

Task Force on the  
Future of the  
Canadian Financial  
Services Sector

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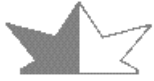
# Financing Knowledge-Based Small Business

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by  
Groupe SECOR Inc.

**September 1998**

Research Paper Prepared for the Task Force on the Future  
of the Canadian Financial Services Sector



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**The views expressed in these research papers  
are those of the authors and do not necessarily reflect  
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## Introduction

### Mandate

SECOR was asked by the Task Force on the Future of the Canadian Financial Services Sector to review the changes which have occurred in the financing of Canadian knowledge-based firms over the past five years.

Knowledge-based firms are broadly defined as those in which the development, possession and application of knowledge is central to the production of goods and services. The Task Force was particularly interested in the issues facing smaller firms, given their greater difficulties in accessing financial services. The study focused therefore on the needs of small and medium sized firms which are heavily dependent on innovative science and technology applications. It also focused on financial institutions as suppliers of different forms of financing to KBI firms, to determine how well they are meeting needs in the current environment.

### Outline

The first section of the study provides a general description of the nature of knowledge-based firms, noting the lack of consensus on definitions and data. Within these limitations, it assesses their potential contribution to the Canadian economy.

The second section briefly describes the growing needs of small knowledge-based firms, emphasizing needs at the earliest stages, when requirements are most onerous.

The third and fourth sections describe the major sources of equity and debt finance for small knowledge based firms in Canada, and notes various supply gaps. Federal programs and policies that assist in bridging these gaps are noted.

The fifth section summarizes SECOR's observations on the gaps in financing at the seed stage. The last section comments on federal policy initiatives and areas for further research.

### Methodology

SECOR consulted widely among suppliers of finance to obtain an up-to-date and accurate picture of the quickly changing environment for Canadian entrepreneurs. A list of those who were interviewed is given at the end of the report. All of the major banks were interviewed, as well as federal agencies, and members or observers of the financial services community. Entrepreneurs themselves were not directly surveyed.

SECOR also based its analysis on an extensive review of secondary sources. Where appropriate, these are noted in the text of the report.

## Executive Summary

### Key Observations

- This report examines knowledge-based industry (KBI) financing in Canada, from the perspective of the suppliers of capital. Our mandate focused on the initiatives taken by financial institutions and their impact on small KBI firms.
- Our major conclusion, based on anecdotal evidence from suppliers, is that there does appear to be an unmet need for seed or zero stage capital. Informal investors are the main suppliers of this form of capital, and need more incentives and support to commit funds.
- The federal government has several instruments that it is using to support KBI entrepreneurs at the seed stage:
  - tax incentives (the Scientific Research and Experimental Development Tax Credit);
  - Industry Canada grants and infrastructure support to promote circulation of information and skills development by small businesses;
  - the Business Development Bank and regional agencies to provide targeted financing;
  - loan guarantees and insurance through the SBLA and EDC.
- In our view, there are no major regulatory or legislative initiatives that should be taken to promote the supply of seed stage capital.
- The federal government could more actively encourage private sector finance suppliers and investors to enter into partnership to share the risks and promote seed stage KBI companies. The best ways to achieve this objective are tax incentives and initiatives to promote the development of infrastructure to link investors and entrepreneurs and to support the acquisition of management skills.

## Summary

- KBI firms contribute between 7% and 17% of Canada's GDP, depending on how broadly KBI is defined.
- The definition of KBI is not widely agreed. The common denominator is the high proportion of intangible or knowledge-based assets used by a firm. Financial institutions use different definitions of KBI, but most note the importance of technology, innovation and growth as key features of the sector.
- Using the SIC Codes used by Statistics Canada, and Canadian Bankers' Association data, the Canadian KBI firm universe can be said to include about 500 large firms (with loans above \$5 million), about 8000 small firms (loans between \$25,000 and \$1 million), and about 7000 small firms at early stages, or with little business credit. More than 50% of these approximately 16,000 firms are services-based.
- This report examines the supply of finance to the small KBI firms with assets most difficult to evaluate. SECOR calls these firms science-based or technology craft firms. Examples are biotechnology or software development. The number of these small firms is estimated to be between 2000 and 4000.
- The core assets of science-based and technology craft firms are knowledge-based technologies and human capital. It is very difficult for financial institutions to assign lending value to these assets, and access to financing is therefore limited for such firms.
- On the other hand, despite the risk, these firms represent an attractive market for capital suppliers because of their fast growth and potential for high returns from innovative new products.
- The financial needs of small KBI firms differ by stage of growth. Generally, more equity capital is required at early start-up stages, and more debt is taken on at later expansion stages. The most critical needs are from the pre-commercial stage up to the stage where a firm has well-defined enterprise value and can become self-financing.
- Debt financing to KBI firms is generally supplied by the chartered banks, and to a lesser extent, by the Business Development Bank. All the major banks have established dedicated KBI units in the last five years to service the market.
- Bank approaches to KBI lending are changing, as they develop new lending models and practices based on enterprise rather than asset value. Nevertheless, the fact that science and technology craft firms are preponderantly at start-up stages continues to make access to debt financing very difficult.
- For many of these firms, there is also a gap in access to export financing. Since many of them are exporters from the start, particularly information technology developers, they have



early need for risk coverage and receivables financing. Local bank account managers have difficulty recognizing foreign receivables in these sectors.

- The Business Development Bank (BDC) fills an important niche as a bridge lender of subordinated debt and quasi-equity; it aims to supply the gap for early stage KBI between informal investors and venture capital or banks. The BDC has agreements with all of the chartered banks which enable it to use bank networks to reach potential clients.
- A key development of recent years is the establishment of partnerships between the banks, and federal regional agencies, which extend the availability of capital to small KBI firms across regions of Canada. These agreements are making more debt capital available to growing firms than might otherwise have been available from the banks.
- Venture capital (VC) has also grown significantly in the last five years, in terms both of the funds invested and in terms of the number of VC firms. The labour-sponsored venture capital firms play a major role, but the banks also all have venture capital arms or partners. Disbursements are increasing and a majority of funds invested are going to technology firms (about 200 firms received first-time financing in 1996) Technology firms are of interest because of their fast growth and potentially high returns.
- However, the VC funds tend to target larger investments, to mitigate risk, to save management effort, and to maximize chances of realizing an exit through an IPO. This tends to exclude smaller KBI firms and start-ups.
- Equity finance from Canadian public markets is being sought more frequently by the larger KBI firms. These firms are launching IPOs once they have established a successful track record and are already well up the growth curve. Average amounts of capital raised are \$15 to \$20 million.
- **The major gap in access to capital for small KBI firms is at the so-called zero stage, when an entrepreneur is seeking amounts of between \$25,000 and \$250,000.** While angels are the major suppliers at this stage, their reach and commitment is restrained, in part because of lack of information about prospects, and in part because of the high risk of investing in unproven science-based or tech craft firms.
- Some suppliers, such as the BDC, some of the chartered banks, and some VC firms, are beginning to address the gap through the establishment of specialized seed or zero stage funds. But many argue that additional incentives (such as better tax treatment of investments) and more infrastructure (in the form of information and expertise networks) are needed to induce more informal investors into the market.
- Banks, VC firms, governments at all levels and universities are supporting the development of information resources, skills networks and commercialization of technologies for would-be entrepreneurs. Much more could be done in this area to accelerate the building of a stronger, national network of resources for technology or science-based entrepreneurs.

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- Our mandate excluded validation of these observations with KBI entrepreneurs and users of the capital markets themselves. Further research with KBI start-up entrepreneurs would help to verify our analysis of unmet needs in the market.
  - Another area for further research is the definition of KBI and its contribution to the Canadian economy. A more precisely quantified definition, particularly of science-based and technology craft firms, would give more focus to the potential wealth creation and specific characteristics of these sectors.

## 1. A Profile of Knowledge-based Firms in Canada

There is no single definition of knowledge-based industries (KBI). Although it is asserted that these industries represent the fastest-growing and highest potential sectors for the Canadian economy of the future, it is difficult to quantify their wealth-creation impact, as there are no widely accepted or comparable data.

The following sections describe:

- The underlying reasons as to why there is no consensus on definitions of KBI,
- Some of the existing KBI definitions,
- The role of KBI in the Canadian economy, and
- Why this report will focus specifically on *technology-based small firms*, as a subset of the KBI universe.

### Why Knowledge-based Firms are Difficult to Define

As the name implies, knowledge-based firms are those in which the development, possession and application of knowledge is central to the production of particular goods and services. There are no industries where knowledge is not important, but there are some where knowledge is applied very intensively in the production process. Similarly, there are land intensive industries like agriculture, or energy intensive industries like aluminium smelting.

Unlike land, energy, capital or labour, knowledge is not readily measurable by standard economic methods. As pointed out by Peter Howitt of the University of Western Ontario,

*"We have no generally accepted empirical measures of such key theoretical concepts as the stock of technical knowledge, human capital, the resource cost of knowledge acquisition, the rate of innovation or the rate of obsolescence of old knowledge."*<sup>1</sup>

Without these measures we can neither judge how much knowledge is needed by one industry versus another or how important knowledge is relative to other factors of production. Nevertheless, knowledge intensive industries such as aerospace, communications and computers are seen as major wealth creators in today's economy.

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<sup>1</sup> Peter Howitt, "The Implications of Knowledge-Based Growth for Micro-Economic Policies", page 10. Ministry of Supply and Services Canada, 1996.

## Some Working Definitions of KBI

Because of the public policy implications of monitoring the impact of knowledge on the economy, many attempts have been made to develop a working definition of KBI. These definitions generally take one of three forms: practical, academic or expert.

The *practical* definition has been supplied by officials at Industry Canada who have grouped 20 industries as defined in the Standard Industrial Classification (SIC) codes used by Statistics Canada to collect and present data on industry performance. Industry Canada focused on the use of information or other advanced technology and scientific research as defining criteria for its KBI groups.

**TABLE 1.1**  
**INDUSTRY CANADA'S DEFINITION OF KBI**

Code	Industry	Code	Industry
0239	Services incidental to agriculture	3741	Pharmaceutical and medicine industry
3211	Aircraft and aircraft parts manufacture	3911	Indicating, recording and controlling instruments
3341	Record player, radio and television receiver manufacture	3912	Other instruments and related products
3351	Telecommunications equipment manufacture	4814	Cable television
3352	Electronic parts and components manufacture	4812	Telecommunications carriers
3359	Other communications and equipment manufacture	4839	Other telecommunications
3361	Electronic computing and peripheral equipment	7721	Computer services
3362	Electronic office and store and business equipment	7759	Other scientific and technical services
3381	Other electronic office and store and business equipment	9611	Motion picture and video recording
3369	Communications and energy wire and cable manufacture	9619	Other motion picture, audio and video recording

The disadvantage of the SIC based method is that its groupings may not actually reflect the intensity of knowledge application in an industry. It may thus lead to underestimation of the contribution of KBI to wealth creation. SICs also do not reflect what entrepreneurs believe. In a 1997 survey commissioned by the Canadian Bankers Association<sup>2</sup>, small business owners were asked to self-identify themselves as knowledge-based. Some 62% of businesses said they were knowledge based. Cross referencing with the SIC code definitions revealed that only 2% of the same group were considered KBI under the Industry Canada definition.

An *academic* definition has been developed for the federal government by Frank Lee and Handan Has who measure KBI by matching human capital with activities (R&D) that create and apply knowledge<sup>3</sup>. Lee and Has define knowledge intensive industries are those that rate highly on R&D and human capital indicators such as:

- The ratio of industry R&D spending to the value of industry output.
- Ratio of total R&D employees to total employees.
- Ratio of professional (scientist, engineer,...) to total employees.
- Post secondary educated workers as a percent of total employees.
- Workers who are university educated in professional disciplines (scientists, management specialist, lawyers, engineers..) as a percent of total employees.
- Employed scientist and engineers as a percent of total work force.

An *expert* definition has also been developed by Mary Macdonald & Associates, a firm specializing in analysis and tracking of activity in the Canadian venture capital community. This definition illustrates what venture capital investors believe to be KBI industries: biotechnology and information technology, communications, electronics, energy and environmental technology and some industrial equipment, including advanced materials<sup>4</sup>.

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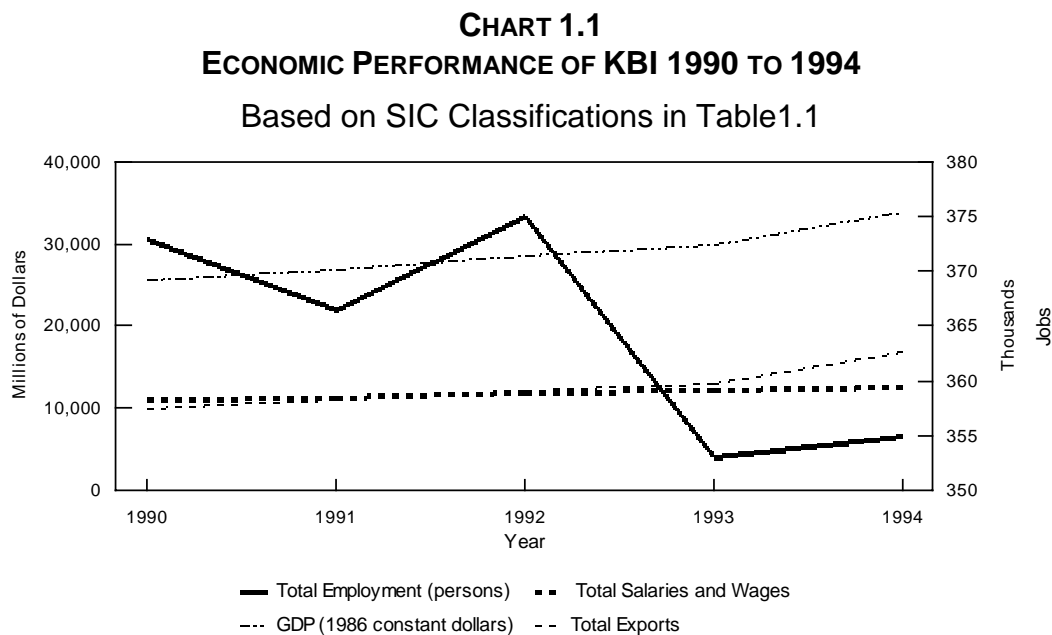
<sup>2</sup> Thompson Lighthouse & Co. Ltd., "Small and Medium Sized Business in Canada, 1997"

<sup>3</sup> Frank Lee and Handan Has, "A Quantitative Assessment of High-Knowledge Industries Versus Low-Knowledge Industries." in "The implications of Knowledge-Based Growth for Micro-Economic Policies". Ministry of Supply and Services Canada, 1996. See also appendix to this report

<sup>4</sup> See appendix to report

## KBI's Contribution to the Canadian Economy

Measuring the economic performance of KBI and their contribution to the Canadian economy is complicated by the lack of consensus on a definition. Using the SIC based definition, and Statistics Canada data, KBIs constituted 5% of the value in the Canadian economy in 1990. The Lee and Has method of classification leads to a KBI contribution in 1990 of 17% of Canada's GDP, over three times the size calculated by using the SIC definition. The Lee and Has definition has been used by researchers to examine employment and output performance but only up to 1991<sup>5 6</sup>.



For more recent performance indicators we must rely on the SIC definition and data available up to 1994 from Statistics Canada. The growth that has taken place in the KBI sector since 1994, which has been strong based on evidence of demand for financing, has not yet been captured completely by the Statistics Canada data.

The available data shows that over the period 1990 to 1994 KBI outperformed the economy as a whole in terms of GDP contribution, wages and exports. KBI firms contributed to GDP at 5 times the rate of the rest of the economy. Part of this growth is due to superior goods export performance.

<sup>5</sup> Surendra Gera, Industry Canada, and Philippe Massé, Human Resources Development Canada, "Employment Performance In The Knowledge-based Economy", Industry Canada Working Paper Number 14, December 1996.

<sup>6</sup> Surendra Gera, Industry Canada, and Kurt Mang, Department of Finance, "The Knowledge-based Economy: Shifts in Industrial Output" Industry Canada Working Paper Number 15, January 1997

**TABLE 1.2**  
**FIVE YEAR AVERAGE GROWTH RATES**  
 1990 to 1994  
 Based on SIC Classification of KBI in Table 1.1

	Economy	KBI
Employment	0.2%	-1.0%
Salaries	1.9%	2.7%
Exports	8.2%	10.7%
GDP	1.1%	5.8%

Source: Statistics Canada 31-203; 63-222; 63-234, Industry Canada and SECOR estimates

Only in the number of jobs did KBI firms lag the rest of the economy. Between 1990 and 1994 they shed a net total of 19,700 jobs. Most of the losses were within two KBI sub industries: telecommunications carriers and aircraft and aircraft parts manufacturers. During the early 1990s, telecommunications carriers were going through restructuring exercises. The world market for aircraft hit a severe slump in 1992 and 1993. Some of the job losses were offset by growth in industries such as computer services and motion picture and video production.

The lackluster performance in employment may also reflect a trend in KBI productivity and wages. Throughout the 1980s, wages in KBI industries grew by 6.3% per year (versus 5.4% in traditional industries). But the productivity of KBI labour was not growing at the same pace (0.7% per year for KBI versus 1% in the rest of the economy)<sup>7</sup>. This gap may have caught up with knowledge workers in the last recession.

### The Small Technology-based Firm: Focus of This Study

Statistics Canada does not provide a dynamic picture of the potential contribution of KBI to the economy. For this purpose, the contribution of the **smaller, high growth** firms must be highlighted. As noted in a recent study by the Bank of England<sup>8</sup>,

*"Smaller technology firms ... form an entrepreneurial seedbed...smaller firms with competitive advantages can grow very rapidly and diffuse their products into the economic structure ... It is because of this connection between diffusion and average efficiency that barriers to growth for the individual firm become barriers to raising the national level of economic performance."*

For the purposes of the current study, we will use the generally accepted chartered bank definition of small business: a business under \$5 million in annual sales<sup>9</sup>.

<sup>7</sup> Frank Lee and Handan Has, "op. cit.

<sup>8</sup> The Bank of England, "The Financing of Technology Based Small Firms", October 1996.

This report focuses on specific small and medium-sized KBI firms which are heavily dependent for their core products on innovative science and technology. These firms are generally science-based firms (in such areas as biotechnology) or technology-based craft firms (in such areas as software development). The emphasis on science and technology is explained because of the high knowledge component in these activities. It is assumed that these firms will include those which have greatest growth and wealth creation potential. The fact that these firms are also among the most difficult to evaluate for risk explains their particular difficulties in accessing capital.

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<sup>9</sup> Statistics Canada define small enterprises as those with fewer than 50 employees and less than \$25 million in sales. Revenue Canada offer small business tax rates to those firms with taxable incomes less than \$400,000.



## 2. The Financing Needs of Technology-based Firms

Technology-based firms are risky propositions in their early years. Their competitive advantage often depends on innovation or breaking new ground. Those firms in start up or early growth mode are riskiest of all for investors. It is at this stage that financial needs can be greatest, either because of the length of time taken to test and launch a product, or because of the inherent costs of rapid growth.

Financing needs vary by stage of company development and by nature of industry. SECOR has developed a typology of KBI firms to capture the different success factors and the risks confronted by broad types of technology-based firms:

**TABLE 2.1**  
**SECOR'S TYPOLOGY OF KBI FIRMS**

Type of Firm	Typical Sectors	Product Development Cycle	Critical Success Factors	Major Risks
Science-based	<ul style="list-style-type: none"> <li>Pharmaceutical</li> <li>Health Biotech</li> <li>New materials</li> </ul>	Long (5 to 10 years) <ul style="list-style-type: none"> <li>Need for clinical trials, regulatory approvals, testing</li> </ul>	Breakthrough scientific product or application, protected by patents	<ul style="list-style-type: none"> <li>Rival patents</li> <li>Undiversified patent portfolio</li> </ul>
High-tech craft	<ul style="list-style-type: none"> <li>Software products</li> <li>Medical Equipment</li> <li>Avionics</li> </ul>	Long (5 years) <ul style="list-style-type: none"> <li>Accumulation of knowledge and testing</li> </ul>	State-of-the art product dominating a niche market	<ul style="list-style-type: none"> <li>Loss of innovation team</li> <li>Loss of market niche</li> </ul>
Integrators	<ul style="list-style-type: none"> <li>Information technology Services</li> <li>Telecommunications</li> </ul>	Short (1 to 2 years) <ul style="list-style-type: none"> <li>Rapid development of competing services</li> </ul>	Superior delivery of complex products or services into a broad market	<ul style="list-style-type: none"> <li>Failure of project management/ overruns</li> <li>Changes in standards</li> </ul>
Technology users	<ul style="list-style-type: none"> <li>Food processing</li> <li>Financial Services</li> </ul>	Short (1 to 2 years) <ul style="list-style-type: none"> <li>Need for continual fine-tuning to market</li> </ul>	Innovative distribution of new technology embedded in mature product or service	<ul style="list-style-type: none"> <li>Loss of tech suppliers</li> <li>Changes in standards</li> </ul>

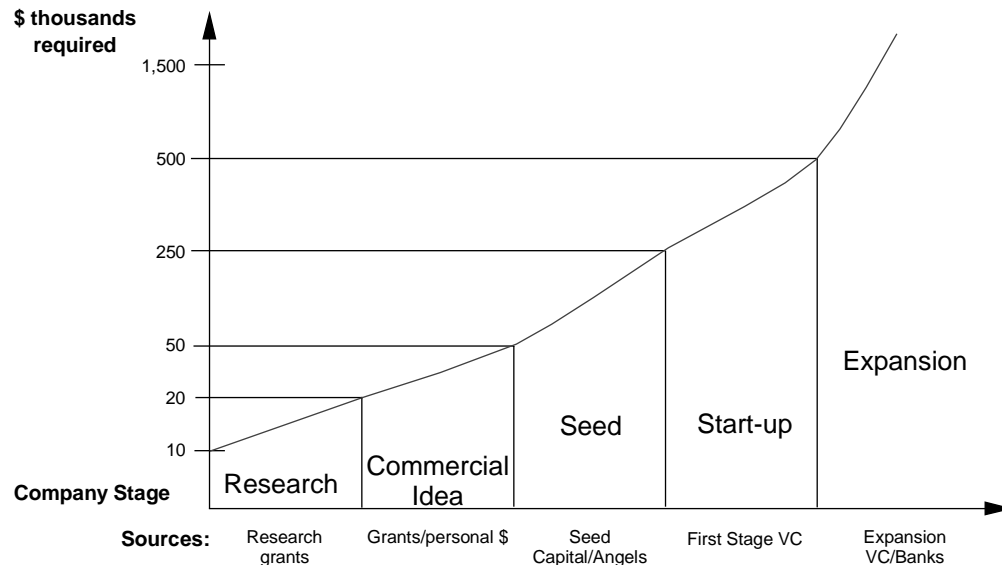
This typology demonstrates the differing development cycles and risks confronting both entrepreneurs and investors. The first two categories, science-based and high tech craft firms, are the ones generally most innovative, and therefore most difficult to assess. Firms in the categories of integrator or technology user are often larger firms with financial needs and risks that can be addressed by financial institutions with more conventional products. The science-

based and technology craft firms have more acute and more complex financial needs, particularly at start-up. These are the firms that we will focus on in this report.

The early stages of firm development have been typically broken down into several sequential steps, as presented in Chart 2.1. These five stages are:

- research
- commercial idea
- seed
- start up
- expansion

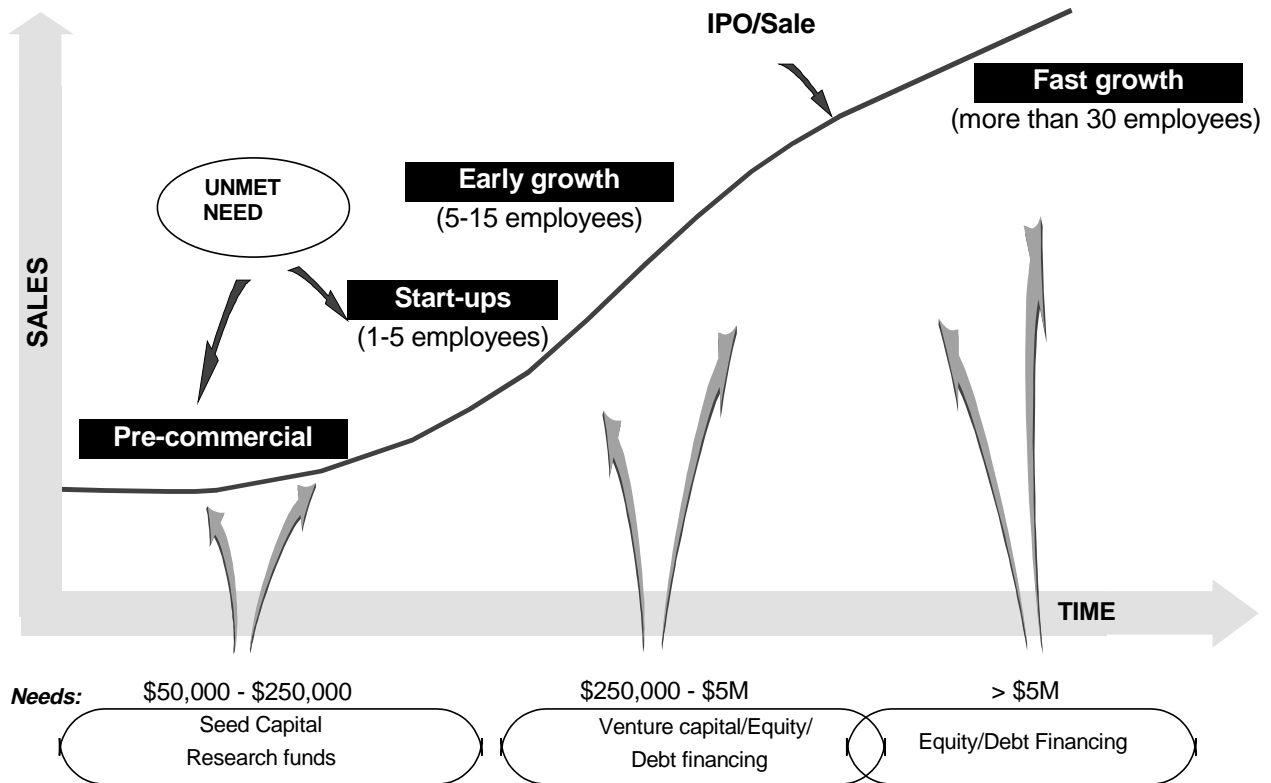
**CHART 2.1  
NEEDS FOR FINANCE**



Source: Bank of Montreal, Secor

At the **research** stage, a would-be entrepreneur is often funded by research grants. In other cases, research is done under a corporate umbrella, becoming an intended or unintended spin-off from a larger project. The firm starts to take shape when it enters the **commercial idea development** stage. At this point, so-called "love" money is what is needed. A new form of venture capital investment, the zero-stage investment, has also started to appear. As the firm is formally launched, it needs **seed capital** to build a management team, plan the business, carry out marketing tests, apply for patents and approvals, etc. Informal investors with patient money and incubators can help. At **post start-up and expansion** stages, the financing needs become more conventional: working capital, export financing, lines of credit, balance sheet support, equity.

**CHART 2.2**  
**STAGES OF GROWTH AND CAPITAL NEEDS**



Amounts of capital required at the earliest stages are small, in the \$50,000 to \$250,000 range. Once the firm is launched and moves into a growth phase, its needs increase to the \$500,000 to \$1 million range. Depending on the length of time taken to develop and launch products, this amount can increase through second and third rounds of financing to several million dollars. The further up the curve the firm moves, the more it is able to access equity and debt financing from venture capital investors and banks. Venture capital investors usually exit through an IPO or sale. Technology based firms that are well launched into growth meet their needs through retained earnings supported by conventional lines of credit. The needs of firms at these stages are not addressed in this report.

### 3. Supply of Debt Finance

The two major types of finance for KBI firms are debt and equity. At different stages, the mix of financing changes appreciably: more equity at earlier stages, more debt at later stages, although individual firms can vary considerably in their mix of the two. Specialized financing such as patient capital or mezzanine financing, bridge between the two forms.

**CHART 3.1  
SUPPLY OF CAPITAL**

<b>STAGES GROWTH</b>	<b>SEED</b>	<b>START-UP</b>	<b>EARLY GROWTH</b>	<b>EXPANSION</b>
<b>EQUITY</b>	Love Money	Love Money	Mezzanine	Mezzanine
	Zero Stage Investment	Venture Capital	Venture Capital	IPO
<b>DEBT</b>	Working Capital	Working Capital	Working Capital	
		Export Financing	Export Financing	Export Financing
	Tax Credit Financing	Tax Credit Financing	Tax Credit Financing	
			Growth Capital	Growth Capital

#### The Chartered Banks

Chartered banks dominate the debt market for KBI firms. They are the most visible of all financial institutions, and it is therefore unsurprising that entrepreneurs identify them most often as their first supply channel. The difficult match between KBI entrepreneur needs and the banks' assessment of risk has already been chronicled. In this section, we will focus on recent changes to the banks' approaches to KBI financing.

## Organization

In the past three or four years, there has been a substantial change in the strategic approaches of the major Canadian banks to the KBI market segment. By 1993, all of the major banks had established dedicated groups to design new approaches to banking KBI. These groups are trying to develop their bank's share of this segment of the small- and mid-sized commercial business market. In most cases, the titling of the dedicated KBI groups refers specifically to knowledge or innovation, indicating that the banks identified knowledge and technology component as being differentiating elements.

### Bank Definitions of KBI

**Royal Bank:** companies which possess some of these characteristics: (1) intangible assets (2) high knowledge component (3) high R&D (4) use of advanced technology (5) exporters (6) holders of patents, licenses.

**CIBC:** knowledge-based businesses who create or apply technology.

**Bank of Montreal:** entities relying on research and development and technology in the delivery/production of goods and services.

**Scotiabank:** firms that use some form of innovation to create a competitive advantage that leads to rapid growth.

The majority of banks identify information technology and life sciences, or biotechnology, as the sectors from which most of their KBI clients are drawn. To a lesser extent, they also identify film and entertainment, and telecommunications. Particular attention has been paid to information technology which, in comparison to biotechnology, is seen to be a more conventionally "bankable" sector, given its more rapid development, generation of cash flow and need for working capital.

The banks have embedded their KBI groups for the most part within their commercial (retail) banking units. These groups are generally staffed by account managers and credit managers drawn from within the banks themselves. Most of them are headed by executives at the Vice-President or Director level, indicating the degree of importance attached to developing the business. The banks intend to grow their KBI units as the market develops, particularly through development of KBI teams within their regional banking centres, using specialized staff to scout for new opportunities.

**TABLE 3.1**  
**MAJOR CANADIAN BANKS IN THE KBI MARKET**

<i>Bank</i>	<i>Royal Bank</i>	<i>BMO</i>	<i>CIBC</i>	<i>BNS</i>	<i>TD</i>	<i>BNC</i>
<b>Formation of KBI group</b>	1994	1993-pilot 1995-rollout	1994	1993-informal 1995-formal	1990 pilot	1997
<b>No. of full-time employees</b>	Between 55 and 70	Between 40 and 50	About 25	Between 25 and 30	About 30	Between 10 and 15
<b>No. of regional centres with dedicated personnel</b>	20 regional centres	12 Innovation and Technology centers	10 regional centres	4 Innovation centers	13 Technology Banking centers	4 centers
<b>Risk sharing with federal agencies</b>	EDC and CCC; BDC, WED; FORD-Q FEDNOR	BDC, EDC and CCC; FORD-Q	BDC, EDC and CCC; WED	BDC, EDC and CCC	BDC; EDC and CCC; WED	BDC; FORD-Q
<b>Bank Venture Capital</b>	<ul style="list-style-type: none"> <li>Royal Bank Capital Corporation (\$350 million)</li> </ul>	<ul style="list-style-type: none"> <li>Bank of Montreal Capital Corp.</li> <li>Ventures West</li> <li>Investment in ven. cap. firms</li> </ul>	<ul style="list-style-type: none"> <li>CIBC Wood Gundy Capital Co.</li> <li>CIBC Innovation Fund (\$100 million)</li> </ul>	Roy Nat	<ul style="list-style-type: none"> <li>TD Capital</li> <li>Investments in 5 Canadian venture capital firms</li> <li>SCC Canada joint venture</li> </ul>	Partnership with Novocap, Technocap, Telssoft, SRI
<b>IPO Services</b>	RBC DS	Nesbitt Burns	CIBC Wood Gundy	Scotia McLeod	TD Securities	Lévesque Beaubien Geoffrion

Source: SECOR

The banks recognize the need for deeper, more specialized understanding of the characteristics of individual knowledge-based sectors. To acquire this understanding, they are supporting their staff through training, the use of specialized technical resources (either internal or on contract) and, in some cases, the provision of specially-designed tools such as proprietary lending models developed for the KBI market.

Bank staff resources, particularly those drawn internally, must climb a very different learning curve for KBI accounts than for conventional account or credit management. This is a barrier to market development both for bank staff and for the KBI client, although it may be diminishing as information is exchanged and as the bank teams learn more about KBI characteristics. This is a slow process. It is important to note that the banks for the most part have not so far chosen to accelerate learning through external recruitment, although this is a possible solution to the problem of quickly acquiring the necessary expertise in areas of new technology. Many of the banks retain technical expertise on contract to evaluate KBI proposals. But mainstream bank recruitment and compensation practices may be barriers to retaining specialized staff.

## Debt Financing

Conventional debt financing is the major product line offered by the banks to small, KBI clients. There were 16,830 KBI customers at the seven major banks as of the end of 1996<sup>10</sup>. Together they had authorizations for \$22.4 billion, with \$7.8 billion (28%) of that actually placed as loans. This represents about 4.6% of the total credit (\$168 billion) placed with all Canadian businesses in 1996, and is proportional with the contribution of KBI to the economy (about 5% of GDP).

The vast majority of KBI bank customers access loans under \$5 million. The 16,200 clients in this group had a combined credit authorization of \$3.2 billion. This represents less than one percent of the total credit authorized by the banks. More than half of that authorized credit was placed at the end of 1996, indicating that KBI firms with access to smaller loans use their credit more intensively than do KBI with larger authorizations.

**TABLE 3.2**  
**BANK MARKET SHARE BY TYPE OF LOAN**

For Credit Outstanding on December 31, 1996

	Loans <\$1Million to KBI	Loans <\$1Million to All Businesses	All Loans to All Businesses
Royal	27.9%	28.1%	23.4%
Hong Kong	17.9%	3.4%	4.8%
Bank of Montreal	15.3%	18.5%	15.1%
Toronto Dominion	12.1%	11.6%	13.5%
Scotia	9.7%	12.0%	15.6%
CIBC	8.8%	17.5%	19.8%
National	8.2%	8.9%	7.7%

Source: Business Credit Statistics, Canadian Bankers Association, December 31, 1996

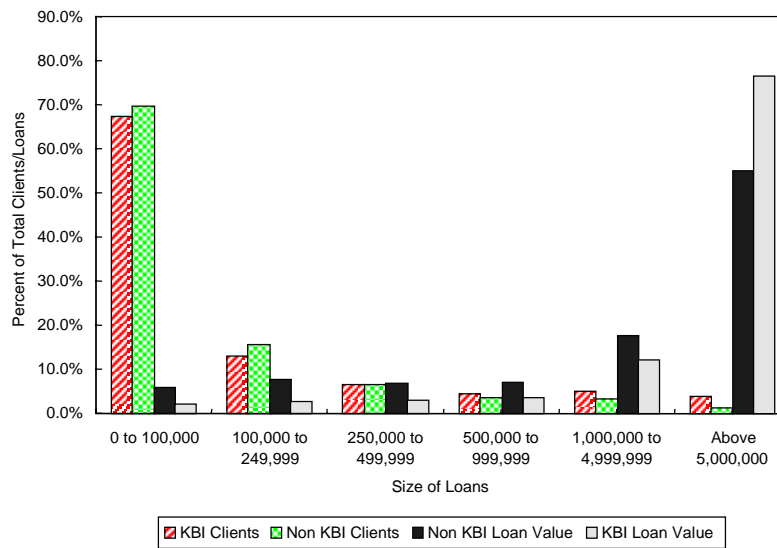
Royal Bank and Bank of Montreal are the major bank lenders of loans under \$1 million to small KBI firms, and among the first to open specialized banking centers for KBI clients. The Hong Kong Bank also has a strong presence in the market for small loans, even though it is relatively small in size compared to the major banks.

The value of the loans varies inversely with the number of customers served. Only 2.1% of the value of loans outstanding at the end of 1996 was made up of loans under \$100,000; 88% of the value was made up of loans over \$1 million. The distribution of customers was the reverse; 64% of the banks' KBI customers were authorized for loans under \$100,000; 8.7% were in the \$1 million and above range. The same pattern, though less pronounced, is evident when the

<sup>10</sup> CBA Business Credit Statistics, December 1996. The Canadian Bankers Association began collecting separate statistics on the KBI market in mid-1996, using the SIC Code definition.

distribution of business loans to all other industries is examined. In general, proportionately more of the dollar value of the KBI loan portfolio is held in very large loans when compared with other industries<sup>11</sup>.

**CHART 3.2**  
**DISTRIBUTION OF THE NUMBER OF BANK CUSTOMERS**  
**AND THE VALUE OF LOANS OUTSTANDING**  
 For loans as of December 1996



Source: Business Credit Statistics, Canadian Bankers Association, December 31, 1996

For banks the most challenging KBI clients are those with loans above \$25,000 and below \$1 million. Below this range the client, KBI or otherwise, frequently has a personal line of credit or loan secured by personal assets. The assessment of KBI clients for these loans would be no different than for any other firm. For loans greater than \$1 million, the banks are dealing with medium to large firms with established business records and cash flows against which to judge credit worthiness. The KBI customers who have loans in the \$25,000 to \$1 million range are those for whom the banks need to develop specialized expertise. The 8,000 clients in this range as of December 1996 had loans totaling \$859 million.

The banks are conscious of the need to establish "single windows" for their clients and to conduct initial assessments on a different basis than for conventional small businesses. To do so, they are trying to link dedicated account managers with trained or specialized credit officers to ensure speedier and more knowledgeable handling of the accounts. Most of the banks have regional centres or units located in areas of high concentration of innovative, technology-based firms and entrepreneurs. The KBI client is handled through a relationship manager who conducts an initial assessment, often with the help of technical resources, and who can arrange for specialized services. Some of the banks have established dedicated teams to help local account

<sup>11</sup> The skew in the distribution of KBI loans toward larger values likely reflects banks' higher comfort levels in assessing the credit worthiness of large established firms.



managers assess potential clients more effectively, once they have been identified. Banks acknowledge that if a technology-based business is not located near a banking center with access to specialized expertise, it faces greater difficulty in getting credit.

Bank policy and practice is to require collateral or security for debt financing. The need to treat small KBI clients somewhat differently than conventional businesses has led to new approaches to what is defined or accepted as collateral. Most banks are developing KBI-specific lending models and risk assessment approaches to assess enterprise value rather than just individual assets, and to recognize the lending value of intangible assets. Indeed not all banks require full collateralization of loans in the traditional sense. But the definition of what can be accepted as collateral for KBI clients with intangible assets needs further development and circulation into the field.

One receivable that is being accepted as collateral by some banks is the federal Scientific Research and Experimental Development (SRED) tax credit. This credit is refundable and paid annually which makes it a good vehicle for improving KBI cash flow through receivables financing. However, a chill may be cast on it by recent legal judgements which throw some uncertainty on the priority given to the banks as holders of SRED credit receivables in the case of bankruptcy<sup>12</sup>.

All the banks recognize that they must spend much more time in doing due diligence on a knowledge-based client to mitigate their risks. This involves not only close assessment of the markets, products, skills and business plans of the client before a loan is made, but also close monitoring of the business and establishment of benchmarks to track client progress against business targets. They assert that the costs of making the loan are therefore higher than they are for a conventional small business even at start-up stage, and the required expertise is less likely to be available internally. The fast growth rates of many small KBI customers may justify the higher costs and risks. This is a case that may take some years to prove, leading the banks to proceed cautiously.

Without consulting directly with KBI firms, it is difficult to assess how well the banks are meeting their needs today. The banks are criticized for not being flexible enough. But the experience of bank ombudsmen who have been established over the past two years does not indicate a major backlog of credit complaints. Without other hard evidence it is premature to suggest that banks are doing a poor job of meeting KBI credit needs. What is clear is that there is still much room for development, particularly at the local level.

## **Export Financing**

Most small businesses address the local goods and services market. But KBI firms are often geared towards exports from the beginning. One of their key financing needs even at early stages is export financing. The banks are asked at the outset to accept foreign receivables as collateral for financing purposes. For early-stage companies with little sales history, these receivables can

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<sup>12</sup> For more information on government tax credits, see Appendix 3.

loom large in determining their enterprise value. The banks recognize this and affirm that, for the most part, they are willing to assign value to U.S. receivables, provided that they are from recognized U.S. creditors. However, for smaller KBI firms, it can be very difficult to persuade the bank account managers of the credibility of a U.S. creditor. Information about U.S. creditors is not easily available or up to date. Because many KBI firms are dealing with foreign KBI firms, or distributors whose credit is not well established, Canadian banks find it difficult to accept them. They do not have the extensive contacts that are available through the branch network domestically to validate a creditor. This problem is even more apparent when it comes to foreign (non-U.S.) receivables.

Recognizing the need to bridge the risk gap, some risk-sharing programs have been developed recently by the SME Services Group of the Export Development Corporation. For example, in 1996 CIBC and EDC formed a 50/50 shared risk program (**GrowExport**) to support CIBC's working capital loans specifically geared to exporting knowledge-based businesses. All of the banks are participating in a new EDC program, **Master Accounts Receivable Program**, launched in 1996, under which EDC guarantees operating lines of credit against receivables for small exporters, whether knowledge-based or not. These are initiatives so new that their impact is not measurable. Take-up rates remain very small (to date about 100 deals for MARG, 5 or so deals for GrowExport). Moreover, both potential bank clients and some bank staff in the field are unaware of the programs. These could be signs that the programs are either not properly designed or not properly marketed. If they develop some momentum, they could be fairly effective for KBI small exporters.

Some of the banks believe that the EDC programs, particularly its pre-shipment working capital guarantees, are not meeting their needs because they do not insure enough of the risk. There is therefore less bank export financing available than might otherwise be the case. EDC believes that the gap may be more of an information gap than a true gap in availability of financing instruments. Many bank account managers and even more entrepreneurs do not know the range of insurance and guarantee products available to them.

Individual banks are taking different initiatives to address this problem. For example, the CIBC established a strategic partnership with Silicon Valley Bank in California in 1996 to help its Canadian information technology clients into the U.S., giving the clients the opportunity to introduce themselves through a recognized U.S. intermediary, with a line of credit for expansion into the California market. The program is too recent to provide an indication of its impact, but would be of significant interest to the information technology community. Royal Bank and Bank of Montreal also offer help for small exporters, although not specifically designated for KBI exporters<sup>13</sup>.

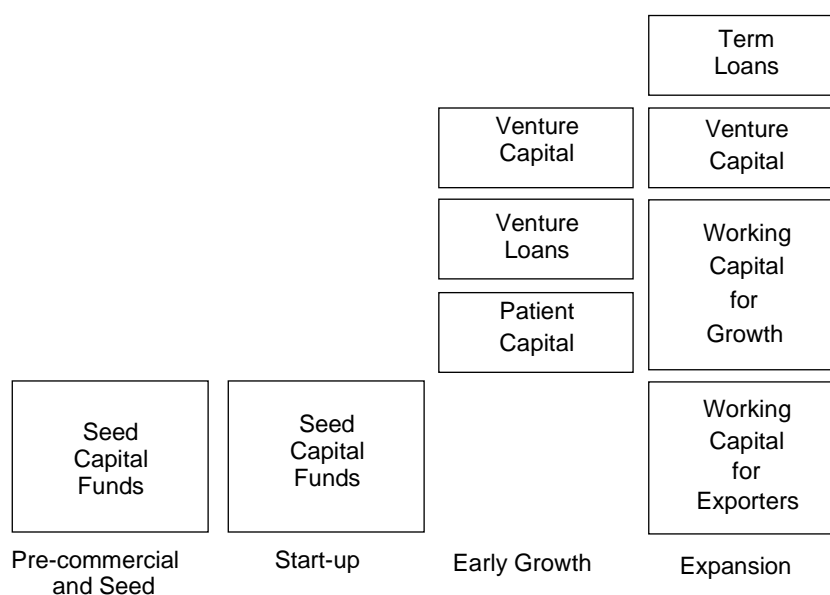
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<sup>13</sup> Royal Bank has been involved for some years in the financing of foreign receivables through an instrument so far unique among the banks, Royal Bank Export Financing Company. REFCO supports knowledge-based exporters by purchasing domestic or export receivables at a discount to improve the exporters' cash flow. Royal Bank also recently joined forces with Bank of Montreal by buying an equity stake in Northstar Trade Finance, a BMO-supported company offering financing to foreign buyers of Canadian goods and services between \$100,000 and \$5 million. Northstar is insured by EDC.

## The Business Development Bank

The Business Development Bank of Canada (BDC), which has always targeted the small business market, has increased its emphasis on the small KBI market since its mandate was revised in mid-1995. In fiscal 1997, 36% of all the BDC's loans went to KBI firms<sup>14</sup>. In this market, the BDC's aim is to bridge between angel or informal investors and the venture capital investors and banks who have different risk/return objectives and different areas of competence. Typically, therefore, the BDC supports knowledge-based firms just past start-up who are into a fast growth but still high risk phase and need financing to get themselves on to a successful commercial footing. It offers a number of products specifically designed to offer flexibility to growing KBI firms. To offset the higher risk, it charges a higher premium, but offers the possibility of postponing repayments. Interest payments are combined with royalties charged on sales.

**CHART 3.3**  
**BDC: KBI PRODUCT OFFERING**



The BDC has concluded exclusive agreements with each of the major banks. Under the agreements, the BDC offers its quasi-equity loans (between \$100,000 and \$1 million) to bank KBI clients. These agreements are designed to be mutually beneficial. The banks are able in effect to expand their product offering while the BDC is able to extend its customer network.

<sup>14</sup> BDC 1997 Annual Report.

The BDC plays an important role in complementing the banks by offering subordinated debt, which it believes to be an underserved market. The only bank rival for BDC's niche is Scotiabank which offers subordinated or mezzanine financing products through **RoyNat**, its venture capital arm.

### **Chartered Bank Partnerships with Public Agencies**

The banks have recently concluded risk-sharing agreements with three federal regional agencies outside the central region of Southern Ontario. **Western Economic Diversification** has focused specifically on KBI firms in Western Canada, and has taken the lead in initiating partnerships with most of the chartered banks. Beginning in 1995, WED started up fourteen sectoral funds in partnership with individual banks, focusing on economic clusters such as biotechnology. In each case, WED uses its local networks to identify potential clients and help develop their business plans, and the bank makes loans on commercial terms for R&D, product and market development. The banks contribute the majority of the capital advanced, backed by a small WED loan loss reserve which covers up to 12.5% of losses incurred under each agreement.

The take-up for these loans in Western Canada has been significant. Over \$24 million in loans have been made, indicating that there was indeed a gap in the debt capital market which the banks had not previously filled. WED is supplementing the local account management and risk evaluation skills of the banks with its own contacts and access to technical expertise to evaluate potential clients. The program is still in its early stages but has been copied by two other federal agencies, the **Federal Office of Regional Development-Quebec**, and **FEDNOR** in Northern Ontario.

In WED's experience, one weakness of these partnerships is the unavailability of enough technically expert staff in the regions to evaluate loan applications. The banks are also experiencing this shortcoming, both in their partnership agreements, and in their own KBI programs, since they still need to build the required field expertise to evaluate technology-based business plans.

### **Support for Market Building**

In the last two years, as they have learned more about the characteristics and needs of their knowledge-based clients, and as they have seen the need for market development, many of the banks say that they have begun to devote more resources to helping clients and potential clients at the early stages of their development and growth. These activities are described by the banks as "market building". There is no immediate return. The objective is to raise their individual profiles and to make earlier links to KBI entrepreneurs.

Some of the banks have begun to provide financial support to information networks and mentoring facilities for small businesses, knowing that before these clients can access credit, they need access to business planning, contacts and management resources. For example, both CIBC and Bank of Montreal support **MettNet**, a network service set up in 1992 linking small and mid-sized technology companies with resources in universities, research centres, financial institutions

and government agencies. CIBC has made a substantial grant of \$150,000 to help MettNet expand from Ontario, Quebec and Alberta to become a national network. Since inception, it has been able to assist some 400 promising small technology companies. Royal Bank established its own regional network called **ViaTech** in 1996, to bridge between emerging technology companies and professional service companies which provide legal, accounting and marketing support. ViaTech is funded locally by individual business banking centres.

CIBC and Royal Bank are now reaching directly into Canadian universities to provide assistance to their technology transfer offices in the identification and early stage commercialization of promising technology or science applications. The **Technology Launch Initiative**, started by Royal Bank in 1996 in partnership with Quorum Growth and Andersen Consulting (subsequently replaced by BCE), is a small group designed to accelerate the commercialization of Canadian technologies through the identification of promising technologies in the universities and research centres which can be developed into viable commercial proposals. The TLI is not a financing but a networking initiative. In this it seems to be similar to MettNet but with a focus on the intellectual sources of innovation in the universities themselves. It is still in its infancy; under five projects have been identified so far, out of 180 to 200 technologies reviewed in five different universities. CIBC has donated over \$1 million directly to specific universities to help them build their technology transfer capabilities. This is an area where much more needs to be done by the universities themselves in partnership with the private sector.

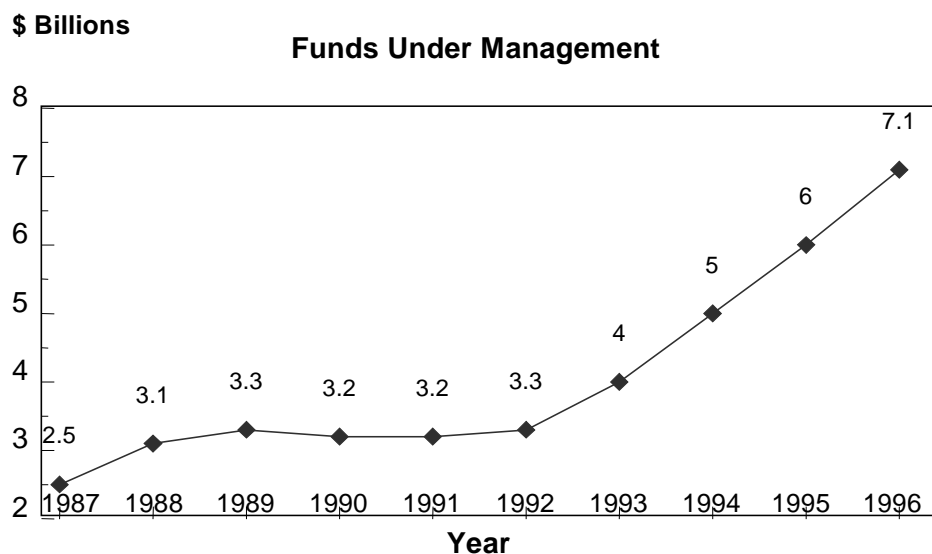
Banks are also supporting other smaller networking initiatives which are springing up locally to fill this information gap for entrepreneurs. The federal government itself is launching another targeted source of information for growing KBI firms with a tool kit called **Steps to Growth Capital**, scheduled for launch in fall 1997. This tool kit is intended to help entrepreneurs sort through potential sources and prepare themselves to meet the requirements of different investors. It was designed to fill the information gap so frequently complained of by entrepreneurs themselves. Much networking information is already available electronically across Canada through *Strategis*, the federal government's Web site for business.

## 4. Supply of Equity Finance

### The Venture Capital Community

Venture capital is supplied in the form of equity finance, usually in the range of \$500,000 and up. Venture capital has exploded in the last five years, due in large part to the government tax credits made available to investors in the labour-sponsored venture capital funds. In 1996, capital under management totaled \$7.1 billion, a major increase from \$2.5 billion under management ten years ago.

**CHART 4.1**  
**VENTURE CAPITAL**



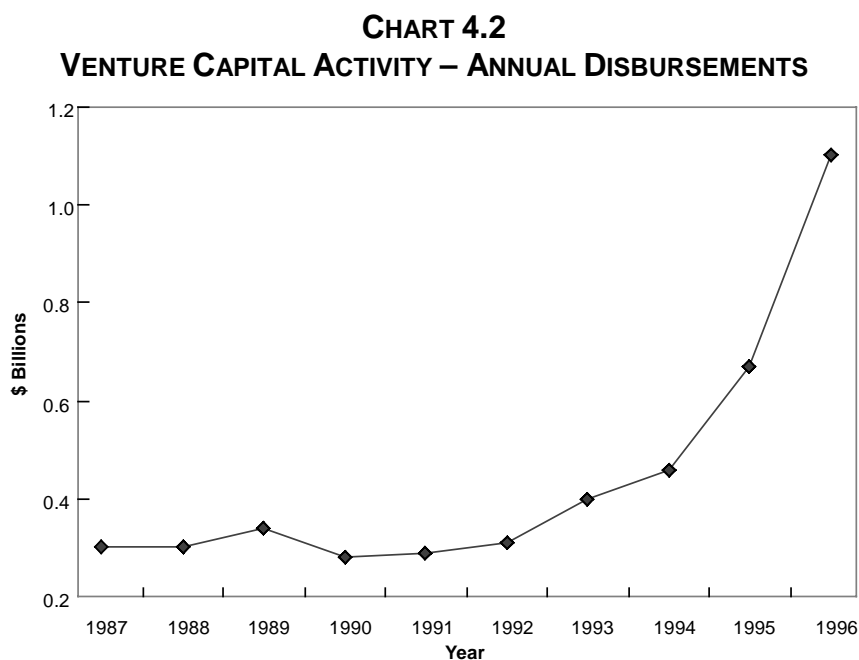
Source: Mary Macdonald and Associates

The 24 labour-sponsored funds control just over half of the total capital under management (\$3.7 billion). Two funds tower over the others, the **Quebec Fonds de Solidarité** and **Working Ventures Canadian Fund**. The **Fonds de Solidarité** is by far the biggest Fund, but focuses all of its investments in Quebec. A large number of smaller funds have sprung up targeted to specific investments in technology-based businesses. For example, the **Canadian Medical Discoveries Fund** (created in 1994) and the **Canadian Science and Technology Growth Fund** (created in 1996) are both focused on knowledge businesses.

The banks are also increasingly supplementing their conventional credit finance and banking services with riskier forms of equity capital. All the major banks have risk capital and investment banking arms which are able to address the equity needs of growing knowledge-based clients. The bank resources devoted to targeted venture capital are increasing. In the last two years, **Royal Bank Capital Corporation** has seen its capital base increase from \$150 million to

\$350 million, and CIBC has entered the market with the **CIBC Innovation Fund** of \$100 million.

Total venture capital disbursements increased by 64% year over year in 1996, to \$1.09 billion. There is no doubt that the KBI businesses are benefiting from the new venture capital disbursements. 60% of venture capital investments in 1996 were made in KBI firms. Almost 200 such firms received first-time financing in 1996, up from 110 firms in 1994<sup>15</sup>. Information technology firms tend to be more numerous in the investment portfolio than biotechnology firms.

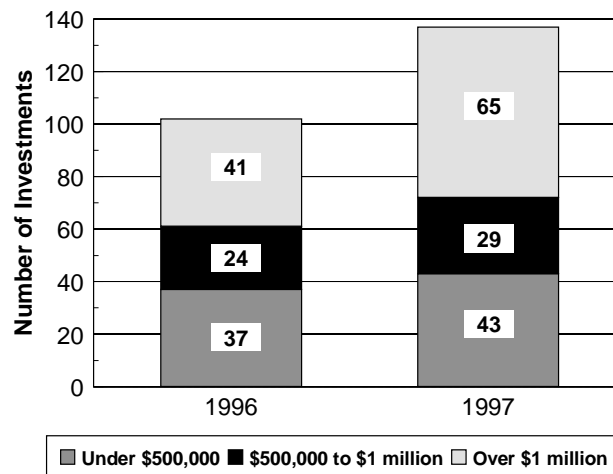


However, although disbursements have increased significantly over the past few years in line with the increased amounts available to the funds, they have tended to target larger investments which provide a better cost/return ratio per dollar invested. Labour funds have not escaped this trend. Their average deal is over \$1 million, well beyond the thresholds of most start-up companies. The bank funds are similarly criticized by KBI firms for managing their venture capital conservatively, and for targeting their investments only to larger companies.

The number of venture capital deals increased in all size categories between 1996 and 1997. Deals over \$1 million registered the largest proportionate gain, moving from 40% of investments made in 1996 to 47% in 1997, suggesting that larger placements are becoming more important. The majority of investments under \$500,000 were made by the Fonds de solidarité which has become a very important regional financing vehicle in Quebec.

<sup>15</sup> Canadian Venture Capital Association, 1996 Annual Statistical Review.

**CHART 4.3**  
**DISTRIBUTION OF VENTURE CAPITAL INVESTMENT**  
**BY SIZE OF INVESTMENT**



Source: MacDonald and Associates

Two other issues often mentioned by fund managers as affecting availability of funds to smaller KBI companies are lack of expertise and higher costs of due diligence. Just as with debt financing, equity investors need to understand the markets, products and strategies of KBI businesses to assess their investment potential. While venture capital firms tend to be more rapid, more flexible and more technically or sectorally expert in their portfolios than bank debt finance suppliers, they do not have large staffs and will only take on only the number of investments that they can manage properly and that can guarantee them the rates of return they expect, at around 30% to 35% pre-tax. Thus, in 1996, 86 venture capital investment groups made 881 investments in 525 companies, or an average of about 10 deals per group.

In Canada, venture capital activity is more demand-induced than supply-driven. Venture capital investors who believe that a return can be realized relatively quickly through an IPO will tend to invest. The degree of activity in public markets has an important positive impact on funds invested, particularly for second or third rounds or mezzanine type financing. Venture capital investors at first rounds tend to be more hands-on development partners for KBI firms.

## The Public Markets

The importance of capital markets for small technology-based firms and their investors is much greater at later stages in their growth, when the firms are well-launched, and equity investors are looking for ways to realize their investment through exit. There do not appear to be any major structural access barriers to Canadian public markets for larger technology-based companies. The key to obtaining a listing and to successful accessing of capital markets through IPOs for small-cap companies is to approach the markets at the right time with a record of profitability and good growth potential.



The costs of listing make it uneconomical for firms to raise small amounts on the major exchanges. Listing requirements as well limit firms to larger issues of several million dollars. This means that equity finance from public markets is most often sought by larger companies than those examined in this report<sup>16</sup>.

In Canada, there are few junior stock exchanges that focus exclusively on technology companies as NASDAQ does in the United States. Some Canadian firms have used NASDAQ as their route to an Initial Public Offering. But a number have successfully used the established exchanges in Toronto, Montreal and Vancouver to launch their IPOs. The Quebec government is looking into the possibility of creating a new Montreal-based junior exchange focusing on biotechnology companies.

**TABLE 4.1**  
**KBI IPOs ON CANADIAN EXCHANGES**

Period	# KBI IPOs	Financing Raised	Average
1997 as of July	7	117,615,000 \$	16.8 M\$
1996	25	504,122,000 \$	20.1 M\$
1995	9	236,088,000 \$	26.2 M\$
1994	8	153,853,000 \$	19.2 M\$
1993	29	619,654,000 \$	21.3 M\$
1992	5	95,583,000 \$	19.0 M4
<b>Total</b>	<b>83</b>	<b>1,726,915,000 \$</b>	<b>20.8 M\$</b>

Sources: TSE, Bourse de Montréal, Financial Post

The number of KBI IPOs on Canadian exchanges since the early 90s has fluctuated considerably. 1993 was a banner year for such IPOs, which numbered 29, after some years of pent-up demand influenced by the recession. Subsequent years hovered under 10 IPOs a year, until 1996 when 25 IPOs were launched. As percentages of the total number of Canadian IPOs annually, KBI IPOs tend to be under 10%, except in 1993 when they numbered close to 15% of the total. Issue sizes are in the \$10 to \$35 million range.

<sup>16</sup> Michael Robinson, "Raising Equity Capital for Small and Medium Sized Enterprises Using Canada's Public Equity Markets", March 1996.

A recent Conference Board study<sup>17</sup> on the experience of eight Canadian growth companies in making an IPO suggests that entrepreneurs have little difficulty in finding an underwriter to assist them in going public. Two or three independent underwriters specialized in technology issues. These are Marleau, Lemire in Montreal, Griffiths, McBurney and Yorkton Securities in Toronto. These underwriters have specialized expertise in KBI sectors such as information technology and biotechnology. However, the bank-affiliated underwriters are equally if not more active as lead underwriters for technology IPOs. Sector expertise does not seem to be a deciding factor in the selection of underwriter.

There does seem to be a structural gap in the availability of public equity of less than \$1 million. The Alberta and Vancouver Stock Exchanges offers the possibility of accessing equity capital of less than \$1 million but due to the costs of listing, for practical purposes most regular IPOs on these exchanges would not be much below \$1 million. Smaller firms must use the Ontario Over-The-Counter market or the Canadian Dealing Network.

Many small firms who are not yet ready to approach the markets use limited market dealers licensed by securities commissions to do private placements. These limited market dealers act as fee-paid intermediaries for entrepreneurs and direct them to various available sources of finance, including venture capital, lessors and other specialized financing sources. The bulk of these dealers are in Toronto and Montreal.

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<sup>17</sup> Michael Andrews, Conference Board of Canada, "Initial Public Offerings: The Experience of Eight Canadian Growth Companies", May 1995.

## 5. Is There a Gap to be Filled?

While professional support and access to information are critical to a start-up business, clearly, capital is the major ingredient in successful growth. For many beginning entrepreneurs, finding seed capital to sustain growth beyond the first stages of commercialization has been extremely difficult. Small, growing firms seeking initial finance up to \$250,000 appear to face a significant gap. Supply is short because: the risks are high; the cost benefit ratio is not favorable; there is a lack of valuation expertise. Informal investors, or angels, are the traditional sources of capital at this stage. But their number is limited and they are restrained by lack of information about good prospects or by lack of time to provide the intensive management support that many start-ups require.

Recent initiatives by both banks and venture capital firms seem to indicate that this gap is beginning to be filled, as they realize the need to replenish the supply pipeline of potential deals. Partnerships are being actively promoted as vehicles to share risk and leverage funds. For example, the Bank of Montreal Capital Corporation in collaboration with the BDC and a pension fund, launched the **Western Seed Investment Fund** in March 1997. This Fund is designed to invest both seed capital and management expertise in promising university research projects in Western Canada. Royal Bank announced the creation of a new subsidiary called **Canada Growth Company** in June 1997. With as yet unnamed partners, Canada Growth Co. will identify promising technologies and bring them to market, providing expertise to successfully commercialize innovation. The target market is very early stage, high growth, knowledge based Canadian firms in life sciences (later on to include sectors such as information technology and advanced materials).

In late August 1997, the BDC announced that it was committing funds to the new seed capital fund known as **T2C2**, launched earlier in the year by the **Caisse de Dépôt et placement du Québec**. As with the others, this fund is designed to supply start-up capital and expertise for the commercialization of technologies developed in Canadian universities, particularly in the areas of health science and information technology. A third seed fund for technology companies with BDC participation is expected for Ontario in fall 1997. As well, the BDC announced in September the launch of an agreement with the NRC to help commercialize the most promising technologies developed in NRC research laboratories.

**TABLE 5.1**  
**SEED CAPITAL FUNDS**

<i>Fund Partners</i>	<i>\$ Available</i>	<i>Date Launched</i>	<i>Areas of Concentration</i>
<i>Western Seed Investment Tech Fund BMOCC / Ventures West / BDC / Cascadia</i>	\$25 million	March 1997	Western Canada computers, new media, biotech, energy and environment
<i>Canada Growth Company Royal Bank and partners</i>	\$30 million	June 1997	Life sciences Information technology Advanced materials
<i>T2C2 Sofinov, BDC</i>	\$45 million up to \$60 million	May 1997	Health sciences Information technology
<i>NeuroScience Partners Fund RBC, Caisse de dépôt MDS Health Ventures</i>	\$52.5 million up to \$100 million	September 1994	Neuro science
<i>Innovatech du Grand Montréal</i>	\$300 million	June 1992	Health sciences Information technology Other KBI

These recent developments are promising indications that the gap in availability of seed capital is beginning to be addressed, at least on a national level. There remain gaps in regions outside major centers, and this is a gap that may prove difficult to close without concerted action by governments as well as private sector players.

Informal investors or angels play the largest role in less urban centers. For them, the barriers to investment are twofold: lack of information, and lack of positive inducement to invest. To address the first problem, the federal government introduced in 1996 a program called **Canada Community Investment Plan**. This program is targeted to communities which want to match innovative small businesses with sources of risk capital in non-financial centres. The idea of CCIP, which will allocate about \$600,000 each to 20 communities over five years, is to enlist all the resources within a community itself to help build a resource network into which entrepreneurs seeking capital and advice can tap more easily. Many if not most of the networks set up under CCIP offer not only referrals but also assistance in preparing the entrepreneur for presentation to investors. This is a key step, as for many investors a major barrier to investment lies in lack of confidence in the management skills or business planning ability of the entrepreneurs themselves. However, CCIP is spread wide and thin. It is not a KBI-specific program.

The second issue, lack of inducement for investors to invest, is more complicated to resolve. The requirements of provincial securities commissions appear to inhibit investors from investing small sums in companies unknown to them. Ontario, for example, requires entrepreneurs to prepare and file a full prospectus to approach investors. The three ways to avoid this expensive requirement are:

- to approach investors who are prepared to invest a minimum of \$150,000;
- to apply for a one time only Seed Capital Exemption, which permits the entrepreneur to show a proposal to not more than 50 people, and have not more than 25 investors;
- to sell direct to close business associates or friends.

In all these cases, the entrepreneur is limited in his or her ability to obtain small amounts of funding from a wide group of unrelated investors.

Even more importantly, the capital gains tax incentives for informal investors are limited. Many observers suggest that one of the most important inducements to more informal capital availability would be better tax treatment of capital gains from private equity investments. There are no tax incentives to invest privately rather than buying public stocks or real estate. The Canadian Advanced Technology Association has proposed that consideration be given to allowing investors to offset some of their expected losses with credits to be applied against them. This would induce investors to keep their money in for longer periods of time.

## 6. Observations and Need for Further Research

In our interviews and analysis of secondary sources, we observed that there is near unanimity of view that the prospects for small knowledge-based firms in Canada today are better than they have ever been. Overall economic conditions, which have the most important influence on the growth of KBI firms, have been very positive. There are, generally speaking, more and more suppliers of KBI-targeted capital. There is also strong consensus on some of the structural factors that may be inhibiting even stronger growth of small KBI firms. Problems do remain, mostly in the area of access to equity capital for the smallest firms. Some of this may be temporal, subject to growth and maturing of capital markets, and not a reflection of failures in the market as such.

There is broad agreement among finance suppliers that the activities of the federal government in improving conditions for the growth of small KBI firms should be focused on building infrastructure and improving business conditions, not on regulating or directly intervening in the market. In any case, the federal government's ability to significantly improve access to equity capital through regulations is limited.

The federal government's policy instruments are primarily the tax system, grants and contributions to build infrastructure, and federal agencies and other corporations to innovate financing vehicles not otherwise available to seed-stage entrepreneurs.

### Tax incentives to Firms

There is general agreement that federal and provincial tax incentives to KBI entrepreneurs in the form of R&D tax credits are critical to getting these firms off the ground, primarily because they can be used to generate cash flow for small companies. Quebec's tax regime is cited as the most helpful because the government provides immediate cash flow by guaranteeing bank debt against the credit receivable.

Quebec also offers targeted tax credits against the value of salaries paid to KBI personnel. These seem to be effective at helping these firms take on the required human resources.

Income tax rates are cited as an obstacle to recruiting and keeping research or other highly qualified personnel, and it has been suggested that more favourable tax treatment would help to solve human resource shortages, particularly in information technology.

### Tax Incentives to Investors

It is suggested by many that more favorable capital gains treatment of investments in start-up KBI firms would be a major incentive to informal investors who are the main supporters of independent KBI start-ups.

## **Grants and Guarantees**

In Quebec, government support of various incubators and research centres has proved to be a significant boost to KBI firm start-up. The biotechnology cluster in Montreal is now one of the largest biotechnology clusters in Canada. Much of this growth has been due to early provincial government financial support in the form of research grants and direct support to incubators and venture capital suppliers for would-be entrepreneurs.

Federal support of incubators and KBI industrial cluster infrastructure has also been important. Industry Canada's infrastructure building efforts for small firms are well received and could be further reinforced, as one of the critical needs of both investors and entrepreneurs remains the need for information.

## **Specialized Finance Vehicles**

The niches for quasi-equity and export finance support supplied by the Business Development Bank and the Export Development Bank are very important to small KBI firms. Observers suggest that both these organizations could be doing even more in the small KBI market.

## **Areas for Further Research**

Although we spoke with observers who are very familiar with the needs and concerns of small KBI firms, our mandate did not include any surveys of KBI firms. We could not verify the assertions of capital suppliers with capital users. Our analysis of gaps in the market and of possible barriers to growth has to be validated with entrepreneurs. It would be an important addition to get a first-hand view from KBI firms about their experiences at the earliest stages of their development to provide another perspective.

Another area for further research is in economic analysis and data. The need for a more adequate and widely accepted definition of knowledge-based industry should be fully documented and tools for data collection and analysis should be fully developed to support public policy decision-making and interventions. Statistics Canada and Industry Canada could play even more of a lead role in this regard.

## Appendix 1. KBI Definitions: Lee and Has

### Classification of Knowledge-intensive Industries by Lee and Has

Knowledge intensive industries can be categorized into high, medium and low knowledge intensity groups, based on the intensity of use of R&D activities and of highly educated human resources .

#### KNOWLEDGE INTENSITY GROUP

High-Knowledge	Medium-Knowledge	Low-Knowledge
Scientific & Professional Equipment	Other Transportation Equipment	Fishing & Trapping
Communication & Other Electronic Equipment	Textiles	Other Electrical Products & Electronics
Other Manufactured Products	Communications	Wood
Aircraft & Aircraft Parts	Paper & Allied Products	Furniture & Fixtures
Computer & Related Products	Mining	Logging & Forestry
Business Machines	Rubber	Transportation
Engineering & Scientific Services	Plastic	Storage & Warehousing
Pharmaceutical & Medicine	Primary Metals, Ferrous	Agriculture
Electrical Power	Non-Metallic Mineral Products	Retail Trade
Other Chemical Products	Wholesale Trade	Personal Services
Machinery	Crude Petroleum Products	Quarries & Sand Pits
Refined Petroleum & Coal Products	Fabricated Metal Products	Accommodation , Food & Beverage Services
Management & Consulting Services	Motor Vehicle & Parts	Clothing
Education Services	Food	Leather
Health & Social Services	Beverages	
Pipeline Transportation	Tobacco	
Other Business Services	Finance Insurance and Real Estate	
	Other Utilities	
	Printing & Publishing	
	Construction	
	Amusement & Recreation Services	

Source: Frank Lee and Handan Has, "A Quantitative Assessment of High-Knowledge Industries Verses Low-Knowledge Industries." in "The implications of Knowledge-Based Growth for Micro-Economic Policies". Ministry of Supply and Services Canada, 1996.



## Appendix 2. KBI Definitions: Macdonald & Associates

### Sectors Defined to be Technology/Knowledge Based

**Biotechnology:**

- Agricultural/Animal Related
- Medical related
- Industrial related

**Electronic Components and Instrumentation:**

- Analytical and science
- Computer-related
- Military-related
- Aerospace
- Other

**Medical/Health-Related:**

- Drug delivery
- Pharmaceuticals
- Diagnostic/therapeutic
- Medical Devices
- Medical Software/Information Svc
- Other

**Energy/Environmental Technology:**

- Alternative energy
- Energy conservation
- Water treatment
- Waste management
- Recycling technology
- Other

**Computer-Related**

- Hardware
- Software
- Service

**Industrial Equipment**

- Specialty chemical and materials
- Controls and sensors
- Robotics/vision systems
- Other

**Communications**

- Commercial
- Data
- Satellite & microwave
- Mobile
- Telephone
- Other

## Appendix 3. Research & Development Tax Credits in Canada

### Research & Development Tax Credits in Canada

The federal government operates a sizeable tax incentive program to KBI entrepreneurs by offering a refundable tax credit to Canadian corporations that undertake scientific research and experimental development (SRED) expenditures in Canada. In addition, Manitoba, Nova Scotia, New Brunswick, Quebec and Ontario have tax concessions of various sorts for R&D activities. The credits and concessions for R&D are additive across jurisdictions, allowing a company with R&D activities in Manitoba and Quebec to receive the tax credits federally and again in each of the two provinces (after apportioning the research spending between the two). The existence of such credits payable in the future boosts the ability of small technology companies to obtain financing both from long term investors and from short term debt suppliers. By guaranteeing that the firm will have at least a limited source of cash with which to meet future obligations, it enables entrepreneurs to improve their immediate access to finance. Some banks provide bridge financing for SRED refunds.

Canada's combined R&D tax credits are valuable asset to KBI businesses seeking financing. However, the various R&D tax credit programs across Canada have different impacts on knowledge based firms and their investors. In each jurisdiction there are extra incentives in the form of higher credits for small businesses. Regionally, if a KBI business has little or no taxable income (often the case with start-up businesses), it will benefit the most from the refundable tax credits in Quebec. Firms with some taxable income (either established KBI firms starting a new program or start-ups with a short path to commercialization) can also benefit from the non-refundable tax credits available in Manitoba, Nova Scotia, and, to a lesser degree, Ontario. KBI firms outside of these four provinces will have just the federal tax credit.

Quebec also uses R&D tax incentives to encourage employment in the sciences. While the province generally accepts the federal definition of R&D, it uses a different eligible expenditures pool. To promote its employment enhancement policy, Quebec accepts only wages and salary eligible expenditures. In this regard Quebec's system rewards labour intensive KBIs.

In Nova Scotia, New Brunswick and Manitoba the provinces' credit is non-refundable. This means that the provincial credit available to a firm in any one year can be no larger than the firm's provincial corporate tax payable in that year. However, firms can carry unused credits forward for seven years or backward three years. This rewards R&D "winners" with future tax credits, but does not provide investors with mitigation of risk at the start-up of a KBI business.

In Ontario, the province allows companies to reduce their taxable income by more than 100% of their R&D expenditures. Ontario calls the portion above 100% the Scientific Research 'Superallowance'. Since the superallowance serves to reduce taxes payable, it too is non-refundable. In this sense it rewards R&D "winners" and established businesses who already have income, and provides little up front risk mitigation for start-up KBI.

## Appendix 4. Labour-Sponsored Venture Capital Funds

Labour Sponsored Venture Capital Corporations (LSVCC) were established to create a pool of patient investment capital for Canadian small- and medium-sized businesses. The regulations governing LSVCCs and their evolution can be divided into two categories :

- Measures designed to attract capital by offsetting the risk of investing in small- and medium-sized (often start-up) enterprises (SME).
- Measures designed to ensure that the funds in LSVCCs reach eligible entrepreneurs and, that once placed, the investments are tolerant of the fluctuations of venture capital.

Most LSVCC are provincially based, such as Manitoba's Crocus Fund or British Columbia's Working Opportunity Fund. The largest fund is the Fonds de solidarité du Québec, which focuses all of its investments in Quebec. Working Ventures Canadian Fund, Canada's second largest LSVCC with over \$860 million under management, invests nationally. The rules and incentives differ from province to province but generally follow the same model. The investor is offered tax credits for investing in an eligible LSVCC and the corporation is required to make specific types of placements that encourage local employment, economic diversification and technology application.

To offset investor risk, LSVCC investors are offered a tax credit. For national funds and provincial funds that are federally registered, there is a federal tax credit of 15% on annual investments up to \$3,500. In addition, provincial tax credits are available with most provinces matching the federal structure. Ontario, for example, allows exactly the same credits provided by the federal government. When added together, investors can receive \$1,050 in tax credits for LSVCC investments of \$3,500. By 1996, LSVCC supplied nearly half of the venture capital funds under management in Canada.

Recent changes to regulations show that governments are reducing the LSVCC investment incentives and increasing measures to get the capital working in SMEs. As lucrative as LSVCC investment tax incentives are today, they are substantially lower than those available prior to the 1996 federal and provincial budgets. Originally, LSVCC federal credits were 20% on investments up to \$5,000, with similar provincial measures. The combined federal provincial rate was capped at 40% of the \$5,000. The changes in 1996 were justified on the basis that LSVCC had no problems in attracting investors.

Investor incentives may have been reduced but measures to encourage the placement of LSVCC funds with target sectors have been increased. To ensure that LSVCC funds are actually invested in SMEs, the federal regulations require that 60% of the capital raised be placed with eligible corporations within two years of its receipt. Some provincial regulations are even stricter. Though 1997 budget announcements left the 60% level intact, the federal government is pushing to have more of the funds reach the smallest of SMEs. To encourage these investments LSVCC can count \$1.50 toward the 60% investment target for each \$1.00 placed with a Canadian SME that has total assets under \$10 million. Measures to encourage more patient investments were also enhanced. If investors redeem their LSVCC investments within 8 years,

they will have to repay the tax credits ; this period has been increased from 5 years. An additional enhancement is that the eight-year holding period applies to all investors. Previously, investors who left Canada or were over 65 years old had to hold LSVCC investments for 2 years before they could be redeemed.

## Interviews

The authors would like to thank the following individuals for their collaboration:

### Banks

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### Venture Capital and Investment Firms

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Hubert Marleau, **Marleau, Lemire**

### Federal Government and Crown corporations

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### Others

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Mary Macdonald, **Mary Macdonald & Associates**

Brien Gray, **Canadian Federation of Independent Business**

Faraj Nakhleh, **Canadian Advanced Technology Association**