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CANADA

Report of the
National Advisory Board
on Science and Technology

COMMITTEE ON THE FINANCING OF INDUSTRIAL INNOVATION

Presented to the
Prime Minister of Canada



National Advisory Board on
Science and Technology

Conseil consultatif national
des sciences et de la technologie

March 1991

The Right Honourable Brian Mulroney
Prime Minister of Canada
Ottawa, Ontario
K1P 8X4
Canada

Mr. Peter Wilson

Chairman of the Commission on the Financing of Industrial Innovation, 1000
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**Committee
on the
Financing of Industrial Innovation**

Final Report

The report of the Committee on the Financing of Industrial Innovation is available
for purchase from the National Library of Science and Technology, Ottawa,
Ontario. The price is \$15.00 plus shipping and handling charges.

Executive Summary

Introduction

1.1 Background
1.2 Objectives
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National Advisory Board on
Science and Technology

Conseil consultatif national
des sciences et de la technologie

March 31, 1991

The Right Honourable Brian Mulroney
Prime Minister of Canada
House of Commons
Room 309-S
Ottawa, Ontario
K1A 0A6

Dear Prime Minister:

On behalf of the Committee on the Financing of Industrial Innovation, I have the pleasure to forward for your consideration its Final Report, as approved by the Plenary Meeting of NABST.

The Committee believes industrial innovation is at the core of future competitiveness for Canada. The extent of innovation in industry depends heavily on the environment for its financing. I believe you will find the report makes a positive contribution to our understanding of the situation with respect to the financing of industrial innovation in Canada.

Three of the five recommendations of the report can be implemented without any impact on the federal deficit in the short term; indeed, one of these three recommendations may generate sufficient revenues to finance the other two in the future. The other two recommendations would require an increase in federal expenditures over the short term. While the Committee is very sensitive to the need for deficit reduction, we believe that action is required now to create a more technology-intensive economy in order to generate the wealth to support the level of services that Canadians expect.

The more all Canadian industries use industrial innovation to become more technology-intensive, the stronger our ability to compete. The Committee sees a direct linkage between industrial innovation and national prosperity and I urge you to consider the attached report in that light.

Respectfully submitted,

Beverley Brennan
Chairman
Committee on the Financing
of Industrial Innovation

**Members of the Committee
on the
Financing of Industrial Innovation**

Mr. Robert Alexander
Vice-President
Technology
Victoria Commonwealth Games Society

Dr. Julia Levy
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EXECUTIVE SUMMARY

Industrial innovation requires an investment in the "soft" assets of knowledge, engineering and marketing, as well as in the "hard" assets of plant and equipment. Financing industrial innovation raises two main issues: the cost of capital and access to capital.

Findings

As a country, Canada has a high cost of capital compared to Japan and the Federal Republic of Germany, but the cost of capital in Canada is comparable to that of the United States and the United Kingdom. The principal reason for the relatively high cost of capital within Canada is the cost of equity. At the country level, international debt costs are converging due to globalization of debt markets. A relatively high cost of equity has a disproportionate impact in Canada, as Canada has the lowest debt/equity leverage of the countries studied. The cost of capital is not uniform for all types of investments. Primarily due to tax arrangements (which are no longer available), the Canadian cost of capital for investment in machinery and equipment with a life of 20 years compared favourably with that of other countries in the period under study. However, for the R&D component of industrial innovation, the cost of capital in Canada is in the upper range of comparisons among countries. The finding at the country level is confirmed by comparisons between 42 Canadian companies and competing or comparable foreign firms: Canadian firms are in a high cost group of companies, while Japanese and German firms had relatively lower costs. The phenomenon is evident across several sectors of the economy.

Access to capital, whether for start-up or expansion, is the primary financing issue for new or emerging technology-intensive firms. Those managing technology-intensive enterprises and their potential investors share a significant characteristic: meager knowledge of each other. The gap in understanding and expertise, on both sides, creates a self-perpetuating cycle of failure, two vicious circles of underinvestment. Access to capital is, first and foremost, a human resources issue-specifically concerning the quality and availability of management. Inadequate rewards for risk-takers result in shortages of the management skills required.

Conclusions

The relatively high cost of capital in Canada is not just a problem for the high-technology sector. Resource-based and mature manufacturing industries are equally threatened. Macroeconomic conditions, such as government deficits and low savings rates (compared to Japan and the Federal Republic of Germany), are largely responsible. Further, current regulation for financial institutions in Canada limits opportunities for growth in the base of innovative industrial performers. Action is required to reduce the cost of capital for R&D and for other elements of industrial innovation.

Technology-intensive firms in Canada, in the start-up or early phases, face severe difficulties in gaining access to capital. The principal difficulties arise from an inadequate supply of management skills for running and building technology-intensive firms, as well as from lack of knowledge, understanding and experience among investors about the development of technology-intensive commercial activity.

Recommendations

The Committee recommends:

1. *that the capital gains tax rules be modified so that gains from eligible equities held longer than three years are not included within personal income for the purposes of taxation.*
2. *that a tax penalty be applied against the assets of pension funds that do not invest at least 1 percent of their assets in eligible small enterprises. Should a fund fail to invest the 1 percent in eligible firms, a penalty of 10 percent would be assessed on the amount not so invested. Eligible enterprises would include companies that perform substantial amounts of R&D or venture capital groups that specialize in the financing of technology-intensive firms.*
3. *establishment of a national fund of up to \$1 billion, capitalized over time by government and/or by the penalty tax on pension funds (see No. 2), administered at arms length from government, for the purpose of sharing up to 50 percent of the industrial innovation costs for specific projects proposed by established firms. The fund contribution would be repayable at premium rates from revenues on eventual sales of the product developed and marketed.*
4. *establishment, on a pilot basis, of a matching investment fund, which would provide repayable government contributions directly to new and/or small innovation-based ventures in an amount up to 75 percent of equity funds raised by individual investors. Government would finance the creation of the fund. Funds would be 'bonded' as to use (i.e., for innovation). Provided that the bond was in place and certain minimum criteria were met, funds would be made available without government review.*
5. *establishment of a financial institution, to provide equity and debt investment for technology-intensive firms. Government(s) would contribute some part of the initial capitalization of this bank. The financial institution would endeavour to earn market rates of returns on its investments.*

INTRODUCTION

Investment in industrial innovation requires an investment in new knowledge, its application to processes and products, and the marketing of the resulting product. Thus the financing of industrial innovation is distinct in certain crucial respects from the financing of other forms of business investment. Business investments in land, buildings and equipment produce tangible assets, intended to yield a quantifiable return to the investor over an agreed period. Investment in innovation is quite different: it produces the intangible of new knowledge which can, as a marketed product, yield great returns. However, the timing of these returns is more difficult to forecast and their probability less clear.

All types of financing require funds to be raised through debt, equity or retained earnings. Financing is as much a factor of production as labour and materials. The lack of a factor of production, or its availability at too high a cost, affects the survival of the producer.

It is in this context that the Committee on the Financing of Industrial Innovation approached its mandate.

Mandate

The Committee has the following mandate:

To examine the situation with respect to the financing of industrial innovation in Canada and abroad. To recommend financing measures which can be undertaken by both the Private and Public Sectors, to improve the financing of such innovation, with the objective of increasing the global competitiveness of Canadian industry and sustaining the relative prosperity of Canada in the long term.

Context

The Committee believes that Canada's economic prosperity depends largely on our success in international trade. With relatively small and dispersed domestic markets, we cannot expect to maintain, let alone increase, our standard of material and social well-being without the wealth generated by trade with other countries.

To gain wealth from trade, Canadian products must be competitive with goods and services available from other countries. Thus our international competitiveness and national prosperity are closely linked.

By far the greatest proportion of our international trade is with the United States. Competitiveness with our largest trading partner is obviously required for national prosperity, but may not be sufficient to assure it. Canadian exports, while competitive with American products, might not be competitive with other sources of supply available to the American importer. Further, Canadian

importers will purchase American products only as long as they are competitive; if American competitiveness slips, imports from other countries will rise in relative prominence.

The Committee believes that constant industrial innovation is a vital element of international competitiveness, and that this is likely to become even more important in the future. The innovation imperative applies not only to the advanced technology sectors of the economy. Future competitiveness means that constant industrial innovation must also become a characteristic of both resource-exploitation industries and mature manufacturing industries. Our whole industrial structure must become more technology-intensive.

For traditional industries, innovation is the basis for survival in the medium term. Canadian resource-exploitation industries must depend on innovation to counteract the competition of lower wage-cost suppliers in other countries. Mature manufacturing industries face a similar challenge, both from countries with lower wages and from fully industrialized economies that have used innovation to improve quality and reduce costs.

If Canada is to meet the challenge of international competition, technology-intensive industries must become an ever growing proportion of our industrial structure. Natural competitive advantage is being replaced by a competitive advantage created through the application of knowledge.

Resource-exploitation industries face diminishing returns in the future. Many of our resources are finite and exhaustible. Real prices for the unrefined product have been falling over the last 15 years and there is no reason to expect that this trend will be reversed. However, such industries have the opportunity to transform themselves through science-based innovation. The transformation, for example, could involve the evolution of a mining or mineral processing company into a materials company specializing in advanced alloys and compounds needed by the industries of the future.

Industrial innovation yields increasing returns, such as employment that is more skills-intensive, better-paid and usually less vulnerable to fluctuations in the economic cycle. Increasing returns are available for as long as people create new knowledge and have the capital to develop it. Knowledge is not a finite resource, but capital is, and that is the subject of this report.

Work Done

a) Process

The Committee on the Financing of Industrial Innovation has held ten meetings since August, 1989. One of these meetings was a Round Table, to which a large number of speakers and participants were invited to discuss ownership links between the financial and productive sectors.

The Committee has contracted with the following consultants:

- Canada Consulting Cresap (TPF&C), for a study on the cost of capital;
- KPMG (Peat Marwick), for in-depth studies of the impact of financing issues on four Canadian firms;
- Deloitte, Touche for an international enumeration of measures used to reduce the cost of capital;
- Tom Courchene, for organization of the Round Table on Ownership Links between Financial Institutions and the Real (i.e., tradeable goods and services) Sector;
- Jean Desrochers, for papers on the links between financial institutions and the industrial-commercial sector; and
- Richard Lipsey, for advice on the preparation of the Committee's terms of reference; the quality of the work of consultants; and macro-economic matters related to the financing of industrial innovation.

The Committee has also received assistance from a number of interested experts, including:

Michael Brown (Ventures West)
 George Hatsopoulos (Thermoelectron)
 Tom Keene (U.S. Council on Competitiveness)

b) Structure

The Committee wished first to understand the range of methods used within Canada to finance, and to support the financing of, industrial innovation. The study contracted to KPMG was of assistance, as it reviews the constraints on, or incentives for, financing industrial innovation from the perspective of four Canadian firms. The study conducted by Deloitte, Touche enumerates the measures used to reduce the cost of capital within ten other countries.

The Committee also required an analysis of the current situation to determine whether the financing environment in Canada was different from that of our competitors. Differences might be found with respect to both the cost of capital and the ease of access to it. If there were differences, the Committee wished to know whether such would affect the extent of investment in innovation and, hence, the competitiveness of Canadian firms. The study contracted to Canada Consulting Cresap is the result. The criteria used to select the firms studied, and a list of their names, appears at Annex A.

Experts in finance and economics apply a number of different methodologies to calculate the cost of capital. Recognizing the variety of approaches, the Committee wished to ensure that the results of the study would be credible within the financial and government community. Consequently, it arranged that the consultants' methodologies and applications were reviewed by a panel of prominent economists from Canada and the United States: Pierre Fortin, Douglas Purvis, George Hatsopoulos and Paul Krugman. The panel is satisfied with the methodology used in the study.

Members of the Committee and some of its advisors drew attention to the differences among countries with respect to the relationship between the financial sector and the industrial/commercial sector. Dr. Tom Courchene organized a Round Table Discussion to facilitate consideration of this

difference and its effect. Further studies on this issue were conducted by Mr. Jean Desrochers, one of the participants in the Round Table.

The NABST Secretariat has prepared a number of supporting papers on, inter alia, the case for science-based innovation; an analysis of the investment distribution of various pools of capital within Canada; an analysis of the country of ownership and R&D/sales ratios of 50 major performers of research and development within Canada; and a review of relative export shares among 11 OECD countries.

The Committee has agreed to present its findings under the headings of "Cost of Capital" and "Access to Capital". The Committee recognizes that the distinction between 'cost' and 'access' may be artificial, in that a low cost of capital may result in easier access to it. The distinction was accepted because some companies within Canada, particularly smaller firms, have difficulty reaching the stage where cost of capital is an issue; they cannot obtain access to capital.

FINDINGS

Part I: Cost of Capital

References to the cost of capital are often interpreted as references to the level of interest rates, which would yield the cost of debt. For the private sector, that interpretation is incorrect. Equity capital also has a cost, in the sense that investors expect a return on their investment, through dividends or share price appreciation. In this report, the cost of capital refers to the sources from which a firm could assemble capital for investment and operations: equity, debt or retained earnings. In the results presented below, the cost figures refer to the real costs actually paid by firms. For example, in one adjustment to move from nominal to real costs, the debt cost figures are calculated net of corporate tax deductions for interest payments.

In Figures 1 and 2 following, Canadian costs appear to be somewhat more volatile than the line for other countries. The exaggerated movement in the Canadian cost line reflects, in part, the resource-intensive structure of the economy; cyclical fluctuations in commodity price and demand have pronounced effects on the performance of resource-based companies.

Differences in the cost of capital can have a significant effect on corporate decision-making, as argued on pp. 7 and 8 below. The difference between the Canadian and Japanese cost of equity in 1988 was about 4.5 percentage points in Figure 2. With a cost of equity in Canada of 7.5 percent, investors would feel they had made a poor investment unless they had earned income or realized price appreciation of an amount equal to their original investment in less than 10 years. In Japan, where the cost of equity was 3 percent, investors would wait more than 23 years before expecting to double the original sum invested. Corporate planning horizons are clearly affected by the relative imminence of the need to provide a return to investors.

Cost of Capital: Country Comparison

1. *Canada has a high cost of capital compared with Japan and the Federal Republic of Germany, but the cost of capital in Canada is comparable to that in the United States and the United Kingdom. (Figure 1)**

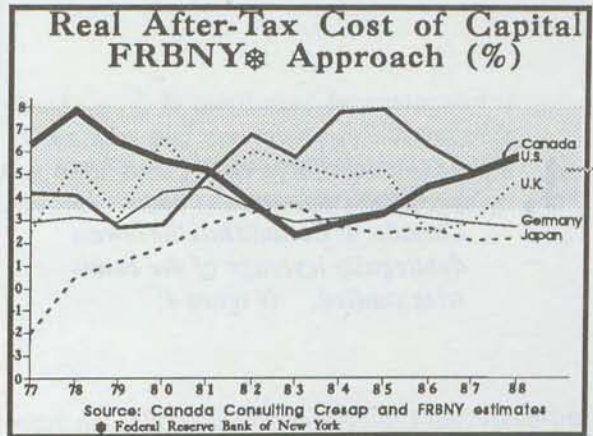
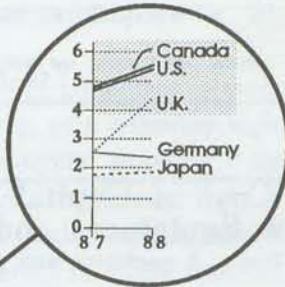


Figure 1



2. *The relatively high cost of capital within Canada is mostly attributable to the cost of equity. (Figure 2)**

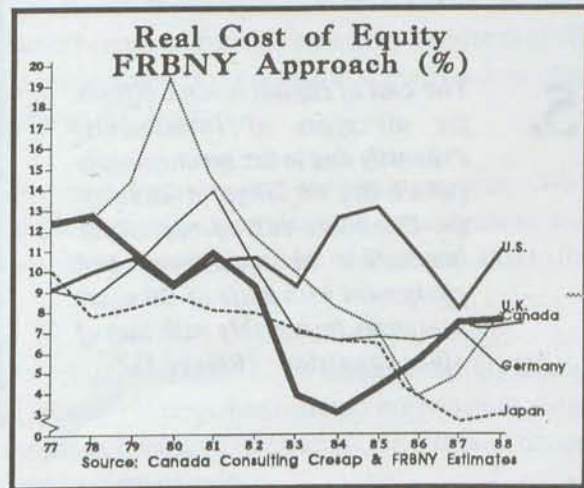
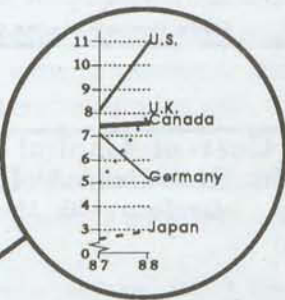


Figure 2



3. *At the country level, international debt costs are converging due to globalization of debt markets. (Figure 3)*

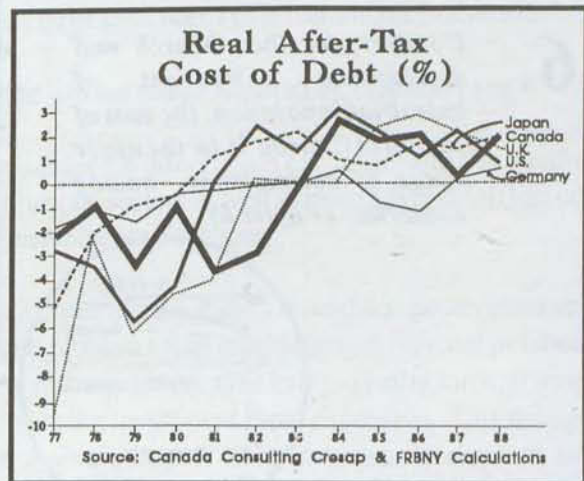


Figure 3

* In Figures 1 & 2, the line for Canadian costs appears to be somewhat more volatile than the lines for other countries. The exaggerated movement in the Canadian cost line reflects, in part, the resource-intensive structure of the economy; cyclical fluctuations in commodity price and demand have pronounced effects on resource company performance.

4. *A relatively high cost of equity has a disproportionate impact in Canada, as Canada has the lowest debt/equity leverage of the countries studied. (Figure 4)*

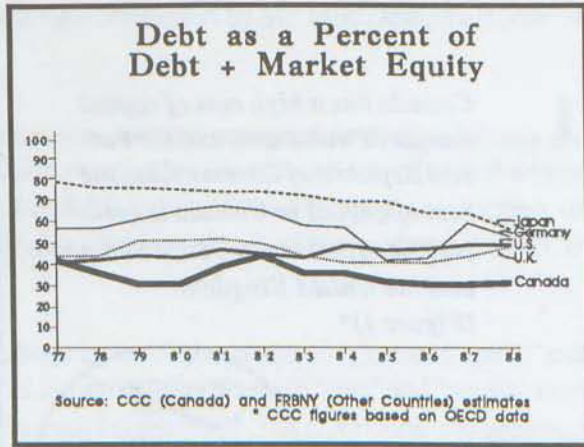


Figure 4

5. *The cost of capital is not uniform for all types of investments. Primarily due to tax arrangements (which are no longer available), the Canadian cost of capital for investment in machinery and equipment with a life of 20 years compares favourably with that of other countries. (Figure 5)*

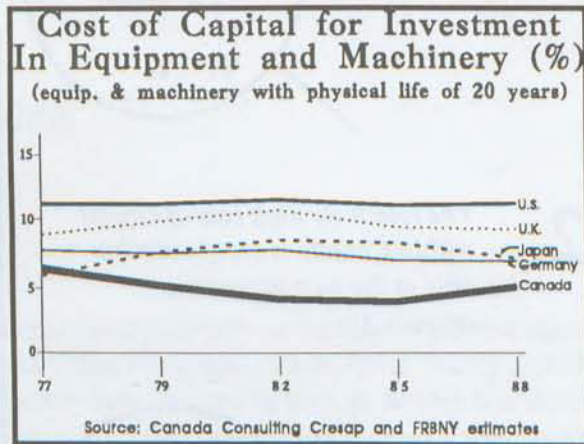


Figure 5

6. *However, for the research and development component of industrial innovation, the cost of capital in Canada is in the upper range of comparisons among countries. (Figure 6)*

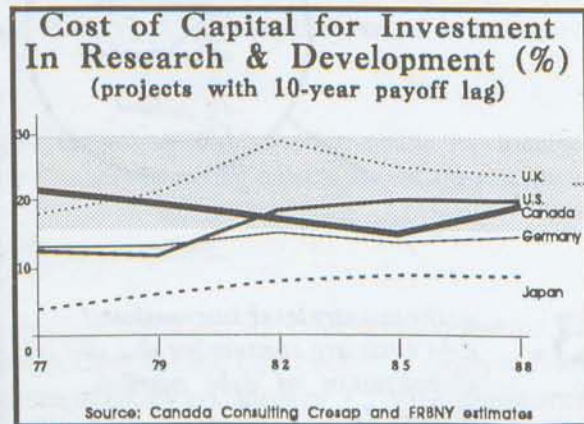
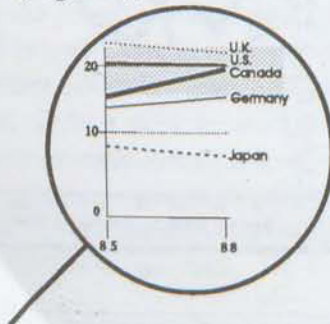


Figure 6



Comparisons among Firms

- 7.** *The finding at the country level (see No. 1 , p. 4) is confirmed by comparisons between 42 publicly-traded Canadian companies and competing or comparable foreign firms: Canadian firms are in a high cost group of companies, while Japanese and German firms had relatively lower costs. The phenomenon is evident across several sectors of the economy.*

Cost of Capital: Causes and Impact

As mentioned earlier, at the country level international debt costs are converging; thus discussion on the causes and effects of a relatively high cost of capital naturally focuses on the reasons for differences in the cost of equity. However, it should be noted that the convergence of international debt costs is of practical benefit only to those firms that can, at least in principle, gain access to international debt markets. Progressive globalization of debt markets could extend this benefit to a wider range of firms in Canada. Nonetheless, where international competition is not a factor, Canadian debt costs could be substantially higher than those prevailing on global markets.

The cost of equity can be influenced by economic performance and economic structure. With respect to the former, the Committee takes note of the views of economists and commentators that equity costs are high in Canada compared with Japan or the Federal Republic of Germany, due to the following factors:

- high levels of real and perceived risk, caused by: higher inflation rates; greater volatility in both inflation and corporate earnings (accentuated volatility in corporate earnings may relate to a high concentration of resource industries); and, for the technology-intensive sector, a lack of understanding by, and communication with, the financial community.
- an inadequate supply of investment capital for private investment, partly due to an extended period of deficit financing and consequential large cash needs of governments in Canada;
- high rates of capital gains tax, which raise the pre-tax return required by investors; and
- a regulatory environment that limits opportunities for information exchange and risk sharing between the commercial/industrial and the financial sectors as well as more adversarial, less cooperative relationships between business, government and labour.

A relatively high cost of capital is a significant threat to Canadian industrial competitiveness and hence, to our economic future: it poses more difficult problems than relatively high material or labour costs, which at least stimulate business to use those resources more efficiently, usually through innovation and capital investment. High costs of capital make investment more expensive. This reduces the range of projects that can be financed, with a severe impact on investments in research and development or other aspects of industrial innovation.

The effects of a high cost of capital are both direct and insidious. For the purpose of this discussion, there are three types of investments a firm can make. First, there are investments a firm is required to make to comply with government rules, such as those respecting pollution control and safety in the workplace. Second, there are investments to maintain a firm's current competitive position, by achieving the same or better production efficiencies than its competitors. Third, there are investments a firm can make to secure its competitive position in the future, by developing new processes or new products.

Firms that do not make investments in the first two categories risk quick business failure. Either government shuts them down, or they fail because of inability to meet the current competition. However, the making of investments does not guarantee the continued financial success of the firm. Investments must generate a return on capital that exceeds their cost. The higher the cost of capital, the more difficult it is to generate a sufficient return. If net returns are negative while the firm continues to grow, its value will be reduced.

The Canada Consulting sample of 22 resource-based and mature manufacturing companies shows that most firms examined have not been successful in achieving positive net returns (see Figure 7). Some firms have continued to invest and grow in recent years, but at the cost of the value of the firm. Other firms have contracted in size.

Given the relative prominence of the resource sector within the Canadian economy, the financial performance of that sector has a significant impact on the performance indicators for the economy as a whole. The impact is apparent in calculations of the cost of equity for Canada. As explained in the Summary Note on the Calculation of the Cost of Capital at the Country Level (p. 10), the cost of equity calculated using the FRBNY method is based on the earnings/price ratio of the stock market. The earnings of resource-based companies are particularly sensitive to changes in world commodity demand. In a steep recession, such as that of the early 1980s, declines in earnings within the resource sector depress the apparent cost of capital for all industries in Canada. However, an apparent low cost of capital is unlikely to result in increased investment when a recession leads to poor financial performance.

Difficulties in generating returns that exceed the cost of capital appear to be less prevalent among technology-intensive firms. In the Canada Consulting sample of 16 established technology-intensive firms, almost all firms continued to invest and grow, with the majority able to increase their value (see Figure 8). The difference in performance between the groups of firms illustrates the benefit in relying less on natural competitive advantage and more on competitive advantage created through

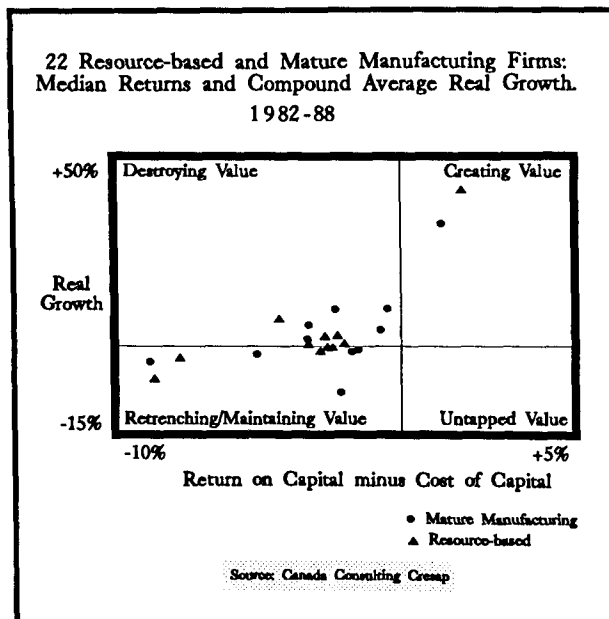


Figure 7

the application of knowledge. The evidence suggests that firms in the resource and mature manufacturing sectors suffer from decreasing returns, while technology-intensive firms are more capable of achieving increasing returns.

Both traditional and technology-intensive firms have the opportunity to make investments in order to secure their competitive position in the future. Investments in this category would include research and development, technology acquisition or product diversification. The higher the cost of capital, the less likely that a firm will be willing to undertake investments with lower short-term returns, or where returns are uncertain. The higher the cost of capital, the more short-term the perspective of investors and, hence, corporate managers. Investments in the future, with no, low or uncertain short-term returns, will be sacrificed in favour of investments which show immediate returns over the hurdle rate. Although the approach may seem short-sighted, the behaviour of managers is rational: a high cost of capital - especially a high cost of equity - requires the short-term perspective that is necessary for short-term survival. That is a precondition for long-term survival.

Failure to make those investments in the future, however, will be felt when the future becomes the present, an ever more-rapid process. Some firms will find themselves a generation behind in process technology; others will discover that their products have been superseded.

The threat applies to both traditional and technology-intensive firms. Traditional firms that do not make such investments will remain traditional firms, trapped in the cycle of negative net returns until the value of the company has been consumed. High-technology firms that do not make the investments required to meet future competition face risks of two kinds. If they endeavour to maintain their entire product line, inadequate levels of innovation may result in the whole firm falling behind its competition. To avoid this, the firm might choose to restrict the range of products it offers. However, a narrowing, specialized niche leaves a firm vulnerable to major changes in technologies or consumer demands.

Measures to Reduce the Cost of Capital

The Committee has received numerous suggestions or options on means by which the cost of capital might be reduced. Some are intended to reduce the cost of capital nationally, for all types of investment; others are targeted more narrowly to the cost of industrial innovation; still others are proposed for the benefit of small firms, especially those in the start-up phase. Possible measures can also be considered from the perspective of the primary beneficiary: some would affect firms directly, others would affect actual or potential investors.

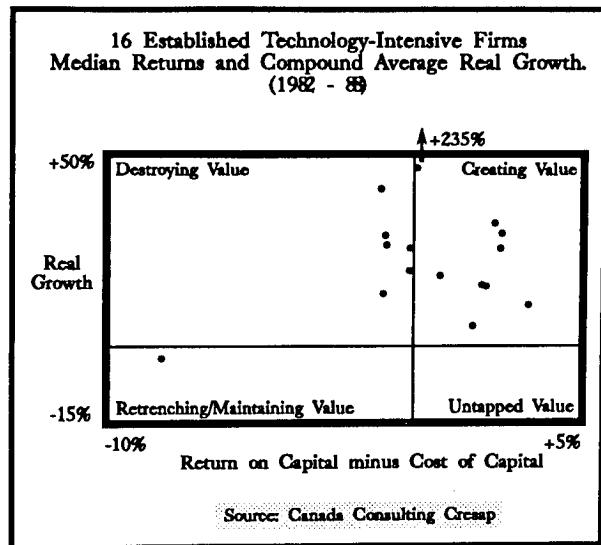


Figure 8

The cost of capital for all types of investment in Canada would be lower given a macroeconomic environment more conducive to savings and investment. As noted above, some economists argue that government deficits have raised the cost of capital available for private investment. It is clear that government debt instruments form a larger proportion of the assets of trustee pension plans and mutual funds than they did ten years ago. The Committee notes the option that governments in Canada reduce their draw on the available sources of capital. Some economists have also suggested that high levels of current private consumption reduce savings and hence raise the cost of capital for investment. The Committee notes the option of using consumption taxes to divert funds to savings.

Lower taxes for corporations or for investors would also reduce the cost of capital for all forms of investment. Field representatives of consultants to the Committee reported on tax measures available within 10 other countries. There appeared to be nothing unique in the tax measures or incentives used. The Committee notes that one of the measures considered to be most effective, accelerated depreciation, has been phased out within Canada. The Committee also took note of measures that raise the effective return to investors, such as reductions in the capital gains tax rate for equity investments, or the use of flow-through shares; these have the effect of reducing a firm's cost of capital, defined in terms of what an investor expects.

The section on Access to Capital refers to how regulations on the behaviour of financial institutions can affect access to capital. As noted there, closer links between the financial and commercial/industrial sectors can have an effect in reducing the cost of capital, by reducing perceived risk.

Summary Note on the Calculation of the Cost of Capital at the Country Level

For measurements at the country level, the cost of capital is the weighted average of the costs of debt and equity.

Calculation of the cost of debt, defined as the real after-tax interest rate paid by non-financial corporate borrowers, begins from the nominal interest rate paid on bank debt and the yield on corporate bonds. Adjustments are made for differing rules on compensatory balances among the countries and to reflect the bank/bond debt weighting. The resultant rate is further adjusted to factor out the tax shelter of deductions against corporate tax and to correct for inflation. Calculations of the cost of debt have been made using the model developed by the Federal Reserve Bank of New York (FRBNY) [McCauley and Zimmer].

Two methods were used to estimate the cost of equity, each serving as a cross-check on the other. The FRBNY approach begins from the earnings-to-price ratio of the stock market. Adjustments are made to make comparisons among countries reliable and to remove distortions that inflation and differing tax treatments of depreciation have on reported earnings. The warranted equilibrium cost-of-capital approach assumes that the cost of equity to a company is the rate at which the company must earn to meet equity investors' requirements, taking into account inflation and tax considerations.

The calculations are not intended to provide precise estimates on a short-term basis. Stock prices and corporate earnings are volatile and probably do not reflect the expectations of investors for a short-term return. However, the estimates are intended to express levels and trends over the medium to long-term.

Another example of the effect of national rules and regulations is within bankruptcy law. It has been suggested that certain companies in the United States, that have petitioned under Chapter XI of the *Bankruptcy Laws of the United States*, have substantially lower costs of capital than others that have not used Chapter XI. However, the use of Chapter XI is not always of benefit to a company's investors.

As the Committee's mandate concerns the financing of industrial innovation, more attention was given to those measures that would specifically support such activity. The Committee has been presented with options under the following headings:

Tax Measures

Measures might include an increase in the research and development tax credit to its level prior to tax reform or higher; restoration of accelerated depreciation; provision of incentives to specially registered venture capital funds; exemption of equity holdings from the capital gains tax; or tax incentives to direct retirement funds to venture capital purposes.

Spending Measures

At the federal level, possible initiatives include the expansion, with more funds, of the ISTC Defence Industry Productivity Program beyond the aerospace and electronics sectors; more funds for the ISTC Strategic Technologies Program; more funds for the NRC Industrial Research Assistance Program; and establishment of a national risk-sharing fund (such as the Swedish Industrifonden) to share in R&D and product development costs. The Committee was also advised of the possibility of an interest rate subsidy or buydown program for designated sectors of the economy, as has been used in Japan.

Government Procurement

A firm government procurement contract for a small firm reduces the level of risk for the investor in the firm and thus lowers the cost of capital.

Summary Note on the Calculation of the Cost of Capital at the Firm Level

For calculations at the firm level, the cost of capital is the rate at which future cash flows are discounted to arrive at the current market value of the company.

The market value of a firm is based on the market value of its equity (over a 12 month average) plus the book value of the debt. Future cash flows, difficult to predict, are estimated using a proprietary model developed by Callard, Madden and Associates, Inc. The model requires as inputs: the real value of a firm's assets in current dollars; the cash flow return on investment, in constant dollars, earned on those assets; real growth in assets; and the projected future real cash flows and assets based on smoothed historical experience. The inputs are used to determine future cash flows. With the variables of market value and future cash flows in place, cost of capital can be determined.

FINDINGS

Part II: Access to Capital

1. *Access to capital, whether for start-up or expansion, is the primary financing issue for new or emerging technology-intensive firms.*

The Committee is aware that difficulties in gaining access to capital are not unique to technology-intensive firms or firms planning industrial innovation. However, high technology enterprises face additional, unique difficulties in gaining and retaining access to capital.

For an institutional lender, a newly-formed high-technology company is not the ideal client. The prospective client has no track record and few conventional assets. More seriously, proposed expenditures would not be recognized as real investments in conventional accounting and financial terms. In any case, the expenditures would be directed to the development of new knowledge, often employing science and/or technology, the potential and market value of which are beyond the capability of the lender to appreciate. Future cash flows to service the debt depend on the success of product development and its acceptance in the marketplace; they cannot be assured. As with all small business start-ups, the future is - at best - uncertain.

New high-technology firms must therefore rely primarily on equity financing, possibly from venture capital companies or other institutional investors but more likely from relatives, friends, colleagues and angels - investors who believe in the management of the firm or the product to be developed. Often the amount of money available from acquaintances is inadequate to the task. The fledgling firm, if not stillborn, starves.

2. *Those managing technology-intensive enterprises and their potential investors share a significant attribute: meager knowledge of each other.*

Owners and managers of small technology-intensive enterprises often know little about financiers and financing. Equally, most financiers and potential investors have little exposure to those in need of capital for innovation; most do not share a common background of training and interests with their prospective clients and, as noted, many do not have, or have easy access to, the technical expertise needed to assess the practicality and potential of an industrial innovation project.

This lack of understanding and expertise, on both sides, creates a self-perpetuating cycle of failure, twin vicious circles of undercapitalization.

Investors are behaving rationally when they shy away from investment in technology-intensive firms. First, they are reticent to invest in a business that they may not understand; second, returns are distant and uncertain compared to conventional, lower risk investments, although successful projects have the potential for far higher returns. For potential corporate investors, lack of expertise or understanding of an innovative technology may result in inadequate or incorrect information about the

product under development and in a weak analysis of investment prospects. These failings are likely to result in a poor choice of investments. Not surprisingly, poor investments yield poor returns. In those circumstances, investors are unlikely to take further equity positions in industrial innovation projects. The cycle continues as investors lose interest in technology-intensive companies, never developing the knowledge and skills required to make better investment choices.

Those still in the private-sector venture capital business report a significant reduction in the number of venture capital firms over the last several years. The reason for the decline is simple: returns on investments were too low.

For those involved in start-ups of high technology firms, the difficulties are similar. An inadequate level of investment at the start means that too many compromises have to be made: for example, a full complement of management skills or state-of-the-art equipment might be too expensive. Those compromises may themselves compromise company performance, yielding financial results below potential and, more importantly, below the expectations of investors. A poorly performing company is unlikely to attract additional investment or, indeed, to retain the investors it has. The cycle of underinvestment continues in a downward spiral.

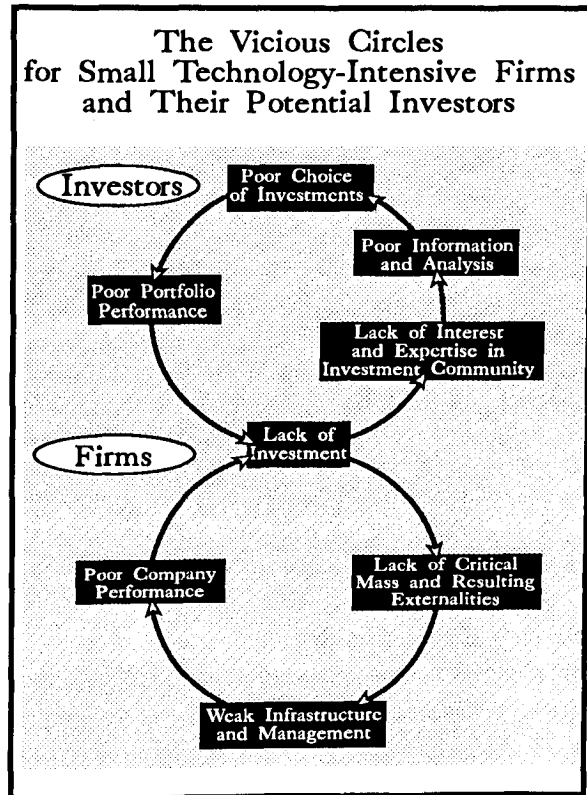


Figure 9

The cycle of underinvestment continues in a downward spiral.

The rules and regulations within which an economy operates can also affect the knowledge that the potential investors have about firms, and hence the firms' access to capital. For example, the strict separation between the financial sector and the commercial/industrial sector within Canada (as well as the United States and the United Kingdom) is sometimes seen as a competitive disadvantage for Canada in comparison to Japan and the Federal Republic of Germany, where closer links are permitted. Closer links, some argue, would mean that lenders were more knowledgeable about the firms in which they had a stake, thereby reducing the perceived risk (and hence the cost) of the debt or equity investment. The sharing of risk, research, market information and contracts among members of a group of companies, either owned by a financial institution or in which there is a financial institution, improves the stability and prospects of member companies, again reducing the risk involved in financing. Within Canada, there are several large conglomerates which contain both commercial/industrial firms and deposit-taking financial institutions. However, it appears to be federal policy that the commercial/industrial and financial arms of these institutions operate at arms-length.

3. *Access to capital for small technology-intensive firms is, first and foremost, a human resources issue; more precisely, the issue concerns the availability of first-quality management skills in the full spectrum required.*

The majority of small business failures, in all sectors, ultimately can be attributed to failings by management. However, the need for first quality management in new or young technology-intensive firms is greater than in other firms. Management must manage assets that are often intangible, must arrange financing based on future cash flows when assets are intangible and must market products that may be unfamiliar, if not revolutionary, to the marketplace.

Observers within the venture capital industry believe that the problem of an inadequate supply of management skills is particularly severe in Canada, certainly in comparison with the United States. First-quality management, even when arranged by a venture capital company, is hard to find.

Shortages in the supply of high-quality managers are the predictable result of the provision of inadequate rewards for the task. Innovation at the forefront of technology is a high-risk career choice and it does not appear that the tax system allows sufficient rewards to compensate for the risk. The United States appears to be a more attractive place for Canadian entrepreneurial managers, a function as much of reward as opportunity. The problem is compounded by federal and provincial government policies that do not target industrial development and that seem to favour multiple centres of expertise, in each technology, in each region.

Access to Capital: Ideas to Improve It

The Committee has received suggestions on how to improve access to capital for small companies planning industrial innovation. For small firms, the issues of access to, and cost of, capital are closely related. Consequently, some of the measures presented to the Committee would also have the effect of lowering the cost of capital for the firms and their investors; reference should also be made to the section of this paper on Cost of Capital. For example, measures that lower the level of perceived risk for the investor improve chances of gaining access to capital and at the same time lower the rate of return the investor expects. Other measures presented to the Committee include those directed to the improvement of management among small, innovative firms.

The Committee has been presented with options under the following headings:

Tax Measures

Measures might include provision of incentives to specially registered venture capital funds; exemption of founders' shares from the capital gains tax; tax incentives to direct retirement funds to venture capital purposes; and special tax incentives to attract experienced managers of knowledge-based companies from other countries.

Spending Measures

Proposals considered apply to the federal level. Government assistance programs of all types improve access to capital, especially if their contributions can be classed as equity (or a contingent liability), rather than debt. A program in which government would match part of the equity raised by the private sector, to be repaid by royalties on future sales, would meet this test because repayment would be contingent upon sales. Measures such as the Swedish Industrifonden, which shares in R&D and product development costs, also show the government's commitment as investor, and thus lowers perceived risk. To assist in the development of management resources, it has been suggested that the government provide loans to companies to defray the extra costs associated with attracting qualified management personnel from elsewhere in Canada, or from other countries. Governments might also wish to finance the training of potential entrepreneurs in the venture capital industry in the United States or elsewhere.

Government Procurement

As noted in the section on Cost of Capital, a government purchase order improves access to capital and reduces the cost of capital by reducing the investor's risk.

Financial Institutions

The upgrading of expertise among financial institutions, or the establishment of a new financial institution, would permit more qualified and sympathetic evaluation of requests for financing of technology-intensive firms. Measures that encourage the managers of major pools of capital to direct a greater proportion of assets to technology-intensive investment would also be of assistance.

CONCLUSIONS

- 1.** *The relatively high cost of capital in Canada is not just a problem for the high-technology sector. Resource-based and mature manufacturing industries are equally threatened. There is a correlation between high costs of capital and low rates of growth in productivity. Over the ten years ending in 1988, Canada's growth in manufacturing productivity has been relatively low; our costs of capital have been relatively high.*

Although its mandate concerns the financing of industrial innovation, the Committee concludes that a high cost of capital affects the Canadian economy as a whole. While Canadian levels of investment compare favourably with those of our international competitors, this comparison does not indicate an ability to surmount a high cost of capital. In the first place, much of Canadian investment reflects our industrial structure, which is heavily reliant on resource and mature manufacturing industries; these industries demand high levels of investment for survival. In addition, investment is not necessarily productive enough to achieve real growth in firms. Information available to the Committee suggests that the real assets of Canadian non-financial corporations, despite consistent high investment, have been lagging behind the economy's growth for several years. Increases in the productivity of production are the foundation of real economic growth. If capital cannot be sufficiently productive to meet its costs, it will simply flow elsewhere: 'elsewhere', in this case, probably means investments that do not add value to Canadian production.

- 2.** *Technology-intensive firms in Canada, in the start-up or early phases, face severe difficulties in gaining access to capital. The principal difficulties are: the insufficient availability of management skills and personnel to build and to run technology-intensive firms, as well as the lack of knowledge, understanding and experience among investors about the development of technology-intensive commercial activity.*

General solutions to these specific problems may not be appropriate. Incentives may be needed to encourage more managers in start-up or emerging technology-intensive firms; the market economy, as currently structured by government, does not produce enough of them. Measures are also required to improve the knowledge of financial institutions about new technologies and their development. Financing start-ups will always be a high-risk endeavour, but greater knowledge should reduce misunderstandings.

- 3.** *Regulation of financial institutions in Canada limits opportunities for growth in the base of innovative industrial performers. While still protecting depositors, closer commercial links between the financial and commercial/industrial sectors could create a climate in which greater innovative risk is not only accepted, but encouraged.*

The Committee takes note of the regulatory regime for financial institutions in France, the Federal Republic of Germany and Japan, under which commercial links are allowed between financial institutions and the commercial/industrial sector. In those countries, links encourage greater understanding between financiers and industrialists, with the effect of increasing tolerance and reducing risk. The result is often improved access to capital, at a lower cost. Federal government policies in Canada and the United States discourage, if not prohibit, such links, citing concerns about the safety of depositors' funds and the risk of corporate concentration. The Committee notes that failures of financial institutions are more common in countries that discourage commercial links than in those where they are permitted. The Committee also notes alternative methods for dealing with excessive corporate concentration (in a time of globalization) that do not focus solely on the financial sector.

4. *High government deficits and low savings rates (in relation to Japan and the Federal Republic of Germany), are largely responsible for the relatively high cost of capital in Canada. Although the Committee would like to see these conditions improved, macroeconomic policy is beyond the scope of its work.*

Large government deficits have been a prominent feature of the Canadian economic landscape for more than a decade. These deficits have raised a mountain of debt, the whole of which must be financed. The crushing weight of the government presence in capital markets raises financing costs for everyone else, with particular impact on the productive sector. Since it is private-sector activity that produces the revenue to finance the greater part of government operations, the impact of government policies has, to say the least, been counterproductive. Annual deficit reduction is only a start. The debt mountain must come down as well.

The Committee has, however, focused its work on areas more specific to the financing of industrial innovation. Constant industrial innovation is the foundation of future competitiveness within the world economy. To the extent that Canadian industry is more competitive, it will be easier for governments to make better progress on the macroeconomic front.

5. *The high cost of capital for research and development in Canada is coincident with the comparatively low rate of industrial investment in this area. Action is required to reduce the cost of capital for industrial innovation.*

There are many factors in a firm's decision to undertake research and development: the type of industry, its competition and its growth potential are just a few. However, high financing costs can only be a deterrent. Research and development is just one element of industrial innovation but there is no evidence to suggest that the costs of capital for the other elements of industrial innovation, such as licence fees, process engineering or marketing, are any lower. The Committee concludes that the high cost of industrial innovation results in less of it being done. The effect of continuous low levels of industrial innovation will affect the competitiveness of all sectors of the Canadian economy. Helpful measures would benefit the firm directly, lowering its innovation costs, or would benefit the investor, allowing a lower pre-tax return in expectation of a higher post-tax return.

RECOMMENDATIONS

Canada's ability to compete internationally depends on improvements in the environment for the financing of industrial innovation. The Committee believes that issues relating to the high cost of capital or inadequate access to capital, would be of much less concern in an economic environment of stable prices, with low government debt. Whether for debt or equity, the cost of capital is affected by inflation and by government crowding on capital markets. Difficulties in gaining access to capital are reduced when there is less competition for funds with governments. The Committee does not see such an economic environment as a probable occurrence within the short term.

Given the current economic environment, the Committee's recommendations are intended to support increased industrial innovation through improvements in how it can be financed. This objective is not a sectoral concern, seeking to better the circumstances of the so-called 'high-technology sector'. International competitiveness requires that innovation be persistent and pervasive throughout the economy: increased industrial innovation is an objective for all sectors of economic activity.

The Committee's recommendations address the following subject areas:

- returns for investors, owners and managers of firms that create real wealth;
- supply of funds for industrial innovation;
- risk involved in industrial innovation by established firms;
- access to capital for start-up of early-stage technology-intensive firms;
- investor knowledge about technology-intensive enterprise;
- communication and understanding between financial institutions/investors and technology-intensive firms.
- availability within small technology-intensive firms of the full spectrum of management skills.

1. Capital Gains

The Committee recommends that the capital gains tax rules be modified so that gains from eligible equities held longer than three years are not included within personal income for the purposes of taxation.

Objective

The Committee seeks to reduce the cost of equity capital by reducing the tax on capital gains. It also seeks to raise the effective reward for investors, owners or managers of new or early stage firms by reducing the level of taxation on the reward. The effect should be an increase in investment funds available to finance innovation.

The expectations for returns on debt or equity investment determine the cost of capital for a firm. Investors are concerned with the return they will receive after taxes. If the tax burden on the investor is reduced, the investor has lower expectations of return; thus the firm's cost of capital is lower.

Remarks

Current tax rules provide that three-quarters of capital gains are considered as taxable income. According to consultants to the Committee, were no capital gains taken into taxable income, the cost of capital would drop by more than 2.5 percentage points. The effect of the incentive would be felt by those companies where a difference of 2.5 percent in the cost of capital affects an investment decision. A difference of that magnitude would be significant, especially for companies engaged in industrial innovation. Adapting the example from page 4, at a cost of equity of 7.5 percent, investors will feel they have made a poor investment unless they have earned income or realized price appreciation of an amount equal to their original investment in less than 10 years. At a cost of equity of 5 percent, investors would be prepared to wait 15 years.

Investment in industrial innovation generally requires a long-term commitment to the firm. To reflect that reality, the Committee proposes that the special capital gains tax treatment apply only to equities held for a minimum of three years. As there is a high level of risk in industrial innovation, capital losses would continue to be deductible against income.

The definition of 'eligible equities' is important and difficult. One alternative, which the Committee rejected, would be to apply the incentive only to those firms that undertake a certain amount of research and development, as defined by the tax laws, in relation to sales. However, as noted on page 1, industrial innovation requires far more than an investment in "research and development", especially as that term is defined in the tax laws. Conversely, there would be little benefit to the economy in providing preferential tax treatment to firms that do not create goods or services which can be traded on international markets. Consequently, the Committee proposes not to extend preferential tax treatment to firms that engage in the principal business of real estate, retailing, distribution, financial and personal services. Within the same spirit, officials who might draft tax law to implement this proposal may wish to exclude other business activities as well.

The proposed tax change would benefit investors in all other firms, whether or not the firm is technology-intensive, and whether or not it undertakes industrial innovation. Broad application is appropriate, as there are opportunities for industrial innovation in all sectors of the economy. The Committee believes that investments in firms engaging in industrial innovation are considerably more likely to produce capital gains over the long term than investments in other firms.

The Committee believes that implementation of this proposal is feasible. The current system already allows for different classes of capital gain, by differentiating between gains that are not taken into income, gains that come under the \$100,000 lifetime exemption, and gains that come under the \$500,000 exemption. The existing tax system also provides methods for determining the date of acquisition and sale. The Committee notes that other jurisdictions, notably the United States, Japan, and the Federal Republic of Germany, have used differential capital gains tax measures.

Federal revenues from the capital gains tax are about \$2 billion per year. Capital gains from the investments of individuals in shares account for roughly 26 percent of all capital gains. Using this measure, in the worst-case scenario, federal revenue losses on the existing distribution of capital gains would be \$500 million to \$600 million, plus the losses incurred from those who transferred their investments to eligible equities (the realization on ineligible assets may, however, result in increased revenues). This estimate presupposes that all gains on shares are eligible, and that all investors have used their lifetime exemption from capital gains. In other words, revenue losses are likely to be much less and would be deferred for at least three years.

2.

Pensions

The Committee recommends that a tax penalty be applied against the assets of pension funds which do not invest at least 1 percent of their assets in eligible small enterprises. Should a fund fail to invest any of that 1 percent in eligible firms, a penalty of 10 percent would be assessed on the amount not so invested. Eligible enterprises would include companies that perform substantial amounts of research and development or venture capital groups that specialize in the financing of technology-intensive firms.

Objective

The Committee seeks to direct investment funds to technology-intensive firms. If pension funds wish to undertake this investment directly, no tax impact would be felt. If not, the revenues so generated would be used to assist capitalization of investment instruments operated, at arms length from government, for the purpose of supporting industrial innovation in Canada (see Recommendations 3, 4 and 5).

Remarks

Trusteed pension plans hold assets of about \$179 billion. The Committee's proposal would require these funds to maintain assets of roughly \$1.8 billion in investments in eligible enterprises. Were pension funds not to invest any funds in eligible enterprises, revenues from the penalty tax would be about \$180 million per year, an amount equal to .1 percent of pension fund assets.

The income of pension funds is not now subject to federal tax. The current tax-exempt status of pension funds reflects their position as the source of retirement income for employees whose firms operate pension plans. It would not be appropriate to place the retirement income of individuals at risk. However, the Committee believes that the retirement income, indeed, the economic future, of Canadians is at risk now, unless Canada improves its international competitive position through industrial innovation. Pension funds must be asked to participate in the financing of our economic future. If they will not do so willingly, a tax to raise funds for that purpose should be sequestered by a special charge.

For the purposes of this proposal, eligible investments would include investments in manufacturing firms or designated service firms the sales of which do not exceed, say, \$50 million; and investments in venture capital funds registered for this purpose.

3.

Risk-Sharing Fund

The Committee recommends the establishment of a national fund of up to \$1 billion, capitalized over time by government and/or by the penalty tax on pension funds (see No. 2), administered at arms length from government, for the purpose of sharing up to 50 percent of the industrial innovation costs for specific high-risk projects proposed by medium and large firms, the fund contribution to be repayable at premium rates from revenues generated by the eventual sales of the product developed and marketed.

Objective

The Committee seeks to reduce the corporate risk in major strategic investments in industrial innovation by sharing in the costs of innovation. A fund that shares the costs of innovation reduces the exposure of investors. Companies using the fund would have a better chance of raising capital. As the risk is lower, support from the fund may also reduce the cost of capital raised.

Remarks

The risk-sharing fund would be a not-for-profit private corporation, with the mandate to: decide on the merits of applications for use of the fund, distribute contributions as appropriate, and collect repayments when due. Case evaluations would be contracted out, so that only a small staff would be required to operate the corporation. Decisions would be made by a volunteer board of businesspersons, who would be paid expenses but receive no direct compensation. Costs of operating the corporation would be recovered by premiums on the repayments of firms that received funds.

As noted previously, the contributions fund would be developed from government contributions and/or revenues from the special tax on pension funds. The value of the fund would be maintained by repayments, based on royalties on the sales of successful products. Since the repayment is contingent upon future sales, it is probable that the corporation financed would not be required to carry the amount on its books as debt. Losses due to company failure or market failure of the product would be written off by the fund. Repayments would exceed the amount of the contribution, to reflect the value of the money and the premium appropriate for a high-risk investment. The additional money generated would ensure that the fund was not depleted by unsuccessful projects or firms. Repayment premiums would also ensure that the fund would not be subject to trade retaliation.

The fund's Board of Directors would decide which applications for assistance would be suitable for financing. Board Members would determine whether the project constituted industrial innovation, based on guidelines provided by the federal government. It may be necessary to use 'project type' and 'maximum project size' as criteria to control use of the fund in its formative years. Members would finance only those projects which have a reasonable probability of success, according to their own judgment of the competence of company management and its ability to bring the project to completion. Members would also be expected to refuse financing to those projects which could be financed by conventional means, again using their own judgement.

It is important that the Board operate at arms length from the federal government, so that the support of industrial innovation is its sole objective. Regional development, social and political considerations should have no bearing on the decision about whether to finance a project.

This proposal is similar to other funds used in other jurisdictions. Both the *Industrifonden* of Sweden and the U.S.-Israel Fund report positive returns, even though they allow for failure rates of between 15 and 20 percent.

4.

Matching Investment Fund

The Committee recommends the establishment, on a pilot basis, of a matching investment fund, which would provide contingently repayable government contributions directly to new and/or small innovation-based ventures of amounts up to 75 percent of equity funds raised by individual investors. Government would finance the creation of the fund. Funds would be 'bonded' as to use (i.e., for innovation); provided the bond was in place and certain minimum criteria were met, funds would be made available without government review.

Objective

The Committee seeks to enhance access to capital for start-up or early-stage technology-intensive ventures. Provision for additional equity contributions to start-up or early-stage firms would contribute to the dissolution of one of the vicious circles of underinvestment discussed earlier.

Remarks

The Committee proposes a pilot project, of perhaps two years' duration, with a maximum total contribution of \$100 million, as there are program design issues to be resolved. Given its experience in the venture capital field, it might be appropriate to approach the Federal Business Development Bank for assistance with the pilot project.

There is a clear shortage of funds available for start-ups of technology-intensive companies, and an inadequate supply of funds for early-stage companies. Provision of supplemental funding should make investors' capital go farther, allowing better-funded start-ups and capitalizations.

The assistance is intended to benefit companies that propose to embark on industrial innovation. Since the Committee believes that a government assessment and approval process, especially for small companies, would be inefficient and unproductive, some other method must be found to identify eligible companies objectively. Placing restrictions on the use of the funds appears to be the most effective method of preventing misuse of the government contribution. Companies would require bonding or some form of guarantee for the amount of the contribution (payable to the government in the event of non-compliance), to ensure that funds are used only for the purposes of industrial innovation. The requirement for a guarantee would restrict the program to entrepreneurs who either had a reputable business record or who were willing to submit proposed expenditures for the approval of the guarantor.

Assistance would be repayable, possibly with an interest and risk premium, by royalties on sales. The contribution would be considered as a contingent liability of the company. As long as the contribution was used within the terms of the performance bond, losses due to business or product failure would be written off by government. Since several high-risk years can pass between start-up of a technology-intensive company and sales of its products, it is unlikely that the matching investment program could operate as a self-sufficient fund.

5. Industrial Innovation Merchant Bank

The Committee recommends the establishment of a financial institution, the purpose of which would be to provide equity and debt investment for technology-intensive firms. Government(s) would contribute some part of the initial capitalization of this bank. The financial institution would endeavour to earn market rates of returns on its investments.

Objective

The Committee seeks to increase the supply of 'intelligent capital'; that is, capital in the hands of investors who appreciate the particular circumstances and needs of technology-intensive industries and who, for each investment prospect, have some understanding of the technology involved in the innovation project, the research and development required at the outset and the engineering, testing and marketing that will follow. This recommendation is intended to address the lack of communication and understanding between the financial community and technology-intensive industries.

Remarks

To the extent that an industrial innovation merchant bank is an attractive and profitable concept, one would expect that the private sector would have already established something like it without government funding or prodding. The absence of such an institution on the Canadian financial scene and, indeed, the decrease in the number of active venture capital concerns, clearly suggests that investors have had difficulty in generating adequate returns from venture investments.

Part of the problem is explained with reference to one of the vicious circles of underinvestment described earlier. If investors lack knowledge about technology-intensive enterprises, it is not surprising that many of their investments produce unsatisfactory results. Another part of the problem results from the rigidity of Canadian financial structures. Chartered Banks, for example, are limited in the extent to which they can participate in the ownership of the commercial sector. Such limitations reduce the scope for experienced managers to guide the course of companies in which management skills are often in short supply.

An industrial innovation merchant bank would be permitted to take debt or equity positions in technology-intensive companies. It would also take the lead in facilitating deals, such as creating cross-equity holdings, to create a critical mass. The articles of incorporation of the institution would describe the types of business and projects in which it would invest.

The Committee envisages that the merchant bank will work most effectively if the private investment share represents a mix of financial and industrial interests. The industrial investors could be particularly important, not only for the expertise they bring but for the entrepreneurial opportunities their participation could bring.

The merchant bank could also offer a range of corporate services to their clients in the technology-intensive sector, in the same way that Chartered Banks offer payroll services. Small technology-intensive firms often experience difficulties in obtaining, at a reasonable price, adequate payroll, accounting, legal and intellectual property services. A central source would ease the paperburden on a small firm. Further, since the service was provided by an investor in the firm, management would have some assurance that the service was of high quality and sold at a fair price.

The government equity contribution to the financial institution should be in a form where no dividends or capital appreciation are expected. In that way, private investors will be able to gain returns on investment that are more likely to attract their participation. The government's interest in the institution as an owner should be used to ensure that the original purpose of the institution remains unchanged; apart from the actions necessary to achieve that objective, government should not participate in the management of the institution or direct its operations in any way. After a number of years, the private investors should have the option of buying out the government equity share at its market value.

The Committee understands that it will be several years before an industrial innovation merchant bank would have a significant impact on the technology-intensive sector. The problem of developing intelligent capital, however, is large and unavailing of more rapid resolution. Consultants to the Committee have identified a number of individuals in the financial and industrial communities who support this concept in principle.

ANNEX A

42 Canadian Firms: Cost of Capital Analysis

Criteria for Their Selection

Three criteria were used as a guide in selecting the firms:

- the need to have several companies in each sector, so that the peculiarities of a single company would not lead to misleading results about the sector.
- the need to cover important sectors of the economy, so that the results are reasonably representative of the Canadian manufacturing economy.
- a bias towards high investment, high-tech, traded sectors; high investment and high-tech sectors have a particular interest in financing costs; sectors producing internationally traded products are the foundation of national competitiveness.

Most companies in the sample are Canadian-owned, although a number are foreign-owned. All companies are publicly-held, which limits the sample but is necessary for ease in collecting reliable information. The foreign competitor/comparable firm list was developed from names provided by the 42 companies operating within Canada as well as by industry analysts. Foreign competitors/comparable firms had to be publicly traded as well.

The list of Canadian firms follows on the next page.

ANNEX A (CONTINUED)

Canadian Companies List
(Total: 42 Companies)

Sector	Canadian Company	1988* Sales (\$ Million)	Owenship if not Cdn
Lasers	Lumonics	88	
Consulting Engineering	SNC Group	321	
Metals and Mining	Alcan	1617	
	Inco	4016	
	Cominco	1660	
	Sherrit Gordon	977	
Steel and Iron	Dofasco	2982	
	Stelco	2711	
	Ivaco	2238	
	Ipsco	438	
Forest Products	Abitibi Price	3304	
	MacMillan Bloedel	3273	
	Domtar	2703	
	Cascades	589	
Oil, Gas, Petrochemicals, Chemicals	Imperial Oil	7105	U.S. Netherlands/U.K.
	Shell Canada	4986	
	NOVA	3941	
	CIL	1541	U.K.
	DuPont Canada	1378	
Food Processing	George Weston	10831	
	John Labatt	5107	
	Canada Packers	3217	
Diversified Resources	Noranda	8858	
Auto Parts	Magna	1458	
Heavy Manufacturing	Varity	2703	
Telecommunications	Northern Telecom	6656	
Data Communications	Memotec	369	
	Gandalf	164	
Computer Hardware, Software	Digital Equipment	963	U.S.
	GEAC	69	
	Cognos	108	
Electronics	CAE	345	
	Glenayre	59	
Heavy Manufacturing & Aviation	Bombardier	1396	U.K.
	Hawker Siddeley Canada	389	
Aerospace, Defence, Sonar, Radar, etc.	Pratt and Whitney Canada	1060	U.S.
	Spar Aerospace	270	
	Fleet Aerospace	181	
	Heroux	59	U.K.
	Canadian Marconi	207	
Biotechnology, Pharmaceuticals	Connaught	210	
	Quadra Logic	**	

Sales are in Canadian Dollars, unless otherwise specified
Sales for 1988 were less than \$1 million (i.e., \$103,000)

