



2017-2022 STRATEGIC PLAN

Version: September 1, 2017
Revised: March 13, 2019

Computer Research Institute of Montréal





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FOR 30 YEARS, CRIM HAS BEEN A CENTRE OF LEADING EDGE EXPERTISE IN
INFORMATION TECHNOLOGY, GENERATING CONCRETE RESULTS AND SERVING
ORGANIZATIONS AS A STRATEGIC PARTNER IN INNOVATION.

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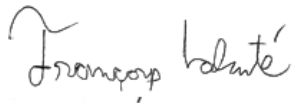
MESSAGE FROM THE GENERAL MANAGER

The Computer Research Institute of Montréal recently celebrated its 30th anniversary. Created to bridge industry and academia, it remains relevant to that purpose today. CRIM's structure, as a member-driven NPO whose Board of Directors consists of representatives from industry and the research and innovation community (universities and organizations), allows it to strike the right balance between the conduct of frontier research and meeting organizations' immediate needs in R&D and innovation. The CRIM model ensures that its service offer is in line with market needs while at the same time giving it latitude to explore and appropriate emerging technology.

CRIM's mission comprises two components: first, economic development that makes organizations more efficient and competitive through the transfer of knowledge and technology, and second, the advancement of scientific knowledge through applied research. CRIM's relevance, its socio-economic significance and the impact of its research work on the scientific community are all confirmed by independent studies.

CRIM has gone through numerous economic and technological cycles over its thirty years of existence. The longevity and renown of the CRIM are not built on fads and the "flavour of the day" but rather on the expertise of its personnel and its ability to adapt and respond to a constantly evolving environment. With its unique positioning, CRIM is able to attract and retain highly qualified personnel with specific profiles as non-university researchers and professionals, motivated by innovative, leading edge projects based on a collaborative and often multidisciplinary approach.

With enthusiasm and great pride, the CRIM management team has crafted a 2017-2022 Strategic Plan that will allow it to actively carry out its mission, consolidate its role as a key player in economic development and thus contribute to Québec's prosperity and the enhancement of citizens' quality of life through innovation.



François Labonté, Eng., Ph.D.
General Manager

VALUES



INNOVATION

AT THE HEART OF OUR MISSION,
IT DRIVES EVERYTHING WE DO.



CREATIVITY

THE ABILITY TO IMAGINE
WHAT DOES NOT YET EXIST,
IT IMPELS EACH OF US
TO EXCEL AND INNOVATE.



COLLABORATION

EMBEDDED IN OUR
ORGANIZATIONAL CULTURE
AND OUR BUSINESS PRACTICES.



INTEGRITY

RESIDES IN THE TRUST OUR
CLIENTS AND PARTNERS PLACE IN US
AS A NEUTRAL THIRD PARTY AND IS THE
FOUNDATION OF OUR PROFESSIONALISM.



TRANSPARENCY

FOSTERS TRUST, FAIRNESS
AND PROMOTES OPEN AND
EFFECTIVE COMMUNICATION.

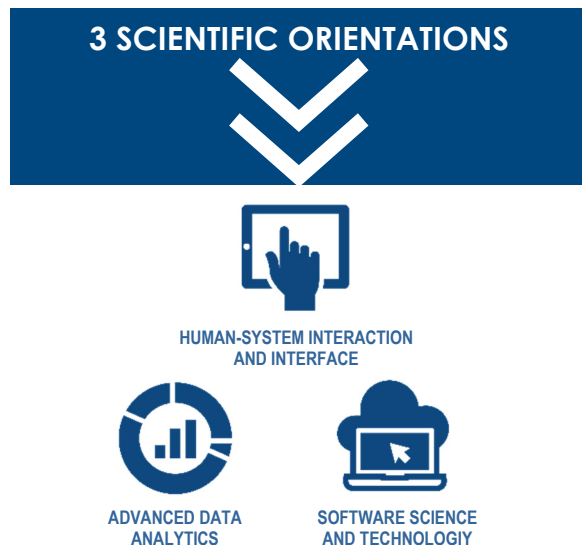
RESEARCH AND DEVELOPMENT

The R&D conducted at CRIM is innovative and timely. Its scientific program is built upon three scientific orientations.


Each of these orientations involves areas of research covering nearly all the projects carried out by CRIM:

1. Human-system interaction and interface;
2. Advanced data analytics;
3. Software science and technology.

CRIM has its own IT researchers and professional conducting its R&D projects, involving mainly software development. It offers experts on demand to organizations that cannot hire them fulltime, in fields of expertise poorly covered by the current market offering. CRIM's spheres of action complement those of universities and are aimed at striking a balance between tech push and market pull.



MISSION



CRIM is an applied research and expertise centre in information technology, dedicated to making organizations more effective and competitive through the development of innovative technologies and the transfer of leading edge know-how, while contributing to scientific advancement.

RESULT

Consistent with the economic situation of the province of Québec in recent years, CRIM's activities have been marked by uncertainty, with subsidy renewals on an annual basis, funding rollbacks and a change in status. Still, CRIM managed to hold its own and deliver solid results.



337
COMPLETED
R&D
PROJECTS



179
SCIENTIFIC
PAPERS
PUBLISHED



82
STUDENTS
AND TRAINEES
SUPERVISED



58
NETWORKING
EVENTS
ORGANIZED

Notables events of the last past years¹

- Change of status: transition from Liaison and Transfer Centre to Public Research Centre.
- Refocusing of operations on applied research.
- Discontinuation of professional training and software testing operations.
- Significant reduction of CRIM's operating subsidy.
- Major deficit related to cost of restructuring.
- Prioritization of deficit repayment through an operating surplus.
- Major socio-economic benefits and significant contribution to scientific advancement.

¹ June 1st, 2013 to March 31, 2017: 4 annual conventions.

GENERAL CONTEXT AND ENVIRONMENT

The digital switchover is forcing major transformation in all economic sectors of society. These changes generate a great demand for impartial information and expertise. Practices and business models are gradually adapting to the new realities of an economy based on data processing.

New approaches to data analysis are emerging online thanks to the proliferation of data sensors, increasingly efficient communication networks and the growth of high-performance infrastructure capable of storing and handling vast quantities of data.

Governments, faced with the many challenges that ensue from this digital switchover, recently launched numerous consultations on digital technology, research, development and innovation, with a view to establishing strategies suited to a knowledge economy.

In this context of rapid change, municipalities are establishing themselves increasingly as key players in innovation. The concept of smart cities is gaining traction and is garnering more and more investment with the objective of delivering services to citizens from a world of digital possibilities.

The recent recognition by government and industry stakeholders of Montréal as a centre of high-quality expertise in the areas of operational research, big data processing and artificial intelligence has brought major sources of funding for R&D projects in these fields. These new investments have spiked enthusiasm in Montréal, a city currently staking its claim on the world scene as a centre of excellence in artificial intelligence.

In this environment where we are pressed to adapt to an ever-faster pace of technological evolution, there are still serious challenges to be addressed if we are to grasp and fully benefit from advancements in data science. These challenges will only be amplified by the ageing of the population and the increasing shortage of skilled labour. New ways of doing things must be sought that will ensure the workforce of tomorrow is able to respond to future needs of organizations.

CRIM CONTEXT AND ENVIRONMENT

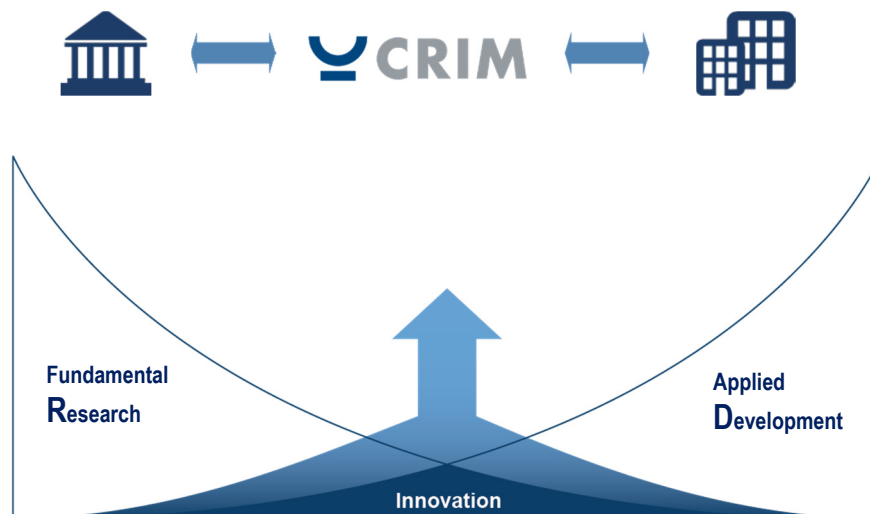
CRIM distinguishes itself by its practices and its unique service offer, tailored to the needs of SMBs. Its areas of expertise, well-suited to the digital switchover and to the era of data processing by artificial intelligence, make CRIM a partner of choice for organizations setting themselves on the path to innovation.

The recent refocusing of its activities has brought new stability to CRIM. The new five-year funding agreement with the ministère de l'Économie et de l'Innovation (MEI) will give CRIM a free hand to follow through on the seven core strategic initiatives set out in this plan. These initiatives and accompanying orientations are closely bound by the requirements of the funding agreement with the MEI and are aimed at combining the two components of economic development and scientific advancement.


Governments, concerned with a continuum of public service offer in research and innovation, are showing a growing interest in applied research centres. CRIM provides real answers to many of the questions raised during consultations on the federal innovation strategy, Québec's digital strategy and the Québec strategy for research and innovation — all reflected in the seven initiatives listed in the plan that follows.

UNIQUE POSITIONING

Establishes linkage between universities and industry with a service offer adapted to the needs of organizations, particularly SMBs.



VISION



**To be the key player in IT
in Québec; bridging academia
and industry, developing,
adapting and making
technologies and know-how
accessible, responding to the
needs of organizations.**

CRIM'S DISTINGUISHING FEATURES

- Provides the cutting edge and complementary expertise required by clients in the completion of their R&D projects.
- Implements business practices adapted to the realities of organizations, particularly SMBs.
- Targets organizations wishing to innovate through IT across all markets.
- Works in collaborative mode.
- Assists in the training, updating and attraction of skilled labour.
- Produces tangible economic benefits for Québec and Canada.
- Contributes to the advancement of scientific knowledge.

ORIENTATIONS

1

[R&D]

Develop and adapt technologies and knowledge in response to specific needs of organizations

- By putting emphasis on concrete, value added solutions.
- By making SMBs more innovative.
- By supporting SMBs, large corporations, government departments, paragonovernmental organizations and NPOs in their drive to innovate and switchover to a data-based economy.

2

[TRANSFER]

Make technologies and knowledges accessible to and usable by organizations

- With customized transfers of knowledge and know-how focused on technical problem-solving and geared primarily towards SMBs.
- With the development and implementation of data processing, analysis and handling platforms which act as conveyors of technology.
- With scientific outreach activities (conferences and seminars) and various technical-commercial events.
- With training of visiting talent at CRIM to upgrade their knowledge and skills and develop their practical know-how.

3

[VISIBILITY]

Promote and publicize CRIM's added value

- Through publication in scientific journals, to strengthen CRIM's credibility among academics and maintain channels of university collaboration.
- Through communication of those characteristics that set CRIM apart from other players in the innovation ecosystem.
- Through promotion of all that CRIM has to offer, particularly to SMBs.
- By getting the word out about CRIM's success stories.
- Through outreach and visibility of our clients and members.

STRATEGIC INITIATIVES

CREATION OF VALUE THROUGH TECHNOLOGICAL PROBLEM-SOLVING



CRIM fills its clients' and partners' needs through structured R&D projects. The CRIM staff is entirely dedicated to these projects carried out directly by technical personnel with the support of project managers, human and material resources, the finance department and the IT team.

In keeping with its twofold mission of economic development and advancement of knowledge, CRIM takes particular care to select projects that will ensure its work is always of high added value and complements the existing market offer. Moreover, the projects chosen contribute to the achievement of CRIM's scientific program.

CRIM distinguishes itself by its flexible methods and business practices, well-adapted to all types of organizations but particularly to SMBs, which often have short-term needs and limited financial and technical resources.

COURSES OF ACTION

- ▶ Offer cutting edge and complementary expertise on-demand.
- ▶ Work in areas that are not commercially well-served.
- ▶ Propose methods and practices that work for SMBs.
- ▶ Generate solid socio-economic benefits through high value added action.
- ▶ Accelerate development and make organizations more effective and competitive.

QUANTITATIVE METRICS

Number of projects completed

Number of separate organizations served

Value of the research portfolio (revenue + CRIM investment)

Level of client satisfaction

QUALITATIVE METRIC

Socio-economic benefits

STRATEGIC INITIATIVES

SCIENTIFIC PROGRAM AND OUTREACH



CRIM's scientific program is innovative and current and offers a potential for high economic benefits for organizations. An external scientific advisory board carries out an annual review of the quality and relevance of CRIM's scientific program and, where necessary, recommends or endorses program modifications. Even as it maintains a core of stable scientific activities that are not overly subject to technological fashions and cycles, CRIM strives to anticipate trends and identify emerging technologies so it may contribute to their development and appropriate them before they become more popular. CRIM's experts watch for technological tendencies they anticipate will become popular over a two-to four-year horizon.

By the very nature of the activities particular to an applied research centre, CRIM researchers don't publish or supervise students to the same extent as their university colleagues. But, through the quality of their work, they succeed in distinguishing themselves by the numerous grants they are awarded under peer review.

COURSES OF ACTION

- ▶ **Subject CRIM's scientific program to an annual review by an external scientific advisory board.**
- ▶ **Publish scientific papers.**
- ▶ **Supervise students.**
- ▶ **Be involved in the scientific community.**
- ▶ **Participate in conferences.**
- ▶ **Conduct exploratory research (not directed by clients).**
- ▶ **Obtain research grants awarded under peer review.**

QUANTITATIVE METRICS

Number of scientific or technical papers published

Number of scientific events organized

Number of participants in scientific events

Number of presentations at national or international conferences

Number of collaborative projects with universities and research organizations

Number of collaborations on scientific publications

Number of participations on peer review committees

STRATEGIC INITIATIVES

TRANSFER OF KNOWLEDGE AND TECHNOLOGIES TO USERS



The scientific community produces new knowledge at an ever-increasing pace. However, the vehicles by which this knowledge is circulated, principally peer-reviewed scientific journals, are not easily accessible to the uninitiated.

Similarly, in the information technology sector, the production of open source software is growing. While much of this software is made available under unrestricted user licences, performance levels don't always meet expectations and getting problem-solving information for technical issues isn't always easy.

There is much to do to make new knowledge and technology more accessible, notably to SMBs that don't always possess the resources or expertise required to quickly absorb them. CRIM's experts actively participate in research communities that are developing and evolving new knowledge while also working on projects that meet users' specific needs. Thus they are ideally suited to facilitating and accelerating the transfer of knowledge and technology to users.

COURSES OF ACTION

- ▶ **Work in collaborative mode to facilitate the transfer of knowledge and know-how in R&D projects.**
- ▶ **Target SMBs and markets outside the IT sector as well as those within it.**
- ▶ **Carry out customized, short-term knowledge transfers.**
- ▶ **Organize technical-commercial events.**
- ▶ **Promote new digital applications (data-based economy, governance, security, multidisciplinary approaches).**

QUANTITATIVE METRICS

Number of short-duration knowledge transfer interventions

Number of technical-commercial events organized

Number of participants in technical-commercial events

Number of participations of our experts as speaker or panelist at technical-commercial events

Proportion of projects involving knowledge or technology transfer

STRATEGIC INITIATIVES

DEVELOPMENT, ATTRACTION AND RETENTION OF TALENT



As the pace of technological change quickens, it becomes increasingly important, for the sake of economic development, to ensure a good match between workers' skill sets and market needs. A growing number of studies mention that the jobs of tomorrow will require a solid university background, complemented by in-depth know-how acquired in rich practice settings that foster the development of transversal skills, with particular emphasis on multidisciplinary work.

CRIM already offers a rich practice setting that helps the students within its walls better prepare for the labour market as they acquire skills and know-how that complement their university education.

In a context of population decline and skill shortages in the IT sector, CRIM is convinced that it can expand the model already in place for students. CRIM can also become a transit hub for workers requiring practical skills upgrades and for recently-arrived, qualified immigrants needing support to integrate the Québec labour force.

COURSE OF ACTION

- ▶ **Be a transit hub for talent development.**
- ▶ **Offer a rich setting for the acquisition of practical skills to complement traditional education.**
- ▶ **Welcome university students (graduate and post-doctoral).**
- ▶ **Welcome workers in need of resourcing and skills upgrades.**
- ▶ **Attract and retain qualified immigrants (CRIM as a transit station).**
- ▶ **Work with key players in the ecosystem toward a continuing education program to upgrade the skills of IT professionals.**

QUANTITATIVE METRICS

Number of students

Number of people (not employed by CRIM) who pass through CRIM to upgrade their skills

QUALITATIVE METRICS

CRIM involvement in initiatives targeting IT workers' skills, job profiles and career promotion

Contribution to job creation

STRATEGIC INITIATIVES

TECHNOLOGY TRANSFER VIA RESEARCH PLATFORMS



Recent advances in Big Data technologies open the way to real progress in upscaling of computing capacities in relation to data size and demand a certain degree of modularity and independence in data processing and handling algorithms. These new computer architectures are particularly useful for showcasing CRIM's know-how in its core competency of advanced analytics of unstructured data.

Over the past two years, CRIM has invested great effort in developing and deploying research platforms tailored to the specific needs and data processing and handling sequences of different research communities.

These large-scale projects make it possible for CRIM to encapsulate and make available to numerous users a great number of unstructured data processing and handling algorithms. In view of their adaptability to the quantity of data and of the relative ease with which data processing sequences can be rearranged to meet the needs of new users, these platforms show great potential for technological transfer.

COURSE OF ACTIONS

- ▶ **Support and cooperate with research communities.**
- ▶ **Ensure that research platforms become a marketing channel, a technology showcase and a technology transfer model.**
- ▶ **Develop platforms for commercial use and make them available.**

QUANTITATIVE METRICS

Number of data processing, analysis and handling services made available through research platforms

Number of research platform user-communities

Number of third parties that exploit CRIM platform services under licence

STRATEGIC INITIATIVES

PARTICIPATION IN THE INNOVATION ECOSYSTEM



Québec's innovation-support ecosystem is large, diverse and constituted of numerous players. CRIM, as a member-driven NPO, includes many of them within its membership. Its clients and partners are, for the most part, familiar with CRIM's offering and fields of action, but CRIM is still often associated with its professional training activities, which it discontinued several years ago.

There is a need to raise awareness of CRIM's value added service offer and of the distinguishing and complementary features that set it apart from others players in research and innovation. This is notably important in light of Montréal's development as a centre for artificial intelligence, where CRIM can play a leading role.

COURSES OF ACTION

- ▶ **Maintain CRIM's position in the continuum of innovation service offering.**
- ▶ **Position CRIM within the burgeoning centre of excellence in artificial intelligence (AI).**
- ▶ **Seek clients among SMBs, non-IT businesses and start-ups.**
- ▶ **Gain national recognition of CRIM as an innovation hub.**
- ▶ **Create original content to get the word out on CRIM's service offer and its accomplishments.**
- ▶ **Participate in sectoral tables, clusters and groups, be present on boards of directors, working groups and advisory committees.**

QUANTITATIVE METRICS

Growth in CRIM membership

Number of participations in tables/boards/groups/committees

QUALITATIVE METRICS

Membership's representativeness

Types of outreach activities and their benefits

Composition of CRIM's board of directors

Maintenance of growth of newsletters subscriptions and social media followings

STRATEGIC INITIATIVES

ADDRESSING IMPORTANT SOCIETAL ISSUES

CRIM's neutrality and its full appreciation of the opportunities offered by emerging technologies make it an important ally for government departments, municipalities and organizations striving to improve society through innovation. Many promising projects are put forward that offer societal benefits characterized by a better quality of life, thanks to technology that makes it possible to do things differently.

CRIM has the ability not only to properly identify the potential of emerging technologies but also to grasp the issues involved in their commercialization. This makes CRIM an important value added partner for precompetitive collaboration and business-driven developmental projects where CRIM, as a neutral party, often takes a lead role.



COURSES OF ACTION

- ▶ **Deliver projects that address important societal issues.**
- ▶ **Become involved in social areas less well served by market offerings.**
- ▶ **Provide expertise in support of certain public sector initiatives.**
- ▶ **Raise awareness about data-driven change and innovation among government departments, municipalities and NPOs.**
- ▶ **Participate in precompetitive/developmental projects.**

QUALITATIVE METRIC

Socio-economic benefits

OVERVIEW

MISSION

CRIM is an applied research and expertise centre in information technology, dedicated to making organizations more effective and competitive through the development of innovative technologies and the transfer of leading edge know-how, while contributing to scientific advancement.

VISION

To be the key player in IT in Québec; bridging academia and industry, developing, adapting and making technologies and know-how accessible, responding to the needs of organizations.

STRATEGIC INITIATIVES

ORIENTATIONS

1

[R&D]

Develop and adapt technologies and knowledge in response to the specific needs of organizations

2

[TRANSFER]

Make technologies and knowledge accessible and usable by organizations

3

[VISIBILITY]

Promote CRIM's added value

CREATION OF VALUE THROUGH TECHNOLOGICAL PROBLEM-SOLVING



SCIENTIFIC PROGRAM AND OUTREACH



TRANSFER OF KNOWLEDGE AND TECHNOLOGIES TO USERS



DEVELOPMENT, ATTRACTION AND RETENTION OF TALENT



TECHNOLOGY TRANSFER VIA RESEARCH PLATFORMS



PARTICIPATION IN THE INNOVATION ECOSYSTEM



ADRESSING IMPORANT SOCIETAL ISSUES



2017-2022 STRATEGIC PLAN



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