Canadian Centre for Research on Imaging

Concept and Business Plan

Executive Summary
prepared for the
Canadian Department of Communications

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March 1989

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1. The mandate

Following the recommendations of the Picard report, the Department of Communications intends to create, in Montreal, a research centre on imaging which would provide Canada with the scientific and technical expertise needed for Canadian companies to improve their position in the international marketplace.

This Centre would bring together the private sector, universities and all levels of government, and in conjunction with other research centres, develop a program of research and development oriented towards the vast field of computer imaging, while taking into account the expressed needs of potential users.

Our firms' mandate, therefore, was to verify the interest of the Montreal research community - private and public enterprises, universities - in the creation of such a research centre. The study was also to define more clearly the concept of the centre by consulting with interested parties and by working closely with an ad hoc Committee composed of representatives and specialists from different sectors of the imaging industry, to examine opportunities or areas of activity as well as the impact of the project, and then, to develop a business plan.

2. Interest from the field

After consulting with the interested parties, we can say that there is clearly an interest in a centre *«which would serve as a locus for exchange and act as a coordinator, managing and promoting research projects carried out by the private sector with the cooperation of external groups»*[1].

Interested participants prefer a new approach of **light intervention, which implies a modest injection of public funds, and which ensures coordination of investment in research** instead of creating new infrastructures. Participants feel that this approach

1 Definition given by a participant.

would likely maximize the spin-offs from the research funds. From the start, industry representatives place the Centre's contribution at the pre-competitive research stage, and they ask that *«major themes»* be favored, with *«two or three scenarios developed around the concept of catalyst projects»*[1].

3. The chosen concept

After a careful examination of various programs for knowledge development and the transfer of technology[2] - and with due consideration given to the availability of technological resources in this sector - the following concept of the future Canadian Centre for Research on Imaging was adopted:

- Establish a research centre with a very light structure which would act as a technological watchdog in the sector, while facilitating cooperation between companies, universities and research centres.

- Capitalize on existing research teams in universities and research centres, by promoting partnerships which answer the needs of the industry.

- Search for maximal flexibility in order to easily respond to many types of requests and to quickly orient research in the most promising areas. Similarly, be able to abandon less promising projects while minimizing irrecoverable costs.

- Use the financing of Canadian Centre for Research on Imaging projects as a *«lever»* to obtain the financing required to undertake large-scale projects from other subsidizing groups and corporations.

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1 Which implies involvement in the form of initial contracts and concerted and continued efforts.

2 This study was able to benefit from expertise acquired by Secor which, in another study, had just completed a series of meetings with groups interested in the development of knowledge and economic development by means of technological transfers to companies. In that study, more than twenty-five Canadian, American and European organizations were visited. The information we gathered enabled us to model the different types of programs and to evaluate their effectiveness.

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In keeping with these principles, the CCRI should be set up as a light structure with a policy of contracting out. Its «research arms» would be university and industrial laboratories as well as those in other existing research centres. However, so as to ensure solid foundations and continued activity, the CCRI could develop agreements with affiliate-members for various areas of research.

The primary role of the CCRI would be to:

- initiate projects;
- identify the scientific expertise capable of carrying them out;
- arrange the financing for such projects;
- negotiate the agreements between the participating partners (CCRI, corporations, universities, public organizations, other subsidizing groups);
- follow-up on the projects so that the objectives are reached within the given time-limit;
- evaluate the projects and their results.

The Centre would be directly involved in the planning, managing and evaluation of the research but not in its execution.

The CCRI would also play a role in monitoring technological developments as well as in the dissemination of scientific information. In addition, the CCRI would play a major role in networking researchers and corporations in the field of imaging research.

4. The mission of the Canadian Centre for Research on Imaging (CCRI)

In conformity with the needs expressed by the main interested parties and by the members of the ad hoc Committee, it was decided that the mission of the CCRI would be to promote knowledge transfers through applied research and

technological development. A broad interpretation of the notion of knowledge transfer is intended, that is the transfer of the results of applied research to the development of cultural as well as industrial products.

5. Priorities

Given the convergence of major technologies, and the financial and human resources of the future Centre, as well as the intense competitiveness of several potential partners, members of the ad hoc Committee have stressed the importance of the *catalyst projects* concept. In their opinion, the R&D in such projects should be pre-competitive in nature, and oriented toward the development of generic technologies which have several applications in different industries.

Based on this and some other criteria, we isolated three high-priority areas for the Centre:

A. High definition television or advanced television

Advanced television is a notion which affects several industries: programs and advertisement designers who will have new technologies at their disposal; producers and broadcasters due to the huge amount of money that will have to be spent on new equipment including cable networks; studio equipment manufacturers (amplifiers, special effects); telecommunication companies which could offer new services, and manufacturers of telecommunication equipment who will have to develop new products. Advanced television will also affect the electronic products manufacturers mainly located in Asia (Japan, South Korea, etc.) as well as consumers who will acquire the new equipment and who will feel the impact of this new technology.

Japanese and European proposals for the high definition television have been turned down by the United States which are backing a separate proposal. Canada and Canadian companies have an excellent opportunity to benefit from the present confusion in North America and to actively take part in the development of the standards for the North American advanced television proposal. A Canadian participation would ensure non-negligeable niches for our companies and would allow Canadian industries affected by these new technological developments to do more than merely follow in the wake of foreign innovations. The opportunity for Canadian firms is real and represents markets of several millions of dollars.

The Montreal region has the sophisticated technological resources and the private companies needed to carry out a catalyst project in this area. Indeed, such a project could bring together university and DOC researchers, broadcasters, studio equipment manufacturers, telecommunication carriers and manufacturers, and art producers. Montreal, which already has a large variety of expertise in this area, could be the designated Canadian testing ground for high the definition television project as it is envisioned by the Department of Communications.

B. Computer imaging

Montreal's strengths in image creation technologies are both upstream and downstream from the manufacturing process. As such, it would be logical to give priority to the research in image creation. Indeed, computerized image creation is a research area which would rally together Montreal's artistic and computer communities. By stressing the use of computers in creation, the Centre would respond to the needs of creators to master these tools, while maintaining Canada's lead in a sophisticated research sector. Mastering these tools is specialllly important in light of the increasing computerization of artistic

production: litterature, movies, videos, visual arts, music. Training in this case tends to be left to manufacturers whose educational programs may not be adapted to the Canadian language, culture and professional practice.

With its public and private television broadcasters, Canada is home to major potential users of this technology. By enabling them to work on the quality and originality of their products destined to the Canadian and international viewers (TV5), governmental aid can help television broadcasters export their products. By mastering the tools associated with image design, Canadian creators would be better positioned to reach the of excellence and competitiveness levels necessary in an international environment. There are in Montreal abundant examples of engineers and music artists, lighting technicians or producers working together to invent and perfect instruments used for image and sound creation. Although not a garantee of future success, these examples reflect the presence of expertise which would allow our country to play a significant role in this area.

C. Document management through imaging

Document handling is a major challenge for service companies, particularly in the financial services sector. Documents are increasingly generated electronically - and can therefore be dealt with by computer - yet organizations still rely on an imposing mass of paper documents, and imaging technologies can become an instrument for simplificaiton and rationalization.

Many different technologies for document handling through numeric imaging are available on the market today. But for the applications we have in mind, these technologies have a limited ability to effectively manipulate such a mass of documents, to adequately store and quickly transmit them. These are the key elements. The new imaging

technologies will have to be capable of solving problems related to the effective storage, retrieval and transmission of structured information with a simultaneous access to documents by several people.

Among its potential members, the CCRI could have companies interested in sponsoring specific research projects in this area.

6. The impact on Montreal of the creation of a research centre on imaging

The image technology sector is already characterized by the presence of an important public-private partnership as well as public policies in the communications and telecommunications sectors among others. As such, the creation of the CCRI would benefit from a framework favorable to the emergence of high-tech activities. Moreover, the funds it could generate would add to the existing development capital and would contribute to the conditions which favor the clustering of high-technology firms. These include incubation, supporting contracts and the emergence of successful companies which are models and an inspiration to future entrepreneurs. Together, these initiatives generate a set of favorable circumstances for the emergence of a strong presence in high-technology imagery in the Montreal area.

Specifically, through its major priority projects, the Centre could:

1. Stimulate the awarding of structuring contracts
2. Increase the technological content of companies operating in the field of imaging
3. Ensure the contribution of universities to the industrial R&D effort in the imaging sector.

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1. Stimulate the awarding of structuring contracts

One of the effects of the Centre would be to place public enterprises as well as large firms in a position to create clustering effects by awarding product development contracts. Indeed, many innovative purchasing decisions lead to a sponsorship which allow new firms to emerge and develop, as they are assured of a stable financial support during the crucial start-up years. This type of decisions have a stimulating effect on all high-technology companies in a given region[1].

The creation of the CCRI should accelerate this kind of stimulation by increasing either the volume of contracts or the club of companies capable of handling contracts of enough importance to allow the birth and growth of such high-tech companies who will become part of or consolidate their position in the Montreal's industrial environment.

2. Increase the technological content of companies operating in the field of imaging

In contrast with several other industries in Montreal, the imaging and sound sector is rich in technical entrepreneurs. As they are small and medium enterprises, they are not in a position to be leaders, yet Montreal remains at the centre of many innovations in the component manufacturing and production process industries. By bringing together these innovative «talents» and by combining them with the financial and technological capacities of big corporations, the activities of the firms involved will be significantly affected.

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1 Already, Bell Canada, Radio-Canada, the Association des câblo-diffuseurs, AES, Central Dynamics, Northern Telecom - all Montreal based companies operating in the imagery sector - have a structuring impact on the industry through their contracting policies and their role as incubators.

3. Ensure the contribution of universities to the industrial R&D effort in the imaging sector

The presence of universities in collaborative projects with the industry is clearly one of the determinant factors for the expansion of the economic activity in high-technology. University participation in research consortia enables these institutions to contribute directly to the advancement of knowledge.

The CCRI will create the opportunity to form consortia. In imaging, universities in Montreal are active through many small groups linked to departments with wide-ranging vocations such as the arts, electronic engineering or business management.

The CCRI could stimulate not only the participation of these researchers in pre-competitive research, but also involve them in the creation of new companies exploiting niches opened up by innovation.

7. Activities

There are a number of activities that the CCRI could undertake in order to «act as a locus for exchange among different organizations and to create a synergy» in imaging technology.

Among them, there is the survey of existing technologies and players; of the existing sources and users of such technologies; the identification of the most promising projects (confrontation between the advancement of research work and the needs expressed by the market); the understanding and interpretation of user needs; the continuous examination of the «state of the art» in selected projects and market opportunities; the dissemination of scientific information through symposia, conferences, the publication of a newsletter, etc.; impact studies on regulation and norms; lobbying at all levels of governement responsible for regulation.

In order to «unite the research and development work through some organic link», the CCRI could engage itself in three types of activity:

- **Exploratory, technico-economic and feasibility studies,** to evaluate the projects' economic and technological potential.

- **The pre-competitive research program** which would include the catalyst projects.

- **The competitive research contracts** which would address the specific development and technical support needs of member firms.

8. The organizational structure of the CCRI

The CCRI will be a non-profit organization. It will be headed by a board of directors with 9 to 11 members representative of the partners of the Centre.

Given its role as a locus for exchange, the Centre's administrative structure will be light and its personnel restricted.

Later on, the Centre will need to form two external committees to ensure its credibility and notoriety: an advisory committee whose role will be to assist the board of directors in choosing its orientation and its technologies, as well as selecting projects and other scientific activities. Also, an external evaluation committee composed of foreign experts known in the international arena who, using recognized methods, will periodically evaluate the scientific contribution of the Centre and will strive to publicize the Centre abroad.

9. Financing the Centre

According to the hypotheses of the business plan, the CCRI will receive $10 million from DOC for five years, renewable at that time. Member contributions will be a second source of financing, worth between $75,000 and $250,000, depending on the number of partners. The contribution principle was selected as a minimum required to allow participating organizations to benefit from the Centre's basic services.

CCRI revenues will be used to cover operating expenses estimated at 20%, as well as to finance coordination and research activities (80%).

In order to maximize leverage for financing researach, the matching funds principle would be used: 50% of each project would be financed by corporations. CCRI participation would take the form of refundable advances to be reimbursed if it leads to a successful commercial exploitation of results.

The catalyst projects, stemming from the pre-competitive research program, could be financed 20% by the CCRI, and the rest by other subsidizing groups like the CRSNG and the "Fonds du développement technologique du Québec", as well as by the corporations involved. For competitive research contracts, CCRI financing should not exceed 50%.

Based on our analysis, the leverage effect exerted by the CCRI would be important for research investments. This effect could actually double funds at the contractual level. At the level of pre-competitive research programs, every dollar invested by the CCRI will be increased five-fold. In addition, the real cost to the CCRI is minimal since every dollar invested in research at these two levels is theoretically reimbursable. The real cost therefore is linked to the risk of failure, estimated at 70% for catalyst projects, and 20% for research contracts. As a result, the CCRI will have invested on a five-year period only $2.375 million at these two levels, yet it will have brought about research activities worth $12.750 million. Moreover, CCRI activities will have enabled research organisms (universities and research centres) to increase their equipment inventory by $1.6 million, while further consolidating

teams already in place. There will be a greater flow of information through the activities of the Centre, as well as the creation of research partnerships. The result of all these activities should be to improve industry productivity in Montreal and in Canada as a whole.

RESEARCH INVESTMENTS ($000)	ORGANISMS			
	TOTAL	CCRI	COMPANIES	OTHER SUBSIDIZING ORGANISMS
Catalyst projects	6 250	375	4 000	1 875
Research contracts	5 000	500	4 500	
Start-up funds	1 500	1 500		
Equipment funds	1 600	1 600		
TOTAL	**14 350**	**3 975**	**8 500**	**1 875**

10. Conclusion

Many corporate and public organization representatives have expressed a clear interest in the creation of the CCRI, and they would readily participate in defining catalyst projects in their fields. Three major priority projects concerning technological avenues have been isolated and can, today, attract large scale partners. The latter already have solid experience in this area and they have, to a large extent, expressed their interest in pooling research efforts in generic technologies.

Other ad hoc Committee members actively participated in defining the tasks of the Centre on the one hand, but will reserve their membership decision until the areas of activity and the priority projects have been chosen.

In light of these attitudes, we feel it would be logical that the next stage be devoted to defining the priority projects with those participants interested to contribute to their sponsorship. It is urgent to undertake the next step in order to solidify the

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Montreal imaging community's synergy. For example, the collaboration of cultural and communications companies interested in high definition television will be stimulated by DOC efforts in the project.

In fact, this stage can be undertaken while DOC seeks an agreement in principle for the creation of the Canadian Centre for Research in Imaging, and secure the funds for its creation.