Science and Technology
Company Profile and Needs Assessment
for Northwest BC

JUNE, 2007

Prepared for:

Northwest Science and Innovation Society (NSIS)

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Acknowledgements

This study was made possible due to the visionary leadership of the Northwest Science and Innovation Society's Executive Director and Board of Directors. It is evidence of their strong commitment to growth and development of their region. Cambria Gordon Ltd. would like to thank the Board for the opportunity to be involved in this project. We appreciate the involvement and contribution of Christine Slanz-Ignas to the synthesis of the process and the content. We would also like to acknowledge the individuals that were interviewed or engaged in discussion on behalf of this study. Their time and insights are very much appreciated.

Report Note

The Report Summary replaces the Executive Summary typically found in research reports. This expanded version was provided so NSIS would have a standalone version of the document to provide to interested parties.

About the Authors

Cambria Gordon Ltd. provides strategic expertise to individuals and organizations to assist with sustainable community, economic and resource development. We specialize in our own backyard of northern British Columbia and have a vested interest in the growth and development of this area. Our expertise is achieved by delivering over 350 projects throughout BC working with First Nations, industry, community associations, educational institutions, and all levels of government. Cambria Gordon Ltd. is founded on long-term relationships based on core values of trust and respect which we share with our clients, colleagues and associates.

1.   REPORT SUMMARY

The Northwest Science and Innovation Society (NSIS) is an independent, non-profit society dedicated to economic development and diversification of the northwest BC region through the application and/or use of science and technology.

NSIS initiated this study, the Science and Technology Company Profile and Needs Assessment, to identify science and technology entrepreneurs in their region, ascertain the needs of this target market, and identify opportunities to foster the growth and development of this sector in Northwestern BC. The instruments used to fulfill these objectives include the creation of a science and technology company database from which data was extracted for the delivery of a questionnaire.

The information contained in this report is intended to provide NSIS with solid baseline information on who the entrepreneurs are in the science and technology sector within their territorial boundaries and insight into their needs and the challenges they face. The database provides the foundation from which NSIS can add and edit data as more information is gathered. The report findings set the stage for future and more specific investigation that enables NSIS to continually monitor and adapt their programs to continually meet the needs of their target market.

Cambria Gordon Ltd. is a local firm that has experience conducting asset inventories, expertise in long-term planning and strategy development, and extensive resource development knowledge within northern BC. This firm provided the required expertise and conducted the necessary research for this project.

Science and Technology Company Definition
A critical first step was to develop a definition of a Science and Technology company that encompassed innovators and/or science and technology businesses located within the NSIS region that could benefit from NSIS's services and programs. The science and technology or high-tech industry includes a wide range of activities, including both goods and services industries. Due to rapid growth, development and expansion of this industry sector, the marketplace uses a variety of definitions to describe a high-tech business. It was therefore essential to establish a description of a science and technology business that NSIS can use to identify and segregate their target market.

The NSIS definition of a Science and Technology company is a business that possesses at least one of the following characteristics.

Innovative:	Designs and develops new, improved or breakthrough products, services or processes offering a *significant or substantial change* AND *adds value* to the end user by increasing monetary worth.
Science Based:	Conducts *research and development activities* that study nature or natural phenomena to discover enduring relationships (principles).
Engineering Based:	Conducts *research and development activities* that develop economical solutions to technical problems to create products, facilities, and structures that are useful and practical.
Technology:	The *use and application* of scientific and engineering knowledge to achieve some practical and potentially *commercially viable* result incorporating a *technological challenge* (i.e. employ chemical, mechanical, computer, aerospace or means).

If the business operations involved one of the above characteristics, it was included in the database. It was recognized that NSIS would want to differentiate and target services and programs to suit differing needs and focus efforts towards businesses that are more closely aligned with NSIS's mandate. Therefore primary and secondary target markets were identified.

NSIS Primary Target Market includes a business or business concept that meets at least TWO of the characteristics. These businesses were included in the NSIS database and received questionnaires.

NSIS Secondary Target Market includes a business or business concept that meets ONLY ONE of characteristics. These businesses were included in NSIS database for communication and marketing purposes only.

A Decision Tree was developed, using Yes/No questions to determine if a business or business concept qualified as a science and technology entity and therefore included in the NSIS database. This Decision Tree was developed for two purposes. The first, to assist researchers in the classification of businesses for the purpose of this study and second, to provide NSIS with a tool to use in the classification of new businesses added to the database over time.

An important segment of NSIS's audience that would not be captured when examining established businesses was the entrepreneur that is in various phases along the commercialization pathway. The commercialization pathway in development of a commercially viable business includes the following phases:

1. Idea phase
2. Research and Development phase
3. Prototype and Process Development phase
4. Production and Market Launch
5. Sales and Distribution

The length of time it takes an innovator to develop a concept into a marketable entity is often considerably longer than an entrepreneur entering the market place with a product or service ready to sell. For this reason, it was important to recognize the different stages of the business commercialization pathway, recognizing that entrepreneurs may require NSIS's assistance and support during the pre-commercialization phases of 1 through 4.

Science and Technology Company Database

The science and technology company database includes an inventory of the identifiable science and technology entrepreneurs and innovators in NSIS territory.

The North American Industry Classification System (NAICS), a 6-digit classification system developed jointly by Canada, the United States and Mexico to provide a common statistical framework for economic analysis, was used to classify businesses into industry sectors.

There are two important distinctions that differentiate NSIS's database from other business and technology organizations. The first deviation is the inclusion of entrepreneurs that are in the pre-commercialization development phases. Most organization focuses on businesses once they have a product or service ready for sales and distribution. NSIS's market includes these businesses but also entrepreneurs in the idea phase through to the production and market launch phase. The second distinction is NSIS's classification process. Businesses were selected for inclusion in NSIS's target audience based on their "fit" with NSIS's science and technology definition rather than segregation by their NAICS code. NSIS recognizes that innovation is not unique to a specific group of industries, but can be found throughout the whole economy. Some firms on the "leading edge" or entrepreneurs in various stages of developing their innovative idea would be missed if they were classified in industries that, in aggregate, fail to show high tech characteristics. Therefore businesses were not excluded if they did not belong to a high technology sector code.

Science and Technology Company Survey

In recognition of the different issues that entrepreneurs face in the differing phases of the commercialization pathway, two separate questionnaires were developed: one for the companies that were already engaged in sale of their product, process or idea, and the other for companies in the pre-commercialization stage.

Questionnaire #1, aimed at businesses in the commercialization phase, was the primary instrument employed. Questionnaire #2 was designed for entrepreneurs in the pre-commercialization phase and was only engaged as a pilot project. The intent of Questionnaire #2 was to provide NSIS with an initial glimpse into the issues and concerns of these entrepreneurs. Both questionnaires were designed to provide NSIS with a tool that could be continually used to gather information on science and technology companies.

A mail-out questionnaire, with follow-up telephone support was selected as the most efficient and effective method to gather information given the size of the study footprint.

A total of 89 questionnaires were sent out and 22 were returned, a 25% response rate. As more information was revealed about the business' operations through the survey questions, only 19 of the returned questionnaires truly met the definition of a 'science and technology' company and were used in the analysis.

In addition to the survey, 300 marketing letters were sent to businesses that were considered part of NSIS secondary target market. The marketing letter was designed to increase awareness about NSIS and its services as well as briefly describe the Needs Assessment study. Although businesses in NSIS's secondary target market were not sent a survey, they were provided the opportunity to participate in the study.

Two follow-up phone calls were made to businesses to encourage their participation in the survey.
Although the sample size is small, it was representative of the geographical area. This small number was not unexpected as the target market was unknown at the onset of the study. This in-depth investigation is the first of its kind for NSIS. The intent of this study was to define NSIS's target markets and provide templates for collection of information for future studies. The reluctance of businesses to participate in the survey could be attributed to the low profile that NSIS has within the established business community, as gauged by the responses to the questionnaire follow-up phone calls. In consideration of the small sample size, the reader should not extrapolate the information presented to represent the entire industry within the NSIS area. The presented information should be used as a starting point from which to validate with additional studies at later date.

The information that was provided by the respondents did provide valuable insights into human resource and growth and development issues facing science and technology companies.

Science and Technology Company Profile
The following table summarizes the findings of survey.

Business Structure	72% of respondents were incorporated companies.
Mentorship	72% of respondents use management support networks.
Business Size	Even distribution based on number of employees: Owner operators (33%) / 5 to 49 employees (39%) / >50 employees (28%)
Gross Sales	56% greater than $1 Million / 31% less than $100,000 / 13% between $100,000 and $500,000
Business Age	11+ years 56% / 6-10 years 28% / 3-5 years 11% / 0-2 years 6%
Industry Sector	Two largest sectors: Information and Cultural Services (32%); Manufacturing (21%)
Product Production	81% of respondents produce products/deliver services close to home/within BC.
Intellectual Property	Half of respondents have products or services that involve IP.
Innovative Activities	83% of respondents attended a technology based conference or trade in past year.
R&D	Two major areas of interest: software, web design/hosting and telecommunications.

Total Number of Employees	2,145 people employed by science and technology companies.
Gender	Male dominated workforce (88%).
Full time status	Majority (59%) of respondent businesses only hire full-time staff.
Education Level	43% of employees had high school; 27% with some post-secondary.
Recruitment Location	35% recruit staff locally; 48% recruit from within the northwest.
Recruitment Method	Majority of respondents use informal networking and local newspaper advertisement.
Employable Skills	Need for professionals and technical or computer skills .
Training	Majority preferred: in-house training programs, internet on-line training or job shadowing and mentoring.
Ease of Hiring	75% of respondents found it difficult to hire administrative, technical, sales and marketing staff and skilled trades.
HR Development	Areas for development: compensation and benefits, job descriptions, recruitment and selection procedures, performance review, and feedback processes.
Business Growth	35% of the respondents expecting sales to increase by at least 50%; majority of respondents expect increase in staff in next 3 years.
Market Development	Majority of respondents want to continue to focus efforts on NW BC.
Financing Methods	Respondents use both equity and debt financing.
New Capital Investment	65% of respondents are planning investment for greater than $50,000.
Business Development	Top two areas: goal setting and planning and work-life balance.
Growth-Development Priorities	Develop significantly new product or service, develop a niche market; develop networking partnerships, increase business visibility.

Science and Technology Company Needs Assessment

The survey information was analyzed for gaps and patterns and the following table highlights the gaps and supporting recommendations.

Workforce Gaps	Recommendations
Mid-level to senior level management in demand.	Identify all training facilities within the NSIS region (e.g. NWCC, UNBC, Kitimat Valley Institute, Northwest Training Centre, etc.). Investigate their program offerings. Explore opportunities to partner with organizations to offer targeted programs. Research the availability of recruits with existing skill levels within the NSIS region. Discuss with existing respondents the possibility of succession within the company and the specific upgrading skills required for their existing staff. Provide information on the key capabilities and skills

	gathered in this and subsequent studies to educational institutions. Explore mutual beneficial opportunities.
Companies are hiring consultants to fill expertise gaps.	Increase awareness of NSIS partners that offer free business counseling and mentoring. Enroll the respondents who currently hire consultants in MentorLinx program.
Finding and keeping qualified, capable staff.	Provide businesses with access to partners with information on human resources issues. Content should include information on hiring, compensation packages (benefits, profits sharing, flexible work hours, career path development, etc.), co-op positions and people management skills. Provide statistics on NSIS website or partner with regional Economic Development organizations to provide statistics on industry wage standards and internet links to sites on occupational profiles. Give presentations at high schools, and colleges that highlight NSIS's programs and services and the job opportunities that are available in their local area.
Recruitment methods primarily done by informal networking and not using or accessing other methods to broadcast needs.	Provide education and awareness of effective recruitment practices through electronic and in-person delivery. Contract technology programs instructors at educational institutions and pursue relationship building for more awareness of NSIS programs and services and brainstorming for future partnership programs (e.g. co-ops, job shadowing, etc.) Add an 'Employment' section to the NSIS webpage. Here employers can post job opportunities and employees can post resumes. Raise NSIS's profile with job creation/seeking agencies that assist employers with recruitment needs. Contact alumni associations for information on graduates. Use information to contact individuals who have left the area to advise them of opportunities 'close to home'. Provide opportunities for students and employers to meet on an informal basis and possibly establish a mentor relationship between the entrepreneur and the student.
Training and Upgrading Gaps	**Recommendations**
Mom and Pop businesses only employ in-house training.	Contact this target group to inform them of training options, some for no cost and a variety of delivery methods.

Marketing and Sales Training	Investigate canned programs like 'Superhost' that can be offered to coach staff on continual marketing and sales techniques. Partner with local Chamber of Commerce and tourism organizations.
Management Support Gaps	**Recommendations**
Small companies employing less than 10 people do not use mentors to assist with business growth and development. Need for development of networking linkages or partnerships connecting cooperative partners and mentors.	Initiate an awareness campaign, incorporating Community Futures, IRAP, and BCRSTN. Use communication channels like Chamber of Commerce, Rotary, and industry sector specific associations to deliver message.
Only established companies (i.e. greater than 10 employees) divide the management functions amongst a management team.	Set-up an electronic "chat site" through the NSIS web page that entrepreneurs can ask questions - "anonymously if desired" - and receive information management or confidential issues.
Lack of awareness on the necessity and usefulness of long term planning and goal setting.	Access resources of Community Futures to put workshops together on Business Planning to include: Human Resource development, succession planning, people management, business plan, training plans, and internal communications.
Market Gaps	**Recommendations**
Limited sales and distribution of goods and services. Respondents focus for existing and future sales are primarily on Northwestern BC. Little interest demonstrated in export, national or international sales.	Increase awareness in the potential of and the steps involved in establishing an export market, perhaps partnering with Export BC (www.expoertbc.com). Emphasize that a high percentage of export goods are transported by truck and rail. This established transportation route may generate interest for additional sales or product development.
A need was identified for assistance with marketing components, specifically: • target market identification, • specialized market development, and • increased business visibility or profile.	Initiate an information campaign to address marketing issues in partnership with other organizations. This could include a column in the local newspapers, and/or 'How-To' Fact Sheets. These fact sheets could be added to the website. Partner with IRAP to provide a higher profile for their MAP – Marketing Assistance Program. Establish a non-competitive mentorship program between established companies that have successful, visible identities and low profile businesses. This could consist of an electronic relationship and mentors could consist of businesses in BCRSTN sister organizations.
Operational Constraints	**Recommendations**
Website development and maintenance	Investigate existing courses currently offered through Distance education or continuing education. Partner with educational source, use their communication mediums to advertise the course and use the database mailing list to contact science and technology

	companies.
Transportation issues – shipping goods to customers and cost of doing business in the north.	Open discussions with local Economic Development organizations to identify areas of opportunity for innovation, science and technology in the transportation sector. This focus would encompass the Prince Rupert Port facility, eastern seaboard and Asian markets, and the increased transportation needs to support the Nova Gold development in Iskut. A forum or workshop, presented by transportation companies like CN Rail, Excel Truck Transportation, Canada Post, Greyhound, would provide information on transportation methods, their advantages and pricing.
Financing Needs	**Recommendations**
Access to financing for existing operations.	Research probable programs and funding sources for entrepreneurs, including grants, co-op programs, internships, IRAP, etc. and add to NSIS webpage – it might be called 'Show Me the Money'.
Access to financing for R&D and prototype testing. Lack of awareness on advantages of SR& ED tax credits.	Advertise testimonials from existing entrepreneurs on where to access funds and the avenues to get there. Partner with IRAP.
Innovation Gaps	**Recommendations**
Small companies (with less than 10 people) do not have intellectual property or do not use any method to protect it.	Develop an awareness campaign to demonstrate the different methods (both formal and strategic) that can be used to garner and protect IP information. Partner with IRAP.
Development Needs and Concerns	**Recommendations**
New Idea Generation	Generate interest in the science and technology sector by profiling and headlining an' easy to relate to' industry sectors. The majority of general population equates science and technology sector with computer and telecommunications software and hardware. To encourage new inventors and increase awareness about the potential of the science and technology industry profile a Sports technology would be a good area to profile to the northwest, perhaps with a hockey focus. Initiate a newspaper article on grassroots entrepreneur human interest stories. These stories would illustrate how ordinary people contribute innovative ideas and products, with a focus on the northwest if possible. Initiate a 'blue sky' forum. This is where existing and established entrepreneurs can get together in a casual setting to discuss innovative ideas and needs.

	At trade show use opportunity to highlight partnerships and information sources for entrepreneurs.
Work-Life balance and Priority Setting	Partner with organizations concerned with this issue, specifically Service Canada (formerly HRDC), service club organizations, counseling organizations, health care providers, etc.
Industry sector gaps in research and development and new technologies. Narrow focus of high technology sector development in terms of the type of product or service offered and the area serviced.	Investigate needs of major industries that are experiencing significant change (i.e. forestry – pine beetle infestation, mining development in NW, air, rail and rubber tire transportation, and fishing originating from Kitimat and Prince Rupert). Disseminate this information to existing businesses involved in these industries. Partner with other organizations to bring in guest speakers who are working in new technology sectors that are feasible in the NW. Two options: 1) build on the existing sectors, telecommunications / wireless technology and manufacturing, or 2) identify new sectors and develop awareness campaign for businesses and public. Develop a round-table series on high technology topics that were highlighted by the survey: specifically software development, website design and hosting, telecommunications and wireless communications.
NSIS Development	**Recommendations**
Create expanded awareness of NSIS, its' mandate, programs, services, events and contact information.	Concerted effort between partners to make a public awareness splash. Highlighting program and services available. Create written material (flyers) listing all services and made available at all partnerships. Links of partners web pages.
Development of NSIS's programs and partnerships.	In development of campaigns or programs the following 2 approaches can be used either alone or in combination to deliver the intended message or services. The two approaches include: 1) shotgun approach – target a wide audience and hope that a few interested individuals are captured, or 2) rifle approach – target specific companies that NSIS has a vested interest in, and direct resources towards the specific needs of those organizations. Offer a regular seminar series and/or newspaper column on topics identified in this report. Communication conduits with organizations and associations that entrepreneurs may frequent should be established, if they are not already in place. A list of these could include but are not limited to the Chamber of Commerce, Rotary Clubs, industry associations

	(engineering, technology, industry sector, etc.).
	Initiate a monthly speaker series (during the winter months as indicated the best time for training by the survey respondents) to discuss a variety of topics. The speaker could visit the larger municipalities and the 1-day event could have an interactive question and answer section.
Expanding NSIS's knowledge base on science and technology entrepreneurs and companies.	Follow-up Survey in three years to build on existing information. Will be able to ask more targeted questions to a more targeted audience.
	Put Questionnaire #1 and #2 on website. Use collected information to continue to build upon existing database.
	Use local IRAP representatives to get pre-commercialization entrepreneurs to fill out Questionnaire #2.

Identification of the issues faced by science and technology companies will assist NSIS with integration and allocation of the service they provide to assist these companies in overcoming obstacles and barriers that limit the growth and development of their businesses. The gap analysis provides a foundation for NSIS to measure their investment of time, money and human resources required to achieve this outcome. The actionable recommendations that emerged from the gap evaluation process will be a starting point for NSIS to formulate a strategic plan to prioritize and target their energy and resources.