NORDICITY GROUP LTD.

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Implementation Plan for the National Technology Marketing Network

prepared by

Nordicity Group Ltd.
Ottawa, Ontario

under contract to

Canadian Advanced Technology Association
Ottawa, Ontario

for

Ministry of State for Science and Technology
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March 25, 1987

Dr. Mike Smith
Industry, Trade & Technology
Ministry of State for Science & Technology
240 Sparks Street
8th Floor West
Ottawa, Ontario
K1A 1A1

Dear Dr. Smith

The Canadian Advanced Technology Association (CATA) is pleased to submit the enclosed report entitled "Implementation Plan for the National Technology Marketing Network" in fulfillment of the terms and conditions of Contract #0500-6-C057.

Change in Focus

The consulting company, Nordicity Group Ltd. of Ottawa, was retained by CATA to assist with the study. Based on extensive research and analysis of the concepts outlined in the proposal for this study, Nordicity submitted a draft report to us during the latter part of January. A copy of this draft report was submitted to you. As background to the current report, the essential elements of our original concept and the results of the research work as presented in the draft report are retained as two appendices.

The research and analysis contained in the draft report indicated that the original concepts for the National Technology Marketing Network would have duplicated many of the entrepreneurial support activities already initiated by governments and by the private sector. Consequently, a change of focus was necessary. A strategic decision was made in early February to orient the focus towards the establishment of a national service in market research and information. The technology brokering function of the original concept was retained as a secondary, complementary focus. The training component has been targeted, in the first instance, on upgrading the market development skill base among organizations serving technical entrepreneurs.

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This change in focus resulted in more work for the consultant. The alternative would have been a report which technically met the terms and conditions of the contract but which would not have helped the industry nor assisted MOSST in its mandate. The present report goes a long way in defining an approach which, we feel, can significantly assist technology development throughout the country.

Conclusions of the Report

The present report presents the key aspects of an implementation plan in terms of the revised approach. A conceptual framework based on the innovation chain is used to segment the marketplace and to design services. Two service areas are presented and explained in detail: Information Access Services and Market Research Services. The report concludes that the market segment most in need of marketing support are inventors, entrepreneurs and early-stage companies, who are generally unable to pay market rates for the critical market information/research services proposed.

Targeting this "unprofitable" market segment is a central theme of the implementation plan for the National Technology Marketing Network as there is no effective private or public sector organization performing these services.

A privately run, publicly funded company is recommended as the preferred management option. This recommendation is based on the desire to operate in the private sector yet target a market segment, for public policy reasons, which is unattractive to the private sector.

Implementation

The question of how to proceed with the actual implementation of the National Technology Marketing Network requires discussion. We would like to review alternatives with you in the near future. A potential approach, for example, is for CATA to undertake implementation and seek the necessary funds through various government programs. The Technology Outreach Program of the Department of Regional Industrial Expansion provides an example of the type of funding program which could be applicable. CATA's involvement would require a positive decision by our Board of Directors.

It should be noted that implementation would require more extensive investigation in certain areas than was possible within the current contract. A more detailed understanding of the market for the proposed services would be required. The interest and commitment of potential affiliates and users is essential. Additionally, it is suggested that the provinces be consulted as part of the process of developing the network. Provincial government officials (and municipal economic development officers) showed considerable interest throughout the research phase of the current project. (One deputy minister was adamant that the provinces be kept involved.) We would be pleased to discuss with you how the above could be achieved.

We look forward to meeting with you to discuss the report and to determine the next steps.

Yours sincerely,

Roy M. Woodbridge
President

RMW:mb
encl:

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EXECUTIVE SUMMARY

This report presents an implementation plan for a National Technology Marketing Network - a corporate structure focussed on overcoming the market information weaknesses of technology development in Canada.

The work began with the development of a more general concept to implement a system for technology-based development which would have encompassed "broker assistance" to link early-stage firms with markets and local sources of capital, a "national market information network" and "training" in business planning and market development. Early research and analysis indicated that the primary focus should be on the national market information network, with secondary focus on broker services and training. The research indicated that there is an unsatisfied market need for rapid access to reasonably priced, targeted, market-related information. The report discusses the market focus, services, organizational arrangements, financial projections and management options of this more focussed approach.

The primary target of the National Technology Marketing Network is the incubation stage of technology development; inventors, entrepreneurs and early-stage companies with a need for market-related information for use in evaluating product development proposals and the potential success of new product launches. Targeting this market segment satisfies the underlying public policy objectives of the National Technology Marketing Network of providing assistance where it is most needed. However, it

raises problems in terms of creating a viable private sector operation since this market segment is generally unable to pay market prices for required services. The implementation plan accomodates this dichotomy through pricing strategies which differentiate between medium/large sized organizations and individual entrepreneurs and small companies.

Two main types of services would be offered by the National Technology Marketing Network: information access services, and market research services. The former would involve access to a range of generic market information extracted from network databases, including those developed by the network itself. The major advantage of such services to potential users is the provision, through one responsible national agency, of improved access to currently or potentially available databases. The second service area would involve adding value to the process of collecting market-related information and directly assisting inventors, entrepreneurs and companies throughout the technology development process. Embodied within the market research services are broker services which would assist users with technology transfer, access to potential investors, commercialization, marketing and obtaining financial and other support. Training would be focussed, in the first instance, on ensuring that these services can be delivered as effectively as possible.

In terms of organizational arrangements for service delivery, the report suggests an approach that would be complementary to existing initiatives of the federal, provincial and municipal governments and private sector organizations. Specifically, agent and franchise agreements with local organizations that are already in existence are suggested as two approaches. A phased implementation of such agreements is proposed. The primary thrust would be to market services in intermediate-sized cities in Canada with a high potential for technology-based development. At the same time a database/communications system would be established that would be made available throughout the country.

The report presents a market analysis which indicates that sales revenues could grow from approximately $500,000 in year 1 to approximately $20 million in year 5. The total untapped market is estimated at approximately $200 million, which means by year 5 that a very conservative 10% of this total market is projected to be served by the National Technology Marketing Network.

The total sales figure is a combination of revenues accruing directly to the National Technology Marketing Network and revenues generated by its affiliates (agents and franchisees). The Network revenue component is estimated to grow from approximately $235,000 in year 1 to approximately $8 million in year 5. Consequently, affiliate revenues would grow from approximately $315,000 in year 1 to $12 million in year 5. Accumulated expenses for the Network are estimated to exceed accumulated revenues by approximately $1.4 million during years 1-3, following which an annual profits of approximately $195,000 and $870,000 would be realized in years 4 and 5, respectively. Development costs prior to operation are estimated at approximately $650,000.

Given the need to target the services to a market segment which is unable to support a fee structure based on costs, a privately-run, publicly-funded company is recommended as the preferred management option for the Network, in the first instance. However, the company should prepare, from the outset, for full privatization within three to five years of start-up. This strategic orientation would provide an appropriate balance between meeting public sector objectives and developing a stand-alone profit-making organization over the long term.

IMPLEMENTATION PLAN FOR THE NATIONAL TECHNOLOGY MARKETING NETWORK

1.0 BACKGROUND

1.1 Introduction

The National Technology Marketing Network (NTMN) is a support system to accelerate the successful launching and growth of technology-based enterprises in Canada.

It targets on overcoming market development weaknesses in small and medium sized technological enterprises, particularly those in an early stage or start up situation. These companies are generally seen as being more technologically oriented than market driven. Thus, they tend to be weak agents for the commercialization of new product ideas.

As originally conceived, the NTMN would combine three separate elements or activities into a national program framework as follows:

"High tech" brokers

These brokers are individuals skilled in managing early stage enterprises. Their role is to act as an interface between emerging companies and sources of finance on the one hand and markets on the other. A prime function would be to assist new companies with the preparation of realistic, market-oriented business plans.

A market information search capability

The technology brokers would be backed by the development of a centralized capability to extract market related information from existing domestic and international data bases, and

Market development training

The network would also offer pragmatic, in depth training modules to upgrade the entrepreneurial and management skills of individuals and corporate executives interested in new product launches or surviving through the early stages of the corporate growth cycle.

The NTMN would concentrate the great majority of its attention on early stage companies. However, it is recognized that the market potential for the services of the NTMN could expand significantly once the system is up and running.

While unlikely to be profitable in the early years, the NTMN has the potential to be a profitable operation delivering a set of services, having real commercial value to end users. Thus, the network could eventually be operated as an independent, private sector initiative.

More information on the original ideas of the NTMN and the rationale for its introduction are contained in Appendix A.

1.2 The Project

This project was designed to develop an implementation plan for the NTMN, including a market assessment of the demand for its services. It results from a contract awarded to CATA by the Federal Ministry of State for Science and Technology. CATA was assisted in this work by the consulting firm, Nordicity Group Limited. The specific terms of reference for the project are also outlined in Appendix A.

The approach adopted was to document and assess existing initiatives across the country that have relevance to the NTMN concept. This preliminary stage was necessary to determine the manner in which the NTMN would supplement, complement and perhaps overlap with existing initiatives.

On the basis of this preliminary stage, a final approach to the design of the NTMN was adopted and a detailed implementation plan developed.

2.0 REVIEW OF EXISTING INITIATIVES OF RELEVANCE TO THE NTMN

The review of existing initiatives identified a significant number of activities that have some relevance to the NTMN concept.

Appendix B contains a detailed description of the main programs supporting small and medium-sized businesses whose objectives are, to some extent, complementary with the proposed NTMN functions. Appendix B also contains a list of the individuals and organizations interviewed or contacted across the country to obtain the information contained in this description.

Existing initiatives of interest include the following:

a) Federal government programs

- the Industrial Research Assistance Program (IRAP) and Program for Industry/Laboratory Projects (PILP) managed by the National Research Council
- the investment banking, the Automated Information for Management system (AIM) and management training and counselling functions of the Federal Business Development Bank (FBDB)
- some of the activities of Canadian Patents and Development Ltd. (CPDL)
- the proposed investment grid of Investment Canada
- a wide range of initiatives under the Department of Regional Industrial Expansion (DRIE), including the Business Opportunities Sourcing System (BOSS), the Import Replacement program, the Industrial and Regional Development program (IRDP)

- the Patent Information Exploitation Program (PIE) of the Department of Consumer and Corporate Affairs

- Employment and Immigration Canada's Canadian Jobs Strategy

- the functions of the Natural Science and Research Council (NSERC) and other funding agencies.

- Federally supported innovation centres, particularly the Canadian Industrial Innovation Centre at Waterloo (CIIC/W) and the Centre for Industrial Innovation (CIIM) in Montreal.

b) Provincial Initiatives

A wide range of provincial initiatives exist that, to some extent, either complement or provide some level of overlap with the NTMN. These initiatives include the activities of industrial trade and technology ministries to support technology development and commercialization, the Incubator and Technology Centre programs initiatives targeted on small business research initiatives and investment incentives.

Of particular interest are the activities of the Centre de Recherche Industrielle du Quebec (CRIQ), the existence of a similar technology support network in Saskatchewan and the Electronic Industry Information Centre in Alberta.

c) Municipal Initiatives

A good deal of effort is expended at the municipal level to encourage new business enterprise, largely through the activities of the offices of industrial development commissioners.

d) Private Sector Initiatives

A number of private sector initiatives have been launched in recent years to assist entrepreneurial development. The most noteworthy among these are:

- The Entrepreneurial Community Corporation of Canada (TECCC)

- the Computerized Ontario Investment Network (COIN)

- the TIEM Canada Incorporated initiative being supported by Control Data Limited

- the Centre for Industrial Technology Transfer and Trade (CIT-3)

- Sourcenet Corporation, William G. Hutchison & Company Ltd.

3.0 MODIFICATION OF THE NTMN CONCEPT

3.1 Revised Focus of NTMN Activities

The previous analysis indicates that there are a multitude of organizations who provide assistance to entrepreneurs and to small and medium-sized businesses and consequently overlap to a degree the proposed NTMN functions. None are, however, specific to technology-based companies and are instead oriented to business activities of all kinds. In this respect, the services of other organizations would subsume those of the NTMN but would not likely be as specifically directed or oriented.

The main thrust of organizations active in this area is to seek out and foster local entrepreneurial activity with the end result of increased employment through the creation of new companies and the growth of existing companies. As a consequence, the most significant overlap is with the proposed brokering and training functions of the NTMN. Support activities are available (or proposed) from various organizations to assist the entrepreneur along the innovation chain from the point of inception of an idea to its entry into the marketplace, including evaluation, incubation, business planning, financing, market assessment, etc. Variations are available for companies wishing to expand. Additionally, training and mentoring are available to assist at all stages.

The plethora of brokering and training services available must be both inefficient in totality and confusing to the business community.

Consequently, the general reaction from interviewees was to question the utility of additional mechanisms for brokering and training but to support the provision of reliable, complete and affordable market information.

Little overlap was observed with the proposed national market information network of the NTMN. The FBDB, the Alberta Research Council, CIT-3 and various individual database suppliers offer or propose to offer market services or information units that are complementary to the NTMN. However, none are as complete, delivered as effectively nor as focused as proposed NTMN market services. Indeed, the NTMN would draw on all of these existing data bases through the integrated service it would provide.

The general conclusions regarding the focus of NTMN activities are as follows:

- the primary focus of the NTMN should be on the establishment of the national market information network. This is the major shortfall in existing program efforts. There is an unsatisfied market need for the ability to rapidly access, at low cost, targeted market related information for use in evaluating product development proposals and the potential success of new product launches.
- the secondary focus should be on the technology brokering function. Notwithstanding the range of existing activities, particular focus on support for technology based enterprises is necessary to ensure growth in this area. Individuals within the existing support framework are not appropriately skilled in the innovation process. If this shortfall in orientation can be overcome, there is no requirement to set up a separate stream of high technology brokers.

- Given the above conclusions, the training component of the NTMN should target in the first instance on upgrading the skill base within the existing industrial support networks for the directed provision of assistance to the innovation process and to early stage technology companies.

3.2 Summary of Revised NTMN Project Concept

In light of the above observations, the project being evaluated throughout the rest of this report has been modified from the initial concept as follows:

- The NTMN will concentrate in the initial stages on the development of a data access capability.
- Market related information will be delivered through the hundreds of individuals across the country in existing programs rather than the specialized technology brokers as originally conceived.
- Training initiatives will concentrate in the first instance on upgrading the skills of existing industrial support officers on how to deal with innovation in small and medium-sized technological enterprises and on how to use the information network to achieve this objective. At a later stage, consideration might be given to providing direct training for private sector entrepreneurs in market development skills.
- The concentration of effort in the first instance will be on developing the support network in a selected number of key regions and expanding the network as quickly as possible across the country.
- The NTMN will target initially on early stage companies with a view to diversifying services and customers over time.

- Access to the NTMN market development data search capability will initially be done through intermediaries (i.e. individuals within the NTMN network). Eventually, however, direct access to the system will be extended to all potential end users.

- Because the system's primary focus is early stage companies, a measure of public funding support will be required. However, the assumption is that the NTMN should be able to move to a position of self sufficiency over time. Thus the entire network could be privatized.

4.0 MARKET INFORMATION NEEDS

This chapter provides a perspective on the market and broker (support) information requirements of potential customers of the NTMN. A framework based on the innovation chain is first presented and used in subsequent sub-sections to segment end users and develop specific service categories. Finally, estimates of the scale of the need or the market size are presented.

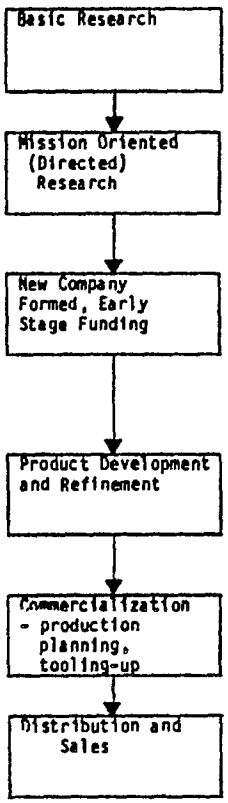
4.1 Conceptual Framework - The Innovation Chain

Exhibit 4-1 presents a conceptual framework of the market information and broker services required to support technology-based development from inception of a technology product to its distribution and sale in the marketplace. The innovation chain, which describes the steps in the innovation process leading to new products, forms the basis of this framework. From the research results described in Section 2.0 and Appendix B, we have outlined the market information requirements, broker service requirements and support databases for each step of the chain. The result is a means of presenting, in a systematic way, the range of information-based services required to support technology product development. Additionally, it provides a means of delineating the specific services which can be provided by the NTMN to support such development on a national basis.

Exhibit 4-1a

Conceptual Framework for Market Information and Broker Services

INNOVATION CHAIN
(Originating in the Laboratory)



	Market Information Requirements	Broker Service Requirements	Support Databases
Basic Research	• Preliminary Market Feasibility		• Research Databases • Research Facilities/Programs • Market Databases • Technical Databases
Mission Oriented (Directed) Research	• Preliminary Market Feasibility		• Research Databases • Research Facilities/Programs • Patent Information • Tax Incentives • Commercial Ideas
New Company Formed, Early Stage Funding	• Market Feasibility Analysis	• Product/Investor Match	• Potential Investors • Training Programs (eg. business planning) • Business Consultants • Legal Information • Market Databases • Technical Databases
Product Development and Refinement	• Product-Specific Market Analysis • Market Strategies/ Plans		• Training Programs (eg. business management) • Legal/Tax Information • Business Consultants
Commercialization - production planning, tooling-up		• Assistance with Commercialization (process information)	• Manufacturing/Production Techn • Tax Information • Consulting Engineers
Distribution and Sales		• Marketing Assistance	• Trade Shows/Conferences • Distribution Networks (franchising, networks, etc) • Joint Venture Partners, Mergers, Acquisitions • Export Consortia/Trading Companies • Overseas Trade Promotions, Trade Offices • Tax/Legal Information
		• Locating Financial and Other Support	• Government Support Programs • Private Support Programs

Exhibit 4-1b

Conceptual Framework for Market Information and Broker Services

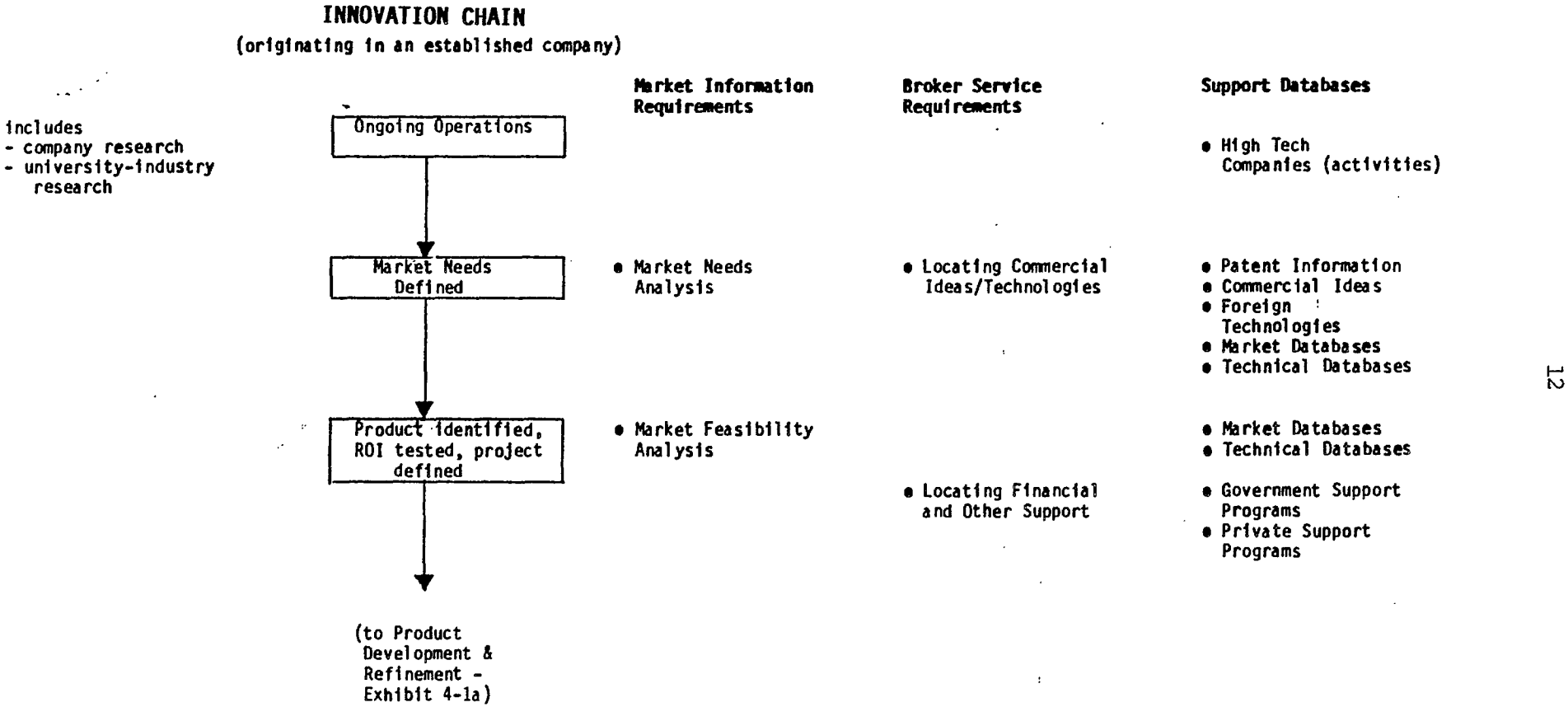
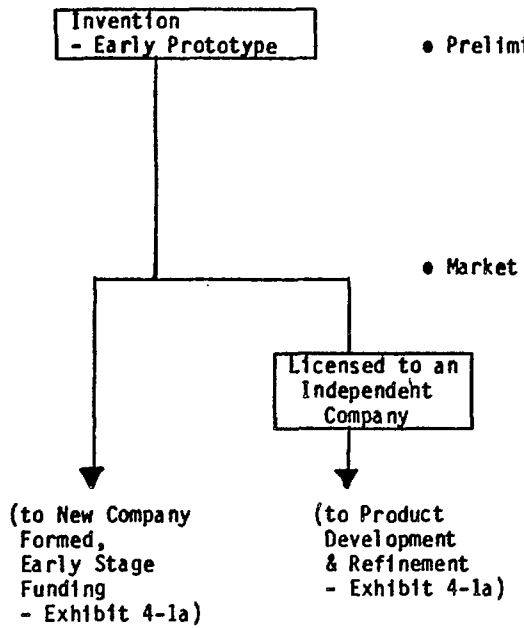


Exhibit 4-1c

Conceptual Framework for Market Information and Broker Services

INNOVATION CHAIN

(Originating with an Individual Inventor/Enterpreneur)



Market Information Requirements	Broker Service Requirements	Support Databases
• Preliminary Market Feasibility	• Locating Commercial Ideas/Technologies	• Patent Information • Network of Knowledgeable Specialists • Commercial Ideas • Foreign Technologies • Potential Entrepreneurs • Market Databases • Technical Databases
• Market Feasibility Analysis	• Investor or Entrepreneur/ Company Match	• Potential Licensees • Market Databases • Technical Databases
	• Locating Financial and Other Support	• Government Support Programs • Private Support Programs

The ideas, as illustrated in Exhibit 4-1, leading to new products can originate from the on-going operations of an existing company, from the conduct of basic or mission-oriented research in our universities and research facilities, or from the activities of inventors and entrepreneurs. If these basic ideas pass early feasibility tests, a new company or a new product line (for an established company) may be established. Subsequently, the idea (product) moves through product development and refinement, commercialization (production planning and tooling-up), and distribution and sales (entry into the marketplace).

The specific (example) databases listed at each stage of the innovation chain provide an indication of the information sources needed to support the provision of the market information and broker services. Some of these databases already exists and are currently used to provide support information. Others do not exist in any easily useable form and may consequently need further development.

4.2 End-User Segmentation

The key characteristics of the end-users of the service requirements discussed above are outlined below. End-users are segmented into three categories: Incubation Stage Users, Growth Stage Companies, and Mature Stage Companies.

Incubation stage users include inventors, entrepreneurs, and early-stage companies who are at the very early stages of investigating, developing or marketing a new technology. In terms of the growth cycle of a company, they span the incubation stage from early inception of an idea

which can lead to company formation, through the formative stages of a company, into the first several years of operation before rapid growth takes place. Users in this cateogry require a range of basic market and broker information but generally cannot afford to pay what the services actually cost. Hence, they generally require financial support to explore market feasibility and establish a company.

Growth stage companies include those companies who are firmly established in one or more product lines and who are experiencing or anticipate rapid growth. It is anticipated that such companies may wish to explore new market areas or develop new product lines. The perceived requirement is for more extensive marketing resources than used at earlier stage of company growth to do longer range and more extensive market planning, particularly with respect to international markets. Such companies should be more capable of paying for the services provided than incubation stage users but may still require some financial support.

Mature stage companies are those who have reached a no-growth or declining position in the company growth cycle. Revenues and market share for current products may be static or declining. Such companies would likely develop new products as one strategy to ensure growth, ie. to return to the incubation and rapid growth phases of the product life cycle for each new product. Such companies require support for new product development and market assessments, and often assistance to search for investment in junior companies. Companies in this category should generally be capable of financing required developed from internal sources.

4.3 Description of the Services Offered by the NTMN

The NTMN would supply two types of services in support of technology-based development throughout the country: information access services and market research services. These two service areas are described below.

4.3.1 Information Access Services

The NTMN would offer access to a range of generic information extracted from network databases. Access would be offered through intermediaries initially and directly to end users subsequently. Depending on the complexity of the requirement, the assistance of NTMN staff may be required. It is anticipated that this service would generally not include an analysis of collected information as to completeness or applicability; such would be the responsibility of the intermediary or end user.

This service is envisaged as supplying access to a wide range of databases worldwide. There are hundreds of public and private databases available which will require investigation for inclusion. Examples include the Stats Canada CANSIM which can supply a range of Canadian market information, the William Hutchison database on high technology companies, Canadian and U.S. patent databases. Questions to be answered may range from "how many farms are their in Saskatchewan", "how many computers of a particular type were sold in Canada in a given year, to "what companies supply a given product and what are their characteristics". The NTMN would also develop over a period of time its own database(s) containing market and broker information directly applicable to technology-based development in Canada.

The major advantage of this service is the provision, through one responsible national agency, of improved access to the myriad of information sources currently available. NTMN staff would be devoted to

ensuring the inclusion of all relevant information sources, providing access in standard format throughout the country and achieving availability at prices that users can bear.

4.3.2 Market Research Services

These are a set of market information and broker services which would add value to the processes of collecting market and broker information and directly assist inventors, entrepreneurs and companies throughout the technology development process. These types of services would draw on both the databases and human resources of the NTMN. The set of services involved were outlined in Exhibit 4-1. These services are described more fully below.

4.3.2.1 Market Information Services

The market information services required to support technology-based development are as follows:

A. Preliminary Market Evaluation Service

- o An initial technical or economic assessment of an invention/technology before any commercialization activities to determine its likely feasibility in the marketplace;
- o Provides a broad examination, in quantifiable terms, of the invention against known success criteria such as, technical and production feasibility, benefits to society, suitability for patenting, and requirements of the proposed market;
- o This service is typically the first step in defining the marketability of a newly defined product/technology. The service would also recommend the next stage the inventor should undertake with respect to further development of the invention;

- o Versions of the service could be developed to suit the requirements of the individual inventors/entrepreneurs, universities/research laboratories and established companies.

B. Market Needs Analysis

- o A preliminary business case assessment of available market niches;
- o Provides a numeric analysis of existing markets in which new product development is warranted. This includes analysis of market size and growth patterns, type and number of competitors, consumer opinions on competitors' products, and technology trends in the market area;
- o This service determines the business potential of new product lines or new market areas before development costs begin;
- o The service is designed for established companies who wish to expand by developing new products or by seeking out new markets.

C. Market Feasibility Analysis

- o A second-level market assessment of a well-defined product. Information requirements are broad aggregates but sufficient in detail for the requirements of an initial business plan;
- o Provides demographic market information at the early start-up stages of product definition. The analysis would include generic data (demographic, geographic, lifestyles and income group appeal) that characterize the user market. These would data then be used to generate the estimated size of the total market, new product penetration rates and finally projected sales;
- o This service would be typically performed upon positive results from the "Preliminary Market Evaluation Service" for inventors and start-up companies or the "Market Needs Analysis" for established companies;
- o The service is aimed at any company in which detailed business plan information is required to continue the product development cycle.

D. Product-Specific Market Analysis

- o A product-specific, market commercialization assessment. Information requirements are highly specific with regards to defining potential demand, pricing components and product characteristics;

- o Provides detailed market information on target markets based on consumer survey techniques;
- o This service would be applicable during the latter stages of product development and refinement and during the early stages of commercialization when marketing strategies and plans must be developed;
- o The service is designed for any company with demands for specific product-market information, prior to market introduction.

E. Market Strategies and Plans

- o A step-by-step plan to effectively market the new product;
- o Provides a number of market strategies based on previously collected market information and a definition of the company's requirements. This service could assist the company in choosing an appropriate market strategy and defining the initial steps of implementation;
- o This service is performed once all market information is assimilated and acts as an input into the final advertising/marketing initiative;
- o The service is designed for any company that requires assistance in determining how to approach their designated marketplace.

4.3.2.2 Broker Services

Exhibit 4-1 also outlines a number of broker or support information services requirements along the innovation chain. These have been grouped into the following service categories:

A. Locating Commercial Ideas/Technologies

- o Search for commercially viable ideas/technologies for licensing;

- o This service would include, for example, patent information available from Canadian Patents and Development Limited and Consumer and Corporate Affairs, import replacement information available from DRIE and trade information availble from External Affairs;

- o The sources would include, for example: universities and research laboratories, companies, individual inventors; Canadian and foreign sources would be included.

B. Access to Potential Investors

- o Provision of a match making service which would link entrepreneurs and early-stage companies with sources of capital;

- o This service would align investors and entrepreneurs based on type of technology, size of requirements, and partnership.

C. Assistance with Commercialization

- o Assistance with manufacturing and production techniques, including: design assistance, building and testing prototypes, manufacturing advice

- o This service would make available information on consulting engineers and potentially any physical facilities required.

D. Marketing Assistance

- o The provision of marketing support at the distribution and sales step in the innovation chain

- o This service would include information on or assistance with, for example: trade shows/conferences; distribution networks; joint ventures partners, mergers, acquisitions; export consortia, trading companies; overseas trade promotions, trade offices.

E. Assistance with Locating Support

- o Assistance from federal, provincial and municipal governments and private sources to support various aspects of the innovation process;

- o This service would include information on support programs available from governments, co-operative arrangements with large companies, research and development facilities, incubator/innovation centre/ enterprise centre/private sector support for entrepreneurial development.

4.4 The Scale of the Need

Exhibits 4-2, 4-3 and 4-4 present the end-users requirements and the estimated total market sizes for the three market segments presented earlier: incubation stage users, growth stage companies, and mature stage companies. The size of the market is presented as an estimate of the yearly volume of likely commercially feasible inventions/products throughout Canada. The estimate of inventions/products arising from inventors and entrepreneurs was based on the Doyle project in Saskatoon and the experience of the Canadian Industrial Innovation Centre/Waterloo. Company information was estimated from published information available on the survey of high technology companies - DIRECTION '86 - conducted by William G. Hutchison & Company Ltd. It was estimated that there are approximately 2,000 high technology companies in the country who are dealing with emerging technologies; approximately 10% are estimated to be two years or less in age (new companies), approximately 40% are estimated to be between two and nine years (growth stage companies) and the remaining 50% are estimated to be ten years of age or greater (mature stage companies). These figures were used to generate the total volumes of new products one the basis of on new product evaluation per company per year.

Exhibit 4-2

End-User Service Requirements and Market Size - Incubation Stage Users

Users	Market Services Required	Supplemental Services Required	Yearly Volume of Likely Commercially Feasible Inventions/Products
Inventors/ Entrepreneurs	• Preliminary market feasibility of new technologies - early analysis of the value of proceeding to commercialize invention	• Locating commercial technologies for exploitation (eg. licensable from government, foreign sources) • Assistance with locating support - government support programs - incubators, Innovation centres, etc.	2,500-5,000
Economic Oevelop-ment Officers		• Locating commercial technologies for exploitation (eg. licensable from government, foreign sources)	400-500
Universities/ Research Labs	• Preliminary market feasibility of new technologies	• Assistance with locating support - government support programs	
Universities/ Research Labs (mission oriented research)	• Preliminary market feasibility of new technologies	• Assistance with locating support - government support programs	50-100
New Company (pre-start-up or early start-up phases)	• Market feasibility analysis (development and refinement of business plan) • Product-specific market analysis • Oevelopment of market strategies and plans to take product to marketplace	• Access to potential investors - seed capital - venture capital • Assistance with commercialization - manufacturing/production techniques - consulting engineers • Marketing assistance - joint venture partners - trade shows/conferences - distribution networks - export consortia/trading companies - overseas trade promotions, trade offices - tax/legal information	200-300

Exhibit 4-3

End-User Service Requirements and Market Size - Growth Stage Companies

Users	Market Services Required	Supplemental Services Required	Yearly Volume of Likely Commercially Feasible Inventions/Products
Established companies in a growth position Assumed strategies - expand market activities - market new product lines	• Market needs analysis • Market feasibility analysis of new product lines • Product-specific market analysis • Development of market strategies and plans	• Marketing assistance - joint venture partners, mergers acquisitions - trade shows/conferences - distribution networks - export consortia/trading companies - overseas trade promotions, trade offices - tax/legal information • Assistance with locating support - government support	700-800

Exhibit 4-4

End-User Service Requirements and Market Size - Mature Stage Companies

Users	Market Services Required	Supplemental Services Required	Yearly Volume of Likely Commercially Feasible Inventions/Products
Established companies in a no-growth position Assumed strategy - market new product lines	• Market needs analysis • Market feasibility analysis of new product lines • Product-specific market analysis • Development of market strategies and plans	• Assistance with commercialization - manufacturing/production techniques - consulting engineers • Marketing assistance - joint venture partners, mergers acquisitions - trade shows/conferences - distribution networks - export consortia/trading companies - overseas trade promotions, trade offices - tax/legal information • Assistance with locating support support - government support programs	900-1,000

5.0 ORGANIZING TO MEET THE NEED

The previous section has presented the range of services required to support technology-based development throughout Canada. This section discusses the recommended role of the NTMN relative to other players, presents proposed service delivery arrangements and describes the supporting data communications network.

5.1 Service Delivery - Role of the NTMN Versus Current Initiatives

In totality, the task for Canada is to support technology development as widely as possible throughout the country. Hence, delivery of NTMN services should take through all available mechanisms. Additionally, our research indicates that the activities of the NTMN should be complementary to the existing initiatives of the federal, provincial and municipal governments.

In this latter respect, co-operative arrangements could be entered into with various local support groups (eg. incubators, enterprise centres, innovation centre, provincial research organizations) to deliver services to inventors, entrepreneurs and companies. This would enable such local groups to more effectively provide the entrepreneurial support services they are already committed to. Since the focus of many such groups is not necessarily on technology development, a requirement will undoubtly exist for NTMN staff to train local affiliates in the provision of NTMN services. Additionally, contractual arrangements may be required in some cases to ensure the appropriate understandings with

regard to service delivery, particularly service quality. Such co-operative arrangements would not preclude the NTMN itself from offering services directly to end users. In areas where affiliate agreements exist, however, such service could be limited to direct network access only.

5.2 Service Delivery Arrangements

The service design of the NTMN is based on the following objectives:

- To make NTMN network services widely available throughout the country, i.e. to support inventors, entrepreneurs, universities, research laboratories, economic development officers and companies wherever they are located;
- To complement rather than compete with the various initiatives which currently support entrepreneurial development.

The following operational characteristics are proposed:

A. That the NTMN be national in scope.

B. That a central group be established with responsibility for service development, service provision and co-ordination of network activities.

C. That the local delivery of NTMN services be achieved by joint venture arrangements with various local entrepreneurial support groups rather than the creation of NTMN local offices.

D. That a physical database/communications network be designed which can support the requirements for market information and broker services throughout the country.

E. That the database/communications network be capable of delivering a range of market information and broker services directly to end users.

The above is envisaged as resulting in the formation of a company with a national mandate, controlled and operated from a central location. Headquarters staff - the only direct staff of the company - could be located in Ottawa because of the concentration of high technology activity, the information/data resources created by the federal government and the desire for a national network rather than one concentrated in a specific province.

In order to complement existing initiatives to encourage entrepreneurial development, particularly of the municipal and provincial governments, the company would, in general, not hire its own staff for local service delivery but would seek arrangements with local organizations based in target cities.

Arrangements with local organizations could take one of the following two basic forms: agent, or franchise agreements. An agency agreement could constitute a non-exclusive agreement to deliver (and use) NTMN service in a given area. A franchise agreement would constitute an exclusive arrangement with contractual responsibilities to deliver NTMN services in a given territory. Depending on local circumstances one or other of these arrangements could apply throughout the country. In the event that neither of these are applicable, the NTMN could arrange for direct delivery of its services. The role of the NTMN in respect to such agreements would be to control the development, pricing and

marketing of NTMN services and specify and control the quality of service delivery.

The following details are provided with respect to each of the two types of arrangements:

Agency Agreements

Under an agency agreement, various of the public or pseudo-public organizations discussed earlier (eg. incubators, provincial research centres, FBDB offices, NRC IRAP offices, economic development offices) would represent the NTMN. Agents' responsibilities/ involvement could range from referrals, subscription to NTMN services, marketing of NTMN services and liaison with the NTMN head office.

Local organizations would benefit from such access to NTMN services as it would support the entrepreneurial development activities they are already committed to. For example, it could significantly benefit economic development officers in their dealings with local entrepreneurs or companies or in seeking development opportunities to have solid market information or be aware of foreign technology transfer opportunities. In such cases, it may be advantageous for the local agent to pre-buy a range of NTMN services.

It will be necessary to address the financial arrangements with agents to ensure the efficient and effective delivery of NTMN services. Some agents, particularly with a public role, may not require a financial

incentive. Others may require an arrangement to retain some percentage of revenues generated. This issue will require resolution at a later stage of NTMN development.

Franchise Arrangements

A franchise arrangement would involve entering into an agreement with a complementary private sector organization to deliver NTMN services. A franchise arrangement with TECCC provides an example of a complementary match. TECCC has an innovative concept in packaging the brokering and training aspects of entrepreneurial development but has not developed a market information component based on the resources of a strong national market network like the proposed NTMN.

In view of the more general entrepreneurial mandate of TECCC, NTMN services would be offered only to technology-based enterprises, ie. a sub-set of TECCC clients. In some cases, of course, the market information/research services of the NTMN could be applied to other than technology-based companies. Indeed, new service ventures that utilize new technology is a principal component of their product might fit quite well into the orbit of the service offerings of the NTMN.

Other franchise arrangements could be considered with organizations like TIEM and CIT-3. Insufficient information is currently available, for proprietary reasons, to judge the workability of potential arrangements with such organizations. However, the start-up activities in a go-ahead stage would provide a realistic basis for negotiation.

The activities/responsibilities of the franchisee would include the delivery of agreed NTMN services in the franchise area, assistance with marketing and referral of users to NTMN staff for resolution of situations beyond their capabilities.

5.3 A Plan for Service Introduction

This sub-section presents a plan for the phased introduction of NTMN services across the country. This plan is focussed, as a primary thrust, on providing support to intermediate sized cities with a high potential for technology-based development but without the support infrastructure found in the larger cities. Service would be provided country wide over time. In fact, provision is made in the operational design for certain levels of service to be available universally from the outset. This approach is a balance between the desire that was evident from all sources during the research phase of this project for a national market information capability and the capacity to realistically phase in the provision of service.

Initial locations for the provision of service have been based on an assessment of the potential stimulation of technology-based development that would result and consideration of regional industrial development. Factors which entered into consideration included the research facilities available which could act as a generator of new product ideas, the existing technological focus and the presence of supportive business activities and the support infrastructure available.

Using these criteria, the following initial locations have been chosen for the provision of NTMN service:

Ottawa (Headquarters)

o University Research Facilities	University of Ottawa Carleton University
o Technological Focus	Microelectronics, Telecommunications, Aerospace, Computer Software, Peripherals, Atomic/Nuclear, Geophysics, Informatics, Instrumentation
o Support	Ontario Microelectronic Centre Ottawa-Carleton Research Institute University of Ottawa Innovation Centre Canadian Advanced Technology Assc. Ottawa-Carleton Economic Development Corporation National Research Council Natural Sciences & Engineering Research Council Defence Research Establishment Canada Institute for Scientific & Technical Information International Development Research Centre Canada Centre for Remote Sensing Communications Research Centre Centre for High Technology Management, Carleton University

Halifax

o University Research Facilities	Dalhousie University Technical University of Nova Scotia Saint Mary's University University of King's College
o Technological Focus	Computer software, Marine instrumentation, Biological oceanography, Physical/chemical oceanography

o	Support	Ocean Industries Innovation Centre Nova Scotia Research Foundation Corporation Bedford Institute of Oceanography Atlantic Research Laboratory Marine Ecology Laboratory

Fredericton

o	University Research Facilities	University of New Brunswick St. Thomas University
o	Technological Focus	Horticulture Forestry & Related Disciplines
o	Support	Maritimes Forest Research Centre NRC-IRAP Field Advisory Service New Brunswick Research and Productivity Council

Kitchener-Waterloo

o	University Research Facilities	University of Waterloo Wilfred Laurier University
o	Technological Focus	Computer software, Microelectronics, Satellite communications
o	Support	University of Waterloo Innovation Centre NRC-IRAP Field Advisory Service

Saskatoon

o	University Research Facilities	University of Saskatchewan
o	Technological Focus	Biotechnology, Plant genetic engineering, chemicals
o	Support	Animal Pathology Laboratory Plant Biotechnology Institute Saskatchewan Research Council

It is to be noted that a number of the locations above also have a very active high technology communith which would further enhance the marketing of NTMN services.

These locations could form the basis for the introduction of NTMN in year 1. If successful, the following centres could be added in subsequent years:

year 2:	Sherbrooke Winnipeg Regina
year 3:	Calgary and Edmonton St. John's Saint John
year 4:	Charlottetown Toronto Vancouver Quebec City
year 5:	Various smaller cities throughout the provinces

Development would continue as market conditions warranted.

5.4 Design of the National Market Information Network

We have previously indicated that the conceptual design of NTMN services included a national electronic database/communications network which would support the delivery of a range of market and broker services throughout the country. This sub-section deals with the design of that network.

5.4.1 Network Design Considerations

In keeping with previously discussed criteria, the network will be designed from the outset to be national in scope and allow for widespread access, ranging from NTMN staff, to affiliates, to end users.

In contrast to the current situation where, for the most part, information is difficult to obtain from the myriad of information sources available, the network will be designed to deliver a comprehensive package of information services in a manner that provides easy access. The NTMN will bring together a central group which is dedicated to assembling information sources which meet the requirements of users across the country and building a network which provides for the required widespread access. It is anticipated that NTMN staff would develop a package of information sources from databases available worldwide plus develop new databases in conjunction with information suppliers or in its own right. The latter may, for example, result in the creation of value-added information databases resulting from NTMN activities.

The requirements of an information network are both horizontal and vertical, in terms of working through information sources. For example, within the general information function alone there are hundreds of public databases worldwide. Thus, currently significant effort is required just to efficiently work through the range of databases available. Attempting to find the appropriate piece of information is often not possible without great aggravation for the user. Our conclusion is that an information network must provide a search service.

Vertically, moving from a general search to product specific information must be straightforward to the user. A user requires the ability to know when to move on to the next level of market information. NTMN

staff and affiliates would assist in defining the required market information, ie. determine the user's information weaknesses. Thus, an information network must also provide an interactive human-based search system.

5.4.2 Network Concepts

Based on the general network design criteria discussed above, we have developed the general concepts for a national market information network, which for brevity is referred to as TECHnet. The network design we have outlined will allow both the first time user and an experienced user to quickly access the specific information they require. TECHnet involves the "networking" of human resources as well as the physical components of a communications network. The TECHnet concept, as a part of the NTMN, will operate in the following stages:

i) Initial Entry Point - human or direct computer interface
ii) Database Researcher and "Locater"
iii) Gateway service to access appropriate database

Each of these stages will be briefly discussed.

5.4.2.1 Initial Entry Point

First time users of TECHnet would contact the local affiliate (or the NTMN headquarters, if appropriate) and receive an overview of services available (as described in previous sections). From that point, the

user can ask the local affiliate to research a topic (with user charges) or, at a later stage of network development, become an accredited user of the TECHnet service and do his/her own database research (with access charges). To facilitate access, the initial contact could be as easy as making a telephone call, including 800 toll-free access.

5.4.2.2 Database Researcher and "Locater"

Through our research, it has become overly apparent that market information exists in great quantities. The problem is that there is no co-ordinating mechanism to make this information overload more manageable. Furthermore, a large number of data sources are unfamiliar and unavailable to first-time or inexperienced database researchers. A resident employee would develop this expertise to a) quickly work through commonly used databases, or b) locate information in private, specialized product-oriented databases. This step is still highly personalized in terms of defining the user's exact information requirements.

5.4.2.3 Gateway Service

This step involves the use of the electronic TECHnet network. TECHnet could, for example, be based on the technology of iNet 2000, an information management service offered by the members of Telecom Canada. In such event, TECHnet would be designed as a custom network, piggybacked on iNet 2000 but only accessible by TECHnet members. The key advantage in using the iNet 2000 service is that all cost components are resident within Telecom Canada, therefore keeping up-front development costs to a minimum. A major factor in using iNet to design

TECHnet is its general accessibility throughout the country and internationally. This aspect of network design responds to the requirement to permit widespread access. It would also be coupled to network access which is designed to allow and charge for direct user access.

The TECHnet gateway service could provide the path to all database providers. Access to a range of public databases is currently available through iNet. Private databases would be accessible through a simple data connection to the database vendor. Additionally, the NTMN would create its own databases on its own computer or through the use of time sharing companies. TECHnet would provide extended access, alleviating any protocol complexities encountered by accessing these services individually.

All services would be cross-referenced in an extensive on-line Thesaurus so that users could search for the information needed by using any of the thousands of terms in the Thesaurus. Each service listing in the tailored TECHnet gateway would include a description of the item or service and the cost.

TECHnet services could also eventually include the provision of other support service than those previously outlined: for example, the provision of electronic mail among users or development of the Investment Grid as proposed by Investment Canada.

5.4.3 Network Structure

TECHnet will be an intelligent network which is driven by simple menu commands. It is hierarchial in nature, allowing the user to enter at a general level and work down to specific details. Exhibit 5-1 illustrates the framework of TECHnet.

Boxes 3 and 4 of Exhibit 5-1 contain the key operational characteristics of TECHnet. Gateway Directories based on seven major information categories are the tools to allow efficient use of TECHnet. Much like the yellow pages in the telephone book, they list the databases available under each specific category. Potential TECHnet categories which provide market and broker information include:

i) Product Definitions
ii) Technology Descriptions
iii) Market Information - Canada
iv) Market Information - Foreign Markets
v) Sources of Financing
vi) Sources of R&D Financing
vii) Technology Transfer

For each directory, there would be a description of contents, information on rates and notes on how to use each database. Exhibit 5-2 demonstrates the operations of the Gateway Director.

Exhibit 5-1

TECHnet

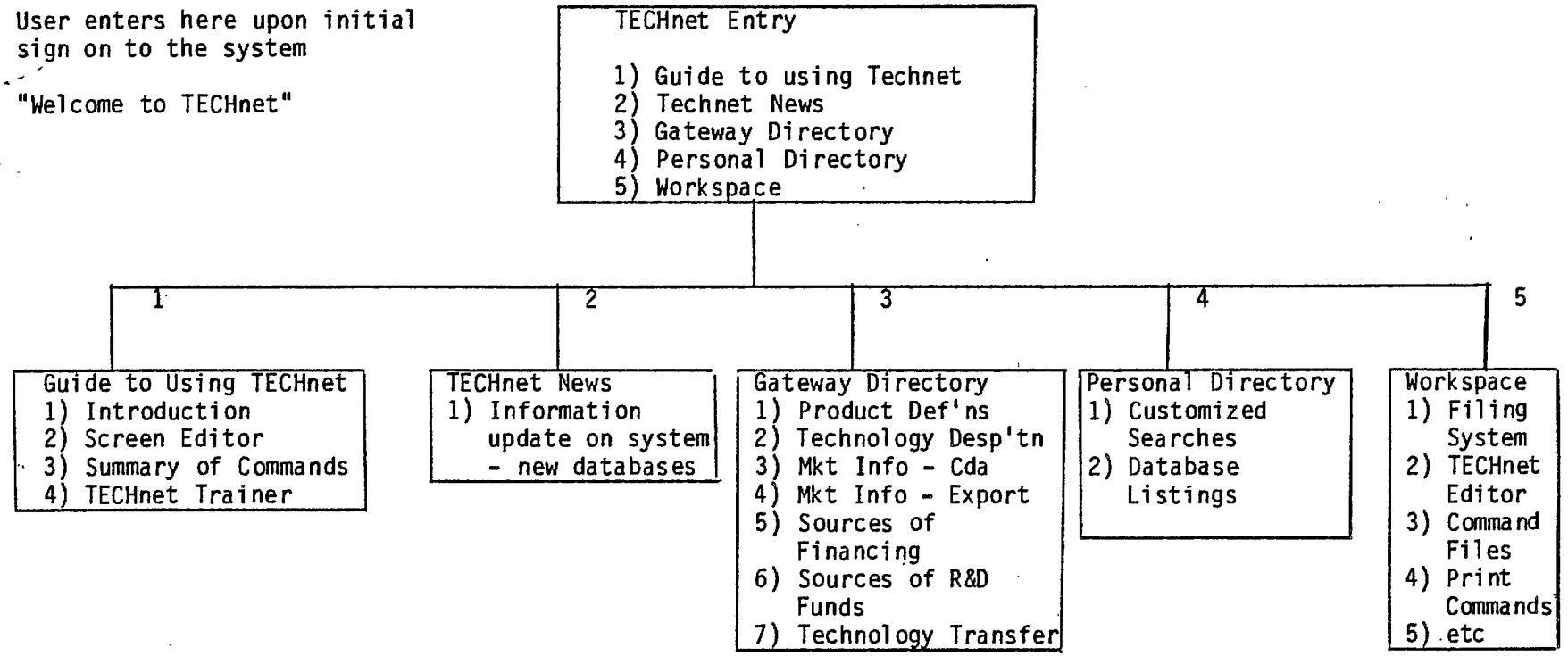
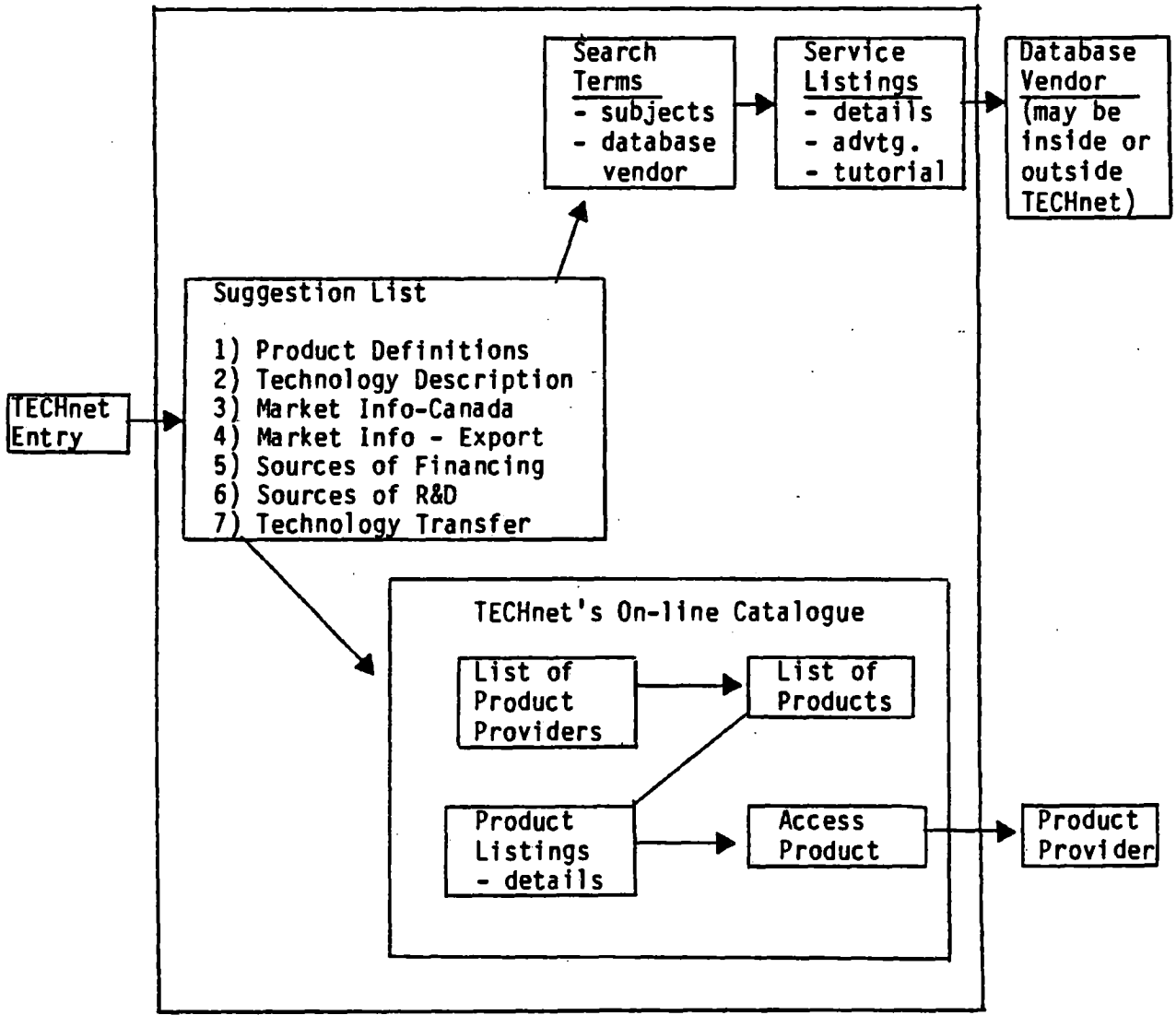


Exhibit 5-2

Gateway Directory Activity



The Personal Directory is a private area (by user) for storing listings to on-line services which are accessed frequently. Further customized searches can be compiled within the directory. Exhibit 5-3 demonstrates the operations of the Personal Directory.

The user can access any Database Provider which is listed in the Gateway Directory or Personal Directory. Typically there are five types of Database Providers or Information Service Provider (ISP) in TECHnet.

1) Universal - All CATAnet users are automatically given access to this ISP

2) Elective - TECHnet user must be accredited to this ISP

3) Closed User Group - The ISP can restrict access to certain TECHnet users (usually a highly specialized service)

4) Private - An ISP that is not currently listed in the Gateway Directory

5) In-house - A database owned or operated by TECHnet for the sole use of its members

Exhibit 5-4 provides a first listing of potential Database Providers and the types of information available through each. Various organizations (programs) have been included on the basis of currently or potentially having information they may wish to make available to the business community (high technology) through TECHnet. Many more public and private databases would be added during design and implementation of the network.

Exhibit 5-5 presents a schematic representation of the proposed TECHnet start-up configuration.

Exhibit 5-3

Personal Directory Activity

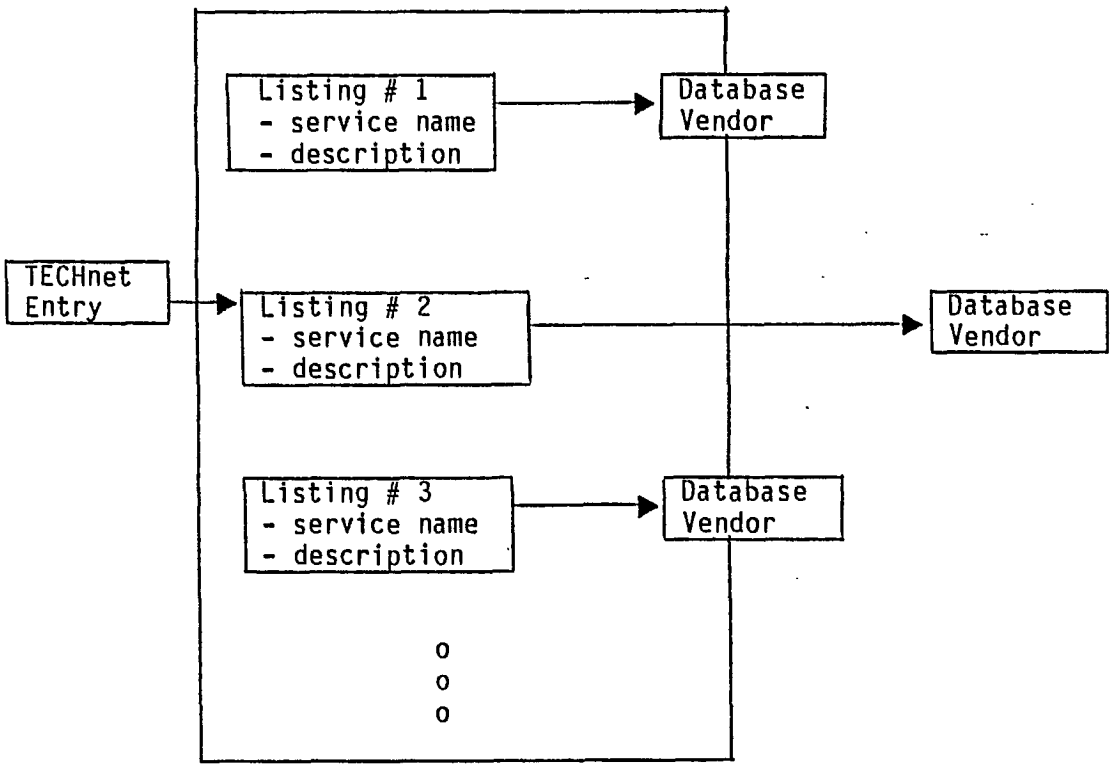


Exhibit 5-4

Potential Database Providers on TECHnet

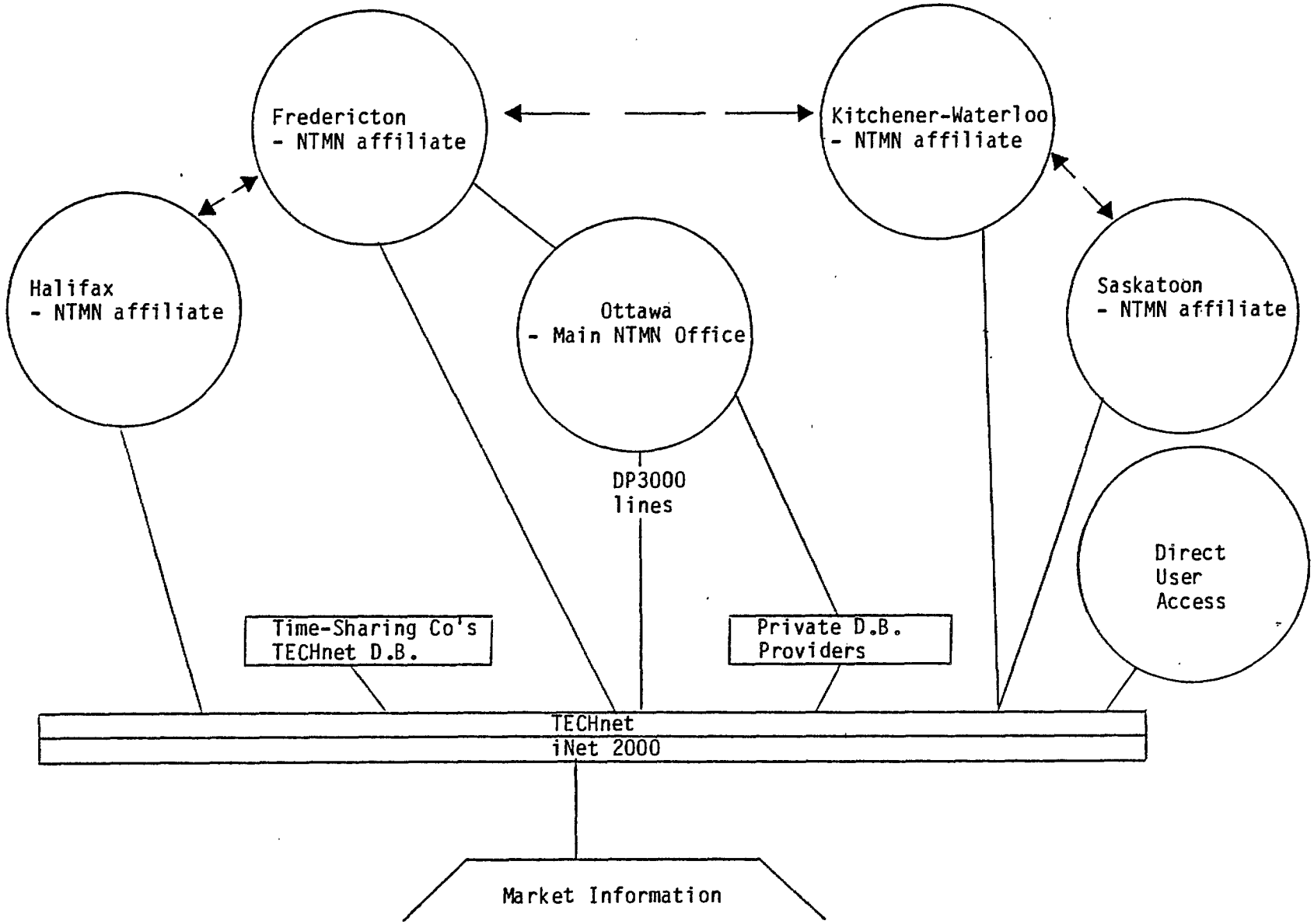
	Product Definitions	Technology Descriptions	Market information Canada	Market information Export	Source of Financing	R&D Funds	Technology Transfer	Industrial Innovation	R&D Enhancement	Testing and Procedures	Business Planning
Federal Business Development Bank AIM System			X	X	X	X					
Statistics Canada CANSIM			X								
NRC/CISTI	X	X									
Sourcenet	X	X			X						
Hutchison						X					
Consumer and Corporate Affairs PIE Patent Information		X					X	X	X		
External Affairs InfoExport	X	X	X	X							
External Affairs TIP Program											
NRC IRAP program	X	X			X	X	X	X	X	X	
NSERC programs	X	X				X	X	X	X	X	
DRIE Export Profile		X		X							
DRIE Export Analysis		X		X							
DRIE BOSS program	X	X			X						
Investment Canada					X		X	X			
ONT Automotive Parts Technology	X	X					X	X	X	X	
ONT CAD/CAM Centre	X	X					X	X	X	X	
ONT Robotics Centre	X	X					X	X	X	X	
Canada-Ontario Centre	X	X					X	X	X	X	

Exhibit 5-4 (continued)

	Product Definitions	Technology Descriptions	Market information Canada	Market information Export	Source of Financing	R&D Funds	Technology Transfer	Industrial Innovation	R&D Enhancement	Testing and Procedures	Business Planning
ONT Farm Machinery Food Technology	X	X					X	X	X	X	
ONT Microelectronics	X	X					X	X	X	X	
Alberta Research Institute					X						
Ontario Chamber of Commerce - COIN System					X			X			
ONT Resource Technology	X	X					X	X	X	X	
Canadian Patents and Development Limited	X	X					X	X			
Easynet (US)	X	X		X							

Exhibit 5-5

TECHnet Proposed Start-up Configuration



6.0 THE COST OF DELIVERING THE PRODUCT

This section presents the costs of establishing and operating the NTMN. Operating costs are projected for a five-year period. The NTMN for costing purposes is defined as the headquarters staff and the national electronic network. Affiliate costs are not included.

6.1 Cost Components

There are 8 basic cost components to be analyzed under NTMN's operational responsibilities:

i) Personnel
ii) Communications Hardware
iii) NTMN Network
iv) Rent and Operating Expenses
v) Promotion and Marketing
vi) Travel
vii) Training
viii) Consulting.

Each of these cost categories calculated for the NTMN central office and the electronic network on a year-by-year basis. A developmental stage of approximately 9 months is added to the operational stage. The costs of the developmental stage are discussed first. During this period, the NTMN headquarters office would be established, staff would be hired, the market information and broker services and the electronic network would be designed and tested, agreements would be negotiated with regional affiliates, required training of regional affiliates would be completed and programs would be implemented to publicize NTMN services.

6.2 Development Costs

i) Personnel

Staff

- Executive Director
- Market Analyst
- System Analyst
- Secretary

Salary
- $200,000 x 9/12 = $150,000

ii) Communications Hardware

Capital Expenditures

- Personal Computers
- Data Communications Facilities
- Word Processing Equipment
- Office Furniture

Cost: $80,000

iii) NTMN Electronic Network

Network Development Costs

- database access and usage costs
- database development
- system design
- Datapac 3000 expenditures

Cost: $135,000

iv) Rent and Operating Expenses

Rent and office supplies

Cost: $4,000 x 9 = $36,000

v) Promotion and Marketing

One of NTMN's key functions in the development stage is to market its services. This will require extensive marketing efforts by all NTMN staff. Cost items are:

- promotional materials
- advertising (direct mail, media)

Cost: $50,000

vi) Travel

Travel requirements relate to promotion and marketing, negotiation of agreements with affiliates and the training of affiliates.

Cost: $50,000

vii) Training

Development of training materials for the training of affiliates in the delivery of NTMN services.

Cost: $50,000

viii) Consulting

Purchase of outside assistance on database and network design.

Cost: $100,000

These individual cost components lead to a total estimated cost of $651,000 to develop the NTMN to a position whereby it could offer the services outlined previously.

6.3 Operational Costs

The following provides estimates of the ongoing costs of operating the NTMN. Costs are provided for a five-year period and assume that the NTMN would expand throughout the country as previously described. Also, it is assumed that market penetration would increase as described in the following section dealing with the market for NTMN services.

i) Personnel

Year One: Addition of a Research Analyst and Receptionist

Salary
$265,000

Year Two: Addition of 2 Senior Consultants

Salary
$365,000

Years 3-5: Addition of 2 Senior Consultants and 2 Research Analysts per Year

Salary
Year 3 - $515,000
Year 4 - $665,000
Year 5 - $815,000

ii) Communications Hardware

Years 1-5: Annual Capital Upgrades

Cost: $25,000 per year

iii) NTMN Electronic Network

Network enhancement costs (from Exhibit 7-3b plus $75,000 annually for network and database development)

- database access and usage costs
- private database links
- telephone links
- further NTMN database development

Cost	
Year One:	$ 160,000
Year Two:	$ 500,000
Year Three:	$ 920,000
Year Four:	$1,550,000
Year Five:	$2,470,000

iv) Rent and Operating Expenses

Cost

Year One:	$ 48,000
Year Two:	$ 54,000
Year Three:	$ 60,000
Year Four:	$ 66,000
Year Five:	$ 72,000

v) Promotion and Marketing

Ongoing promotional campaign; as the number of affiliates increases marketing costs will increase. $10,000 additional cost per affiliate is assumed.

Cost
Year One: $ 50,000
Year Two: $ 80,000
Year Three: $ 120,000
Year Four: $ 160,000
Year Five: $ 210,000

vi) Travel

Travel cost relate primarily to maintaining working relationships with affiliates; $10,000 per affiliate on average.

Cost
Year One: $ 50,000
Year Two: $ 80,000
Year Three: $120,000
Year Four: $160,000
Year Five: $210,000

vii) Training

Development of training materials.

Years 1-5: Cost: $10,000 per year

viii) Consulting

Consulting expenses are included to handle the anticipated work load resulting from consulting contracts with the affiliates.

Cost
Year One: $ 200,000
Year Two: $ 800,000
Year Three: $1,400,000
Year Four: $2,200,000
Year Five: $3,400,000

6.4 Cost Summary

Exhibit 6-1 presents a summary of the developmental and projected annual costs of the NTMN for a period of five years.

Exhibit 6-1

NTMN Developmental and Annual Five-Year Projected Costs

Cost Item	Development Costs ($000)	Annual Costs ($000)				
		Year 1	Year 2	Year 3	Year 4	Year 5
i) Personnel	150	265	365	515	665	815
ii) Communications Hardware	80	25	25	25	25	25
iii) NTMN Electronic Network	135	160	500	920	1550	2470
iv) Rent and Operating Expenses	36	48	54	60	66	72
v) Promotion and Marketing	50	50	80	120	160	210
vi) Travel	50	50	80	120	160	210
vii) Training	50	10	10	10	10	10
viii) Consulting	100	200	800	1400	2200	3400
TOTAL	651	808	1914	3170	4836	7212

7.0 MARKET SHARE PROJECTIONS AND REVENUE FORECASTS

This section presents projections of NTMN revenues under anticipated market conditions. The direct costs of providing these service have also been included in order to ascertain the size of the deficit from providing services to certain market segments at rates lower than costs. These revenue/cost relationships are used to devise pricing and costing strategies to overcome the deficit. Revenues are first estimated for the totality of the NTMN and affiliates. Subsequently, revenues are estimated for the NTMN only. These revenues are combined with the operational costs of the previous section to produce a five-year financial analysis for the NTMN.

7.1 Service Pricing Versus Costs

Exhibit 7-1 presents the price ranges versus estimated service provision cost ranges for each component of the market and support information services. Price levels and price ranges are based on estimates from our research and consulting experience of what the market will bear.

Generally, inventors, entrepreneurs, start-up companies and, to some extent growth stage companies, are unable or unwilling to pay the actual costs of required information, hence services are priced below costs. Mature companies, on the other hand, can afford prices which recover actual costs, hence services are priced to recover costs. On first observation, pricing in this manner would appear to cause confusion in the marketplace, ie. different companies would be receiving the same product at different prices. However, the actual services delivered to

Exhibit 7-1a

Service Pricing Versus Costs

Service Type	End-User Target	Pricing Strategy	Cost
Market Information Services			
A. Preliminary market feasibility analysis	Inventor/Entrepreneur	100-200	500-1,000
	Universities/Labs	100-1,000	500-1,000
B. Market needs analysis	Growth Stage Companies	5,000-10,000	5,000-10,000
	Mature Companies	5,000-10,000	5,000-10,000
C. Market feasibility analysis	Start-up Companies	2,500-5,000	10,000-15,000
	Growth Stage Companies	8,000-10,000	10,000-15,000
	Mature Companies	10,000-15,000	10,000-15,000
D. Product specific market analysis	Start-up Companies	10,000-15,000	25,000-30,000
	Growth Stage Companies	20,000-25,000	25,000-30,000
	Mature Companies	25,000-30,000	25,000-30,000
E. Development of market strategies and plans	Start-up Companies	5,000-10,000	15,000-20,000
	Growth Stage Companies	10,000-15,000	15,000-20,000
	Mature Companies	15,000-20,000	15,000-20,000

Exhibit 7-1b

Service Pricing Versus Costs

Service Type	End-User Target	Pricing Strategy	Cost
Broker Suppoer Information Services			
A. Locating commercial ideas/technologies	Inventors/Entrepreneurs	500-1,000	2,500-5,000
	Mature Companies	2,500-5,000	2,500-5,000
	Economic Development Officers	2,500-5,000	2,500-5,000
B. Access to potential investors	Start-up Companies	500-1,000	2,000-4,000
C. Assistance with commercialization	Start-up Companies	2,000-3,000	5,000-7,500
	Mature Companies	5,000-10,000	5,000-10,000
D. Marketing assistance	Start-up Companies	5,000-10,000	15,000-20,000
	Growth Stage Companies	10,000-15,000	15,000-20,000
	Mature Companies	15,000-20,000	15,000-20,000
E. Assistance with locating support	Inventors/Entrepreneurs	100-200	1,000-2,000
	Universities, Labs	1,000-2,000	3,000-4,000
	Start-up Companies	1,000-2,000	3,000-4,000
	Growth Stage Companies	2,000-3,000	3,000-4,000
	Mature Companies	3,000-4,000	3,000-4,000

individual companies would be sufficiently unique, particularly with regard to range, to allay such concerns.

7.2 Market Assumptions

Exhibit 7-2a, 7-2b provides the assumptions which were used in the market analysis. In respect of the market research services (Exhibit 7-2a), the process first involved finding average total market volumes, average prices and average costs from the ranges presented in previous exhibits. For ease of presentation, individual service elements were consolidated into average revenues and costs per transaction for each user catetory for the market and broker information services. Market development rates were estimated for each of the user segments as illustrated. Conservative estimates of percentage of the market developed were made in year 1, growing steadily to year 5. The percentage price-increase and cost-reduction figures also contained in Exhibit 7-2a illustrate the strategies to overcome the internal deficit. The assumption is that, over time, prices can rise as NTMN market research services gain market acceptance and costs can be reduced as a result of improved productivity and greater volumes. It should be emphasized that without such strategies a deficit would always exist, requiring an ongoing external subsidy.

It was assumed in respect of the information access services (Exhibit 7-2b) that total market volumes and market development rates were the same as for the market information services of Exhibit 7-2a. The average number of hours of use per customer was estimated and used to calculate average revenues per month per customer. The price used in

Exhibit 7-2a

NTMN Market Analysis - Assumptions (Market Research Services)

Service/Users	Total Market Volume	Percentage Market Development YR 1	2	3	4	5	Average Revenue per Transaction	Average Associated Costs	Percentage Price Increase (over initial year) YR 2	3	4	5	Percentage Cost Reduction (over initial year) YR 2	3	4	5
A. Market Information Service																
Inventors/Entrepreneurs	3750	1%	2.5%	5%	10%	20%	$ 150	$750	10%	15%	20%	20%	10%	10%	15%	15%
Universities/Laboratories	75	10	12.5	15	17.5	20	550	750	10	15	20	20	10	10	15	15
Start-up Companies	250	5	7.5	12.5	17.5	25	23750	52500	10	20	30	40	10	20	25	25
Growth Companies	750	0	1	2.5	5	10	51500	62500	10	15	20	25	5	10	15	20
Mature Companies	950	0	1	2	3.5	5	65000	65000	5	10	15	20	5	10	15	20
B. Support (Broker) Service																
Inventors/Entrepreneurs	3750	1%	2.5%	5%	10%	15%	$ 900	$ 5250	10%	20%	30%	40%	10%	10%	15%	15%
Universities/Laboratories	75	5	10	15	20	30	1500	3500	10	10	20	20	10	10	15	15
Economic Development Officers	450	5	10	15	20	30	3750	3750	10	10	20	20	10	20	25	25
Start-up Companies	250	1	2.5	5	10	15	12250	30250	10	20	30	40	10	20	25	25
Growth Companies	750	0	2.5	5	7.5	10	15000	21000	10	10	15	20	5	10	15	20
Mature Companies	950	0	2.5	5	7.5	10	32250	32250	5	10	15	20	5	10	15	20

Exhibit 7-2b

NTMN Network Analysis Assumptions (Information Access Services)

Users	Total Market Volume	Percentage Market Development YR 1	2	3	4	5	Average Number of Hours of Use per Customer per Month	Average Cost per Customer per Month	Average* Revenue per Customer per Month
Inventors/Entrepreneurs	3750	1%	2.5%	5%	10%	20%	1	$ 22.5	$ 22.5
Universities/Laboratories	75	10	12.5	15	17.5	20	4	90	100
Start-up Companies	250	5	7.5	12.5	17.5	25	20	450	500
Growth Companies	750	0	1	2.5	5	10	40	900	1000
Mature Companies	950	0	1	2	3.5	5	60	1800	2000

* Assumes $16.5/hour - database usage
8.5/hour - network access
$25.0/hour - network cost

these calculations was $25 per hour for network costs (database usage and network access); actual costs were estimated to be 10% lower. In the case of inventors and entrepreneurs the price was set equal to cost.

7.3 Revenue Forecasts for NTMN Plus Affiliates

Exhibit 7-3a, 7-3b presents revenue projections with associated service provision costs by user group for the two main NTMN service categories. Under the assumptions outlined above, revenues would be $593,000 in year 1 and increase to $21,341,000 by year 5. The revenue/cost relationship would be negative in the first three years ($587,000-$746,000) and become positive ($25,000, $1,431,000) in years 4 and 5, respectively.

The revenue estimates presented here apply to the totality of the NTMN and affiliates. Hence, the shortfall in revenues versus costs in the early years of operation would be borne by all parties. Many of the affiliates already absorb this kind of revenue shortfall through various grants or subsidies from government.

7.4 NTMN Revenue Projections

This section delineates projected revenues for the NTMN component from the overall structure. As discussed earlier, the NTMN will be responsible for the head office and the NTMN network. Affiliates will generate revenues and costs on a standalone basis with direct payments or royalty payments to the NTMN. Thus the following projections are for the operations of the NTMN component only. Consistency with the above market estimates is maintained.

Exhibit 7-3a

NTMN Market Analysis - Revenues/Costs (Market Research Services)
($000)

Service/Users	Year 1 Revenues	Year 1 Costs	Year 2 Revenues	Year 2 Costs	Year 3 Revenues	Year 3 Costs	Year 4 Revenues	Year 4 Costs	Year 5 Revenues	Year 5 Costs
A. Market Information Service										
Inventors/Entrepreneurs	5.6	28.1	15.5	63.3	32.3	126.6	67.5	239.1	135.0	478.1
Universities/Laboratorie	4.1	5.6	5.7	6.3	7.1	7.6	8.7	8.4	9.9	9.6
Start-up Companies	296.9	656.3	489.8	885.9	890.0	1312.5	1350.8	1722.7	2078.1	2460.9
Growth Companies	0	0	424.9	445.3	1110.5	1054.7	2317.5	1992.2	4828.1	3750.0
Mature Companies	0	0	648.4	586.6	1358.5	1111.5	2485.4	1837.1	3705.0	2470.0
TOTAL	307	690	1584	1987	3399	3613	6230	5799	10756	9169
B. Support (Broker) Service										
Inventors/Entrepreneurs	33.8	196.9	92.8	443	202.5	885.9	438.8	1673.4	708.7	2510.2
Universities/Laboratorie	5.6	13.1	12.4	23.6	18.6	35.4	27.0	44.6	40.5	66.9
Economic Development Officers	84.4	84.4	185.6	151.9	278.4	202.5	405.0	253.1	607.5	379.7
Start-up Companies	30.6	75.6	84.2	170.2	183.8	302.5	398.1	567.2	643.1	850.8
Growth Companies	0	0	309.4	374.1	618.8	708.8	970.3	1004.1	1350.0	1260.0
Mature Companies	0	0	804.2	727.6	1685.1	1378.7	2642.5	1953.1	3676.5	2451.0
TOTAL	154	370	1489	1890	2987	3514	4882	5496	7026	7519
Grand Total ($000)	461	1060	3073	3879	6386	7127	11112	11295	17783	16687

Exhibit 7-3b

NTMN Market Analysis - Revenues/Costs (Information Access Services)
($000)

Users	Year 1 Revenues	Year 1 Costs	Year 2 Revenues	Year 2 Costs	Year 3 Revenues	Year 3 Costs	Year 4 Revenues	Year 4 Costs	Year 5 Revenues	Year 5 Costs
Inventors/Entrepreneurs	10.1	10.1	25.3	25.3	50.6	50.6	101.3	101.3	202.5	202.5
Universities/Laboratories	9.0	8.1	11.3	10.1	13.5	12.2	15.8	14.2	18.0	16.2
Start-up Companies	75.0	67.5	112.5	101.2	187.5	168.7	262.5	236.3	375.0	337.5
Growth Companies	0	0	90.0	81.0	225.0	202.5	450.0	405.0	900.0	810.0
Mature Companies	0	0	228.0	205.2	456.0	410.4	798.0	718.2	1140.0	1026.0
TOTAL	94.1	85.7	467.1	422.9	932.6	844.3	1627.5	1475.0	2635.5	2392.2
Grand Total (All Services)	555	1146	3540	4302	7319	7991	12740	12770	20419	19079
Revenues Less Costs	(591)		(762)		(652)		30		1,340	

7.4.1 Revenue Components

There are three revenue components which the NTMN's head office will generate, namely:

i) Consulting Fees

ii) Information Access Services

iii) Affiliate Payments.

Each of these revenue categories will be described and calculated in broad terms.

7.4.2 Revenue Projections

i) Consulting Fees

The NTMN head office, besides co-ordinating the entire NTMN network, will have facilities to pursue its own consulting work as well as acting as sub-contractors on affiliate conducted research projects. We have estimated that 25% of the revenues from the market research services would flow back to the NTMN in this way (this amount includes network charges - both database access and network usage).

Revenue

Year One:	$ 115,000
Year Two:	$ 768,000
Year Three:	$1,597,000
Year Four:	$2,778,000
Year Five:	$4,446,000

ii) Information Access Services

The electronic market network system will be accessible by any NTMN member. The extent of the potential revenue was presented in Exhibit 7-3b.

Revenue

Year One:	$ 94,000
Year Two:	$ 467,000
Year Three:	$ 933,000
Year Four:	$1,628,000
Year Five:	$2,636,000

iii) Affiliate Payments

In sub-section 5.2, agency and franchise agreements were described to deliver NTMN services on a local basis. In some cases agents would pay directly for services and resell to end users, in others agents would retain a portion of fees, and with respect to franchisees a royalty would be charged. The net revenue flow to the NTMN we have estimated to be 7.5% of the total revenues generated by the affiliates.

To calculate NTMN revenues, the market revenue projections of Exhibit 7-3 are used.

Total market yearly revenues minus NTMN's consulting revenues produces a total affiliate gross revenue on which to calculate the 7.5% revenue estimate.

Exhibit 7-4 illustrates the calculations.

Revenue:

Year One:	$26,000
Year Two:	$173,000
Year Three:	$359,000
Year Four:	$625,000
Year Five:	$1,000,000

Exhibit 7-4

Calculation of Affiliate Revenue Base and Royalty Payments
($000)

	YR 1	2	3	4	5
Market Services	$307	1584	3399	6230	10756
Broker Services	154	1489	2987	4882	7026
Total Revenues*	461	3073	6386	11112	17783
Less NTMN Head Office Consulting Fees	115	768	1597	2778	4446
Affiliate Revenue Base	346	2305	4789	8334	13337
X .075					
NTMN Net Revenue	$ 26	173	359	625	1000

* Revenue figures available from Exhibit 7-3a

7.4.3 Revenue Summary

Exhibit 7-5 provides a summary of the revenue projections for the NTMN for a period of five years. Revenues increase from $235,000 in year 1 to $8,082,000 in year 5.

7.5 NTMN Five-Year Financial Analysis

The above revenues and the expenses from Section 6.0 have been consolidated into a five-year financial statement for the NTMN (Exhibit 7-6). Under the assumptions made, the NTMN would experience a loss in the first three years of operation with a profit being realized in the fourth and fifth years. In summary, the first three years of operation would require an investment of $1,360,000. A profit of $1,065,000 on total revenues of $13,113,000 would be realized in years 4 and 5. Including the developmental costs of $651,000, a total investment of approximately $2 million is required before profitability is reached. It should be noted that under this scenario the NTMN would absorb much of the revenue shortfall referenced in Section 7.3 and Exhibit 7-3b.

Exhibit 7-5

NTMN Five-Year Revenue Projections
($000)

Revenue Source	Annual Revenue Projections ($000)				
	YR 1	YR 2	YR 3	YR 4	YR 5
1) Consulting Fees	115	768	1597	2778	4446
2) Information Access Services	94	467	933	1628	2636
3) Affiliate Payments	26	173	359	625	1000
Total Revenues	235	1408	2889	5031	8082

Exhibit 7-6

NTMN Five-Year Financial Projections
(Constant Dollars - $000)

	Year 1	Year 2	Year 3	Year 4	Year 5
REVENUES					
Consulting Fees	115	768	1597	2778	4446
Information Access Services	94	467	933	1628	2636
Affiliate Payments	26	173	359	625	1000
TOTAL REVENUES	235	1408	2889	5031	8082
EXPENSES					
Personnel	65	65	515	665	815
Communications Hardware	25	25	25	25	25
NTMN Electronic Network	160	500	920	1550	2470
Rent and Operating Expenses	48	54	60	66	72
Promotion and Marketing	50	80	120	160	210
Travel	50	80	120	160	210
Training	10	10	10	10	10
Consulting	200	800	1400	2200	3400
TOTAL EXPENSES	808	1914	3170	4836	7212
GROSS PROFIT (LOSS)	(573)	(506)	(281)	195	870

8.0 NTMN MANAGEMENT OPTIONS

In the introduction to this report it was indicated that the underlying thrust of the NTMN is to overcome the market development weaknesses in small and medium-sized technologically-based enterprises in Canada. In order to achieve this thrust, it was subsequently stated that the primary focus of NTMN activities must be at the incubation stage of technology development. Services should be designed, in the first instance, to support inventors, enterpreneurs and early-stage companies across the country. The secondary focus would be on growth and mature stage companies.

As noted in the previous section, incubation stage users (and some growth stage companies) are unlikely to be able to pay compensatory rates for required services. Consequently, subsidies will be necessary, at least on an initial basis, for these classes of users. The subsidies can come from two sources: a grant from external sources, or from other users who are able to pay. In the first instance, subsidies should come from external sources, for example governments, since overcharging affluent users at the early stages of NTMN development would discourage use. However, over a period of time the NTMN should be able to build a critical mass of customers and price such as to reduce external subsidies to zero.

The following sub-sections outlines three options for the management of the NTMN which respond to these considerations:

A public sector program approach, an autonomous private sector company, a privately-run, publicly-funded company with directed mandate and finite lifetime. These three options are discussed below.

8.1 Public Sector Program Structure

Consideration of a public sector approach for the NTMN is generally outside the private sector orientation of the current project. It is discussed here for completeness and because it was raised in discussions with NRC regarding the IRAP program. The basic point for decision is whether government would wish to provide NTMN services on a program ("service") basis, paid for from general revenues. The return to governments would be increased activity in technology-based enterprises resulting in jobs for Canadians and increased tax revenues for governments. Such an approach is not unlike some existing federal (eg. IRAP) and provinical (eg. Saskatchewan) government programs.

Two alternatives are available to implement this approach: a parallel IRAP structure and a pseudo public-sector approach involving modifications to FBDB.

The parallel IRAP structure could avail of the IRAP network of people, facilities and company contacts to quickly become operational. NRC would be most logical to undertake this role and could do so by creating a separate program area or enlarging the IRAP mandate. Alternatively, some other body, even private sector, could undertake to deliver the program in a co-operative manner with IRAP, probably on a contract basis.

The second alternative is to direct FBDB to focus an element (a subset) of its activities on technology-based enterprises. To fully adopt NTMN concepts, FBDB would be required to become pro-active in seeking out and supporting entrepreneurial activities (in technology-based areas), to significantly expand the capabilities of the AIM database network and to focus its training programs on the requirements of technology-based enterprises. Government could choose to have FBDB deliver NTMN services at selected areas of high technology concentration or uniformly throughout its 77 offices across the country, depending on policies to support technology development. The advantage to government is that NTMN developmental and operational costs would be borne by FBDB (some of which could be recovered by FBDB through charges to its customers).

8.2 Autonomous Private Sector Company

The NTMN would be established under this option as a private sector company funded by private investment and encompassing the range of services described earlier. A private sector company would be drawn to the most lucrative market segments; namely, the established companies. This is not the market segment - incubation stage users - where the underlying thrust of the NTMN would dictate that emphasis be placed. Furthermore, from our preliminary analysis of the market it would be difficult for a private sector company to attract private sector capital for the up-front investment required to establish the business as proposed.

Venture capital for a personal services enterprise is next to impossible to find; furthermore the capital markets are not sophisticated enough to realize that there is potential return on investment in an information infrastructure.

An autonomous structure that received up front public investment would face a number of competitive and political problems. The company would be forced to compete for the entrepreneur, the start-up company or the established company with the various other non-profit, government and commercial organizations who purport to offer similar services. Competition would exist, for example, from FBDB, CIT-3, TECCC, the Alberta Business Network and various independent database suppliers. While such competition is acceptable in a purely private sector environment, governments could face accusations of unfair competition if the NTMN were to receive public support.

The second difficulty with a public investment in a commercial enterprise stems from the necessary focus of the corporation, ie. the high profit margin part of the business. It would be difficult to demonstrate to municipal and provincial governments that something unique was being offered if they were presented with a proposal based primarily on providing market and broker information services to established companies.

8.3 Privately-Run, Publicly-Funded Company

A privately-run, publicly-funded company with a directed mandate and finite lifetime is suggested as a structural option to resolve the seemingly conflicting objectives of operating the NTMN as a private sector undertaking while supporting public policy to achieve greater success in the creation, formation and growth of small and medium-sized technology-based organizations throughout Canada. As noted earlier, this requires serving a market segment - incubation stage users - where private sector initiatives would not be undertaken and where considerable subsidies will be required.

This option, then, proposes the formation of a company with responsibility to provide services to the uneconomic sector of the marketplace in return for government support of the deficits which will occur. Since such an arrangement could take on the attributes of a public sector program, the following formula to gain private sector efficiencies is suggested: (i) non-profit incorporation, (ii) private sector management, and (iii) privatization within three to five years of start-up.

To prepare for full private sector operation, the company would be required to build a sustained market presence, volume of a strong customer base, and a good sized volume of business as users progress from the incubation stage to other stages of growth, the higher profit margin segment of the market could cross-subsidize assistance to the early stage entrepreneurs.

The commitment to serving the unprofitable segment of the market while receiving government support would allow the NTMN to avoid unfair competition with the private sector. The move to unfettered competition would also be fair as long as government support was completely removed. In fact, the privatization process could allow for competitive proposals for buying the NTMN. As well, government could make sale conditional on the buyer continuing to serve the unprofitable market segment.

8.4 Recommended Management Option

A privately-run, publicly-funded company would appear the most feasible option for the NTMN. This approach has the advantage for governments and the country of implementing desired public policy, achieving the efficiencies of private operation, avoiding conflict with the private sector (since the target market segments are not financially attractive to private companies) and providing complementary services and services arrangements with local initiatives.

APPENDICES

Appendix A

The Origins and Nature of the National Technology Marketing Network Concept

Appendix A

The Origins and Nature of the National Technology Marketing Network Concept

1.0 BACKGROUND

1.1 Introduction

The National Technology Marketing Network (NTMN) is a pro-active approach to fostering, supporting and accelerating the successful launching and growth of technologically-based enterprises in Canada. The NTMN responds to the general need to achieve greater success in the creation, formation and growth of small and medium-sized enterprises throughout the country. Small and medium-sized enterprises are a source of innovative ideas, growth in output, and recently, the major sources of new jobs. Yet, Canadian performance in spawning new, advanced technology enterprises is weak, particularly in comparison with the U.S., where investment in start-up situations has consistently been six times the Canadian level on a per capita basis. There are many reasons for this poor performance, but at least part is due to management and market development weakness in early-stage companies. The NTMN targets this problem. It is designed to strengthen the capabilities of entrepreneurs to commercialize new product ideas.

The NTMN concept builds on a very successful project conducted by the Government of Saskatchewan in Saskatoon with the assistance of Mr. Denzil Doyle, former President of Digital Equipment of Canada Ltd. and currently President of Doyletech Corporation. The Saskatchewan project led to the establishment of a number of high-technology start-ups in Saskatoon and reinforced high-technology development in that city.

The creation of the NTMN has also been strongly endorsed by participants in the National Technology Policy Roundtable sponsored by the Canadian Advanced Technology Association (CATA). The report of the Roundtable* describes many Canadian high-technology firms as being:

> "small, niche-seeking high-tech companies that are almost certainly cash-poor, thin on management, and in all probability, run by people with an inadequate training in marketing in general, and international marketing in particular."

The NTMN concept is directed, in particular, to addressing these shortcoming of Canadian high-technology business.

1.2 Terms of Reference

The Terms of Reference for the project, as outlined in the Statement of Work of the contract between the federal Ministry of State for Science and Technology (MOSST) and CATA, are:

a) To develop an implementation plan for a national technology marketing network.

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* Annex to the Report of the National Technology Policy Roundtable, Canadian High Technology Week, Toronto, Ontario, September 23, 1986. A project coordinated by The Canadian Advanced Technology Association in cooperation with Connelly Exhibitions Inc.

b) To develop a five year analysis.

c) Interviews with other prospective subscribers.

d) Consultation with Investment Canada to determine possible adoption of Investment Grid concept.

e) Consultations with Entrepreneurship Institute of Canada to avoid duplication of efforts.

f) Consultation with NSERC and other bodies (eg. FBDB) to draw upon their experience in this field.

CATA was assisted in carrying out the Terms of Reference of this project by the consulting firm Nordicity Group Ltd. of Ottawa.

2.0 OUTLINE OF THE NTMN CONCEPT

2.1 NTMN Goals

The goals of the NTMN are to:

- foster an entrepreneurial climate which leads to new high technology business start-ups;
- improve the success rate of start-up companies during the early stages of growth;
- increase significantly the creation and growth of small and medium-sized technologically-based enterprises in Canada and hence create and sustain jobs for Canadians.

2.2 Proposed NTMN Design

The NTMN, as presented in the proposal to MOSST, was conceived as providing three key functions for technology-based enterprises:

- broker assistance to link early-stage firms with markets and local sources of capital;

- o a national market information network to help technology-based firms research markets and prepare business plans;
- o training in business planning and market development for technically-oriented managers of technology-based firms.

The concept was for a private sector approach that would draw on government services and initial funding to assist technologically-oriented enterprises in Canada. The NTMN was to be designed to be complementary to existing initiatives of the private and public sectors. A more detailed description of the three key functions, as outlined in the proposal to the Ministry, is presented below.

High Technology Broker

There is a perceived need that exists for a high-technology broker in Canadian communities where there is no sophisticated venture capital capacity but where there exists some infrastructure to source entrepreneurial ideas (eg. R&D capability, universities and some advanced technology enterprises). This means cities like Victoria, Calgary, Edmonton, Saskatoon (which already has one), Regina, Winnipeg, Sudbury, Windsor, Kitchener-Waterloo, Quebec City, Sherbrooke, Fredericton, Saint John, Halifax, St. John's and St. John, N.B.

A person (or small team) would be established in selected communities. The role of the high technology broker would be to ferret out new product ideas that emanate from any part of the community, put the originators of the ideas through a business planning process, and then act as the interface between the would-be entrepreneurs and sources of early-stage capital. In some cases the companies may already exist, but typically they would be start-up operations.

The high technology broker would be someone with considerable business experience in the high technology field in Canada, with direct background in international marketing. Ideally, he/she would have an entrepreneurial background in companies that have been through the full development cycle. The broker would from an advisory committee to help identify and vet new product ideas.

Market Information Network

A large part of the high technology broker's role would be to help prepare business plans. Since the market research aspects of the business plan are the most difficult to undertake, there would have to be some local competence for conducting market research as part of the broker's role. This need would likely involve a full-time specialist in market research to assist the high technology broker. It would also require access to a market information network to obtain needed information from existing data banks and at least a network of leads to get at specific information.

The first level of information need is simply basic market information (eg. how many firms are there in Saskatchewan?). The second level is the dynamic information on the marketplace: who are the customers? how do they buy? who are the competitors? This information is only available from specialized trade information databases and people directly involved in this field. The need, then, is for an information network that supplies the primary information and the leads for obtaining the more specific market information.

It is contemplated that each regional high technology broker would specialize in certain kinds of market information - local, national, and international. The national centre could also channel primary and international market information to those who need it. All centres should be linked electronically to facilitate the sharing of market information among regions.

The increasingly available public data bases would be linked to each high-technology broker's operation, taking advantage of existing distribution services. Standard market information would be part of the first level of market information made available, eg. Statscan, Scott's Directory, Reference Canada (a federal government "800" information service), United Nations, Dun & Bradstreet, New York Times clipping service, etc. The task of educating regional centres on their availability and how to use them would likely be the responsibility of the central "node" in this market information network.

Training and Skills Development

In this third component of the NTMN it is anticipated that the early-stage company officers would need on-going training support. The need is based on the imperfect skills of early-stage corporate managers. The need embraces market development skills (the most important element), entrepreneurial training, managing through start-up, dealing with financial markets, financial management in early stage companies and the enhanced ability to write business plans.

The training support is not simply a "how to be an entrepreneur" course, offered by itinerant private sector instructors. It would be integrated with the high technology broker and market research functions. A more sustained training course is required - yet one that takes into account the limited time of executives in small and medium-sized enterprises. It was pointed out in the preparation of the Roundtable that this type of training is sorely needed as opposed to the inadequate 1-2 day workshops for CEO's that are onw more typically available.

Appendix B

Environmental Context of the NTMN

Appendix B

Environmental Context of the NTMN

1.0 Introduction

In the process of investigating the NTMN concept a file of background information was created from a literature search and a series of telephone and personal interviews. A list of the individuals and organizations interviewed is provided at the end of this Appendix. In general terms, the body of information includes the related activities and interests of the following:

1) Various federal government departments and agencies.

2) Selected provincial Departments of Development/Research Agencies.

3) Selected Economic Development offices/Municipal Development offices in the general Ottawa/Toronto areas.

4) University Technology Transfer/Business personnel.

5) Selected Innovation Centres/Incubators/Research Institutes/ Technology Centres in the Ottawa-Toronto-Montreal areas.

6) Private sectors initiatives.

7) Various high technology companies.

This body of knowledge was used to develop the following environmental context of the NTMN. The environmental analysis assesses support activities for small and medium-sized businesses from the point of view of their complementarity with the proposed NTMN functions.

2.0 Federal Activities/Programs

Various federal government departments and agencies have instituted a number of activities and programs for small and medium-sized businesses which would complement or, in some cases, encompass certain aspects of the NTMN. Key activities and programs are discussed below.

A. NRC - IRAP

The National Research Council (NRC) provides the Industrial Research Assistance Program (IRAP) which is designed to increase the calibre and scope of industrial R&D through the use of the latest technology. IRAP maintains a network of people throughout the country in NRC offices, provincial research organizations, various specialized centres and through association with the Association of Consulting Engineers of Canada. IRAP provides both personal and financial assistance relative to the adoption of new technology and R&D projects. IRAP currently provides close to $70 million annually to Canadian business.

In discussions with the director of the IRAP program, it was noted that IRAP officials often observe a requirement for the functions being proposed for the NTMN. IRAP officials are, however, generally unable to assist since financial, management and marketing matters are outside the IRAP mandate.

The possibility exists to implement an NTMN approach which parallels in structural and locational aspects the IRAP program. This approach would have the advantage of providing credibility and immediate access to companies and a network of people involved in technology R&D and utilization. It would have the disadvantage of not necessarily being oriented to start-ups and of being captured within the IRAP ambit of providing service and funds. As such, it could come to be seen as a federal program rather than as a private sector initiative.

B. Federal Business Development Bank

The Federal Business Development Bank (FBDB), a federal Crown corporation, provides a range of financial, investment banking and management services which partially overlap the proposed functions of the NTMN. Exhibit 2-1, taken from a brochure prepared by FBDB, presents an overview of the types of services provided by FBDB. Services are provided to the business community at large and consequently do not have the technology focus of the NTMN.

Three areas of FBDB services are of particular note relative to the NTMN: investment banking, the Automated Information for Management (AIM) system and management training and counselling.

Exhibit 2-1

FBDB Services

FINANCIAL SERVICES	
Term Loans	To finance a variety of projects at flexible terms and conditions.
Financial Matchmaking	Business people with money available to invest are matched with business people seeking funds.
Strategic Planning	To help evaluate competitive situations, and determine the resources businesses need to achieve full growth potential.
Financing Packaging	FBDB will prepare a report that can be used by financial institutions to assess applications for funding.
Do-It-Yourself Kits	Available on five management topics, to help draw up the plans required for businesses.
INVESTMENT BANKING	
Investments	FBDB will purchase shares in a business, or work with private sector financial institutions to obtain the equity financing.
MANAGEMENT SERVICES	
Management Training	Business management seminars, courses, clinics and publications.
Management Counselling	The CASE Counselling Program offers specialized advice tailored to needs in all areas of business management.
Information Services	Free information on government programs for small business, as well as a wide range of market data and statistics.

Investment Banking

Investment banking is a new service in which the bank seeks to mobilize risk capital in Canada. The bank provides venture capital, equity financing, will assist with or participate in mergers and acquisitions (including matchmaking between the providers of risk capital and investment situations) and will assist with or participate in syndication and underwriting.

AIM System

AIM is in an information database, announced in the fall of 1986, to meet the needs of small and medium-sized businesses. The information in the AIM database is classed into three broad categories: government assistance programs for business, information sources, and business opportunities. Some of the information sources and business opportunities include:

- o key business regulations;
- o services available from Canadian trade associations;
- o Canadian trade representatives abroad and foreign trade representatives in Canada;
- o import replacement opportunities;
- o government-funded inventions available for commercialization;
- o new U.S. products with Canadian market potential;
- o census data on population, income and employment.

This information is stored on microcomputers located in each of FBDB's branches. The microcomputers are interconnected with electronic communications throughout FBDB's branches, regions and head office.

AIM is available at any of the 77 FBDB branches across Canada. Selected other organizations will also offer access to AIM. Branch staff will also request searches of databases external to FBDB. Access to the AIM database is provided free of charge. Searches of external databases are carried out at a cost.

Management Training and Counselling

FBDB provides a range of business management seminars - full-day and half-day - on general management, marketing, finance and perosnnel for small and medium-sized businesses. FBDB also provides a counselling service in which retired business people advise on business problems and issues.

FBDB services overlap but do not include all aspects of the proposed NTMN functions. Investment banking includes the matchmaking aspects of the broker role (it goes beyond in providing equity support) but does not include the pro-active ferretting out of new product ideas. The management training and counselling services parallel, structurally if not otherwise, the proposed support to be given to start-ups in terms of preparing business plans and in training. AIM, which presently is a rudimentary network, could easily evolve to the marketing network envisaged for the NTMN.

There is a fundamental difference between FBDB and the NTMN in that FBDB must offer its services to all small and medium-sized businesses whereas the NTMN will focus on technology-based companies. As such its services can be much more precisely defined and marketed. Additionally, FBDB

does not adopt a particularly pro-active stance in promoting its services. The NTMN will do so.

C. Canadian Patents and Development Limited

Canadian Patents and Development Limited (CPDL) is a federal crown corporation which was established to handle the patenting and licensing of technology developed by federal government departments and agencies and, by agreement, also technology developed by universities, provincial research establishments and other non-profit organizations. It reports to Parliament through the Minister of Regional Industrial Expansion. The main objective of CPDL is to make available to the public the industral and intellectual property that results from R&D that is publicly funded.

CPDL is currently exploring a new mandate, the impetus undoubtly being as a result of one of the recommendations of the Nielsen Task Force, namely:

> "Transfer of publicly-owned technology to the private sector is encouraged by Canadian Patents and Development Limited. In future, the corporation will seek to maximize its revenues from licensing intellectual property owned by the federal government and by other public institutions which contract in, while giving the Canadian private sector first right of refusal at competitive licensing rates. More aggressive marketing of patented technology paid for by taxpayers should substantially increase returns to the federal government and to those provinces and universities wishing to participate".

To achieve the recommendation of the Nielsen Task Force, CPDL must become more pro-active in promoting and marketing its technologies. Currently, CPDL advertises inventions to industry by various means such as trade shows, technical publications and the "Inventions" listing. To become pro-active it must adopt or acquire many aspects of the broker, market information and training functions proposed for the NTMN.

CPDL currently maintains an inventory of some 400 inventions which it can license to industry. It does, however, face a problem in that government departments and agencies are not required to disclose new technologies to CPDL; they can proceed independently. Hence, CPDL has no assurance of receiving the best technologies nor all that government has to offer.

D. Investment Canada - Investment Grid

In an interview with Investment Canada, it was learned that officials have investigated the concept of a computerized market system - called the Investment Grid - based on computer conferencing. The Grid would function on the basis of matching entrepreneurs and venture capitalists through common access to a computer bulletin board. Similar systems have been established in New Hampshire and Michigan. The approach was described as dynamic in nature; providing, in real time, a growing body of information on technologies and investment opportunities. This dynamic aspect was contrasted to the relative static nature of current business databases.

Establishment of the Grid would require a relatively inexpensive computer system, computer conferencing software (eg. COSY: Computer Conferencing System, University of Guelph was referenced) and communication capability (eg. access to DATAPAC, INFODAT). Users would access the system with personal computers or terminals. Approval to establish the Grid has not been received.

The Grid concept could be included as a component of the NTMN. In fact, it could exist as one of the databases on the national marketing network and significantly enhance the matchmaking aspects of the broker role. It is not, however, seen as a replacement for the network itself since its capabilities are limited compared to those envisaged for the network.

E. Department of Regional Industrial Expansion

The Department of Regional Industrial Expansion (DRIE) provides a number of programs which could be supportive in developing the MTMN concept. Various programs support business in general while others provide market information directly useable by technology-based firms. These latter programs are highlighted below:

Business Opportunities Sourcing System (BOSS)

BOSS is a database of Canadian companies, their products and the markets they serve. It has on file more than 20,000 manufacturers, trading houses and service companies. Information is distributed to each of Canada's international trade offices, DRIE regional offices, Business Information Centres, provincial departments of industry across

Canada and purchasing offices in private industry. Information is available on-line through microcomputer/terminal access or through a catalogue, computer tape or microfiche. The information is generally provided free to users. BOSS could be one of the market information sources to be included on the NTMN. Access to BOSS could be achieved as one of the databases available on the network.

The Market Development Branch of DRIE is also looking into the development of a Market Opportunities System (MOS) to run in parallel with BOSS to include automatic matching of demand and supply. This system will improve communications on marketing opportunities with Canadian companies, and will act as a clearing house for opportunities/sourcing matching to encourage new companies to broaden their market base. NTMN could be complementary and provide a supportive infrastructure for this program.

Import Replacement Program

DRIE has instituted a program to ascertain Canadian business opportunities by replacing imports with Canadian manufactured products. The program has two components:

Import Profile: used by businesses, through DRIE, to expand production, extend a product line or identify new investment opportunities. Profiles provide a brief published report of import trends and market information on particular products or product groups over a four-year period. Import profiles could provide a starting point for more in-depth market research.

Import Analysis: prepared in response to company requests, contains import data for individual products over a specific time period and in greater detail than Statistics Canada publications.

Industrial and Regional Development Program (IRDP)

IRDP is a core DRIE program, designed to promote industrial and regional development in Canada. It provides industrial financial assistance designed to combat regional disparaties. The IRDP program would not in itself be directly applicable to the NTMN but could provide support for companies using NTMN services. In this respect, funds are available to assist with studies, the development of new products and processes and the development of new technological capabilities.

F. Consumer and Corporate Affairs - Patent Information Exploitation Program

The Patent Information Exploitation (PIE) program, federally funded and administered by the Intellectual Property Directorate of Consumer and Corporate Affairs, is designed to make collected technology information accessible to the public to stimulate economic and industrial development:

- o ensuring rapid and efficient technology transfer;
- o enhancing research and development;
- o promoting industrial innovation;
- o contributing to the mangaement of technological change;
- o eliminating duplication of effort.

The Directorate provides technological search, assessment and forecasting services. The PIE program is directed to small and medium-sized businesses, research institutes, industry associations and other organizations. The Directorate is also creating a network (informal) of organizations to provide access to PIE program services.

PIE could provide useful market information for the NTMN. Its utility, however, is currently limited in that it does not provide on-line access. It is reported, however, that the Department is intending to provide on-line access. When available, PIE could become a valuable market information database for inclusion on the market network.

G. Employment and Immigration Canada - Canadian Jobs Strategy

The Canadian Jobs Strategy of Employment and Immigration Canada contains six programs to support training and job creation: Skill Investment, Job Entry, Job Development, Skill Shortages, Innovations, and Community Futures. To the extent that the NTMN can be shown to provide new solutions to labour market problems (ie. creates jobs in disadvantaged areas), funding may be available. The greatest possibility exists under the Innovations program which will provide financial assistance for pilot and demonstration projects.

H. National Sciences and Engineering Research Council

The functions of the Natural Sciences and Engineering Research Council (NSERC) are to promote and support the development and maintenance of research and the provision of highly qualified manpower in the natural sciences and engineering:

- o to support excellence in research for the creation of new knowledge in the natural sciences and engineering;
- o to promote and support the development of research in selected fields of regional and national importance;
- o to assist in the provision and development of highly qualified manpower.

NSERC provides a number of research grants to support basic research. It also administers the University-Industry program to improve the university-industry interface. The program includes four major components:

- o Co-operative R&D activities;
- o University-Industry links (Workshops and Seminars, Affiliations);
- o Canadian Microelectronics Corporation;
- o Scholarships and fellowships.

This program has expanded considerably in the last few years: in the last 2½ years approximately $60M NSERC funds have been committed plus approximately $45M from industry.

In an interview with NSERC it was noted that NSERC could not directly support the NTMN. NSERC support can only be indirect insofar as their support of basic research creates an environment which generates the basic ideas which might eventually be commercialized. Specifically, it was stated that none of the NSERC programs appear to fit the primary

functions of the NTMN. One exception was noted; namely, the conduct of seminars under the University-Industry program to encourage university-industry linkages. If this were to be a part of the NTMN, then NSERC funds would be available.

3.0 Provincial Initiatives

All of the provinces have instituted programs to support small and medium-sized business development. Some provinces support technology-based enterprises more than others. Given limitations on time and funds, this review of provincial initiatives is representative rather than inclusive. In this respect, personal visits were made to Nova Scotia, New Brunswick, and Ontario and telephone conversations were held with various others. In general, provincial officials were supportive of the NTMN concept, but stated they would require an in-depth proposal before commitment could be given, particularly if it involved spending program funds to support the NTMN. Provincial officials generally indicated that NTMN proposals should be complementary to existing initiatives and should fill a recognized gap, for example, providing a national market network. One province was also adamant that any future NTMN proposals be fully discussed with the provinces.

A. Saskatchewan

Documentation provided by Saskatchewan indicates that the technology innovation process is seen as a partnership between science, business and government. Components of the process involve basic R&D, technology roll-out, company development, prototype to production and marketing. Saskatchewan Science and Technology provides support in all categories.

The Department provides the following programs and services, some of which are cost shared with the federal government:

Buildings & Equipment

- Capital Equipment
- Research Infrastructure

Research & Development

- Industrial Research
- Joint High Technology Research
- Research Infrastructure
- University-Industrial Collaboration
- Task Forces and Project Teams
- Bridging Capital Assistance

Financing and Investment

- Bridging Capital Assistance
- Industrial Investment Assistance
- Strategic Investment Assistance

Business Ventures

- Information Transfer
- Entrepreneur Services
- Development Analysis

Manufacturing

- Inventor Services
- First-user Risk Reduction

Marketing

- Marketing Support
- Feasibility Studies
- Request for Proposals

B. Ontario

The Ontario Government, through the Ministry of Industry, Trade and Technology (MITT) and the Ministry of Revenue, has developed a number of programs to support technology development and its commercialization. Key programs are described below:

B1. Ministry of Industry, Trade and Technology

Innovation Centre Program

Twenty-two centres have been established at post-secondary institutions throughout the province. Individuals (entrepreneurs) receive support from business departments and students in the evaluation of innovative ideas, preparing business plans, obtaining patents and developing products and processes. The program provides a network amongst centres to find and provide the appropriate expertise to evaluate ideas. The program was established in 1985 and is due to expire in 1988. Funding has been established at $100,000 per centre per year.

Technology Centre Program

Seven centres have been established across the province to provide testing facilities, expertise for technology development and production techniques for innovation ideas. Centres vary in terms of technology

support for various areas, eg. agricultural, microelectronics, manufacturing, robotics, etc.

Small Business Directorate (MITT)

This Directorate of MITT has established the following programs to assist small business:

1. Advice and Counsel Program

   This program is targeted at start-up companies and provides:

   - publications, literature, phamplets
   - seminars: profit sharing, quality control, marketing, financial planning, computers
   - TVOntario series on motivation called "Frontrunners"
   - telephone hotline for information on permits, licensing, etc.

2. Advocacy Program

   Enables small business to discuss topical issues on regulation and taxation.

3. New Ventures Program

   Establishes loan guarantees arranged through the chartered banks, with limits to $15,000. Businesses must match the amount of the loan. Preparation of a business plan is necessary.

Innovation Ontario Corporation

Innovation Ontario, formerly the Idea Corporation, provides venture capital to firms in the early stages of development. Investments are made on the basis of repayment of the initial investment plus a return. The Corporation started in September with funding reaching $8 million this fiscal year.

B2. Ministry of Revenue

The Ontario Ministry of Revenue has established the Small Business Development Corporations Program. This program was designed to stimulate private sector investment in other companies. Private sector investors are induced to pool money and create a Small Business Development Corporation (SBDC) - a holding company - which invests in other companies. The inducement is an up-front grant of 30% of the total funding. The programs encourages investment on a market basis in that the SBDC places its money where the best returns can be achieved, decisions are made within each SBDC and the Ministry only monitors progress. Total investment by each SBDC in individual companies is based on profit potential.

The program was established in 1979. Since then, 889 SBDC's have been registered and 297 de-registered when requirements for private sector investment have not been met. A total of $352 million, representing 1,806 separate investments, has been invested in Ontario companies.

C. Quebec

Quebec provides a number of programs to assist Quebec-based businesses as follows:

C1. Ministry of Industry and Commerce

General Management of Enterprise Services

1. Bourse D'Affaire

   Program developed for young graduates from CEGEPs and Universities to assist in the creation of business enterprises or with their entry into existing businesses (through share purchase assistance).

2. Pro-Pine

   Program developed for manufacturing companies who want to develop marketing (in-house) or administrative expertise. The program is directed to young graduates (or professionals) with a view to providing employment to graduates and new professional skills for manufacturing companies.

Quebec Industrial Development Corporation

1. Investment Program for Manufacturing Companies

   A financial assistance program developed for manufacturing companies to fund either the start-up of new companies, or fund the expansion of existing companies through investment in machinery and equipment.

2. Investment Program for Tourist Development

   Investment program targetted to the tourist industry.

3. Research and Development Program

   Investment program directed towards manufacturing and service companies. Program is aimed at the development of new products or production techniques.

4. Program for Exports

   Program to assist companies or individuals who would like to set up sales offices or warehouses outside of Quebec.

C2. Centre de Recherche Industrielle du Quebec (CRIQ)

CRIQ is a corwn corporation under the Department of Industry and Commerce established circa 1970 to assist small and medium-sized businesses to carry out research and development projects. The corporation has responsibility for promoting economic growth by stimulating the technological development of manufacturing firms by providing:

- o technological and industrial information;
- o help in solving production problems;
- o assistance in developing and improving products and manufacturing procedures;
- o technology transfer assistance.

In future specialized services will be available in:

- o robotics and flexible manufacturing;
- o industrial engineering;
- o analytical mechanics;
- o compliance testing;
- o metals and materials;
- o development of machines and mechanical equipment;
- o energy and technological information.

CRIQ's industry information service provides business people and various economic development agents information on:

- o suppliers or distributors of a specific product;
- o regulations, standards and patents;
- o conversion to the international system of units (SI);
- o alternative sources of energy.

The service's team of information specialists has at its disposal a number of effective information search aids, including access by computer terminal to more than 400 North American and European databases containing some 40 million references.

Businesses can also ask CRIQ to conduct various types of technical and economic studies dealing with:

- o market overviews;
- o status of a given technology;
- o diversification studies.

This type of strategic information helps business people in their decision making.

An Industrial Information Bank has been established since 1978. The Bank has published the Répertoire des produits fabriqués au Quebec (Index of Products Manufactured in Quebec) providing index information on:

- o number of people employed by a company;
- o products, trademarks;
- o distributors, points of sale;
- o information on exports, manufacturing standards and international system of units (SI).

The Index is used as a practical guide for buyers and managers in the public and private sectors to promote purchase and sale of Quebec products. Users of the Index also have access to other services offered by the Bank including lists and sets of manufacturers' addresses at a price agreed to in advance (lists by region, sector of activity and number of employees).

C3. Young Investors Corporation

The Quebec government announced in December 1986 the launching of the Young Investors Corporation to help budding entrepreneurs with risk capital. Entrepreneurs aged 18-30 years will be able to obtain loan guarantees from Quebec businessmen of $35,000 to $100,000 to help them start their own enterprises. The loans are to begin in March 1987. The corporation expects to disburse $5 million in this fashion. The businessmen participating in the scheme will receive tax exemptions for guarantees they provide, similar to tax deductions for charitable donations. The government will provide $450,000 to cover administrative and operating costs of the corporation.

D. Nova Scotia

D1. Nova Scotia Department of Development

Discussions with officials of the Department of Development focused on the applicability of the NTMN and the relationship to existing programs. Department officials noted that the province has a number of initiatives to support Nova Scotia businesses, many of them funded under

federal-provincial agreements. Some of the programs include:

- o Consulting Assistance Program
  - helps a small business retain professional help to solve specific non-recurring problems. Maximum contribution of $2,000.
- o Ocean Industries Innovation Centre
  - assists in the establishment of medium to high technology companies in the oceans industries sector.
- o Trade Expansion Program
  - offers to assist Nova Scotia firms wishing to attend trade fairs and exhibits, conduct market education courses, and host incoming buyers.
- o Women's Entrepreneurial Development Program
  - provides assistance (maximum $1,500) for women in business to develop their entrepreneurial and technical skills in the areas of planning, marketing and operational aspects of business.
- o Youth Entrepreneurial Skills Program
  - development of entrepreneurial skills among youth (ages 16-24 years). Loans to a maximum of $5,000 are available.
- o Venture Capital
  - enables private venture capital corporations to secure matching funds from government in the form of interest free loans to a maximum of $5 million.

Federal/provincial joint agreements on Ocean Industries and Trade and Technology support technology-based activities. Incubator malls have or are being developed to foster small business start-ups.

In discussing NTMN functions, it was noted by officials that the broker and training aspects had, to a degree, been already provided by various provincial initiatives. The market network function had not. Officials indicated that Nova Scotia would consider initial-stage funding if the NTMN:

- offered something new and unique;
- was complementary to existing initiatives;
- involved local companies (eg. used local consulting companies to obtain market information);
- did not result in a flow of technology and opportunities out of the province.

Officials suggested talking to the Department again at a later stage of implementation.

D2. Nova Scotia Research Foundation

The Nova Scotia Research Foundation (NSRF) conducts research which support Nova Scotia industry. In discussions with the President, it was noted that NSRF has two programs in which it can assist industry:

- o Marketing Research and Project Feasibility Services
  - identifies and assesses new products and business opportunities. Provides survey and feasibility studies on new businesses having domestic and international markets. Provides consultation to existing companies to identify and rectify marketing-related problems.

- Technical Inquiry Service
  - provides technical assistance in improving current products, improving plant operations, introducing new technologies, or solving technical problems.

E. New Brunswick

Similar to Nova Scotia, New Brunswick provide support programs for small and medium-sized businesses. The official interviewed was of a similar opinion to Nova Scotia officials that initiatives had already been taken with respect to the broker and training role of the NTMN. It was recognized, however, that these weren't as technology based as proposed for the NTMN. The province would be interested in reviewing a future proposal that provided something unique, particularly in the area of market information.

F. Alberta - Electronic Industry Information Centre

The Electronic Industry Information Centre is a project of the Alberta Research Council to provide a catalyst role for technological develoment in the province and, particularly, to provide market information - determine market directions as well as specific market requirements. The project has a broad mandate, to improve the development of the communications industry in Alberta and has presently focussed on the electronics and software development sector. Initial funding of $1.5 million was provided through provincial government initiations for a pilot project which started one year ago.

The project has three aspects:

1) to create a small database of information exclusive to Alberta industry

   - presently, a general listing of a calendar of events, association meetings, conferences/seminars, items of current news;

   - information on government and private contract tenders available to bid on;

   - information on grants and assistance to small and medium-sized bussinesses, where to find funding, investors, etc.

2) to promote the use of electronic mail to tie the industry together;

3) assistance with on-line searches of databases

   - link between the cities of Edmonton and Calgary where companies will access the network with assistance from librarians (knowledgeable about system) to perform searches;

   - searches will be performed remotely, with a call-in to the network to talk to the search expert. Screen monitors (remote and search experts) will display results of information searches (the company's terminal would be in remote echo mode). Once the company remote sees information that is useful, screen contents can be transferred to disk or printer.

No new hardware or software were used in developing this system, instead it uses existing Telecom Canada services - Datapac, Envoy 100 and iNet 2000.

G. Manitoba

Information received from the Manitoba Department of Industry, Trade and Technology indicates that the governmnet supports technology development in the following ways:

1. Technology Commercialization Program

Program to provide a mechanism to create a broader technological base in the province. The program contains three specific elements to commercialize technology in the province:

- o New Business Assistance
  - designed to identify and support entrepreneurs with innovative technological ideas and the goal of developing successful new businesses;
  - provides assitance in the form of office and manufacturing space, financial assistance, business advice and technical support.
- o Investment
  - assists promising technological businesses, new or established, with financial support at the "seed funding" stage;
  - provides funding between $20,000 to $200,000, with a typical value under $100,000. The client must provide at least 25% of the cash flow. Repayment is in the form of a royalty based on gross sales revenues.
- o Technology Transfer
  - facilitates the transfer of technology from government, university and private laboratories to industry;
  - support is provided by means of information in the form of a technology data-bank, bulletins and technology transfer seminars.

2. Strategic Research Support Program

An initiative by Manitoba to encourage and orient university and industry research towards Manitoba technological development. The program provides research grants to individuals and research contracts to organizations.

4.0 Municipal Environment

Throughout the course of the study the NTMN and its specific functions were discussed with various municipal and/or economic development officers from Ottawa/Carleton, Kingston, Peterborough, Markham, Kitchener/Waterloo, Guelph, Niagara Region, Halton and Cambridge in Ontario. All were generally supportive and interested in further information concerning the NTMN. A group meeting of economic development officers from Ottawa/Carleton, Guelph, Niagara Region, Halton and Cambridge resulted in the following points which are generally representative of municipal comments:

1. Local economic development units have a significant level of contact by individuals with inventions or ideas which they wish to investigate and possibly commercialize.

2. Local economic development units do not normally have sufficient staff or expertise to really work with these inquiries other than to encourage development of a business plan.

3. There is a need for access to marketing information, however, the meeting did not arrive at a concensus as to when detailed information is required, ie. at business plan stage, at a stage when potential investors are taken with the idea or when a company goes into operation. (Some felt that the most critical stage is when the business plan is being prepared).

4. How one interprets (3) influences the view on the availability of information for the NTMN. The more general the need the more likely information is available on existing databases which only need to be accessed.

5. The group was unanimous that a NTMN should:

    - not be systemized to the point that personal involvement is eliminated. The concern is that whether a new company is formed may well depend on a personal "champion"

- work within an existing structure such as EDO's, Innovation Centres, etc. for delivery as there are far too many groups already in existence. (The group was not satisfied that the Entrepreneurship Institute would be an appropriate approach as the concept was unproven).

6. The group was receptive to a private sector, profit oriented firm undertaking the activity but noted that a senior government stamp of approval would be desirable to mute criticism that EDO's were favouring one firm which was probably not located in the area. (Government group might do it but would there be the champion?)

7. The group concluded that, if the network was sufficiently valuable, EDO's might offer access by entrepreneurs to the network in their facilities for a fee of $100 to $200 (perhaps the EDO's paying some annual fee for the service). On the broader aspect of financing the cost of more detailed support by a private sector supplier, the group suggested it might be encouraged by tax incentives to investors such as is done through Ontario's SBDC program.

8. In conclusion:

   - there is a need for support which cannot be met by local economic development units;

   - there is a need to deliver services economically through an existing outlet or outlets;

   - the basic backup could well be private sector provided it was profit oriented and had government approval;

   - financial support for the services would be entrepreneurs (limited) and investors (with appropriate tax legislation).

5.0 Private Sector Initiatives

Within recent years a number of private sector approaches have been initiated to assist entrepreneurial development. In some cases, available information was limited since detailed company operating data were considered proprietary.

A. The Entrepreneurial Community Corporation of Canada

Origin/Structure

The Entrepreneurial Community Corporation of Canada (TECCC) was incorporated in November 1986 to help community economic development officers stimulate new business formation in Canadian cities. The principal and controlling shareholder of the company is Mr. James A. McPherson, former Chief Executive Officer of the Canadian Industrial Innovation Centre of Waterloo, Ontario. Mr. McPherson is also President of the new company.

The company acquired from the Innovation Centre certain assets of The Entrepreneurship Institute of Canada, which has become a division of TECCC. The intent of TECCC is to market the programs developed by The Entrepreneurship Institute of Canada through community-based affiliated local offices across Canada. The company is based in Waterloo, Ontario.

This aspect of the report covers the requirements of the Terms of Reference requiring consultations with the Entrepreneurship Institute of Canada to avoid duplications of effort.

Programs

The objective of the new company is to complete the development of programs begun when the Institute was an operating division of the Innovation Centre and to deliver them to communities in Canada, under the label of "The Entrepreneurial Community Program". The first of two key elements is an "Entrepreneurs' Forum" in a community. The Forum brings together, for a one or two-day period, potential entrepreneurs with experienced individuals in all areas of business. The second phase is the "Enterprise Planning System" which makes available, through a "store-front", materials and services designed to provide the basic assistance necessary to enable an entrepreneur to properly research and develop business plans and to discuss them with local business representatives who have specific experience in the relevant industry. A separate set of materials is available to those already in business and who wish to expand.

The program is designed to be supplied by personnel at a permanent office established in the community which is supported by a group of local people to whom entrepreneurs would have access on a confidential basis. The Institute has developed, or will develop, all the tools necessary to support the local offices. In addition, the Institute will perform assessments of business plans and will assist the entrepreneur to obtain financing when sources are not available in the community.

Marketing

The Institute will market its services on a community-by-community basis to economic development officers (or industrial commissioners) located in various communities across Canada. In some cases, their offices may form the basis for delivery of the Institute's programs.

Funding

The company has secured (as of November 1986, final funding details were being negotiated) a contract with Employment and Immigration Canda which will provide the funding necessary to complete the development phase (complete the development of programs) and to test its products in the marketplace. The contract involves a total budget of $1.2M (half of which is in-kind and some cash support from communities). The contract calls for delivery of the Institute's programs to Thompson, Manitoba, Thunder Bay, Ontario; Hamilton, Ontario; Penticton, British Columbia; Cornor Brook, Newfoundland; and Sherbrooke, Quebec. Apart from the Employment and Immigration contract, projects are being planned for Richmond, B.C., Calgary and Winnipeg. The organization of forums and the development of materials is planned for January to May 1987 and actual delivery is expected to begin in September 1987. Funding is currently being sought from corporate and other sources for the $600,000 matching funds required under the Employment and Immigration contract (eg. banks). Funding is also being sought for continuation of the publication the "Entrepreneurship Development Review" started by the Institute when it was a division of the Innovation Centre. An estimated $40,000 subsidy or advertising revenue is necessary.

Instructional and Assessment Materials

The following instructional and assessment materials are included as part of the Enterprise Planning System:

1. The Opportunity Focus for Entrepreneurs at the Pre-venture Stage

   A set of self-paced instructional materials and professional assessment containing the following modules:

   - Going Into Business?;
   - What Are You Selling?;
   - Who Will Buy It?;
   - How Will It Be Distributed?;
   - How Much Will It Sell For?;
   - How Many Will Sell in the First Two Years?;
   - How Much Will It Cost?;
   - The Opportunity Assessment or "Who Else Says It Will Fly?"

2. The Entrepreneur's Self-Assessment

A self-administered inventory of the entrepreneur's skills, background and personality, which forms the basis for customized guidance on the following from the Institute's Entrepreneurship database:

- background and life experience relative to the intended business;
- effectiveness of the entrepreneur's skills in perceiving and dealing with business situations;
- appropriateness of the entrepreneur's expectations and attitudes;
- appropriateness of the entrepreneur's reasons for starting the business;
- temperament of the entrepreneur relative to operating the business efficiently and interacting effectively with partners and employees;
- management competence and skills fit relative to intended business.

3. The Business Plan

A series of modules to prepare, target and present business plans for businesses seeking access to Venture Capital (as opposed to early seed capital):

- New Venture Planning;
- The Business Team;
- Preparing the Business Plan;
- After the Start-Up;
- The Business Plan Assessment.

Community Support Materials

The following materials are provided which serve to support a community in delivering the Institute's programs:

1. Video-tape Series

   A series of six video-tapes on new enterprise development.

2. Training Program and Enterprise Planning System Manuals

   An intensive one-week training program for key personnel in affiliated organizations.

3. Client Monitoring and Network Management System

   A software system for tracking and follow-up services to entrepreneurs plus communication of information to the Institute's head office and other affiliated offices across Canada.

4. Publications

   Publication of the Entrepreneurship Development Review - four issues per year.

Analysis of TECCC versus NTMN

The planned elements of TECCC appear to contain the essential elements of the proposed "broker" and "training" functions of the NTMN. Similar to the broker role, TECCC will ferret out new product ideas, put the originators through a business planning process and aid with securing early-stage capital. Also as proposed for the NTMN, TECCC will assist start-up operations with expansion. TECCC training modules include, as would the NTMN, entrepreneurial training, managing start-ups, marketing, dealing with financial markets, financial management and writing business plans.

TECCC does not, however, include the "market information network" aspect of the NTMN. In fact, no specific proposals are contained in TECCC, as in the NTMN, to obtain market information.

It should also be noted that TECCC is directed towards small and medium-sized businesses in general and not technology-based firms as is the NTMN. In this respect, TECCC subsumes the NTMN since its activities would certainly include technology-based firms.

B. Centre for Industrial Technology Transfer and Trade (CIT-3)

Structure/Functioning

CIT-3 is a technology brokerage institution which is intended to facilitate the international movement and financing of technology. Ten provincial nodes are intended in Canada, with the first being planned for the MICOT Centre in Hull. Nodes will function autonomously but be interconnected electronically. The concept for CIT-3 originated in the

U.S. where twelve nodes will be established. The first phase of CIT-3's international operations is intended to include twenty overseas nodes as joint ventures.

Services

Documentation available on CIT-3 indicates that it will provide access to the following services and revenue sources:

- o corporate profile activity reports: matching ideas, capabilities, needs and resources;
- o corporate and business plans, management guidance plans;
- o manualization of unpatented know-how;
- o technical aids and engineering services;
- o technology evaluation;
- o licensing and patents;
- o royalty agreements;
- o grants from Federal, Provincial and Corporate Agencies;
- o Canadian and American military cost-sharing arrangements;
- o financing of manufacturing retooling and plant refurbishing;
- o project financing;
- o educational and tax-exempted trust funds;
- o R&D limited partnerships (RDLP's);

- o consortium and joint venture packaging;
- o mergers and acquisitions;
- o legal counsel, Canadian and international;
- o tax packages, Canadian and international;
- o covenants and audit trails;
- o one stop world scan scientific and technological data exchange;
- o data gateways and services to existing academic, government, commercial and CIT-3 databases, worldwide;
- o membership and sale of trade journal magazine and advertising services;
- o exhibitions of experimental iterations of innovative ideas;
- o telecommunications services, including computer conferencing;
- o organizational structure for seminars and conferences;
- o seminars and training packages.

CIT-3 Versus the NTMN

In contrast to the NTMN, CIT-3 appears to have little local (community) orientation. Instead, its thrust appears to be the moving and marketing of technology on an international basis. Consequently, there appears to be little overlap with the broker and training functions of the NTMN. The services outlined, however, could have a degree of overlap with those to be supplied by the national marketing network, particularly the international aspects. Additionally, such services are apparently intended to be delivered by telecommunications/database techniques, as planned for the NTMN.

C. Computerized Ontario Investment Network (COIN)

Structure/Functioning

COIN is a non-profit organization, operated by the Ontario Chamber of Commerce, which matches the business ideas of entrepreneurs with interested investors. The Ontario Ministry of Industry, Trade and Technology supplied initial funding in the amount of $100,000. Additionally, the network is supported and sponsored by various private sector companies.

Information available from COIN indicates the system works as described below. Both entrepreneurs and investors are required to outline, through questionnaires, their objectives and operating parameters before being entered into the system. An entrepreneur is required to answer questions pertaining to the nature of the business, amount of capital required, sales facts and projections, status (i.e. idea stage, infant company, young or established company), degree of investor involvement expected and several others. Investors answer similar questions concerning their preferences. Answers from both groups are identically formatted. This enables the COIN computer to search through its database of sets of investment and capital requirements and quickly find all the investor/entrepreneur matches or near matches that exist.

When a potential match is found, COIN contacts the investor first and provides a description of the investment possibility. If the investor is interested, COIN sends out a copy of the entrepreneur's answers to

the COIN questionnaire, plus an Executive Summary of the entrepreneur's business plan.

Up to this point, no names are given. If the investor wishes to go further after reading the executive summary, COIN informs the entrepreneur. If both parties agree, names are then exchanged so that a meeting can be arranged.

COIN charges applicants for being listed, rather than charging a commission or fee. Entrepreneurs pay $150 for a one-year listing. Investors pay $250 per year for being listed in all business categories.

COIN indirectly provides other services through its network of community Chambers of Commerce/Boards of Trade. COIN can advise on market conditions, assist in locating government advisory and assistance programs and help locate required professional skills.

COIN versus the NTMN

COIN overlaps the NTMN insofar as it has institutionalized the entrepreneur-investor matching aspects proposed for the broker role of the NTMN.

Other aspects of the broker role or other functions of the NTMN are minimally, if at all, present in the COIN concept.

D. TIEM Canada Inc.

Structure/Functioning

TIEM Canada Inc. is a private sector company whose focus is to provide a support system for small business at the community level. It has been operational for one year, of a 5-year set-up period. TIEM is based in Mississauga, Ontario and has four operational centres in St. John's, Syndey, Winnipeg and Vancouver. It is still not operational in Ontario - no agreements have been reached with Employment and Immigration, DRIE or the Ontario Ministry of Industry, Trade and Technology. Control Data Ltd. is an equity partner; Control Data also has several centres operating successfully in the U.S.

Services

TIEM provides two types of assistance: TIEM Centres and Business and Technology Centres (Incubators). With TIEM Centres, clients occupy TIEM premises for a period of 4 to 6 months and the Centre assists entrepreneurs in developing their business plans and provides training to improve management skills. Business and Technology Centres - the second step in the development process - provide for a longer period, more services and more advanced planning. Services include the development of practical business skills, business opportunities identification, business plan development, cash flow budgeting and market assessment/analysis. TIEM also provides access to professional/specialist services, equity financing, lawyers/accountants, other entrepreneurs/partners, new technology licences, etc. There are no up-front charges, payment is in the form of a royalty on sales for

5 years with the provision of ongoing advice and assistance. TIEM was established with funding assistance from the federal government. DRIE provided a repayable $11.8 million contribution for start-up of the program.

TIEM versus the NTMN

TIEM offers brokering and training services that are similar to those proposed for the NTMN. It has, however, a general rather than technology-based focus. It would appear that TIEM lacks any sophisticated access to market information.

E. Federally-Supported Innovation Centres

Two non-profit federally-sponsored Innovation Centres have been established in Waterloo and Montreal, respectively, to support entrepreneurial development and help commercialize Canadian technologies. While the long-term intent is to be self-sufficient, the two innovation centres were established with financial assistance from DRIE. The following briefly describes the two Centres:

E1. The Canadian Industrial Innovation Centre, Waterloo

The Innovation Centre is a non-profit corporation associated with the University of Waterloo. The Centre has five strategic objectives:

1. Invention development and utilization.

2. Enterprise and Entrepreneur development.

3. Encourage student inventors and entrepreneurs.

4. Provide educational services for innovation.

5. Stimulate and co-ordinate research in innovation processes.

The Centre provides the following services:

1. Invention Services

   - inventors assistance through assessment and evaluation to explore technical feasibility and commercial potential;

   - development agreements between inventors and the Centre to offer technical development assistance and also patenting, licensing, marketing.

2. Enterprise Development

   - opportunity appraisal, evaluation to determine success potential;

   - opportunity development assistance in product development, company formation, incorporation/partnership, business planning;

   - financing - sourcing suitable resources, eg. government grants;

   - business start-up advice/assistance re facilities planning, personnel, manufacturing;

   - innovation place: office/light assembly space/services made available to new companies.

3. Additional Services

   - technology assessment, financial management advice, patenting, co-ordination with University of Waterloo facilities and expertise, access to an innovation bank, world-wide technology sourcing, in-house education on innovation.

Costs are covered by charging fees at cost or participation in equity/royalty arrangements.

E2. Centre for Industrial Innovation, Montreal (CIIM)

An independent, non-profit organization established to support inventors and entrepreneurs. CIIM provides the following services:

1. "Newprod" Evaluation
   Service that determines success/failure of a new product; sets up a quick and simple method before costlier feasibility studies and development stages; claims a prediction accuracy of 84% based on 200 case studies experience; comparative profile determines strengths/weaknesses of project.

2. Commercial Services
   Provides market research, business plans, commercial partners search, technology transfer, new technologies brokerage.

3. Technical Service
   Technical evaluation of innovation projects; in-plant engineering to optimize product designs and fabrication; R&D programs assistance for small to medium-sized enterprises; project management; technological innovation seminars.

4. Preliminary Invention Evaluation Service
   Provides assessment of technical merits of invention; determines commercial value; determines strengths/weaknesses of plan of action; cost of $100.

5. Financial Counselling
   Provides guidance in selection of financing/government grants; early stage development participation of innovative projects; industrial partners location assistance; help in raising venture capital; new venture start-ups.

Innovation Centres Versus the NTMN

The Innovation Centres' services appear to overlap significantly the proposed broker role of the NTMN. While not as institutionalized, certain of the proposed training functions are included. The scope of the Waterloo Centre is, however, national as compared to the local orientation of the NTMN broker and training functions. No significant overlap, either from supplied literature or discussions with officials, was observed relative to the national market network.

Individuals and Organizations Interviewed

Federal Government

INTERVIEWEE	TYPE OF INTERVIEW*
1. Elizabeth J. Payne Acting Director General Office of Industrial Innovation Department of Regional Industrial Expansion Ottawa	P
2. Veli S. Dagpinar Chief, Technology Transfer Services Office of Industrial Innovation Department of Regional Industrial Expansion Ottawa	P
3. David Simpson Analyst, ERDA Agreements Office of Regional Development Department of Regional Industrial Expansion Ottawa	T
4. Harold Melanson Program Head, Incentives Division Industrial Research and Development Program Department of Regional Industrial Expansion Ottawa	T
5. D.K. Ranger Chief, Business Opportunities Sourcing System Department of Regional Industrial Expansion Ottawa	T
6. Claude Lajeunesse Director, Targeted Research Directorate Natural Sciences and Engineering Research Council of Canada Ottawa	P
7. Gilles Morier Grant Officer, Targeted Research Directorate Natural Sciences and Engineering Research Council of Canada Ottawa	T
8. W.M. Coderre Executive Manager, Industry Development Office National Research Council of Canada Ottawa	P

* T - Telephone
P - Personal

Individuals and Organizations Interviewed
continued

Federal Government

INTERVIEWEE	TYPE OF INTERVIEW
9. Earl Maser Information Officer, Industry Development Office National Research Council of Canada Ottawa	T
10. John C. Smirle Technology Development Division External Affairs Canada Ottawa	P
11. Information Officer Program for Export Market Development External Affairs Canada Ottawa	T
12. Information Officer InfoExport Program External Affairs Canada Ottawa	T
13. Information Officer Technology Inflow Program External Affairs Canada Ottawa	T
14. P. Hicks Acting Executive Director Canadian Jobs Strategy Group Employment and Immigration Canada Ottawa	T
15. D. Giddings Acting Chief, Labour Supply Analysis Employment and Immigration Canada Ottawa	T
16. Information Officer Export Development Corporation Ottawa	T
17. Peter Graham Information Officer Patent Information Exploitation Program Consumer and Corporate Affairs Canada	T

Individuals and Organizations Interviewed
continued

Federal Government

INTERVIEWEE	TYPE OF INTERVIEW
18. Jean Gariepy Director, Information and Technology Exploitation Branch Intellectual Property Directorate Consumer and Corporate Affairs Canada Ottawa	T
19. M. Rochon Director General Marketing and Information Services Branch Statistics Canada Ottawa	T
20. A. Abongi Acting Director Investment Environment and Policy Investment Canada Ottawa	P
21. Kenneth D. Hart Policy Analyst Investment Research and Policy Investment Canada Ottawa	P
22. Rodger S. Linton Project Development Manager Federal Business Development Bank Ottawa	P
23. Robin Heileg Information Officer Federal Business Development Bank Ottawa	P
24. Rod Stillwell Manager, AIM Network Federal Business Development Bank Montreal	T
25. W.D. Gordon Acting President and Chief Executive Officer Canadian Patents and Development Ltd. Ottawa	P

Individuals and Organizations Interviewed
continued

Federal Government

INTERVIEWEE	TYPE OF INTERVIEW
26. E. Rymek Chief, Business Development Canadian Patents and Development Ltd. Ottawa	T

Provincial Governments

27. Ivor Harrington Director Ocean Industries Innovation Group Department of Development Government of Nova Scotia Halifax	P
28. Vincent Santilli Development Planner Program and Evaluation Branch Department of Development Government of Nova Scotia Halifax	P
29. Thomas B. Nickerson President Nova Scotia Research Foundation Corporation Dartmouth	P
30. G. Stephenson Wheatley Executive Director Science and Technology Secretariat Department of Commerce and Technology Government of New Brunswick Fredericton	P
31. Information Officer Direction Generale des Services aux Entreprises Ministère de L'Industrie et du Commerce Quebec City	T
32. Information Officer Direction Generale de L'Industrie Service des la Promotion Industrielle Ministère de L'Industrie et du Commerce Quebec City	T

Individuals and Organizations Interviewed
continued

Provincial Governments

INTERVIEWEE	TYPE OF INTERVIEW
33. Ann Whalen-Griffin Director, Technology Policy Branch Ministry of Industry, Trade and Technology Government of Ontario Toronto	P
34. Judy Simon Senior Advisor Policy/Program Co-ordination Ministry of Industry, Trade and Technology Government of Ontario Toronto	P
35. George Moore Manager, Community Small Business Centre Program Ministry of Industry, Trade and Technology Government of Ontario Toronto	T
36. Gary Angst Community Small Business Centre Program Ministry of Industry, Trade and Technology Government of Ontario Toronto	T
37. Reay Bevis Senior Supervisor Disbursement Programs Ministry of Revenue Government of Ontario Toronto	T
38. J.K. Reichert Executive Director, Technology Division Industry, Trade and Technology Government of Manitoba Winnipeg	T
39. A.J.Y. Guy Deputy Minister Saskatchewan Science and Technology Saskatchewan Telephones Government of Saskatchewan Regina	T
40. Robert Wohl Data Manager, Electronic Industry Information Centre Alberta Research Council Edmonton	T

Individuals and Organizations Interviewed
continued

Municipal Governments

INTERVIEWEE	TYPE OF INTERVIEW
41. William Marshall President and General Manager Ottawa-Carleton Economic Development Corporation Ottawa	P
42. Marcelle Menard-Porier Business Services Officer Ottawa-Carleton Economic Development Corporation Ottawa	T
43. Phillip R. Green Director, Economic Development Branch City of Ottawa	T
44. L.B. Kearse Director of Business Development Regional Municipality of Halton	P
45. Matthew Fischer General Manager Niagara Region Development Corporation	P
46. W.F. Allcock General Manager, Business Development Department The Corporation of the City of Cambridge	P
47. D.B. Murray Industrial Commissioner City of Guelph	P
48. E.A. Barton Industrial Commissioner Economic Development Department City of Markham	P
49. George Borovilos Business Development Department City of Kitchener	T
50. Aleck McLeod Development Manager City of Peterborough	T
51. Veronica Cluett Administrative Director York Technology Association Markham, Ontario	T

Individuals and Organizations Interviewed
continued

Private Sector

INTERVIEWEE	TYPE OF INTERVIEW
52. M.I. Bishop Senior Vice-President and Chief Financial Officer GEAC Computer Corporation Limited Markham, Ontario	P
53. Rene Pardos Chairman Lanpar Technologies Toronto	T
54. T. Peter Hern Quintel Industries Ltd. Ottawa	P
55. Marge Armstrong Operations Manager Computerized Ontario Investment Network Ontario Chamber of Commerce Toronto	T
56. Nikki Basuk Executive Vice-President Centre for Industrial Technology Transfer and Trade Hull, Quebec	P
57. James R. McPherson President The Entrepreneurship Institute of Canada A Division of the Entrepreneurial Community Corporation of Canada Waterloo	P
58. Chris Armstrong The Entrepreneurship Institute of Canada A Division of the Entrepreneurial Community Corporation of Canada Waterloo	P
59. Gordon F. Cummer Director of Corporate Development Canadian Industrial Innovation Centre Waterloo	P
60. Gary K. Svoboda Supervisor, Marketing Services Canadian Industrial Innovation Centre Waterloo	P

Individuals and Organizations Interviewed
continued

Private Sector

INTERVIEWEE	TYPE OF INTERVIEW
61. Information Officer Centre for Industrial Innovation Montreal	T
62. Dianne Moore Executive Director Ontario Industrial Development Council	T
63. Ian Mumford Vice-President, Corporate Affairs Ontario Centre for Microelectronics Ottawa	P
64. David Rothwell Vice-President, Marketing and Sales Ontario Centre for Microelectronics Ottawa	P
65. Pat Duggan President Kanata Enterprises Corporation Kanata	T
66. Administrative Assistant Ontario Centre for Farm Machinery and Food Processing Technology Chatham	T
67. Administrative Assistant Ontario Centre for Automotive Parts Technology St. Catherines	T
68. Administrative Assistant Ontario Centre for Resources Machinery Technology Sudbury	T
69. Administrative Assistant Ontario Robotics Centre Ontario Centre for Advanced Manufacturing Peterborough	T
70. Don Stelliga Client Services Consultant Ontario CAD/CAM Centre	T
71. Client Services Consultant Canada/Ontario Centre Ontario Centre for Advanced Manufacturing Windsor	T

Individuals and Organizations Interviewed
continued

University

INTERVIEWEE	TYPE OF INTERVIEW
72. John Callahan Director, Research Centre for High Technology Management School of Business Carleton University Ottawa	P
73. Robert B. Nally Commercial Development Office University of Waterloo Waterloo	P

Other

74. Jerry Turcotte President Ottawa-Carleton Research Institute Ottawa	P
75. Gilles Le Breton Communications Marketing Specialist Ottawa-Carleton Research Institute Ottawa	T
76. Peter Buckland Australian High Commission Ottawa	P