786	64.1	344	12.4	113	4.1	344	12.4	93	3.3	104	3.7
1963	3 082	1 922	62.4	392	12.7	149	4.8	394	12.8	111	3.6	114	3.7
1964	3 272	1 967	60.1	431	13.2	191	5.8	422	12.9	120	3.7	141	4.3
1965	3 469	2 041	58.8	482	13.9	198	5.7	470	13.5	137	3.0	141	4.1
1966	3 711	2 100	56.6	541	14.6	223	6.0	548	14.7	145	3.9	154	4.2

*Figures exclude investments of insurance companies and banks (held mainly against liabilities to non-residents), subscriptions to international investment agencies, and miscellaneous investments. Figures include the equity of non-residents in the assets abroad of the Canadian companies surveyed.

Source: Direct Investment Abroad by Canada 1946-1967, Foreign Investment Division, Office of Economics, Department of Industry Trade and Commerce, Ottawa, Feb. 1971 pp. A-5, A-7, Tables CDX-3, CDX-3A.

than doubled, from $1 619 million to $3 356 million-an increase of slightly over 107 per cent. However, over this period, the increase in *Canadian controlled investment* abroad was about 62 per cent. Direct investment abroad by United States controlled Canadian corporations increased by almost 208 per cent. As a result, *the proportion of Canada's direct investment abroad that was actually controlled by Canadians decreased from 73 per cent in 1957 to 57 per cent in 1964.* The proportion controlled from the United States rose from about 26 per cent to almost 39 per cent, and the proportion controlled from other countries rose from under 1 per cent to slightly over 4 per cent.[2]

The non-Canadian controlled segment of foreign direct investment has been on the increase because, for corporate purposes, it is preferable to have certain third-country subsidiaries report to head office through Canada. This is especially true for certain Commonwealth plants that are entitled to special treatment if they are controlled by a Canadian corporation. Another reason why the proportion of non-Canadian controlled direct investment is increasing is the continuing takeover of Canadian firms; when a firm is bought up, its overseas operations are usually acquired at the same time.

Some Canadian Owned or Controlled Firms and Their International Activities

Information on non-Canadian controlled foreign sales and investment is difficult to obtain. Below, however, is a representative list of Canadian owned or controlled firms, some of their international activities, and their total international sales for 1968 shown in parentheses.

Abitibi Paper Co. Ltd. ($255 588 000)
Owns: newsprint mill at Augusta, Ga.; hardboard and insulation board mill at Alpena, Mich.; wall-panel mills at Chicago, Ill., and Cucamonga, Calif.; 31 000 acres of timber in Michigan; and 95 000 acres in Georgia and South Carolina.

Canada Packers Ltd. ($789 543 000)
Owns: feed packing plants in Danville, Ill., and Cartersville, Ga.; distributing centres in New York and Los Angeles; and majority interests in meat packing plants in Australia and Western Germany.

Canadian Pacific Railway Co. ($925 million)
Through subsidiary Soo Line Railroad Co., operates 4 600 miles of railroad in the northern U.S. Its subsidiary, Canadian Pacific Investments (CPI), controls Central-Del Rio Oils Ltd., with acreages in Louisiana, Montana, New Mexico, North Dakota and Alaska. CPI also owns a large share interest in Great Lakes Paper Co. (with two U.S. sales subsidiaries), and shares of Rio Algom Mines Ltd. (British controlled, with subsidiary operations around the world) and Cominco Ltd.

Cominco subsidiaries own a fertilizer plant at Beatrice, Nebraska, 50 per cent of an ammonia plant in Texas, a Honolulu steel company, and an

[2] *Ibid.*, p. 17.

interest in a Missouri lead mine. Affiliates of Cominco own a zinc smelter and a British producer of zinc alloy.[3]

Canron Ltd. ($141 042 000)
Owns: Tamper Inc., with a railway equipment factory in Columbia, South Carolina; Pacific Press and Shear Corp., with a plant at Mount Carmel, Ill.; and Tamper (Australia) Pty., Ltd., a sales agency in Melbourne, Australia.[3]

Consolidated-Bathurst Ltd. ($295 472 000)
Owns pulp, paper and paperboard mills: at Ashland N.H., Hinsdale, N.H., Clayville, N.Y., and Rockland, Del., in the U.S.; and at Alling, Lubbecke, Hoya, and Viersen in Germany. Also owns: seven container plants in Germany; and four tissue plants, at Brattleboro, Vt., Los Angeles, Calif., Rockland, Del., and Utica, N.Y.[3]

Consumer's Gas Co. ($123 037 000)
Owns a subsidiary, St. Lawrence Gas Co. Inc., which distributes natural gas in 19 municipalities in New York state, including Massena, Potsdam, Canton, Norwood and Ogdensburg.[3]

Distillers Corp.-Seagrams Ltd. ($603 500 000)
Owns a 38-storey, $40 million office building on Park Ave. in New York city (the U.S. main office); and distilleries, warehouses and bottling plants throughout the United States. The company also owns: the Texas Pacific Oil Co. of Dallas, Texas; warehouses and two distilleries in Scotland; a worldwide import-export business; distilleries in Argentina; and production facilities for Gordon's Gin in England.[3]

Dominion Textile Co. Ltd. ($172 214 000)
Owns: Howard Cotton Co., Delaware, a Tennessee cotton buyer; and Dominion Textile Co. (U.K.) Ltd., a British selling agency.[3]

Emco Ltd. ($83 399 000)
Has subsidiaries which own plants take make liquid handling equipment: in Margate, England; in Kirchhain, West Germany; in Union, N.J. and Conneaut, Ohio; in Melbourne and Sydney, Australia; and in Tokyo, Japan. Emco also controls a French distributor of such equipment.[3]

Fraser Co. ($76 568 000)
Owns a subsidiary, Fraser Paper Ltd. with paper mills at Madawaska, Maine.[3]

George Weston Ltd. ($729 889 000)
With its subsidiaries, owns: biscuit-making plants in Battle Creek, Mich., Passaic, N.J., Richmond Va. and Tamoca, Wash.; and fish processing and freezing plants in Alaska and California. A major subsidiary, Loblaw Companies Ltd., controls companies operating over 1 000 supermarkets across the United States.[3]

[3] *Toronto Daily Star,* January 3, 1970.

Hiram Walker-Gooderham and Worts Ltd. ($299 763 000)
Through wholly owned subsidiaries, owns a 69-acre distilling complex at Peoria, Ill. It also owns eight distilleries in Scotland and one in Argentina, and a glass plant at Hillsboro, Ill.[3]

John Labatt Ltd. ($128 155 000)
Owns Manning's, Inc., a San Francisco-based food service company with 25 cafeterias in the U.S. and a prepared food plant at Eugene, Ore. Labatt controls General Brewing Corp., which owns breweries in San Francisco, Calif. and Vancouver, Wash. A wholly-owned Labatt subsidiary, Catelli-Habitant, has operations in Manchester, N.H. Catelli Primo Ltd. (Trinidad) operates in Barbados and Trinidad.[3]

MacMillian Bloedel Ltd. ($578 682 000)
Owns: 5 corrugated package plants in England, and one each at Jersey City, N.J., and Baltimore, Md.; and paper product marketing companies in England, the U.S. and Australia. MacMillan Bloedel also controls a company with lumber, plywood and linerboard mills at Pine Hill, Ala., and holds a 30 per cent interest in a Dutch company with paper mills at Maastricht, Netherlands and Lanaken, Belgium.[3]

Massey-Ferguson Ltd. ($916 771 000)
Owns 8 machinery manufacturing plants in the U.S., 7 in England, 4 in Australia, three each in France, Italy and Brazil, 2 in Mexico, and one each in Germany, Scotland, Rhodesia, South Africa and Argentina. Associated companies have 4 factories in Spain and one each in India, Argentina and Mexico. Two plants are under construction in Turkey.[3]

Molson Industries Ltd. ($224 575 000)
Through subsidiaries, owns: service station equipment plants at Muskegon and Hart, Mich.; air and other industrial equipment plants at Conshohocken, Pa., St. Paul, Minn., and St. Louis, Mo. Another subsidiary owns a gasoline pump plant near Milan, Italy. Affiliated companies own service station equipment plants in Solothurn, Switzerland, and Mexico City, Mexico.[3]

Moore Corp. Ltd. ($366 017 000)
Owns plants making business forms, machinery and equipment, and packaging products, at 36 locations in the United States, one at San Juan, Puerto Rico, and one at Tlalnepantla, Mexico. Moore also owns: about 20 per cent of Lamson Industries Ltd., a British-based international manufacturer of business forms and equipment; 45 per cent of a Japanese business form firm; and 49 per cent of a similar firm in El Salvador. Moore recently acquired control of business form companies in Jamaica and Brazil.[3]

Noranda Mines Ltd. ($426 328 000)
Through subsidiaries, owns an aluminum smelter and manufacturing facilities near New Madrid, Mo., and a plant making aluminum building products near Cleveland, Ohio. Controlled companies own: a fluorspar mine near San

[3] *Toronto Daily Star*, January 3, 1970.

LuisPotosi, Mexico; a gold mine in Nicaragua; and a copper mine and mill in northern Chile. Associated companies own wire and cable plants in Venezuela, Colombia, Mexico, Dominican Republic and New Zealand. Noranda wholly owns an exploration company in Australia.[3]

Thomson Newspapers Ltd. ($92 861 000)
Through its subsidiary, Thomson Newspapers Inc., owns and publishes 37 daily, and 11 weekly, newpapers in the United States.[3]

While the above list of multinational activities refer to Canadian controlled firms, there is some evidence which indicates that Canadian subsidiaries of multinational companies can also become involved in international activities to a reasonable degree. For example, Canadian Industries Limited (CIL), a subsidiary of Imperial Chemicals Industries (ICI) of the U.K., has recently acquired McPhar Geophysics-one of the world's foremost companies supplying exploration services to the mining industry; McPhar operates through subsidiaries on a worldwide basis. In addition, CIL has acquired West African Explosives and Chemicals Limited of Liberia. Whether, and to what extent, international activities of this type can be expanded in other subsidiaries is still unclear.

Implications for R & D

A few of the Canadian controlled firms in our study are active in international markets. During the interview process, we took the opportunity to discuss their experience in such markets as it relates to research and development.

In Chapter III, it was noted that multinational corporations, especially those based in the United States, tend to centralize the most sophisticated research in the home country. In addition, there may or may not be support R & D around the world. In interviews with Canadian companies engaged in international operations, a different picture appears to emerge. Although research and development is firmly established in Canada and is intertwined with the historical development of the firm, *increasing segments of the operation have been, and continue to be, transferred to the most active market area–the United States.*

One chief executive felt that it paid his company to locate all of its R & D in the United States because manpower needs could not be met in Canada. When presented with data on the increasing quantity of highly qualified manpower in Canada, the interviewee vacillated and admitted that, while times might have changed and manpower needs could now be satisfied in Canada, it did not seem worthwhile to transfer R & D back to Canada. A number of reasons were cited, including a higher rate of personal taxation in Canada and the necessity of maintaining an R & D capability near the major customers of the firm. In this firm, the higher tax rate in Canada proved to be an impediment to moving research operations to Canada from the United States. We were told that when this was attempted, many in the research staff balked, since the move would have led to a cut in after-tax income.

[3] *Toronto Daily Star*, January 3, 1970.

The single most important reason for locating R & D activities in the largest market area is to be near the major customers of the corporation and to be able to service their needs. One corporation has to maintain a research establishment in the U.S. because it designs and manufactures a product which can be used only in conjunction with a particular office machine produced in the U.S. Consequently, since this corporation must work very closely with the firm that produces the complementary machine, it is most efficient to house the research staff nearby.

A need to maintain a U.S. research capability arises especially when the Canadian firm's product is only one component of a final product made in the United States. Problems which arise in connection with production of the final product must be dealt with as they arise. This can be accomplished only by maintaining a research staff near the production centre in the United States.

A number of interviewees were of the opinion that a U.S. "presence" was always helpful–especially in view of the spillover from the "Buy America" Act. Even when there is no legislative reason for buying U.S. products, many U.S. corporations, states, cities and counties often buy American-made products as a matter of common practice.

The impetus to locate R & D outside of Canada is not restricted to manufacturing establishments. One Canadian-based resource company spends 40 per cent of its R & D budget in Canada, with the remaining 60 per cent spent in the U.S. The Canadian research budget is spent on process development, i.e., that research which makes the extractive process more economical. This must be spent in Canada, where the resource is physically located. The remaining 60 per cent of the budget is spent in the United States and Europe, where new product development work is carried out. Thus, a company with over 70 per cent of its employees in Canada finds that it must spend 60 per cent of its R & D outside of Canada.

In another company, the corporate officers claimed that the setting up of branch plants abroad would lead to research and development abroad only when the product manufactured abroad differs from that produced by the Canadian operation. A different product in a foreign country obviously requires a different production technique, and different technological underpinnings necessitate strong local research support.[4]

Another Canadian firm revealed a different international R & D strategy. It did not see a great necessity for research and development and other functions to move out of Canada as the company becomes more multinational in character. The reason given is that it is not expanding its international operations into any particular market area–and, especially, is becoming heavily involved in the United States at this time. Most of its overseas operations are being set up in Europe, actually in several countries in Europe. For this firm, a wide diversification of activities in many international markets seems to indiate that R & D will, in large part, be maintained in Canada.

Another wholly Canadian owned company with substantial U.S. sales and

[4]This is the other side of the United Aircraft case, outlined in Chapter IV. Thus, Canadian subsidiaries of multinational corporations can achieve a greater R & D mandate if they can move into a product line where the parent or other third country subsidiaries are not active.

operations currently performs all of its R & D in Canada. This company is resource-based, and listed the following reasons why it might decide to locate R & D in the United States:

a) to adapt to local market conditions, i.e., to adapt to a particular scale of production; or

b) to use local materials more efficiently; or

c) to achieve more effective local quality and process control; or

d) to have trained technical people nearby who can communicate with the customers.

In this case, the company applied for a Canadian government research grant to cover research in Canada for an item which was to be produced in its United States plant. The application was refused on the grounds that the results of the research would be used outside of Canada. The interviewee felt that experiences of this sort might lead it to establish an R & D capability in the United States.[5]

Policy-makers should not assume that locating the headquarters in Canada will automatically lead to an establishment of all the support functions in Canada as well. One well-known Canadian company maintains a relatively small world headquarters staff in Toronto, while the headquarters and support activities for its North American operations are located in the United States.

The interviews suggest that, located next to such a vast market concentration, Canada faces a possibly inexorable "iron law" which might be as follows: "*when a company in a relatively smaller country expands its international operations into a significantly larger market it finds, over time, that it pays to locate not only production but support and managerial functions in the larger offshore market area*". The Canadian policy-maker who urges the use of public tax funds to support the establishment of Canadian-based multinational corporations must carefully assess this built-in tendency. Research must be undertaken in this area, to determine whether incentives or constraints can be devised which could serve to encourage a continuing Canadian presence as Canadian controlled multinational firms expand into world markets–especially the United States market. The cost of maintaining corporate functions in Canada–especially research and development–may be small or great. At this point, little is known on this subject. A remedy may be impossible, or it may lie in a relatively minor tax concession or similar policy modification by the federal government.

The problem of Canada may, in this regard, be the problem of Sweden. At a meeting which the author attended in Sweden on the subject of the multinational firm, a representative of the Swedish firm, Facit, explained how this multinational firm operates so as to maximize profits and to spread its operations around the world.[6] He noted how the Facit table-top calculator was beginning to make an impact in world markets. At this point he was

[5] Note the four reasons cited for establishing an R & D capability in the United States. These are the same functions performed by the support type of research in Canadian subsidiaries. When the subsidiary is located in the U.S., however, and the parent is located in Canada, the relative size of the subsidiary can lead to an outcome in which the corporate research centre is most efficiently located in the United States.

[6] The meeting was sponsored by Styrelsen for Tekniskutveckling–the Swedish Board for Technical Development–a semi-autonomous arm of the Swedish Government. Ronneby, Sweden, November 29-December 1, 1970.

interrupted by a Swedish Member of Parliament, who asked why the Swedish firm bought the most highly technological component in the calculator from Japan. The Facit man did manage to answer ("we can't be in the forefront of technology in all areas"), but his answer is less significant than that such a question was asked. The Swedes recognize the implications of a small country being a headquarters for multinational corporations which are increasingly international in their operations and outlook.

In conference-related discussions with elected and government officials, it was learned that many Swedes are worried about losing segments of their industry into the Common Market. Leading firms such as SKF and Volvo have, in recent years, increased production and management activities in countries other than Sweden. The director of Volvo's Gothenburg plants has recently said, "We have come to the point where the company has outgrown the country."[7] There is a definite trend toward moving into the markets of greatest potential activity. This will be the case particularly if Sweden elects not to seek membership in the European Economic Community. The future position of Sweden as a base for multinational corporations, vis-à-vis the European Economic Community, could very much resemble the present position of Canada vis-à-vis the United States.

[7]"Volvo Grows Up", *The Economist*, July 10, 1971, page 89.

Appendices

Appendix A

The Science Council Study of Canadian "Science-based" Manufacturing Industry

Introduction

A small group of staff members of the Science Council, interested in the process of innovation in Canada, decided to join efforts and participate in a study of science-based manufacturing industry in Canada, which would be used as a common information pool. A number of studies under way or near completion draw on the interviews and data recorded in the course of carrying out the study.

In addition to the "core" study, visits have been made to the head offices of a representative number of non-resident subsidiaries. Questionnaires were completed both for subsidiaries and for some parent operations. In the latter case, the dissimilarity of the Canadian operation to headquarters makes the data received from headquarters of almost purely academic interest.

This report, *The Multinational Firm, Foreign Direct Investment and Canadian Science Policy*, relies extensively on the qualitative material drawn from the interviews and the particular characteristics of an individual firm as represented by a completed questionnaire. These have been employed to indicate the probable structure of industry, patterns of behaviour, and an appraisal of performance potential.

The Study

The findings contained in this paper are based on a sample of some 50 firms in Canada, and a representative number of head offices in the United States, United Kingdom and Europe.

In the study we sought to select representative firms in "science-based" industry in Canada. Indigenous and foreign-owned companies were chosen. U.S. and other foreign-controlled ones were also consciously selected. Large and small firms were included in the sample as well.

The broad limits which served as our point of departure were the following:

1. The total number of companies to be interviewed should be between 50 and 60.

2. The sample selection should be weighted in favour of industries that depend strongly on science and technology, but otherwise should be representative of structure of industry in Canada.

3. In the selection process, the following variables should be taken into account: the type of industry, whether ownership is domestic or foreign, comapany size, and geographic location.

Selection of Industry Groups

The first step was the determination of which industry groups should be included in the study. It was felt that, as much as possible, the breakdowns should be those used by official information-gathering agencies in Canada and elsewhere, so as to alleviate our own information problem and to make possible comparisons by industry group with other countries. After consideration of DBS and OECD approaches, the following broad industry groups were agreed upon:

1. Electrical and Electronic
2. Chemical (including petroleum and pharmaceutical)
3. Transportation (including aircraft)
4. Metals and mining
5. Machinery
6. Pulp and Paper
7. Utilities
8. Miscellaneous

These groups are essentially those that have been used by the OECD, with the following differences:

–"Aircraft" and "other transportation" are normally kept separate by OECD, but here are combined.

–Pulp and paper, which is normally included under miscellaneous, is broken out separately because of its particular importance to Canada.

–Metals and mining, because of the particular structure in that sector in Canada, is taken more broadly than "basic" metals, which would be the nearest OECD grouping.

Determining the Number of Companies in Each Major Group

We began by assuming that the amount of R & D which is done by an industry is a good indicator of its dependence on science and technology. Moreover, it has the merit of being one criterion for which statistical information is available. However, as Canadian industry is, in some sectors, highly dependent on imported technology, consideration was given not only to the amount of R & D done by industry groups in Canada but also to the amount of research which these industries do in other countries.

Table A.1 shows the distribution of R & D expenditure among different industry groups for eleven OECD countries and for Canada. The final two columns show, respectively, the distribution which was decided upon and the suggested number of companies on the basis of these data.

Table A.1 – Distribution of R & D Expenditure, by Industry Group, OECD Countries and Canada

Industry Group	Relative R & D Expenditure[a]			% Distribution of Sample	Number of Sample
	OECD[b] Over all Distribution	OECD[c] Average of 11 Countries	Canada		
Electrical and Electronic	25.6	25.4	29.1	24	12
Chemical	15.6	23.6	23.6	20	10
Transportation	44.3	26.9	17.8	18	9
Metals	4.1	11.8	9.8	12	6
Machines	7.9	7.3	4.2	8	4
Pulp & Paper	–[d]	–[d]	4.5	4	2
Utilities	–[d]	–[d]	–[d]	4	2
Miscellaneous	6.0	11.1	11.0	10	5

[a] *Source*: Gaps in Technology between Member Countries: Report of OECD, 1968.
[b] This column shows the distribution of the sum of the expenditures of eleven countries taken together. The U.S., because of its large absolute expenditures, largely determines the pattern.
[c] This column is the average of the same eleven countries, but here the distribution is first determined in each individual country and then the results are averaged.
[d] Not broken out separately.

The distribution selected for the sample requires explanation in some cases. The emphasis given to transportation is somewhat lower than might be expected, in light of the OECD figures. The reason for this is that we felt that OECD figures were distorted by the inclusion of the U.S. space program, military aircraft development, and the Concorde development in the U.K. and France. On the other hand, a distribution near to the average of OECD countries was taken for metals and for machines because we felt that these groups were of particular importance to Canada and to the improvement of productivity in our industry.

Distribution According to Ownership

Table A.2 shows the percentage of foreign ownership and the percentage of foreign control by industry group, along with the number of companies allocated to each group.

Table A.2–Distribution of Manufacturing Firms in the Study, According to Ownership

Industry Group	% Foreign Ownership	% Foreign Control	Number of Canadian Companies	Number of Foreign Companies
Electrical and Electronic	70	78	4	8
Chemical	66	80	3	7
Transportation	82	80	3	7
Metals	51	51	3	3
Machines	62	54	2	2
Pulp & Paper	53	48	1	1
Utilities	18	4	2	0
Miscellaneous	50	59	3	2

Distribution According to Size

Companies employing 0 to 499 employees were defined as small, and those employing 500 or more were defined as large. This division point between "large" and "small" industry is one that has been employed by the U.S. Department of National Defense for purposes of applying the provision whereby they gave special consideration to "small" industry.

This definition having been applied, the relative distribution between "large" and "small" was determined by the relative value of shipments from each group.

The final sample design became this one given in Table A.3.

Table A.3–Distribution of Manufacturing Firms in the Study, According to Size

Industry Group	Foreign Large	Foreign Small	Canadian Large	Canadian Small
Electrical and Electronic	4	4	2	2
Chemical	5	2	2	1
Transportation	6	1	1	1
Metals	2	1	2	1
Machines	1	1	1	1
Pulp & Paper	1	0	1	0
Utilities	0	0	2	0
Miscellaneous	2	0	2	1

Consideration of sub-groups

In addition to the main industry groups, consideration was given to ensuring equitable representation from each of the more important sub-groups. For example, in the electrical and electronic groups, representation was given to each of the following: electrical equipment, appliances, consumer electronics, electronic equipment, electronic components. The number in each sub-group was generally based on the proportion of the total sales of the main group which it represented, although allowances were made in some obvious cases for the degree of dependence which the sub-group has on science and technology. A particular example of this was the pharmaceutical industry, where a greater weighting was given than mere sales would have warranted.

Additional Companies

Beyond the initial fifty, a number of other firms were subsequently added, bringing the present total to about 55. In particular, it was decided to include representation of the construction industry (including construction materials).

Questionnaires

Questionnaires were sent to firms in Canada and, where applicable, to a representative number of headquarters abroad. In most instances, the questionnaire was later reviewed in an interview with a staff member of the Science Council and a spokesman for the particular firm. This technique served to make the interviews both structured and informational.

Copies of the questionnaires employed in this study may be obtained by writing directly to the Science Council of Canada.

Appendix B

Comparison of Intensity of R & D by Sector: United States and Canada, 1967

A continuing element of the debate on foreign ownership is the extent to which subsidiaries of foreign firms carry out R & D in Canada. It has been suggested that the subsidiary tends to spend on R & D as much as or more than its indigenous counterpart. This finding must be tempered by the fact that in a great many cases there is no comparable indigenous counterpart.

For a number of reasons (see the fourth section of Chapter III) it is likely that subsidiaries do spend relatively more than comparable indigenous counterparts. However, another comparison is of interest: R & D expenditures of subsidiaries as compared to the parent operation. Since these data are not readily available, a surrogate has been constructed: the way in which Canadian science-based industry differs from its U.S. counterpart. Given the high degree of foreign ownership (mostly U.S.) which prevails in Canadian science-based industry, an assumption is made that U.S. industry represents the parent operation of Canadian subsidiaries. Thus it is hypothesized that the data for subsidiaries are represented by Canadian science-based industry, while the data for the parent operation are represented by U.S. science-based industry.

In the attached tables, an interesting focus of comparison is to look at the chemical, petroleum, machinery, electrical products, and transportation equipment industries. These are industries characterized in Canada by a high degree of foreign ownership or control. In these sectors, the U.S. industry is, in every case, characterized by substantially greater R & D outlays per thousand dollars of sales. On the other hand, where non-resident ownership is not significant in Canada, and/or where an industry is based on a particular Canadian resource, either the R & D expenditures per thousand dollar sales are equal between Canada and the U.S., or Canadian industry is characterized by greater R & D expenditures. See for example: paper and allied products, primary metal industries, lumber and wood products and food and kindred products.

Table B.1–A Comparison of R & D per $1 000 Sales in Canada and the United States: Manufacturing Industries by Sector, 1967

Sector	Canada			United States		
	Value[a] of Shipments (Sales)	Current[b] Intramural R & D Expenditures	R & D Expenditures per $1 000 Sales	Value[c] of Shipments (Sales)	R & D[d] Expenditures	R & D Expenditures per $1 000 Sales
	$ million	$ thousands	dollars	$ million	$ million	dollars
1. Food & kindred products	7 429.27	7 807	1.051	82 935	122	1.471
2. Tobacco products	493.26	m		4 957	m	
3. Textile mill products	1 404.939	3 700	2.634			
4. Knitting mills	325.543	m		19 767	39	.963
5. Apparel & related products	1 176.755	m		20 750		
6. Lumber & wood products	1 675.642	856	.511	10 875	11	.594
7. Furniture & fixtures	640.196	157	.245	7 634		
8. Paper & allied products	3 231.176	18 519	5.731	20 927	74	3.536
9. Printing, publishing & allied industries	1 297.275	m		21 677	m	
10. Chemicals & allied products	2 268.769	41 095	18.113	42 188	1 113	26.382
11. Petroleum & coal products	1 558.207	16 629	10.672	21 967	314	14.294
12. Rubber & plastics products	584.357	3 543	6.063	12 362	140	11.325
13. Leather & leather products	369.115	m		5 146	m	
14. Non-metallic mineral products	1 082.213	2 711	2.505	14 569	112	7.688
15. Primary metal industries	3 052.537	20 000	6.552	47 023	181	3.849
16. Metal Fabricating industries	2 732.066	4 488	1.643	33 191	124	3.736
17. Machinery industries	1 516.875	13 062	8.611	49 077	1 033	21.049
18. Electrical products industry	2 312.519	83 261	36.004	43 606	2 755	63.179
19. Transportation equipment industries	4 720.876	43 161	9.143	70 539	4 421	62.675
20. Miscellaneous manufacturing (includes instruments & rel. prod.)	1 083.797	11 591*	2.442	26 673	407*	6.963
Totals	38 955.389	270 580	6.946	555 863	10 846	19.512

*In addition to R & D expenditures in the miscellaneous manufacturing sector, these totals include R & D expenditures in all the above sectors which are denoted with an "m". Hence the ratios "R & D expenditures per $1 000 sales" have as their base, the sales of these sectors as well as the sales of the miscellaneous sector.

[a]DBS, *1967 Annual Census of Manufacturers,* Preliminary Bulletin, No. 31-208P. Table 2, pages 3-4. Value of shipments of goods of own manufacturers has been used as a proxy for sales.

[b]DBS, *Industrial Research & Development Expenditures in Canada, 1967,* No. 13-532. Table 4, page 31.

[c]U.S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States, 1969.* Table 1109, pages 716-721. Value of shipments has been used as a proxy for sales.

[d]NSF, *Research & Development in Industry, 1967,* No. 69-28. Table 22, page 44.

Notes: U.S. figures for R & D include essentially the same costs as are included in the Canadian figures for current intramural expenditures. The only difference in the two sets of figures is that the U.S. figures include depreciation and overhead, whereas the Canadian figures do not.

So that the Canadian and U.S. figures would be comparable, depreciation and overhead were abstracted from the U.S. figures. In Table 22 of the NSF publication, R & D costs are broken down into wages, materials and supplies, and other costs (see sample questionnaire on page 98 and explanation of questionnaire on pages 103 to 105). Therefore, the figures for the U.S. were arrived at by subtracting other costs from total R & D costs.

Table B.2–Breakdown of Sectors into Component Industry Groups: Comparison on the Basis of Smaller Groupings

Industry Group	Canada			United States		
	Sales	R & D	R & D per $1 000 Sales	Sales	R & D	R & D per $1 000 Sales
	$ million	$ thousands	dollars	$ million	$ million	dollars
10. Chemicals & allied products	2 268.769	41 095	18.113	42 188	1 113	26.382
a. Drugs & medicines	295.640	9 556	32.323	5 256	237	45.091
b. Other chemical products	1 973.129	31 539	15.984	36 932	876	23.719
15. Primary metal industries	3 052.537	20 000	6.552	47 023	181	3.849
a. Ferrous metals	1 629.134	5 234	3.213	27 917	109	3.904
b. Non-ferrous metals	1 423.404	14 766	10.374	19 106	72	3.768
19. Transportation equipment	4 720.876	43 161	9.143	70 539	4 421	62.675
a. Aircraft and parts	610.210	40 011	65.569	21 474	3 442	160.289
b. Other trans. equipment	4 110.666	3 150	.766	49 065	979	19.953
20. Miscellaneous manufacturing	1 083.797	11 591	2.442	26 673	407	6.963
a. Scientific instruments	315.776	9 031	28.599	9 503	354	37.251
b. Other mis. manufacturing	768.021	2 560	.578	17 170	53	1.083

Sources: DBS, *1967 Annual Census of Manufacturers,* Preliminary Bulletin, No. 31-208P. Table 2, pages 3-4. Value of shipments of goods of own manufacture has been used as a proxy for sales.

DBS, *Industrial Research & Development Expenditures in Canada, 1967,* No. 13-532. Table 4, page 31.

U.S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States, 1969.* Table 1109, pages 716-721. Value of shipments has been used as a proxy for sales.

NSF, *Research & Development in Industry, 1967,* No. 69-28. Table 22, page 44.

Notes: U.S. figures for R & D include essentially the same costs that are included in the Canadian figures for current intramural expenditures. The only difference in the two sets of figures is that the U.S. figures include depreciation and overhead, whereas the Canadian figures do not.

So that the Canadian and U.S. figures would be comparable, depreciation and overhead were abstracted from the U.S. figures. In Table 22 of the NSF publication, R & D costs are broken down into wages, materials and supplies, and other costs. Depreciation and overhead make up the other costs. Therefore, the figures for the U.S. were arrived at by subtracting other costs from total R & D costs.

Table B.3–Foreign Ownership and Control of Canadian Industry, 1965

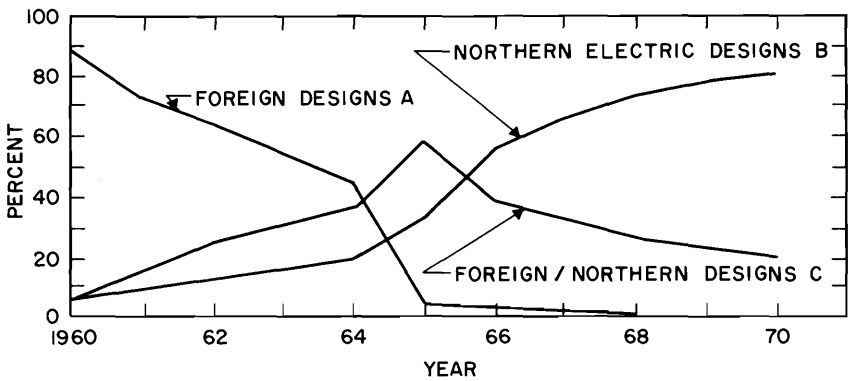
	Foreign Ownership	Foreign Control
	per cent	per cent
Manufacturing:		
Beverages	28	19
Rubber	74	99
Textiles	22	22
Pulp and Paper	53	48
Agricultural Machinery	62	54
Automobiles and Parts	91	96
Transportation Equipment	61	80
Iron and Steel Mills	20	14
Aluminum	72	100
Electrical Apparatus	70	78
Chemicals	66	80
Other	52	59
Sub-total	*54*	*59*
Petroleum and Natural Gas	62	72
Mining:		
Smelting and Refining of Non-ferrous Native Ores	47	50
Other mining	63	64
Sub-total	*59*	*60*
Total of Above Industries	**57**	**63**

Source: DBS Daily Bulletin, Friday, February 13, 1970.

Appendix C

The Changing Nature of R & D and Exports: Northern Electric (See Chapter III, third section)

Chart C.1 – Analysis of Effort Distribution by Design Source at the Montreal Regional Laboratories



Note: Chart C.1 depicts the analysis of effort distribution according to design source over a ten-year period at the Montreal Regional Laboratories. Designs originating from a foreign source, as indicated by curve A, fall from 90% in 1960 to zero in 1970, while NE designs (curve B) rise from 5% to 80% in the same period. Curve C is a combination of designs that have sources both NE and foreign origin.

The Montreal lab is the largest regional lab and is assumed to be typical of the other labs at the manufacturing plants. The Ottawa laboratories, which represent nearly 40% of the company's total R & D effort, can be classified at close to 100% NE design. For the entire company, therefore, there is in excess of 85% for NE design and 15% foreign content.

Chart C.2–Growth of Professional Staff: R & D Division

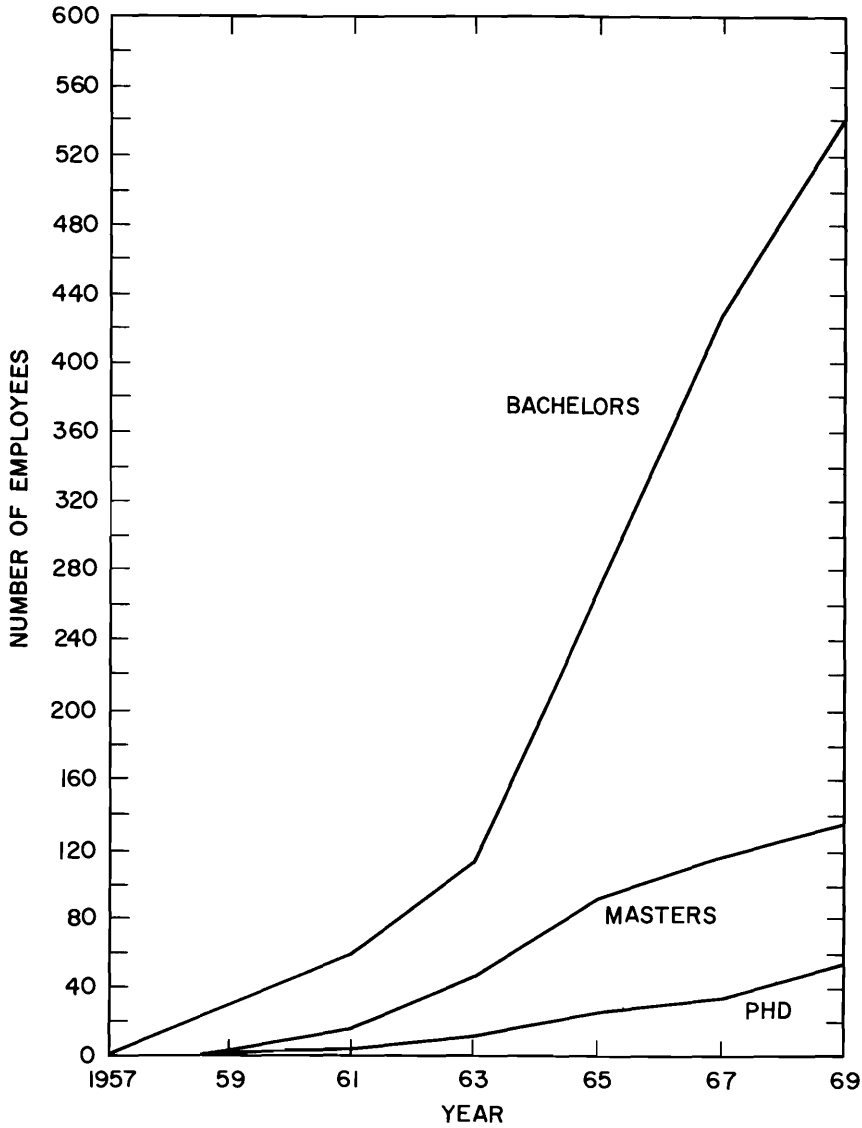


Table C.1–Growth of Professional Staff*: R & D Division

Year Ending	Bachelors	Masters	Ph.D.
1957	3		
1959	30	4	2
1961	60	19	4
1963	114	45	13
1965	268	91	26
1967	428	115	32
1969	540	135	52

*Includes Management

Chart C.3–Total R & D Employees

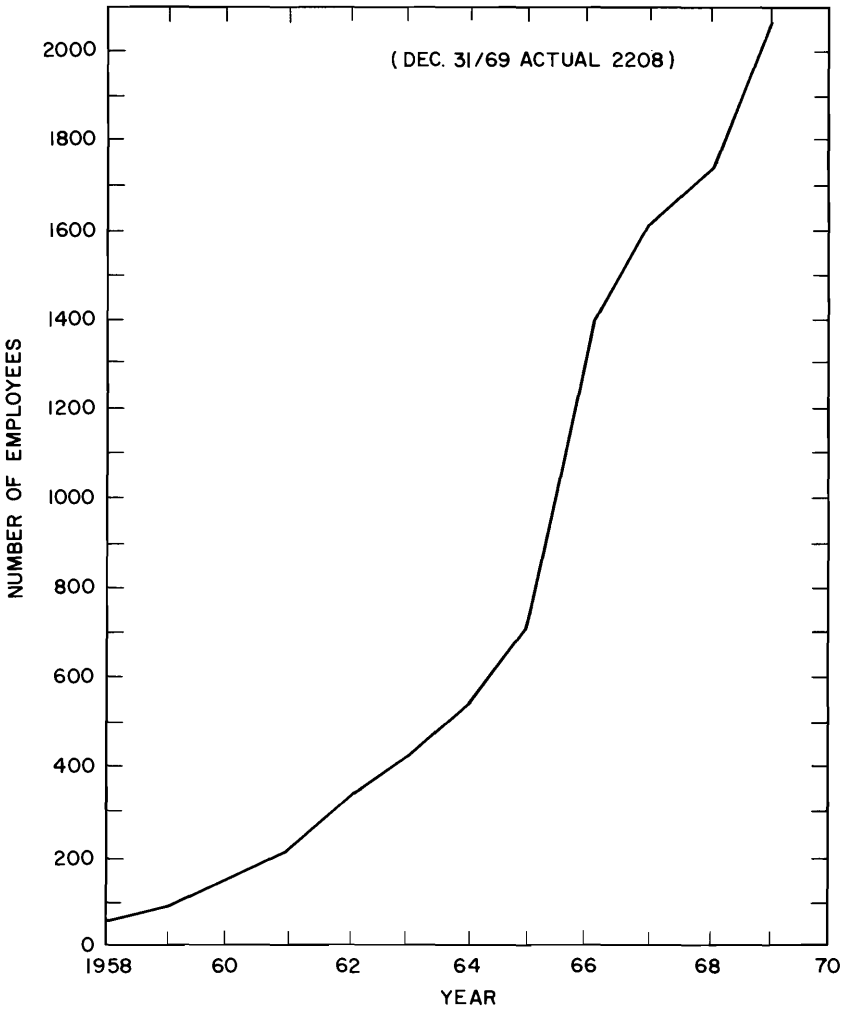


Table C.2–Total R & D Employees

Calendar Year	Average Employment
1958	55
1959	92
1960	153
1961	215
1962	328
1963	421
1964	546
1965	704
1966	1351
1967	1613
1968	1722
1969	2037 (Dec. 31/69 actual 2208)

Notes: Figures are based on yearly averages.
Year end counts are slightly higher

Chart C.4–Gross R & D Expense

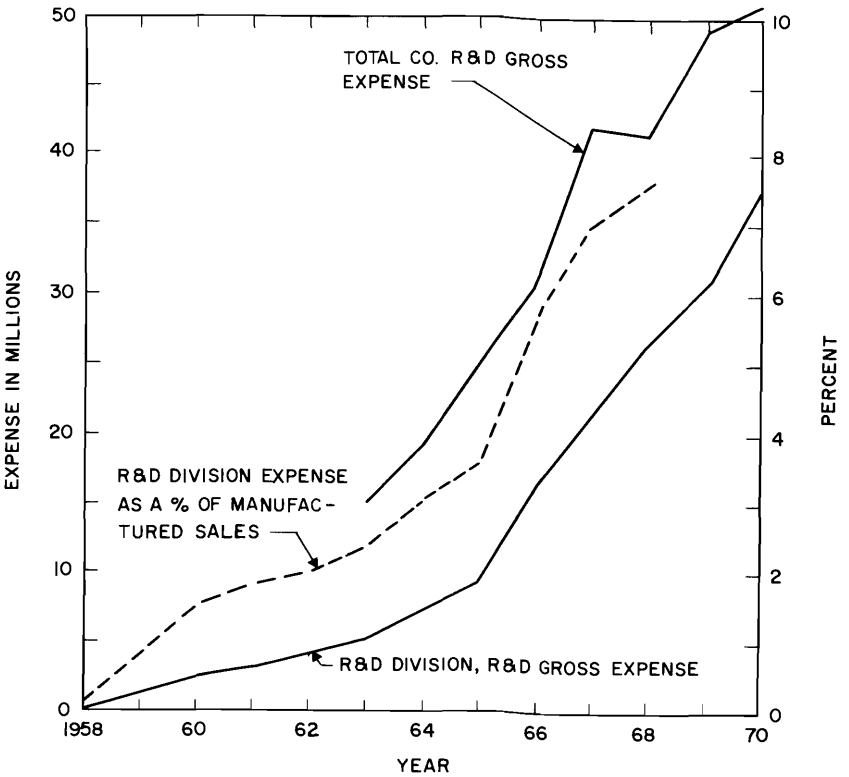


Table C.3–Gross R & D Expense

Calendar Year	R & D Division R & D Gross Expense	R & D Division Expense	Total Company R & D Gross Expense
	$ Thousands	% of Manufactured Sales	
1958	329.6	0.2	N/A
1959	1415.1	0.8	N/A
1960	2665.9	1.5	N/A
1961	3195.3	1.80	N/A
1962	4158.8	2.00	N/A
1963	5299.6	2.4	15000.0
1964	7124.0	3.1	19000.0
1965	9380.7	3.7	25000.0
1966	16290.7	5.7	30500.0
1967	21438.2	7.0	42000.0
1968	26227.9	7.6	41500.0
1969	30503.0 (Est.)	7.8	49000.0
1970	37.752 (Est.)	8.2	51000.0

Chart C.5–R & D Capital Expense

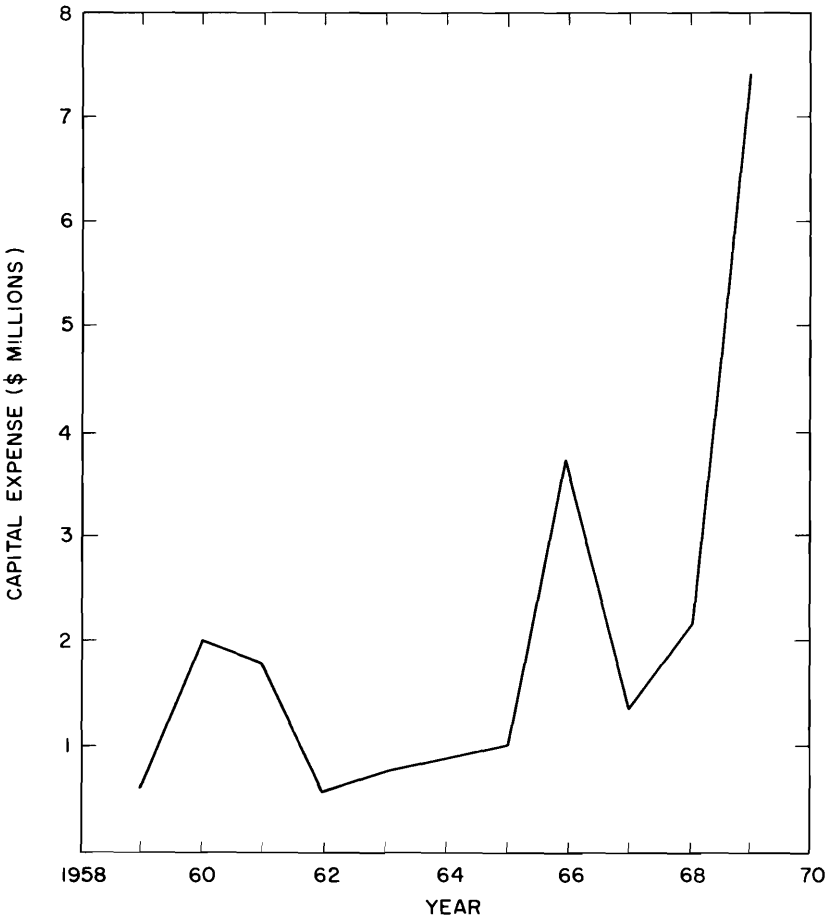


Table C.4–R & D Capital Expense

Calendar Year	Capital Expense
	$ millions
1958	N/A
1959	0.750
1960	2.031
1961	1.844
1962	.637
1963	.777
1964	.879
1965	1.013
1966	3.788
1967	1.381
1968	2.113
1969	7.465
1970	$22.678 million (est.)

Table C.5–Changing Composition of Markets of Operation (Per cent of sales, overtime, export or external to Canada)

Following is the percentage of sales external to Canada related to total company sales for the years 1963 to 1969 and projected from current forecast to 1974.

Calendar Year	% Export to Total Sales
1963	2.5
1964	3.9
1965	3.6
1966	2.2
1967	4.1
1968	8.7
1969	10.5
1970	17.9
1971	19.2
1972	23.4
1973	24.9
1974	24.8

Table C.6–Canadian Content, 1958 and 1968

	1958 Suppliers		1968 Suppliers	
	Canada	United States	Canada	United States
Raw materials & basic supplies	88%	12%	93%	7%
Components	62%	38%	85%	15%

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