Evaluation of the Canada-Israel Industrial Research and Development Foundation

Final Report

Foreign Affairs Canada,
International Trade Canada
and
Industry Canada

Office of the Inspector General
Evaluation Division (SIE)

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List of Acronyms

ACOA	Atlantic Canada Opportunities Agency
BIRD	Israel-US Binational Industrial Research and Development Foundation
CFI	Canadian Foundation for Innovation
CIIRDF	Canada-Israel Industrial Research and Development Foundation
COPAC	Canadian Opto-electronic Packaging and Assembly Consortium
CPC	Canadian Photonics Consortium
CPFC	Canadian Photonics Fabrication Centre
FAC	Foreign Affairs Canada
IRAP	Industrial Research Assistance Program
ITA	Industrial Technology Advisor
ITCan	International Trade Canada
JEC	Joint Economic Commission
MOU	Memorandum of Understanding
ORDCF	Ontario Research & Development Challenge Fund
PMO	Prime Minister's Office
R&D	Research and development
STP	Strategic Technology Program
TIP	Technology Inflow Program
TOEP	Technology Opportunity in Europe Program
TPC	Technology Partnerships Canada
WED	Western Economic Development

Executive Summary

The Canada Israel Industrial Research and Development program is delivered through the private sector-based Canada-Israel Industrial Research and Development Foundation (CIIRDF). The rationale for the program is that closer research and development ties, particularly in the knowledge-based sectors of the economy, are an effective way of enhancing commercial relations over the long term.

CIIRDF has two major objectives:

- To strengthen Canada-Israel science and technology cooperation and binational business to business alliances; and,
- To strengthen the international ties of Canadian businesses by promoting a more global orientation in their approaches to corporate planning, technology acquisition and market development.

An anticipated outcome of meeting these objectives is the strengthening, ultimately, of the overall economic, trade, and cultural relations between the two countries.

The specific objectives of this summative evaluation were to assess:

- the continued need to support CIIRDF with public funds;
- the achievement of CIIRDF objectives in terms of innovation capacity, international relations, and socio-economic impacts; and
- the effectiveness and efficiency by examining how the CIIRDF program has been administered in terms of Governance, Strategy, Program Design, management, and Delivery.

Based on a document review and interviews with key stakeholders, the study concluded that CIIRDF's objectives continue to be relevant to Canadian and Israeli companies, and that further public support of CIIRDF is appropriate. CIIRDF matchmaking or linkage activity coupled with sufficient funding to support R&D projects provides a good mechanism to link Canadian technology firms with new sources of technology. Our analysis revealed that most firms would not have conducted the R&D project without CIIRDF funding, as their R&D budgets are too small and the risk associated with conducting R&D projects with international partners is relatively high.

The study concluded that CIIRDF has improved the competitive position of firms in a number of ways. CIIRDF funding has led firms in new directions: to create new

innovative products or services, to pursue new markets, and to spin-off companies. Our analysis, based on sales forecasts from eleven Canadian firms undertaking CIIRDF R&D projects since 1999, estimated that $714.5 million in cumulative sales revenues and $178.6 million in cumulative profits will likely be generated by 2013. The study concluded that these eleven projects have the potential to provide a return of $18.7 million[1], consisting of $1.9 million in royalties to CIIRDF and $16.7 million in potential income taxes to the Canadian government, recovered from profits associated with commercialization of these projects. Based on these figures, 3 of 18 CIIRDF projects, initiated since 1999, will have to achieve commercialization to cover the Canadian government's share of CIIRDF's costs over the period 1999-2004.

CIIRDF projects provide socioeconomic benefits. Examples include: a project that has the potential to make clean drinking water more available in the Middle East, and at the same time reduce the costs associated with treating saltwater and wastewater; and a project to treat inoperable solid tumours that could potentially replace the use of chemotherapy for certain patients and reduce hospital stays and their associated costs.

The evaluation revealed that CIIRDF has contributed to strengthen overall economic, trade, and political relations between Canada and Israel. CIIRDF has helped bring about a change in the perception of Israel held by Canadian firms, and Israeli companies are today more likely to consider Canadian companies for collaborative R&D projects than before CIIRDF existed. CIIRDF has been instrumental in the development of photonics and biotechnology consortia in Canada, modelled after successful consortia in Israel. These consortia offer the opportunity for Canadian firms to conduct joint R&D efforts with members of Israeli photonics and biotechnology consortia. The Foundation has also played a central role in the establishment of a National Roundtable on Photonics in Canada.

CIIRDF governance structure, management, and delivery strategies have played an important role in achieving CIIRDF's objectives. Key elements include its operation at arm's length from the Government; its bilateral/binational governance structure; its rigorous evaluation process which utilizes expert evaluators in both countries; and the direct support of R&D activity by contributing up to 50% of R&D costs incurred by private firms.

Our analysis concluded that the request for proposal process is competitive, fair, responsive, and transparent. Furthermore, support services appear to be provided effectively in Canada and Israel. CIIRDF is effective at finding suitable firms, making

[1] It should be noted that one project accounted for $6.9M in returns.

introductions, arranging meetings, making site visits to firms, and when necessary, smoothing out disagreements and misunderstandings between firms.

CIIRDF's recent strategy of developing consortia in the photonics and biotechnology industries is in accordance with both governments' strategic objectives, and complements the CIIRDF objective of promoting R&D collaboration between firms in both countries.

Finally, the CIIRDF model has clear potential for application with other important trading partners, including emerging economies. Of specific note is the opportunity for applying the CIIRDF approach with Palestinians in an effort to promote peace-building in the region.

CIIRDF's funding level is adequate, however a higher funding level would likely make CIIRDF's impacts even greater. The Israel-Korea R&D collaboration program, for example is funded at $10 million per year; the BIRD program (Israel-USA) is funded at about $14 million per year.

CIIRDF is well managed, however, there are opportunities for improving and/or strengthening administrative and managerial aspects of CIIRDF. The current method of repayment of contributions, namely the collection of royalties based on sales of products developed from CIIRDF-sponsored projects, creates an administrative burden for CIIRDF. A more practical approach to the repayment process may be one that requires firms to repay the contribution from CIIRDF over a set length of time (i.e., 7 years, 10 years, etc.), once the commercialization process has begun. Furthermore, the capture and dissemination of CIIRDF results to appropriate audiences needs to be more consistent and systematic, and more communication between CIIRDF and its sponsoring departments would be welcomed.

CIIRDF's President fulfills many roles such as evaluator, matchmaker, promoter, coordinator, administrator, leader, and troubleshooter. It is unclear if a successor could be found with comparable skills and with extensive contacts. However, CIIRDF's supporting structure (i.e., the evaluation process, the Board of Directors, and foreign contacts) appears to be strong and it is likely that CIIRDF would continue.

To address the issues identified above, the following steps are recommended:

Recommendation 1: *Industry Canada, International Trade Canada (ITCan), and Foreign Affairs Canada (FAC) should continue supporting CIIRDF and consider maintaining or increasing its funding level.*

Recommendation 2: *CIIRDF should adopt a more consistent process of capturing and disseminating its results. CIIRDF may wish to consider hiring a resource to conduct this function.*

Recommendation 3: *CIIRDF should strive to improve communication with its sponsoring departments.*

Recommendation 4: *CIIRDF should take steps to address the administrative weaknesses identified in issue 12: Program Management of this evaluation.*

Recommendation 5: *The CIIRDF Board of Directors should consider revising its current method of repayment of contributions by collecting royalties based on sales of products developed from CIIRDF-sponsored projects. A more practical approach to the repayment process may be one that requires firms to repay the contribution from CIIRDF over a set length of time (i.e., 7 years, 10 years, etc.), once the commercialization process has begun.*

The Management Responses to these recommendations could be found on page 48 of this report.

1.0 Introduction

This report presents the results of an evaluation of the Canada-Israel Industrial Research and Development Foundation (CIIRDF). CIIRDF was established in 1994 to promote collaborative research and development (R&D) between firms in Canada and Israel.

The overall objective of this summative evaluation was to assess the impacts CIIRDF has had in securing the interest and participation of Canadian advanced technology firms, by supporting and facilitating scientific, technical bilateral cooperation, and collaborative R&D projects between Canadian and Israeli companies. The evaluation assessed the extent to which CIIRDF is achieving its objectives in terms of strengthening Canada- Israel science and technology, and business to business relations between Canadian and Israeli companies. The evaluation also addressed the socio-economic impacts and the impacts on the overall economic, trade, and cultural relations between the two countries. Finally, the evaluation reviewed the continuing relevance of CIIRDF and the effectiveness of the results achieved since the renewal of the contribution agreement.

1.1 Report Outline

This report consists of five sections.

- Section 1.0 introduces the evaluation report;
- Section 2.0 discusses the methodological approach for the evaluation;
- Section 3.0 presents a profile of CIIRDF;
- Section 4.0 presents the findings of the evaluation for each evaluation issue;
- Section 5.0 presents the evaluation's conclusions and recommendations.

2.0 Approach and Methodology

2.1 Evaluation Scope and Objectives

The overall objective of this summative evaluation was to assess the extent to which CIIRDF has secured the interest and participation of Canadian advanced technology firms in collaborative R&D projects with Israeli companies. CIIRDF activities support and facilitate scientific and technical cooperation between Canada and Israel, as well as collaborative R&D projects between Canadian and Israeli companies.

The evaluation provides a summary of results, lessons learned and recommendations based on experience to date.

The specific objectives of the evaluation were:

- To evaluate the relevance of CIIRDF by assessing the continued need to support, with public funds, the development of relations in science and technology between Canadian and Israeli companies;
- To assess the extent to which CIIRDF is achieving its objectives in terms of innovation capacity, international affairs, and socio-economic impacts; and,
- To assess the effectiveness and efficiency by examining how CIIRDF has been administered in terms of Governance, Strategy, Program Design, Management, and Delivery.

The Statement of Work required the Contractor to address specific Evaluation Questions/Issues.

2.2 Evaluation Approach

The approach for this evaluation has been designed to address the above mentioned evaluation objectives and questions/issues. Four methodologies were utilized to conduct this evaluation:

- ***Document review:*** *Non-financial documents* were reviewed to examine CIIRDF's performance and to report on achievements against each evaluation criteria. These documents included CIIRDF reports and documents concerning its matchmaking activities, its efforts to enhance R&D linkages through the establishment of consortia in Canada, and the projects undertaken and specifics

on the companies involved. *Financial documents* were reviewed to determine the financial and economic impacts of CIIRDF funded projects.

- ***Interviews with key stakeholders:*** Telephone and in-person interviews with key internal and external stakeholders supplemented information obtained from the document review and were used to address the strategic and policy related issues. These interviews were conducted with representatives from the CIIRDF Board, Foreign Affairs Canada (FAC), Industry Canada, the Israeli government, industry associations, and consortia in Canada and Israel. A total of 44 interviews were conducted. The breakdown of key informant interviews was as follows:

Exhibit 2.1 Key Informant Interviews by Category

Key Informant Category	Canada	Israel
Government Representatives	7	4
CIIRDF Staff/Board of Directors	4	2
Private firms	18	2
Other key informants	4	3
Total	33	11

- ***Survey of CIIRDF-supported companies:*** A telephone survey of companies receiving support from CIIRDF since 1999 helped determine the impacts of CIIRDF on Canadian companies and identified issues of concern. A second questionnaire to gather more financial data was sent to those firms that have commercialized their products (3 firms).

- ***Case studies:*** Case studies, based on the file reviews and documents provide a better understanding of the dynamics of CIIRDF and its impacts for individual companies. Case studies describe why the firms originally got involved, what sort of benefits they realized from partnering, the factors that made the partnering successful, lessons learned, and taxes generated by commercialized products. Taxes flow to the government from profits derived from sales of products created by CIIRDF R&D projects. Case studies required telephone interviews with company representatives (in-person interviews where appropriate) and with the firms' Israeli partners, to provide a complete picture of CIIRDF's benefits and impacts.

3.0 CIIRDF

Canada and Israel signed a three-year Memorandum of Understanding (MOU) on March 30, 1993 to create the Canada-Israel Industrial Research and Development (CIIRD) program. The MOU was approved in the context of a March 1992 meeting of the Canada-Israel Joint Economic Commission (JEC) aimed at strengthening economic and commercial cooperation, thereby increasing the level of bilateral trade. The MOU was based on the successful Israel-US Binational Industrial R&D Agreement, known as the BIRD Fund, which had an initial endowment of US$110M, funded equally by Israel and the United States in 1977.

CIIRDF is delivered through the private sector-based Canada-Israel Industrial Research and Development Foundation (CIIRDF). The rationale for CIIRDF is that closer research and development ties, particularly in the knowledge-based sectors of the economy, are an effective way of enhancing commercial relations over the long term. During negotiations with Israel, Canadian representatives required that CIIRDF be incorporated in Canada. The rationale was that Canadian SMEs required more hands-on assistance due to their lack of experience with international collaboration, particularly with Israeli companies. Furthermore, according to CIIRDF management, the rationale had to do with the practical problem of having CIIRDF active across all regions of Canada, many in which there was little knowledge of Israel. To be effective, CIIRDF needed a regional profile in Canada, and with a small operating budget, this would be difficult to achieve with the Foundation headquartered in Israel.

In 1997, CIIRDF was renewed for a further three-year period by both governments. At the time, it was expected that CIIRDF would become self-financing by the end of the three-year period. On November 25, 1999, Cabinet approved postponing the self-sufficiency requirement and the Canada-Israel MOU and the funding of CIIRDF was extended from fiscal year 2000-01 to 2004-05.

3.1 CIIRDF Objectives

CIIRDF has two major objectives:

- To strengthen Canada-Israel science and technology cooperation and binational business to business alliances; and
- To strengthen the international ties of Canadian businesses by promoting a more global orientation in their approaches to corporate planning, technology acquisition and market development.

An outcome of meeting these objectives is the strengthening, ultimately, of the overall economic, trade, and cultural relations between the two countries.

3.2 Activities

CIIRDF is involved in three broad complementary activities:

- Promoting and marketing joint R&D collaborations;
- Matching companies in one country seeking a research partner in the other; and,
- Supporting projects financially by contributing up to 50% of the joint R&D costs.

CIIRDF management conducts a number of sub-activities to support the three activities described above. These sub-activities include program promotion, proposal evaluation and selection, contract negotiation and monitoring, post-project monitoring, collection of repayments, developing MOUs with regional organizations for program delivery and funding, and attending meetings of the Board of Directors.

3.3 CIIRDF-Sponsored Projects

CIIRDF sponsors two kinds of projects: feasibility projects and full-scale projects.

Feasibility Projects. In cases requiring preliminary investigations to determine the technical feasibility or market acceptability of a new project or process concept, the Foundation may grant up to $20,000 as its 50% share of conducting feasibility tests. Such awards are made on the understanding that a formal proposal for a full-scale project will be submitted by the companies to the Board should the feasibility results prove positive.

Full-scale projects. In a full-scale project, CIIRDF will contribute contribution amounts for the approved projects based on up to 50% of R&D costs or a maximum of $800,000. For full-scale projects, the President, based upon evaluations by Canadian and Israeli experts will submit his specific recommendations to the Board of Directors. Although the Board typically convenes semi-annually to take action on these proposals, highly meritorious proposals that offer exceptional opportunities to the proposing companies can be evaluated and acted upon throughout the year.

3.4 Assessment and Eligibility Criteria

Eligible companies are Canadian and Israeli firms which operate and are headquartered in Canada and Israel respectively. Subsidiaries of firms headquartered and owned outside of Canada and Israel are normally not eligible for CIIRDF support. An exception can occur if CIIRDF is satisfied that the subsidiary has a global product mandate for the technology being developed and that the product or technology will be substantially produced in or exported from Canada and/or Israel. Eligible R&D costs are as defined by Revenue Canada and the Israeli Income Tax Authorities (i.e., incremental direct costs of personnel, research consumables, some travel and capital costs if the equipment is essential to the project and has no other uses). Corporate overhead costs and financial charges are not funded. At least 30 percent of the actual R&D expenditures for a project must be in either Canada or Israel.

CIIRDF obtains third-party expert evaluation of applications for consideration and decision by its Board of Directors from experts in both countries. For example, Industry Technology Advisors (ITA) from the National Research Council of Canada, and professional evaluators of the Office of the Chief Scientist in Israel, provide expert and objective advice on the quality of the applications received.

3.5 Reporting Requirements

Technical Reporting

The purpose of the technical and financial reports is to enable the Foundation to monitor project progress and to assist in decisions relating both to continued funding of the project and to decisions on new projects. Semiannual and/or annual reports, depending on the duration of the project, are required as well as final reports at the completion of the project. The final report, which must be submitted within 60 days after project completion, should describe the outcome of the project in commercial terms, including the market acceptance of the products or processes developed, sales and cash flow forecasts, new product opportunities and any further activities planned jointly by the project partners. Firms are expected to compare the current sales and cash flow forecasts with those made in the proposal, and explain any differences.

Financial Reporting

The purpose of financial reports is to enable CIIRDF to monitor actual expenditures on the project and to assist in decisions relating to the continued funding of the project. All expenses incurred on a CIIRDF-supported project must be itemized. The Foundation

recognizes expense variations from budget of up to 10% within any of the major budget categories (e.g., direct labour, subcontracts, consultants, etc.) with the understanding that the total amount does not change. However, at any stage during the course of the project, if the actual expenses relating to a budget category are forecast to exceed the budget by more than 10%, a request for an amendment to the budget must be submitted.

Commercialization Reports (basis of royalty payments)

Commercialization is reported to CIIRDF on a semiannual calendar basis and forms the basis for royalty payments to CIIRDF. Reports are due within three months following the end of each semiannual period, and standard reporting forms are generally sent to the companies during the month following the end of the semiannual reporting period. Commercialization activities, and royalty payments resulting therefrom, are reported in terms of:

- Gross sales. Royalties are paid at 2.5% of gross sales.
- Revenues resulting from sales of patented inventions. The royalty rate accruing to CIIRDF on these revenues is 1.5%.
- Revenues derived from License Agreements. Subject to repayment to CIIRDF at the rate of 30%.

Cumulative repayments and royalties due to CIIRDF, contributions from any and all sources of revenues, are not to exceed 100% of the current contribution funds actually awarded the participants.

3.6 Organizational Structure

CIIRDF is incorporated as a not-for-profit corporation under the Canada Corporations Act. In Israel, CIIRDF is registered under the Israeli Corporate Register. The Foundation maintains offices in both Canada and Israel. The office in Israel is shared with BriTech, the Britain-Israeli Technology Foundation and a point of contact exists in the Office of the Chief Scientist, Ministry of Industry, Labour, and Trade. In Canada, CIIRDF is operated by a President and a small staff located in Ottawa. The President reports to a Board of Directors made up of three members appointed from each country. The Chairman of the Board is the Israeli Chief Scientist.

CIIRDF staff includes a President, reporting to the Board of Directors of CIIRDF and two staff members, which includes a Manager based in Israel who reports to the President.

3.7 Resources

Initially, the governments of Canada and Israel each contributed $1 million per year for a three year period (years 1994-1997). In February 1997, the commitments were renewed for another three years and, subsequently renewed in 2000 for an additional five-year period, terminating in 2005.

In Canada, arrangements are in place with regional development agencies such as the Atlantic-Canada Opportunities Agency (ACOA), Western Economic Development (WED), and the provinces of Ontario and Quebec to supplement program funding for projects located in their respective regions up to 25 percent of Canadian project costs.

The CIIRDF Board has placed a limit on overhead of 15 percent of the total annual funding from the governments.

3.8 New CIIRDF Initiatives

In addition to offering matchmaking services and funding collaborative R&D projects between Israeli and Canadian firms, CIIRDF is undertaking several new strategic initiatives, as approved by the its Board of Directors.

In 2002, CIIRDF began creating bilateral links between consortia and networks involved in technologies that are judged to be of critical importance to both countries. To help identify the most important technologies, CIIRDF is working with the National Research Council of Canada and seeking out national and regional centres of excellence in photonics and biotechnology to create a platform for joint consortia projects.

Photonics

CIIRDF has taken steps to establish consortia modelled after similar successful efforts in Israel. CIIRDF helped establish the Canadian Opto-electronic Packaging and Assembly Consortium (COPAC) to enhance Canadian leadership in opto-electronics through collaborative research and development in packaging and integration. COPAC consists of several Canadian photonics firms and is supported by several institutions such as Photonics Research Ontario, NRC, Carleton University, and Materials and Manufacturing Ontario. COPAC has held a number of workshops and commissioned a study in 2002 to identify technical concerns in opto-electronic component development.

COPAC's first priority is to promote and fund collaborative, industry-led research in opto-electronic packaging, integration and assembly through three major mechanisms:

- The Canada-Israel Opto-Electronic Packaging Project which will provide $2M in funding for industry-led R&D projects through the Canada-Israel Industrial R&D Foundation;
- Acquisition of support from the Ontario government through the Ontario Research & Development Challenge Fund (ORDCF) to fund university-industry collaborative research and development over 5 years;
- Acquisition of support from the federal government through the Canadian Foundation for Innovation (CFI) to enhance the national research and development capabilities by establishing R&D infrastructure in the Canadian Photonics Fabrication Centre (CPFC) and the Canadian academic community at large.

CIIRDF has also established and chairs a steering committee on the National Round Table on Photonics, with participation from the Prime Minister's chief science advisor.

Biotechnology

Pharmalogica is an Israeli consortium that brings together Israeli companies and universities in a series of research activities aimed at developing novel "generic" technologies for modeling the bioavailability of active molecules. In fall 2003, CIIRDF arranged two technology round tables drawing participation from pharmaceutical companies, universities, hospitals and venture capital. Four cluster communities (Ottawa, Toronto, Vancouver, and Montreal) were brought into the round table discussion aimed at two objectives. The first objective was to identify potential Canadian participation in the Israeli consortium and, therefore, leverage the partnering activities considerably. The second objective was to develop a "value proposition" for Canada in establishing a Canadian version of Pharmalogica. A return visit to Israel took place in the first week of May, 2004, on the occasion of Biotech Israel 2004, a major International Conference, held annually in Tel Aviv. The return visit provided an opportunity for the Canadian consortia members to meet the Pharmalogica research leaders and evaluate in greater detail the specific opportunities for Canadian participation.

Future Canada-Palestinian Initiatives

For a number of years, CIIRDF, with the support and encouragement of Canada's heads of post in the region, has engaged Palestinian interlocutors with the proposition of Canada establishing a similar organization with them. The creation of a Palestinian version of CIIRDF would establish a basis for greater involvement of Canadian businesses with Palestinian counterparts, would encourage investors in the economic

opportunities in the West Bank and Gaza and would, over time, create a platform for trilateral cooperation involving Israel. CIIRDF has also taken the initiative to identify specific areas of opportunity to ensure a practical and positive program launch. This has involved discussions with companies in the language software and water purification industries, among others. The overall initiative has received support at the deputy minister and minister level and awaits the right political opportunity and further program detail to become reality. The initiative would constitute an important new and positive role for Canada in peace-building. The use of a "CIIRDF-style" instrument and the direct involvement of CIIRDF itself in that role is a reflection of the growing importance that technology cooperation plays in international relations.

4.0 Findings

The following section presents the findings of this evaluation study by evaluation issue; i.e., program rationale, design and delivery, reach, success, etc. Evaluation questions used to address each issue, as identified in the evaluation methodology, are also identified.

4.1 Relevance

Issue 1: Relevance to Canadian & Israeli firms

Do the objectives of CIIRDF continue to be relevant to Canadian and Israeli companies?

According to its Treasury Board submission, CIIRDF has two major objectives:

- To strengthen Canada-Israel science and technology cooperation and binational business to business alliances; and
- To strengthen the international ties of Canadian businesses by promoting a more global orientation in their approaches to corporate planning, technology acquisition and market development.

The Treasury Board submission notes that an outcome of meeting these objectives will be the strengthening, ultimately, of the overall economic, trade, and cultural relations between the two countries.

Our analysis, based on interviews and documents reviewed, indicates that international collaboration is relevant to Canadian firms especially in industries where R&D costs are significant. Creating new products is particularly crucial in the technology sector, where Canadian firms tend to be small, have limited R&D budgets, and where products may require updating to remain competitive. CIIRDF is playing an important role in supporting the technology sector by assisting firms in the acquisition of critical technologies from Israel and by contributing up to 50% of R&D costs. In the photonics industry for example, which has struggled from the recent downturn in the telecommunications market, CIIRDF has launched the Canada-Israel Opto-Electronic Packaging Project which will provide $2M funding for industry-led R&D projects.

Canadian firms tend to be relatively strong in marketing and sales, while Israeli firms tend to be relatively strong from a scientific and engineering standpoint. Israeli firms tend to have access to the Asian and European markets, and Canadian firms tend to

have access to the North American market. Together, Israeli and Canadian firms can create new products that reach new customers, increasing both firms' revenues and profits.

Furthermore, CIIRDF has been instrumental in the development of photonics and biotechnology consortia in Canada, modelled after successful consortia in Israel. These consortia offer the opportunity for Canadian firms to conduct joint R&D efforts with members of Israeli photonics and biotechnology consortia. The Foundation has also played a central role in the establishment of a National Roundtable on Photonics in Canada.

Finally, CIIRDF is over-subscribed, an indication that its services are very much in demand by technology firms. Representatives from every Canadian firm that has undertaken a CIIRDF-sponsored project since 1999 indicated they would like to participate again.

Finding 1: CIIRDF's objectives continue to be relevant to Canadian and Israeli companies.

Issue 2: Relevance to the Canadian & Israeli governments

Are the objectives of CIIRDF adequately defined? Is CIIRDF continuing to serve the objectives of sponsoring departments in Canada and Israel? Does the CIIRDF model for supporting international science and technology, trade, and foreign policy implementation continue to be of interest in the formulation of public policy?

Interviews with key informants in government and the private sector confirmed that CIIRDF's objectives are well defined. Key informants are well aware that CIIRDF's objectives are to strengthen business and collaborative relationships between Canada and Israel, and to strengthen overall economic, trade, and cultural relations between the two countries.

Despite a shift in recent years from software to photonics and biotech projects, CIIRDF is consistent with the objectives of Industry Canada, namely helping small and medium-sized Canadian firms to grow and be successful. CIIRDF is also in line with the innovation agenda as enunciated in the many pronouncements of the Prime Minister and incorporated into the mandate and objectives of his newly-appointed Chief Science Advisor. CIIRDF links Canadian firms to Israeli firms that can strengthen their technology base and provides financial support that helps firms create new products and ultimately jobs, increased revenues and increased profits.

CIIRDF also serves the objectives of FAC through efforts to solidify binational relations between Canada and Israel, and serves the objectives of International Trade Canada (ITCan) by efforts to improve Canada's prosperity through international trade and commerce. The evaluation concluded that CIIRDF creates two way international trade via the supply of Israeli hardware and software components to Canadian firms and vice versa. Furthermore, CIIRDF creates additional international sales for Israeli and Canadian firms, as well as the accrual of royalties and revenues to Israeli firms from licensing agreements with Canadian partners, and vice versa.

International R&D collaboration is an important aspect of Israel's strategy to strengthen its firms and improve political relations with other countries. Consequently, Israel has many similar programs with other countries such as the US, UK, and Singapore. According to some Israeli key informants, CIIRDF is one of the best programs of its kind, however increased funding would be welcomed to bring it in line with the magnitude of funding enjoyed by other programs.

CIIRDF is the only program of its kind in Canada, and as such is considered innovative and creative. Key informants in Canada stated that the Prime Minister's Office (PMO), Foreign Affairs Canada, and Industry Canada speak highly of CIIRDF's ability to improve bilateral relations. For instance, senior key informants from Canada and Israel remarked that CIIRDF acts as a buffer when politics become strained. A comment by one key informant was particularly insightful: "strong business relationships create a more solid foundation than political relationships which tend to be artificial, hence the private sector is the best avenue to foster stable political relations".

CIIRDF serves to raise Canada's profile in Israel which according to several key Israeli informants is relatively low compared to that of the US and UK. CIIRDF serves an important political purpose in Israel as Israeli government representatives feel it is important to have agreements with other countries as they believe these agreements help to legitimize Israel as a world player.

Finding 2: CIIRDF's objectives are adequately defined and CIIRDF continues to serve the objectives of sponsoring departments in both countries. The CIIRDF model continues to be of interest in the formulation of public policy and could potentially be used as a model for developing similar programs between Canada and other countries such as India and China.

Issue 3: Program Incrementality

What percentage of Canada-Israel collaborations occur outside of CIIRDF? Is CIIRDF sufficiently incremental to the interaction already going on? Has CIIRDF measurably improved Canada as a source of technology-based collaborations for Israel companies - vis-a-vis other countries, especially as compared to the amount of such collaborations before CIIRDF was set up?

The WTO estimates Canada-Israel bilateral two-way trade at approximately USD$650M in 2003, however the level of R&D collaboration is not clear. It is acknowledged however, that large Canadian companies such as Bombardier and Pratt & Whitney undertake R&D collaborations in Israel without CIIRDF's assistance. Furthermore, it is apparent that some firms were doing business in Israel or had some sort of business ties with Israel prior to undertaking a CIIRDF-sponsored R&D project.

Interviews with representatives from private firms revealed however, that 14 of 18 firms would not have conducted the R&D project without CIIRDF funding, as their R&D budgets are too small and the risk associated with projects is relatively high.

Key informants stated that CIIRDF has been very good at marketing Canada to Israel, and "despite its small size" relative to the Israel-US BIRD program and the Israel-UK program, "CIIRDF has contributed to raising Canada's profile in Israel". CIIRDF is now getting unsolicited calls in Ottawa and Tel Aviv. Interested parties in both countries are also seeking out individual Board members to discuss potential R&D projects.

CIIRDF's efforts to develop consortia have also helped raise Canada's profile in Israel as a source of R&D collaboration. Representatives from Israeli photonics and biotechnology consortia for example, have travelled to Canada to speak of the benefits of consortia and are willing to collaborate on projects in the future.

Finding 3: The percentage of Canada-Israel collaborations that occur outside of CIIRDF is unknown. The risky nature of R&D collaboration requires government sharing of R&D costs to facilitate participation by Canadian firms. Israeli companies are today more likely to consider Canada as a country to do collaborative R&D projects with than before CIIRDF existed.

Issue 4: Applicability to other countries/need for continued government support

Is the CIIRDF approach relevant in other countries? Is further public support of CIIRDF appropriate?

Key informants stated that the CIIRDF approach of developing consortia in the photonics and biotechnology industries are not only relevant in other countries, they are in fact modelled after similar successful Israeli consortia. Whether adopting a strategy of developing consortia to consortia or firm to firm collaborative R&D efforts, Canada must choose partner countries carefully. For instance, countries must be chosen that are strong in areas in which Canada is weak and vice versa. This way, each country can benefit from collaboration. Natural competitors such as Australia in telecommunications would not be suitable for example. It also helps if there is a strong immigrant community in Canada from the partner country (e.g., the Chinese and Indian communities), as its members provide a source of initial contact with firms and governments in the partnering countries.

To do business with another country, firms must be willing to invest time in building relationships, and CIIRDF provides a successful model for promoting this at low cost. Key informants suggested that countries include Singapore, Hong Kong, India, Brazil, and China could be candidates for CIIRDF-type programs.

Our analysis indicated that continued public support of CIIRDF is appropriate. Key informants indicated that "Canada gets a good bang for the buck", that CIIRDF "opens a lot of doors for $1M per year", and that it is "an inexpensive program with good benefits". Our analysis indicated that the CIIRDF matchmaking or linkage activity coupled with sufficient funding to support R&D projects provides a good mechanism to link Canadian technology firms with new sources of technology. Furthermore, CIIRDF is not self-sufficient: royalties collected cannot exceed contributions made to firms.

Finding 4: Continued public support of CIIRDF is appropriate and the CIIRDF approach could be relevant in other countries. Our analysis indicated that the CIIRDF matchmaking or linkage activity coupled with sufficient funding to support R&D projects provides a good mechanism to link Canadian technology firms with new sources of technology.

4.2 Impacts/Results

Issue 5: Economic Impacts

What economic returns have been generated through the activities of CIIRDF? Are the returns on investment realized from the projects in line with participant expectations? Is CIIRDF substantively enabling the pursuit, or accelerating the implementation of important components of corporate strategies of private sector companies? Has the Foundation had an impact on the ability of participating firms to attract and retain qualified staff? How have CIIRDF services and programs improved the competitive positions of firms?

Anticipated Revenues From Projects

Interviews were conducted with representatives from 18 Canadian firms that commenced a CIIRDF funded project since 1999. Three of 18 projects have commercialized (the remaining 15 projects are still ongoing). Two of three firms with commercialized products provided sales to date and forecasted sales for future years. Sales information from the third firm is pending. Sales forecasts were also provided by an additional 9 firms whose projects are still ongoing. As illustrated in Exhibit 4.1 below, combined sales to date (2 projects) and forecasts of sales to 2013 (11 firms) total $714.5 million (current dollars). Profits are estimated to be $178.6M over this same period.

Exhibit 4.1 Forecasted Sales and Socioeconomic Benefits from CIIRDF Projects Initiated Since 1999

Canadian Firm Name	Research Area	Start Date	Project Status	Forecasted Sales in $M (to 2013)[1]	Socioeconomic Benefits
Gallium Software Inc.	Air defence and command	Jan-99	Completed	$12.7	HP, AF, GS
Qbiogene Ltd.	Gene Delivery Research	Sep-99	Completed	N/A	HP, EB, HB
Mitel Networks Inc	Video conferencing	Jan-02	Completed	$11.7	HP, AF
GEM Systems	Seismic monitoring	Jan-00	Ongoing	$15.5	HP, AF, GS
Qbiogene Ltd.	Gene Delivery Research	Jan-02	Ongoing	N/A	AF, HB, NC
Mirador DNA Design Inc	DNA/infectious disease analysis	Jun-02	Ongoing	$59.0	LP, HP, GS, EB, HB
Tesma Engine Technologies	Automobile parts manufacturing	Aug-02	Ongoing	N/A	LP, HP, GS, EB, HB
Bioxel Pharma	Solid tumour treatment	Oct-02	Ongoing	$72.0	AF, HB, NC
Ocean Nutrition Canada Ltd.	Marine food ingredients	Oct-02	Ongoing	$55.5	PC, HB
MITEC (Wavesat Wireless)	Wireless communication	Mar-03	Ongoing	$47.6	HP
Unity Wireless Systems Corp	Wireless communication	Mar-03	Ongoing	N/A	PC, HP, GL, EB
OZ Optics Ltd	Fibre optics	Mar-03	Ongoing	N/A	PC, HP, AF, GL
Omega Recycling Technologies	Industrial Waste Treatment	Apr-03	Ongoing	$4.2	EB, NC
Digimerge Technologies Inc.	Wireless security	Jul-03	Ongoing	$32.6	PC, LP, HP, AF, GS, GL, NC
Digiscreen Corporation	Digital cinema	Jan-04	Ongoing	$24.0	LP, NC
MDA Ltd	Satellite imagery	Feb-04	Ongoing	N/A	HP, AF
ZENON Environmental Inc	Salt water treatment	Feb-04	Ongoing	N/A	PC, GL, EB, HB, NC
Metconnex	Optical networks	Apr-04	Ongoing	$379.7	LP, HP, AF, GL, NC
			Total	$714.5	

[1] Sales forecast in current dollars. Legend: N/A = not available; AF=additional features; EB =environmental benefits; GL=greater product longevity; GS= greater product safety; HB=health benefits; HP=higher product performance; LP=lower prices; NC=new companies or spinoffs; PC=process cost savings

Anticipated Returns Net of Program Expenditures

Returns in Canada from projects are anticipated from two sources: royalties paid to CIIRDF from Canadian firms and potential taxes flowing to the Canadian government from profits on sales. Royalties paid to CIIRDF are insufficient to cover it's expenditures for several reasons:

- Royalties repaid cannot exceed the contribution amount the firm received;
- Some projects do not achieve commercialization, hence the firms involved are not required to repay the contribution from CIIRDF;
- The economic life spans of some products end before royalties repay the entire contribution amount; and,
- Royalties do not account for CIIRDF's overhead cost

Taxes levied on profits however, have the potential to provide a greater return than royalties. Based on the sales forecasts from 11 projects, estimates were made of the potential taxes flowing to the Canadian government. These estimates were added to the royalties anticipated to be repaid. As illustrated in the Exhibit 4.2 on page 18, the total estimated return (discounted to present value) from these 11 projects is $18.7M[2] ($1.9M in royalties and $16.7M in potential income taxes recovered). For this analysis, it is assumed that there are slack resources in the economy (the resources would not otherwise be used productively) and that due to the innovative nature of the CIIRDF program, competition would not be adversely affected.

CIIRDF program expenditures by the Canadian government from 1999 to 2004 (also discounted to present value) were $4.9M. If sales forecasts provided by these 11 firms are typical of the returns that CIIRDF's commercialized projects will generate, then approximately 3 of 18 projects initiated during the period 1999-2004 will need to commercialize for CIIRDF to cover its expenditures over this period. This requires a project commercialization rate of 16.7% (3 of 18 projects) to recover program expenditures.

Exhibit 4.2: Forecasted Returns From Projects

Project Status	Projects	Discounted Return from Royalties	Discounted Return from Potential Taxes Generated	Discounted Total Return
Commercialized	2	$326,695	$417,872	$744,566
Ongoing	9	$1,654,018	$16,305,977	$17,959,996
Total	11	$1,980,713	$16,723,849	$18,704,562

Note: The methodology for forecasting total returns from projects is based on a methodology used by the Industrial Research Assistance Program (IRAP). The discount rate used was 8%; sales forecasted only to 2013.

[2] It should be noted that one project accounted for $6.9M in returns.

Impacts on Corporate Strategies, Staffing Levels, and Competitiveness

CIIRDF has an impact on corporate strategies in a number of ways:

- Most firms interviewed stated they would not have proceeded with the R&D project without CIIRDF funding;
- CIIRDF funding reduced the risk associated with R&D efforts;
- Some firms stated the absence of funding would have delayed the R&D project;
- CIIRDF funding has directly affected decisions on staffing levels at firms;
- Projects have led firms in new directions: to create new technologies, to pursue new markets, to spin-off companies; and,
- Some projects have led to further collaborations with their Israeli partner that have the potential to lead to new products.

Key informants stated that CIIRDF had a direct impact on its ability to attract and retain staff. CIIRDF funding for example, often directly paid the wages of additional personnel hired to assist with the project. The table on page 25 summarizes the impact of these projects on staffing levels. An additional 34 full-time employees have been hired because of the projects, and another 84 are expected to be hired in the future.

Exhibit 4.3: Impacts on Employment Levels at Participating Firms

Year Project Started	Number of Projects	Commercialized Projects	Effect on Employment to Date (FTEs)	Potential Effect on Future Employment (FTEs)
1999-2001	3	2	2	5
2002	6	1	10	32
2003	5	0	20	17
2004	4	0	2	30
Total	18	3	34	84

Key informants indicated that CIIRDF has improved the competitiveness of their firms. From interviews with representatives from 18 firms, 13 stated their firms had developed new innovative produces or services due to the CIIRDF project, and 4 stated it was too early in the project to know definitively. CIIRDF-funded projects for example have:

- Assisted a Canadian auto parts manufacturer to create a new magnesium-based alloy that has the potential to achieve $30M in sales per year.
- Assisted a Canadian life sciences company to create a new hand-held device that can test for infectious diseases in 5-10 minutes versus current methods that required 1-2 hours of testing. The potential market for this product is very large.
- Assisted a Canadian software firm to develop a 3-D mapping system for use by the military and airports. The Israeli partner has introduced the firm to customers in Israel, resulting in about $1M per year in sales to Israel. Prior to the project, the Canadian firm did not sell to Israel.
- Assisted a Canadian manufacturer and marketer of marine based ingredients to develop functional food ingredients from marine seaweed. The project has allowed the firm to diversify its product offering beyond Omega-3 products, and
- The product developed has the potential to account for $20M in annual sales by 2009.

Finding 5: Canadian firms undertaking CIIRDF R&D projects since 1999 forecast $714.5M in cumulative sales revenues by 2013. Based on these forecasts, 3 of 18 CIIRDF projects will need to achieve commercialization to recover the Canadian government's share of program costs from 1999-2004. CIIRDF is directly impacting the corporate strategies of private firms and has improved the competitive positions of firms. CIIRDF- funded projects have increased employment levels at recipient firms and anticipate additional hires in the future.

Issue 6: Political Impacts

Has CIIRDF strengthened overall economic, trade, and political relations between Canada and Israel? Have the international alliances between Canada and Israeli firms extended beyond their initial purpose?

Most key informants felt that CIIRDF had strengthened relations between Canada and Israel. Politically, CIIRDF has helped to improve political relations between the two countries. Former Prime Minister Jean Chretien for example, renewed CIIRDF during a visit he made to Israel.

According to key informants, CIIRDF has strengthened economic ties. Several key informants see a close link between CIIRDF and the Free Trade Agreement that

Canada has with Israel. CIIRDF "sends a signal to the business community that countries can do business together". CIIRDF has educated Canadian businesses about Israel. Israeli key informants note that CIIRDF has helped bring about a change in the perception of Israel held by Canadian firms. Canadian firms now appreciate the strong scientific talent and capable businesses found in Israel.

Most key informants, particularly representatives from private firms believe that many of the alliances between firms have extended beyond their initial purpose. Several projects have led to further collaboration that would not have occurred without CIIRDF funding. The development of photonics and biotechnology consortia in Canada is another example of CIIRDF extending beyond its initial purpose.

Finding 6: CIIRDF has strengthened overall economic, trade, and political relations between Canada and Israel. The alliances between firms in Canada and Israel have in several cases extended beyond their initial purpose.

Issue 7: Socioeconomic Impacts

Are there social benefits attributable to the activities of CIIRDF?

Representatives from 18 firms provided many examples of socioeconomic benefits they expect will result from the commercialization of their products. The table on page 27 illustrates that the most common socioeconomic benefit anticipated is higher product performance (12 projects). Other benefits expected include additional features (9 projects), greater safety (5 projects), environmental benefits (6 projects), and health benefits (7 projects). Possible spin-off companies are anticipated from 7 projects.

Exhibit 4.4 Anticipated Socioeconomic Benefits (Projects started since 1999)

	Year Project Started				
Socioeconomic Benefits	**1999-2001**	**2002**	**2003**	**2004**	**Total**
Process Cost Savings	0	1	3	1	5
Lower Prices to Consumers	0	1	1	2	4
Higher Performance	3	3	4	2	12
Additional Features	2	3	2	2	9
Greater Safety	2	2	1	0	5
Greater Product Longevity	0	0	3	2	5
Environmental Benefits	1	2	2	1	6
Health Benefits	1	5	0	1	7
Possible Spin-off Companies	0	2	2	3	7

Examples of specific socioeconomic benefits include:

- A Canadian environmental company has developed a membrane-based process to desalinate saltwater. The process has the potential to make clean drinking water more available in the Middle East, and reduce the costs associated with treating saltwater and wastewater.
- A Canadian and Israeli firm have developed an implant to treat inoperable solid tumours. The implant could potentially replace the use of chemotherapy for certain patients and reduce hospital stays and their associated costs.
- A Canadian firm specializing in magnetometers and the commercial arm of the Israeli Nuclear Research Centre have developed a system for improving the accuracy of earthquake prediction, which could ultimately save lives.

Finding 7: There are socioeconomic benefits attributable to CIIRDF. These include for example, lower prices to consumers, higher product performance, and health and environmental benefits.

4.3 Design and Delivery

Issue 8: Appropriateness of Program Design

Is CIIRDF's funding level sufficient to achieve its objectives? How does CIIRDF compare with other R&D collaborative programs managed by Canada or Israel? What are its strengths and weaknesses? Is CIIRDF's Request for Proposals process undertaken in a manner that is competitive, fair, responsive, and transparent? Are the terms and conditions attached to agreements reasonable and do they protect the interests of CIIRDF?

A few key informants felt that CIIRDF's current funding level was sufficient to achieve its objectives. Most key informants however would welcome a higher level of funding. Their argument is that at its current funding level, CIIRDF cannot reach a critical mass. This belief was prevalent among Israeli key informants, who compare CIIRDF against a number of much larger programs Israel has with other countries. The BIRD program (Israel-US) for instance, is funded at about $14M per year; the program Israel has with Korea is funded at $10M per year CIIRDF however, would prefer receiving longer term commitments of the same amount rather than increased annual allotments for a few years.

Our analysis, based upon interviews and the document review, indicated that CIIRDF has three main strengths relative to other international R&D programs. First, CIIRDF provides Canadian and Israeli firms with pre-qualified leads in each other's country.

- CIIRDF's network of contacts has the capacity to find the most suitable partner for a firm, and weed out inappropriate partners.
- Second, CIIRDF's evaluation process and the technical advice it provides to firms are very strong. In one case a proposal was rejected when an evaluator discovered that a similar R&D project to create the same product was already underway in California and the firm's 6 month head start could not be overcome. The rejected firm disputed the information at first, but upon further investigation acknowledged the information from the evaluator was correct. The firm was appreciative, as they would have wasted over $1M developing a product that would have been beaten to market by a competitor.

- Third, CIIRDF provides funding.[3] Given Canada's decentralized structure of R&D, firms must seek funding from a variety of sources which can be difficult and inconvenient. Interviewees were of the opinion that funding is necessary for firms to agree to undertake collaborative efforts with foreign firms located in countries such as Israel.

Canadian and Israeli government key informants were of the opinion that the request for proposal process was conducted with due diligence and that the process was, for the most part, attracting the right size of firm (i.e., small and medium sized firms). Representatives from 18 firms were asked to comment on how they found the process of completing a proposal for CIIRDF. Seventeen of 18 firms interviewed expressed satisfaction with the process. Only one firm felt the process was "a little too bureaucratic". For the most part, firms found the process to be "fair", "quick", "non-bureaucratic compared with other programs like Technology Partnerships Canada", and found the CIIRDF handbook (to guide firms in writing the proposal) to be "well written". Some firms indicated that they appreciated the fact that CIIRDF's President was willing to provide constructive feedback to them to improve their proposals. Some firms indicated that the CIIRDF manager in Israel was also "very helpful at the proposal stage".

Following submission of a proposal, time is required for the CIIRDF Board to review the proposal and makes its decision. The Board meets twice per year but can call an ad hoc meeting if required (this option has never been exercised). Thirteen of 18 firms expressed satisfaction with the decision process. Five firms were not satisfied, however their dissatisfaction may be more a reflection of different expectations than a slow proposal decision process. Nevertheless, some firms felt the lag in time between submission of the proposal and approval was too long, others stated they were "left in the dark" as to the proposal's progress, and one Canadian firm learned that the project had been approved from its Israeli partner, not from CIIRDF itself. Two firms suggested the Board meet more than twice per year to reduce delays.

To date there have not been major problems associated with the terms and conditions of agreements. At least one key informant expressed that in his opinion, the terms and conditions were less stringent than those for other Industry Canada programs like the Strategic Technology Program (STP) and Technology Opportunity in Europe Program (TOEP). CIIRDF does not audit the firms to which it provides financial support, hence the hours worked and costs incurred by firms are subject to a desk review only.

[3] CIIRDF differs from Canada's umbrella S&T agreements with other countries in that CIIRDF focuses on industrial R&D while the latter focus on science and technology.

Finding 8: ***CIIRDF has three main strengths compared with other international R&D programs: it provides high-quality pre-qualified leads and introductions for firms, it provides funding to offset R&D costs which is necessary for most firms to undertake international R&D projects, and it provides strong technical and market based evaluation of proposals to ensure that only the best projects are funded. CIIRDF's funding level would appear to be sufficient to achieve its objectives, however a higher funding level would likely make its impacts even greater.***

For the most part, the request for proposals process is competitive, fair, responsive, and transparent; however, some firms (5) were of the opinion that the approval process takes too long. To date, the terms and conditions attached to agreements have not created major problems for CIIRDF.

Issue 9: Effectiveness of Program Delivery

Are support services provided effectively in Canada & Israel? Are the matchmaking services being effectively conducted? Is CIIRDF being effectively promoted?

As discussed in the previous issue, firms were appreciative of the services provided by CIIRDF at the proposal stage. Representatives from firms also commented positively on CIIRDF's ability to find suitable firms, make introductions, arrange meetings, and make site visits to firms. CIIRDF's President was also acknowledged for helping to smooth out problems and misunderstandings between firms and to keep projects on track.

CIIRDF, in cooperation with IRAP's national network of technology advisers, provides four types of matchmaking services:

- **Basic Service** - a request to make a specific contact or to provide information.
- **Introduction Service** - a request to find and to interest one or more potential companies in entering into dialogue.
- **Bringing Prospective Partners Together** - an additional service that brings companies together: e.g., advice and mediation, Technology Inflow Program (TIP) assistance.

- **Funded Project** - the partnering companies apply together for financial assistance in support of an R&D based collaboration.

In the past 3-4 years, CIIRDF has provided matchmaking services to approximately 240 firms. From March to September 2003, CIIRDF provided matchmaking services to 77 firms as presented in the table below.

Exhibit 4.5 Matchmaking Services (March-September 2003)

Type of Service	Number
Basic Service	5
Introduction Service	58
Bringing Prospective Partners Together	4
Funded Project	10
Total	77

The majority of services were introductory services which were activities to find and to interest one or more potential companies in entering into dialogue. Of 77 requests, 10 resulted in funded projects. CIIRDF presently makes use of a former Technology Partnerships Canada (TPC) Director to coordinate matchmaking activities.

Interviews with the 18 firms that have or are currently participated in a CIIRDF sponsored project revealed that most had established very positive ongoing business relationships with their Israeli partners, and all 18 firms stated they would be willing to participate in another CIIRDF project in the future. Several firms have in fact decided to collaborate on further projects with their partner without CIIRDF funding.

CIIRDF promotes its services in several ways. It began promotional activities 10 years ago by inviting a number of technology companies, institutes, and associations to number of seminars across the country. Today its promotion comes from the President's involvement in photonics and biotechnology consortia and roundtables, and to a large extent, from word of mouth of companies that have undertaken a CIIRDF sponsored project. CIIRDF also promotes itself through its website, its initiatives with regional economic development agencies such as ACOA and WED, and via close contact with advisors at Industry Canada and NRC.

At present, the fund is oversubscribed. The concern with increasing promotional efforts is that it may flood CIIRDF with far more projects than it can fund. Although CIIRDF has

established linkages to agencies such as ACOA, to date, demand for CIIRDF's services has come from Ontario and Quebec. Some key informants have expressed a wish to see more effort to promote CIIRDF to firms in Atlantic Canada and the Prairie provinces.

Finding 9: Support services appear to be provided effectively in Canada and Israel.

Matchmaking services are also being conducted effectively. Firms that participated in CIIRDF-sponsored projects have established positive business relationships with their partners. CIIRDF is being promoted effectively and its project funding is currently oversubscribed.

Issue 10: Communication

How well has CIIRDF given recognition to its partners? Does CIIRDF communicate effectively with its sponsoring departments? Are the achievements of the program effectively and efficiently captured and disseminated to appropriate audiences? Does CIIRDF communicate effectively with the firms it evaluates/ sponsors?

Board members have not heard complaints from the sponsoring departments (Industry Canada, International Trade Canada (ITCan), and Foreign Affairs Canada (FAC) on this issue. Furthermore, CIIRDF presents the departments as its sponsors "front and centre" at presentations, and the departments are highlighted as CIIRDF sponsors on the CIIRDF website.

More communication and coordination with the ITCan Post in Israel would be welcomed by some members of the department. These department members would like Trade Commissioners to be more involved with CIIRDF representatives when they visit Israel, specifically they would like them to attend meetings that the CIIRDF President holds during these visits. It should be noted however that CIIRDF was designed to operate at arm's length from the government and furthermore, some meetings that CIIRDF holds with firms are extremely technical and are not of particular use to departmental representatives.

Some key informants stated that CIIRDF was not well known at Industry Canada, and that it is necessary to "better educate IC people about CIIRDF".

Some key informants also stated that they would like to be informed about CIIRDF's achievements and that the dissemination of results by CIIRDF requires improvement.

Hard numbers on the outcomes of projects sponsored would be welcomed as it would provide some measure of CIIRDF's success to date, and justify continued funding. At least one key informant suggested that CIIRDF hire someone to capture, quantify, and disseminate its achievements.

Representatives from firms that received funding from CIIRDF were generally satisfied with the communication and guidance from CIIRDF in writing proposals. Thirteen of 18 firms were satisfied with the communication they received during the review of proposals; 5 were dissatisfied. CIIRDF also received favourable comments regarding its efforts to smooth out conflicts that arose on occasion between firms.

Finding 10: CIIRDF would appear to give appropriate recognition to its partners, however, its sponsoring departments would like more communication and coordination from CIIRDF, particularly during visits to Israel. In general, CIIRDF communicates effectively with the firms it evaluates and sponsors. The capture and dissemination of program results to appropriate audiences however, needs to be more systematic.

4.4 Management

Issue 11: Binational structure

Is the binational governance structure of CIIRDF effective in achieving CIIRDF"s objectives? Is the binational project selection process of CIIRDF effective in achieving CIIRDF's objectives?

The binational governance structure is similar to that used for Israel's BIRD program. The Israelis are very comfortable with this structure. First, the binational structure reminds all parties that it is a joint program, and that both sides must contribute to its success. Having the Israeli Chief Scientist as the CIIRDF Chair is very effective. The current Chief Scientist continues in the tradition of his three predecessors of being an active Chairman of the CIIRDF Board and an enthusiastic supporter of the Foundation. Given the seniority of his position (equivalent to that of a senior Deputy Minister in Canada), this involvement and support is of great value to the role and reach of CIIRDF and Canadian firms in Israel.

Key informants stated that Canada has somewhat more influence on CIIRDF since the President (who handles day to day activities) is located in Ottawa, but this has not adversely affected the program. The CIIRDF Board of Directors is quite skilled,

experience, and stable, particularly its Canadian members, some of whom have been on the Board since its inception.

CIIRDF's evaluation process would appear to be effective in achieving its objectives. The evaluation process begins with the President reviewing an outline from the proposed firms. His experience allows him to very quickly filter the good proposals from the bad ones. If the proposal passes this first test, the President asks the firms for another more detailed outline of the project, and some further consultations occur over a period of weeks.

If the President believes there is still some merit to the proposal, he sends it out for peer review. In Canada, if it is an IT project, it goes first to Industry Canada. The Industry Canada point of contact will find an industry expert to review the proposal with respect to the following issues:

a) Is this leading edge technology?
b) What is the market for this product?
c) What is known about these firms? (Firm history, stability, personnel, etc.)

These experts are often from NRC, IRAP, and Industry Canada, or the academic community.

The Israeli evaluation begins with the Chief Scientist. He/she has a network of professional evaluators representing about 75% of Israel's 3500 technology firms. For every evaluation, the Israeli evaluator conducts a site visit with the Israeli firm.

If both the Canadian and Israeli evaluators agree to approve the project, it goes to the CIIRDF board for final approval.

Key informants spoke positively about the evaluation process. They consider it to be "thorough" and "rigorous". Evaluation experts in each country are not only familiar with the technology being proposed, they are familiar with the reputations of individuals at the firms in their country, and are effective at assessing the business potential of the product. In practice, evaluators rarely disagree with one another despite conducting completely independent evaluations.

Finding 11: The binational governance structure is modelled after the BIRD program, and it appears to be effective. The binational selection process is also rigorous and effective.

Issue 12: Program management

Is the program well managed? Does CIIRDF have a performance system to track progress and achievements?

The administration and management of CIIRDF has many strengths with respect to the management of contributions. Examples of these include the following:

- the Board includes very senior, well qualified individuals from both Canada and Israel;
- the Board has an active Audit Sub-committee, responsible for reviewing and approving CIIRDF budgeted projections and financial statements;
- the Foundation requires that each proposal submitted for review include both a technical proposal and a business case;
- proposals are reviewed by at least two independent experts, one in Canada, and one in Israel;
- evaluation criteria include consideration of the robustness of the applicants as well as the potential for developing a successful partnership between the two applicants;
- the evaluations are appropriately documented and are done so in a standard and consistent format;
- both the recommendation of the President and the reviews by the two independent evaluators are provided to the Board for consideration;
- recommendations for funding are prioritized to ensure funding is effectively allocated;
- the Board appears to be actively involved in reviewing, analyzing and or challenging the recommendations by the President and the reviews by the evaluators;
- approval authority for all R & D agreements rests with the Board and approval/rejection of each proposal is documented in the Board minutes;
- standard agreement templates are used for each recipient;
- each agreement includes the following appendices against which the applicant is held accountable: the applicants' project plan, budget, cash flow projection, resource loading, and other project details;

- applicants are required to submit very detailed financial and technical progress reports which are signed or certified by authorized representatives of the recipient organization; and
- the monitoring process includes a review of actual progress/results against the original project plan and budget.

Although there are many examples of very solid and effective management of CIIRDF and CIIRDF funding, there are aspects in the administration and management of CIIRDF that could be strengthened. These include issues related to:

- succession planning (addressed in a subsequent section);
- the administration and management of agreements (including the adequacy of resources); and
- the royalty-based repayment regime (addressed in a subsequent section)

CIIRDF has been purposefully designed to minimize the amount of resources required to support administration and management. The CIIRDF office in Ottawa consists only of the President and a half time administrative position. As noted above, administration and management is only one of many roles filled by the President. Based on interviews with the President and a review of project files, Board minutes, and various CIIRDF status and other reports, several administrative weaknesses were identified, including, for example:

- status reports on royalty payments and projections were not always readily available;
- centralized, complete and organized project files were not always readily accessible;
- interim project status and financial reports were missing from several project files;
- interim project and financial reports showed little evidence of review and analysis against the terms and conditions of the contribution agreements;
- there is no systematic approach in place for identifying the need for audits of contribution recipients; and
- reports related to the commercialization or repayment phase were either missing and or appeared to not have been received on a timely basis.

The potential negative impact of these administrative weaknesses on the current operation of CIIRDF appears to be minimal due to the reliance on informal or undocumented systems and the President's corporate knowledge. However, in this era of transparency, openness and accountability, it would be prudent for the CIIRDF Board to work towards strengthening these weaknesses. Such actions may require increasing the amount of resources dedicated to the administration of CIIRDF.

Finding 12: CIIRDF is well managed, especially with respect to the selection and evaluation phase of the agreement cycle. However, several opportunities do exist for improving and or strengthening several administrative and managerial aspects of CIIRDF.

Issue 13: Financial controls

Has CIIRDF managed its activities and programs within allocated annual budgets? Is the repayment of contributions via royalties managed effectively? Are royalties the most appropriate mechanism by which to collect repayments by firms that CIIRDF has sponsored?

The process for managing CIIRDF funding and ensuring its programs and activities fall within allocated annual budgets includes the following:

- Review and approval of the CIIRDF 5 Year Plan by the Board;
- Annual review and approval of the CIIRDF budget (both operating and contribution funding) by the Board;
- Preparation of annual audited financial statements by an external auditor;
- Review of the audited financial statements by the Audit Sub-committee of the Board;
- Review and approval of the audited financial statements by the Board;
- Ongoing monitoring of both operational and contribution budget status by the President;
- Ongoing monitoring and analysis of contribution cash flow budgets and actuals by the President;
- Prioritization of funding opportunities by the President;
- Review and approval of new funding opportunities by the Board; and,
- Interim review of budget status by the Board in June of each year.

During the last four fiscal periods, CIIRDF expenditures related to contribution agreements have been within allocated annual budgets. Expenditures for administrative expenditures have been slightly higher than budgeted (e.g., 30% higher in Fiscal 99/00 and 2% higher in Fiscal 02/03), however such increases were approved by the Board. Total expenditures by CIIRDF have consistently fallen within allocated annual budgets. On the revenue side, royalty repayments have been lower than budgeted ($206,000 or 23% less than budgeted during the four year period). Exhibit 4.6 illustrates and compares CIIRDF actual and budgeted amounts over the last four fiscal periods.

Exhibit 4.6: Overview of Budgeted versus Actual Financials (Fiscal 99/00 to 03/04)

	Fiscal 99/00		Fiscal 00/01		Fiscal 01/02		Fiscal 02/03	
	Budget	**Actual**	**Budget**	**Actual**	**Budget**	**Actual**	**Budget**	**Actual**
Revenue								
Royalties	200,000	10,873	497,500	549,475	100,000	75,000	100,000	56,216
Total Revenue	2,740,000	2,305,752	2,842,500	2,744,243	2,445,000	2,485,423	2,500,000	2,268,405
Expenditures								
Grants and contributions	2,257,485	1,382,819	1,311,576	1,089,101	1,380,334	717,191	2,340,776	2,110,490
Administration	298,500	388,287	331,500	333,663	344,500	375,398	351,500	356,852
Total expenditures	2,777,685	1,900,708	2,287,576	1,730,139	2,076,834	1,368,423	4,086,508	2,859,354
Excess Revenue	-37865	405044	554,924	1,014,104	368,166	1,117,009	-1586508	-590949

(Source: Audited Financial Statements)

Repayment of Contributions

The current sales volume-based approach requires applicants to repay funding to CIIRDF based on a percentage of Gross Sales derived from the sale, leasing and or other marketing or commercial exploitation of the innovation. Issues and concerns related to this approach include the following:

- Such an approach creates an administrative burden on CIIRDF to request, review and verify sales reports from the recipient organizations;
- Since the amount of repayment to CIIRDF is dependent on sales levels, such an arrangement creates a situation that, in effect, encourages under reporting by contribution recipients;

- The review and challenge of the reasonability of the self-reported amounts can lead to an antagonistic relationship between CIIRDF and the recipients, which is contrary to the partnership building role of the foundation; and
- The current agreements do not appear to effectively close loopholes for contribution recipients to escape liability for repayment in instances where, for example, the ownership, location or structure of the recipient organization(s) has changed or where the focus of research and or product development has been altered.

A more practical approach to the repayment process may be one that is based on negotiation of a "repayment agreement", once the commercialization process has begun. The intent and legal requirement to enter into such an agreement would, of course, have to be included as part of the original conditional contribution agreement. One option for a more streamlined and practical "repayment agreement" would be one that is:

- time-based (i.e., monthly or quarterly payments); and
- structured based on the financial health of the recipient organization, or its "ability to pay", and the extent to which the recipient organization(s) are benefitting from the commercialization of the products or findings from the funded activities.

Any such "repayment agreements" must seek to find a balance between CIIRDF's role as an incentive program and CIIRDF's responsibility to recoup government funds from recipients that have benefitted from commercialization opportunities. With respect to repayment of the conditional contributions, CIIRDF should, at some point, give consideration to outsourcing collection responsibilities and or selling CIIRDF receivables to a financial institution.

Finding 13: For the fiscal periods 1999/2000 to 2002/2003, CIIRDF has managed its activities and programs within allocated annual budgets. There are several weaknesses in the repayment requirements for contribution funds. Royalties are not the most appropriate mechanism by which to collect repayments.

Issue 14: Strategic Direction of CIIRDF

Has the targeting by CIIRDF of a limited number of technology areas as set out in the Strategy Plan been effective? Has the support provided to technology development been in accordance with the strategic objectives and actions of both governments? Is there an adequate balance of activity in support of the mandates of CIIRDF? Are recent initiatives by CIIRDF (i.e., development of consortia, Palestinian initiative) appropriate and within its mandate?

CIIRDF is reactive in the sense that it receives proposals, it does not seek them out, therefore projects tend to reflect the marketplace and Canada's natural strengths. CIIRDF focuses on the technology sector, from which strong growth has come in the last decade, however, within the technology sector there are a variety of industries which have received CIIRDF funding. A number of telecommunications and biotechnology projects for example, have been funded in recent years. This is not surprising as there is a concentration of photonics and biotechnology strength in Israel and Canada. However, CIIRDF has also funded a number of projects in other tech-based industries such as security, nutrition, earthquake technology, GIS mapping, and automobile parts manufacturing.

Recently CIIRDF has targeted particular industries by developing consortia. CIIRDF has worked to develop consortia in photonics and biotechnology, and most key informants support this strategy. Israel and Canada have complementary strengths in these areas and due to the recent mapping of the human genome, the biotechnology industry is poised for strong growth. Concentrating efforts in a couple of industries has its advantages and disadvantages. Evaluations for example, tend to be more astute and rigorous. On the other hand, the industries targeted may never achieve their potential, and a developing opportunity can be overlooked in another industry.

Innovation is a strategic priority for Israel and Canada. Representatives from both countries ensure that CIIRDF remains in line with the respective countries' strategic objectives. The Chief Scientist of Israel sits on the CIIRDF Board and reviews projects and CIIRDF strategies to ensure that they are in accordance with strategic objective of Israel. Furthermore, the three board members from Canada, who include an ADM from Industry Canada (who sits as a private citizen) and a former member of Parliament and Cabinet Minister, ensure CIIRDF remains in accordance with the strategic objectives of Canada.

CIIRDF pursues three broad activities: contributing 50% of joint R&D costs; matching companies from each country seeking a research partner in the other; and, promoting

the benefits of joint R&D collaboration. Key informants did not feel that any one of CIIRDF's activities were being overlooked in favour of others. These activities are somewhat inter-related and complementary. Matching companies for example, can often lead to funded projects. The development of consortia in photonics and biotechnology are recent strategies but also complement CIIRDF activities, as they promote R&D collaboration between several firms in both countries.

CIIRDF has been instrumental in developing the Canadian Opto-electronic Packaging and Assembly Consortium (COPAC) in cooperation with the Canadian Photonics Consortium (CPC). CIIRDF has four goals for COPAC:

- Optipac (Israel) and COPAC (Canada) should be aware of what each other is working on;
- Increased participation in COPAC by Canadian firms;
- Increased participation in COPAC by Israeli firms and,
- Undertake joint COPAC and Optipac (Israel) projects involving several firms from both countries.

Our analysis concluded that CIIRDF's mandate, as described in its MOU, does not preclude it from pursuing the development of consortia.[4] As well, key informants stated the goals of the consortium directly relate to CIIRDF's overall objectives of strengthening Canada-Israel science and technology cooperation and binational business to business alliances; and strengthening the international ties of Canadian businesses by promoting a more global orientation in their approaches to corporate planning, technology acquisition and market development. Although some key informants believe that the UK, US, and Germany may be more natural partners for Canada's photonics industry, the proposal to work collaboratively with the Israeli photonics consortium was attractive and convincing.

CIIRDF is also encouraging the establishment of a collaborative R&D program between Canada and the Palestinians. The Palestinians are well educated with capabilities waiting to be developed in areas like water purification and language software. Furthermore, the Palestinian initiative may have potential spin-off benefits such as improved political relations, and improved quality of life in the Middle East.

[4] Memorandum of Understanding on Bilateral Cooperation in Private Sector Industrial Research and Development Between the Government of Israel and the Government of Canada, March 1993.

Finding 14: CIIRDF has funded projects from a wide range of technology-based businesses and its activities appear to be well-balanced. CIIRDF's recent strategy of developing consortia in the photonics and biotechnology industries would appear to be in accordance with both governments' strategic objectives and within CIIRDF's mandate.

Issue 15: Resource/Succession Planning

Is CIIRDF adequately staffed? Should sponsoring departments be concerned that CIIRDF can function effectively under another President?

Key informants pointed out that CIIRDF is a very lean organizational structure and hence places considerable demands on the President's time. As CIIRDF has taken on new strategic directives (i.e., the development of consortia), the President has secured the services of a former Director at Technology Partnerships Canada to assist in finding evaluators and conducting matchmaking services. Despite this added resource, the President acknowledges that he could use another full-time staff, but does not wish to increase overhead expenses.

According to some key informants, CIIRDF's President possesses a broad range of skills and fulfills multiple roles including evaluator, matchmaker, promoter, coordinator, administrator, leader, and troubleshooter. It is unclear if a successor could be found that possesses comparable skills along with extensive contacts. However, CIIRDF's supporting structure (i.e., the evaluation process, the Board of Directors, and foreign contacts) appears to be strong and it is likely the CIIRDF structure could continue if there is a change in leadership.

Finding 15: CIIRDF would benefit from the services of an additional full-time resource in Canada. CIIRDF's strong supporting structure would likely ensure its continuation under another President.

5.0 Conclusions and Recommendations

5.1 Relevance

This section concludes on the relevance of CIIRDF and the need for the program to continue.

Conclusion 1: CIIRDF's objectives continue to be relevant to Canadian and Israeli companies.

CIIRDF is playing an important role in supporting the technology sector by assisting Canadian firms in the acquisition of critical technologies from Israel by contributing up to 50% of R&D costs. CIIRDF is relevant to Israeli technology firms who like their Canadian counterparts, tend to be small and have limited R&D budgets, and would like to gain access to the large North American market. Finally, CIIRDF is over-subscribed, an indication that its services are very much in demand by technology firms, and all firms interviewed stated they would like to participate in another CIIRDF project.

Conclusion 2: CIIRDF continues to serve the objectives of sponsoring departments in both countries. The CIIRDF model continues to be of interest in the formulation of public policy. CIIRDF could potentially be used as a model for developing similar programs between Canada and other countries such as India and China. CIIRDF could also be used as a model for improving bilateral relations with other countries like Palestine, which would have significant policy implications for Canada.

CIIRDF is consistent with the objectives of Industry Canada, namely helping small and medium-sized Canadian firms to grow and be successful. CIIRDF also serves the objectives of FAC and ITCan as it works to solidify political and economic binational relations between Canada and Israel. From the perspective of the Israeli government, international R&D collaboration is an important aspect of its strategy to strengthen its firms and improve political relations with other countries.

Senior key informants from Canada and Israel remarked that CIIRDF acts as a buffer when politics become strained. Furthermore, CIIRDF serves to raise Canada's profile in Israel which according to several key Israeli informants is relatively low compared to that of the US and UK. CIIRDF serves an important political purpose in Israel as Israeli government representatives feel it is important to have agreements with other countries as they believe these agreements help to legitimize Israel as a world player.

The CIIRDF approach is relevant in other countries, and some key informants suggested countries include Singapore, Hong Kong, India, Brazil, and China could be potential candidates. Canada must be careful however to choose partner countries that are a natural fit.

Conclusion 3: CIIRDF's strengths relative to Canada's bilateral S&T agreements with the EU, France, Germany, Japan and Korea include providing high-quality, pre-qualified leads for research parties, providing funding which is necessary for firms to agree to participate in international R&D projects, and providing rigorous proposal evaluations that ensure only the best projects are funded.[5] One weakness of CIIRDF is that its funding is relatively low compared with programs that Israel has with other countries.

Our analysis, based upon interviews and the document review, indicated that CIIRDF has three main strengths. First CIIRDF acts as matchmaker by finding suitable, high-quality firms in Canada and Israel to participate in joint research. Second , CIIRDF's evaluation process and the technical advice it provides ensures that only the best projects get funded. Third, CIIRDF provides funding, which is necessary for firms to agree to participate in joint international R&D research. A weakness of CIIRDF is that its funding is relatively low compared with similar Israeli programs with other countries, which tends to minimize CIIRDF's impacts.

Conclusion 4: Further public support of CIIRDF is appropriate. Our analysis indicates that the CIIRDF matchmaking or linkage activity coupled with sufficient funding to support R&D projects provides a good mechanism to link Canadian technology firms with new sources of technology.

5.2 Results/Impacts

This section concludes on the impacts and results that CIIRDF has achieved since 1999.

Conclusion 5: Canadian firms undertaking CIIRDF R&D projects since 1999 estimate they will generate $714.5M in cumulative sales revenues by 2013. Based on these forecasts, 3 of 18 CIIRDF projects will

[5] CIIRDF differs from Canada's umbrella S&T agreements with other countries however, in that CIIRDF focuses on industrial R&D while the latter focus on science and technology.

need to achieve commercialization to cover the Canadian government's share of program costs from 1999-2004.

Based on the sales forecasts from 11 projects, estimates were made of the potential taxes flowing to the Canadian government and royalties accruing to CIIRDF. As illustrated in the Exhibit 5.1 on page 43, the total estimated return (discounted to present value) from these 11 projects is $18.7M[6] ($1.9M in royalties and $16.7M in potential taxes).[7]

CIIRDF program expenditures by the Canadian government from 1999 to 2004 (also discounted to present value) were $4.9M. If sales forecasts provided by these 11 Canadian firms are typical of the returns that CIIRDF's commercialized projects will generate, then approximately 3 of 18 projects initiated during the period 1999-2004 will need to commercialize for CIIRDF to cover its expenditures over this period. This requires a project commercialization rate of 16.7% (3 of 18 projects) to recover program expenditures.

Exhibit 5.1: Forecasted Returns From Projects

Project Status	Projects	Discounted Return from Royalties	Discounted Return from Potential Taxes Generated	Discounted Total Return
Commercialized	2	$326,695	$417,872	$744,566
Ongoing	9	$1,654,018	$16,305,977	$17,959,996
Total	11	$1,980,713	$16,723,849	$18,704,562

Note: These estimates of benefits would be larger had the attribution rate been higher or maintained at initial levels, the discount rate been closer to current market rates, product life been extended beyond 11 years, or the results extrapolated to include non-reporting firms. Benefits could be reduced by lower profit expectations or by downward revisions to forecast revenues.

6 It should be noted that one project accounted for $6.9M in returns.

7 It is assumed that there are slack resources in the economy (the resources would not otherwise be used productively) and that due to the innovative nature of the CIIRDF program, competition would not be adversely affected.

Conclusion 6: CIIRDF is directly impacting the corporate strategies of private firms. CIIRDF- funded projects have increased employment levels at recipient firms, and these firms anticipate hiring more people in the future. Furthermore CIIRDF has improved the competitive positions of firms in a number of ways.

CIIRDF has had an impact on corporate strategies in a number of ways. For example, most firms interviewed stated they would not have proceeded with the R&D project without funding; CIIRDF funding helped to reduce the risk associated with research and development; CIIRDF funding has directly affected decisions on staffing levels at firms; and projects have led firms in new directions: to create new technologies, to pursue new markets, to spin-off companies. Projects that began since 1999 have resulted in the hiring of an additional 34 full-time, and another 84 are expected to be hired in the future.

CIIRDF funded projects developed new innovative produces or services. For example, funding has assisted a Canadian auto parts manufacturer to create a new magnesium-based alloy that has the potential to achieve $30M in sales per year and assisted a Canadian life sciences company to create a new hand-held device that can test for infectious diseases in 5-10 minutes versus current methods that required 1-2 hours of testing.

Conclusion 7: There are socioeconomic benefits attributable to CIIRDF. These include for example, lower prices to consumers, higher product performance, and health and environmental benefits.

Examples of specific socioeconomic benefits include a project that has the potential to make clean drinking water more available in the Middle East, and reduce the costs associated with treating saltwater and wastewater; and a project to treat inoperable solid tumours that could potentially replace the use of chemotherapy for certain patients and reduce hospital stays and their associated costs.

Conclusion 8: CIIRDF has strengthened overall economic, trade, and political relations between Canada and Israel. The alliances between firms in Canada and Israel have in several cases extended beyond their initial purpose. As well, Israeli companies are today more likely to consider Canada as a country to do collaborative R&D projects with than before CIIRDF existed.

Politically, CIIRDF has contributed to strengthened political relations between the two countries. Former Prime Minister Jean Chretien for example, renewed CIIRDF during a visit to Israel.

Our analysis indicates that CIIRDF has helped bring about a change in the perception of Israel held by Canadian firms. Several projects have led to further collaboration without CIIRDF funding. The development of photonics and biotechnology consortia in Canada is another example of CIIRDF extending beyond its initial purpose

CIIRDF is now receiving unsolicited calls in Ottawa and Tel Aviv and interested parties in both countries are also seeking out individual Board members to discuss potential R&D projects. CIIRDF's efforts to develop consortia have also helped raise Canada' profile in Israel as a source of R&D collaboration. Representatives from Israeli photonics and biotechnology consortia for example, have travelled to Canada to speak of the benefits of consortia and are willing to collaborate on projects in the future.

5.3 Design and Delivery

This section concludes on the effectiveness of the design and delivery of CIIRDF.

Conclusion 9: CIIRDF's funding level would appear to be adequate, however a higher funding level would likely make CIIRDF's impacts even greater.

Our analysis indicated that a higher level of funding for CIIRDF would be welcomed in order to achieve more significant impacts. The program Israel has with Korea, for example is funded at $10M per year; the BIRD program with the United States is funded at about $14M per year.

Conclusion 10: For the most part, the request for proposals process is competitive, fair, responsive, and transparent.

Our analysis indicated that the request for proposal process was conducted with due diligence, was not bureaucratic, and that the process was, for the most part, attracting the right size of firm. Most firms were satisfied with the approval process, however five firms expressed dissatisfaction with the length of time the process required and/or experienced a lack of communication from CIIRDF on the progress of their proposals.

Conclusion 11: To date, the terms and conditions attached to agreements have not created major problems for CIIRDF. The use of royalties as the form of repayment of contributions however, has created an administrative burden for CIIRDF.

To date there have not been major problems associated with the terms and conditions of agreements. The nature of royalty repayment however, places the onus on firms to honestly report revenues and creates an administrative burden for CIIRDF to ensure that firms do not under-report revenues.

Conclusion 12: Support services appear to be provided effectively in Canada and Israel. Matchmaking services are being conducted effectively. Firms that participated in CIIRDF-sponsored projects have established positive business relationships with their partners.

Our analysis indicated that CIIRDF is effective at finding suitable firms, making introductions, arranging meetings, making site visits to firms, and when necessary, smoothing out problems and misunderstandings between firms. CIIRDF has made efforts to coordinate visits from Israeli consortia representatives, organize and conduct seminars and workshops, and bring interested parties together to discuss the advantages of consortia.

In the last 3-4 years, CIIRDF, in cooperation with IRAP's national network of technology advisers, has provided matchmaking services to approximately 240 firms. CIIRDF presently makes use of a former Technology Partnerships Canada Director to coordinate matchmaking activities. Most firms that have or are currently participating in a CIIRDF sponsored project revealed that most had established very positive ongoing business relationships with their Israeli partners. Several firms have decided to collaborate on further projects with their partner without CIIRDF funding.

Conclusion 13: CIIRDF is being promoted effectively, and currently project funding is oversubscribed. CIIRDF gives appropriate recognition to its partners.

At present, the fund is oversubscribed. The concern with increasing promotional efforts is that it may flood the program with far more projects than it can fund.

Board members have not heard complaints from the sponsoring departments (Industry Canada and FAC) on this issue. Furthermore, CIIRDF presents the departments as its sponsors "front and centre" at presentations, and the departments are highlighted as its sponsors on the CIIRDF website.

Conclusion 14: The capture and dissemination of program results to appropriate audiences needs to be more consistent and systematic.

Program stakeholders would like to receive more consistent information about CIIRDF's achievements, particularly its economic impacts.

Conclusion 15: In general, CIIRDF communicates effectively with the firms it evaluates and sponsors. More communication with CIIRDF and involvement in its visits to Israel would be welcomed by the sponsoring departments.

Representatives from firms that received funding from CIIRDF were generally satisfied with the communication and guidance from CIIRDF in writing proposals. CIIRDF also received favourable comments regarding its efforts to arrange meetings between Israeli and Canadian firms and smooth out conflicts that arose on occasion between firms.

More communication and coordination with the ITCan Post in Israel would be welcomed by some members of the department. It should be noted however that CIIRDF was designed to operate at arm's length from the government and furthermore, some meetings that CIIRDF holds with firms are extremely technical and are not of particular use to departmental representatives. Finally, some key informants stated that CIIRDF was not well known at Industry Canada, and that it is necessary to "better educate IC people about CIIRDF".

5.4 Management

This section concludes on the effectiveness of CIIRDF management.

Conclusion 16: The binational governance structure is modelled after Israel's BIRD program. It appears to be effective. The binational proposal selection process is also effective.

The binational governance structure is similar to that used for Israel's BIRD program with the US and it appears to work effectively. The CIIRDF Board of Directors is quite skilled, experienced, and stable, particularly its Canadian members, some of whom have been on the Board since its inception. Having the Israeli Chief Scientist as the CIIRDF Chair is also very effective, as his contacts and influence in Israel are extensive, and he has considerable experience managing Israel's other international R&D programs.

Our analysis indicated that the evaluation process is effective. Evaluation experts in each country are not only familiar with the technology being proposed, they are familiar with the reputations of individuals at the firms in their country, and are effective at assessing the business potential of the product. The rigorous evaluation process also serves the best interests of firms by rejecting proposals from firms that are unaware that similar R&D efforts are being conducted by competitors.

Conclusion 17: CIIRDF is well managed, especially with respect to the selection and evaluation phase of the agreement cycle. However, several opportunities do exist for improving and or strengthening several administrative and managerial aspects of CIIRDF.

The administration and management of CIIRDF has many strengths with respect to the management of contribution programs. For example, the proposal evaluation process is very strong. There are aspects in the administration and management of CIIRDF that could be strengthened. The potential negative impact of these administrative weaknesses on the current operation of CIIRDF appears to be minimal due to the reliance on informal or undocumented systems and the President's corporate knowledge. However, in this era of transparency, openness and accountability, it would be prudent for the CIIRDF Board to work towards strengthening these weaknesses.

Conclusion 18: CIIRDF has managed its activities and programs within allocated annual budgets. There are several weaknesses in the repayment requirements for contribution funds however. Royalties are not the most appropriate mechanism by which to collect repayments.

During the last four fiscal periods, CIIRDF expenditures related to contribution agreements have been within allocated annual budgets. On the revenue side, royalty repayments have been somewhat lower than budgeted.

The current sales volume-based approach creates an administrative burden on CIIRDF. A more practical approach to the repayment process may be one that is based on negotiation of a "repayment agreement", once the commercialization process has begun. With respect to repayment of the conditional contributions, CIIRDF should, at some point, give consideration to outsourcing collection responsibilities and or selling CIIRDF receivables to a financial institution.

Conclusion 19: CIIRDF's recent strategy of developing consortia in the photonics and biotechnology industries would appear to be in accordance with both governments' strategic objectives. CIIRDF activities appear to be well balanced. Recent initiatives are appropriate and within CIIRDF's mandate.

Recently, CIIRDF has worked to develop consortia in photonics and biotech. Representatives from both countries ensure that CIIRDF's activities remain in line with the respective countries' strategic objectives. The Chief Scientist of Israel sits on the CIIRDF Board and reviews projects and CIIRDF strategies to ensure that they are in accordance with strategic objective of Israel. Furthermore, three board members from Canada, who include an ADM from Industry Canada (who sits as a private citizen) and a former member of Parliament and Cabinet Minister, ensure CIIRDF remains in accordance with the strategic objectives of Canada.

CIIRDF is well balanced in its activities, namely contributing 50% of joint R&D costs; matching companies from each country seeking a research partner in the other; and, promoting the benefits of joint R&D collaboration. These activities are somewhat inter-related and complementary. Matching companies for example, can often lead to funded projects.

The development of consortia in photonics and biotechnology are recent strategies but also complement CIIRDF activities, as they promote R&D collaboration between several firms in both countries. Our analysis concluded that CIIRDF's mandate, as described in its MOU, does not preclude CIIRDF from pursuing the development of consortia.[8] Most key informants stated the goals of the consortium directly relate to CIIRDF's overall objectives, and the strategy has been approved by the Board of Directors.

CIIRDF is also encouraging the establishment of a collaborative R&D program between Canada and the Palestinians.

Conclusion 20: CIIRDF would benefit from the services of an additional full-time resource in Canada. CIIRDF's strong supporting structure would likely ensure CIIRDF's continuation under another President.

[8] Memorandum of Understanding on Bilateral Cooperation in Private Sector Industrial Research and Development Between the Government of Israel and the Government of Canada, March 1993.

Key informants pointed out that CIIRDF has a very lean organizational structure and hence CIIRDF places considerable demands on the President's time. CIIRDF's President acknowledges that he could use another full-time staff, but does not wish to increase overhead expenses.

According to some key informants, CIIRDF's President possesses a broad range of skills and fulfills multiple roles including evaluator, matchmaker, promoter, coordinator, administrator, leader, and troubleshooter. It is unclear if a successor could be found that possesses comparable skills along with extensive contacts. However, CIIRDF's supporting structure (i.e., the evaluation process, the Board of Directors, and foreign contacts) appears to be strong and it is likely the CIIRDF structure could continue if there is a change in leadership.

To address the issues identified above, the following steps are recommended:

Recommendation 1: *Industry Canada, International Trade Canada (ITCan), and Foreign Affairs Canada (FAC) should continue supporting CIIRDF and consider maintaining or increasing its funding level.*

Recommendation 2: *CIIRDF should adopt a more consistent process of capturing and disseminating program results. CIIRDF may wish to consider hiring a resource to conduct this function.*

Recommendation 3: *CIIRDF should strive to improve communication with its sponsoring departments.*

Recommendation 4: *CIIRDF should take steps to address the administrative weaknesses identified in issue 12: Program Management of this evaluation.*

Recommendation 5: *The CIIRDF Board of Directors should consider revising its current method of repayment of contributions by collecting royalties based on sales of products developed from CIIRDF-sponsored projects. A more practical approach to the repayment process may be one that repays the contribution to CIIRDF over a set length of time (i.e., 7 years, 10 years, etc.), once the commercialization process has begun.*

Preamble to Management Responses

CIIRDF's track record, as confirmed by the evaluation, demonstrates that strengthening international research and development collaboration, particularly in the knowledge-intensive sectors of the economy, is an effective means of enhancing international commercial relations and the capabilities of domestic industry in both the short and long terms.

Since the completion of the evaluation the department has consulted widely with other government departments to determine the merits of continuing to support CIIRDF. It was concluded that the program should be continued. For the previous 11 years of the program funding was secured on an ad-hoc basis from the Department of Foreign Affairs and International Trade and Industry Canada with no one departmental program to accommodate CIIRDF. Recognizing the importance of the program, as outlined in the evaluation, International Trade Canada included CIIRDF in the request for funding of a program for international science and technology under Budget 2005. The Budget provided $20 million over 5 years for international science and technology initiatives. The department then submitted a Memorandum to Cabinet to establish the International Science and Technology Partnership Program (ISTPP) for the emerging economies of China, India and Brazil and also included funding for CIIRDF. Cabinet approved the ISTPP in June, 2005 and Treasury Board approved the funding in early October, 2005.

The Canada-Israel Agreement, which established CIIRDF, expired March 31, 2005. Until a new agreement could be concluded, both countries, having agreed to continue with CIIRDF, signed a Joint Declaration of mutual intent to continue to support CIIRDF on April 7, 2005. With the approval of funding from Treasury Board in place, the CIIRDF Agreement with Israel is being negotiated with an expected signature by December 2005.

Management response to recommendation#1:

<u>The Government continue supporting CIIRDF and consider maintaining or increasing its funding level</u>.

The Government will continue supporting CIIRDF at its current funding level. The International Science and Technology Partnerships Program (ISTPP) includes funding for CIIRDF of up to $1 million per year for five years. After consideration of the ISTPP budget for not only CIIRDF but China, India and Brazil as well, the current funding level for CIIRDF was considered to be adequate. Funding for the program will be made available in December and the CIIRDF Agreement will be signed at that time.

Although not a part of this recommendation, the evaluation states that "CIIRDF could potentially be used as a model for developing similar programs between Canada and other countries, such as India and China". It was determined by the Government that CIIRDF's experience and expertise within a broader ISTPP would be invaluable. Therefore, based on the many successful elements of CIIRDF, the ISTPP for China, India and Brazil is planned to be delivered through an arms length organization(s) modelled after CIIRDF. Therefore, not only will the Government continue to support CIIRDF it will use CIIRDF as a model for its only international science and technology partnerships program.

Management response to recommendation # 2:

CIIRDF adopt a more consistent process of capturing and disseminating its results and consider hiring a resource to conduct this function.

While CIIRDF management does not believe that the operating budget can accommodate the hiring of a resource to conduct the function of disseminating CIIRDF program results, they plan to present a communications strategy to both the Board of Directors and to the sponsoring governments that will feature real time reporting on CIIRDF activities. As well, CIIRDF will produce regular hard-copy reports with information on active and successfully completed projects, on partnering activities, on regional cluster round tables as well as technology missions. These reports will also be posted on the CIIRDF website. The Government (IIS) supports that plan and will ensure that the information provided by CIIRDF on completed projects will include their actual and planned repayments of CIIRDF contributions. The Government (Science and technology Bureau, IIS) will request that the communications strategy be presented within the next four months and will monitor CIIRDF to ensure that the reports are produced on a more regular basis.

Management response to recommendation # 3:

CIIRDF strive to improve communication with its sponsoring departments.

CIIRDF management proposes that quarterly meetings be held with officials of the sponsoring departments, including the National Research Council. The main purpose of these meetings will be to discuss the CIIRDF forward agenda and propose appropriate involvement and/or participation of departmental officials and to recommend that from other departments and agencies. As per past practice, officials from the sponsoring departments of both governments will be invited to sit as observers to meetings of the CIIRDF Board of Directors. The Government (IIS) supports that plan.

Management response to recommendation # 4:

CIIRDF take steps to address administrative weaknesses related to the management of agreements, reporting and auditing.

CIIRDF advises that steps have already been taken to ensure that project file management will follow a formal review and reporting process supported by project management software. CIIRDF management has also retained the services of a project evaluation team to assess the management structure, job descriptions, and overall corporate governance structure of operations, including file storage, sharing and retrieval and the record keeping of project reporting evaluations. The Government (IIS) supports that plan.

Management response to recommendation # 5:

The CIIRDF Board of Directors consider revising its current method of repayment of contributions by collecting royalties based on sales of products developed from CIIRDF-sponsored projects. A more practical approach to the repayment process may be one that repays the contribution to CIIRDF over a set length of time once the commercialization process has begun.

The bi-national CIIRDF Board of Directors, at their recent April 2005 meeting considered options for royalty repayment and concluded that the repayment formula was adequate but that improvements could be made by a more rigorous compliance regime for the reporting (by the companies) of their commercialization and sales. On the issue of royalty repayment policy, the CIIRDF Board expressed concern that a change in the repayment criteria would affect the project screening, selection and approval process, as well as preclude certain meritorious projects from proceeding. Because of the past success of the CIIRDF projects, the Board concluded that it would turn its attention on compliance rather than rules change. In this context, two factors will help ensure the improved rigour of royalty repayment. First, is the installation of the program management software mentioned above and second is the use of the Office of the Chief Scientist of Israel's resources in enforcing these obligations for the Israeli companies. The Government (IIS) supports the actions taken.