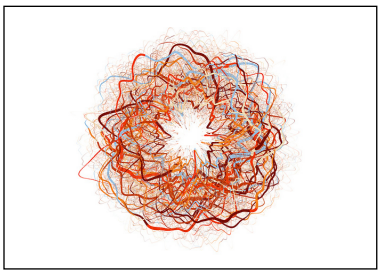
Technology Innovation Management Review

March 2013



Local Open Innovation

Welcome to the March 2013 issue of the *Technology Innovation Management Review*. The editorial theme of this issue is Local Open Innovation. We invite your comments on the articles in this issue as well as suggestions for future article topics and issue themes.

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Overview

The *Technology Innovation Management Review* (TIM Review) provides insights about the issues and emerging trends relevant to launching and growing technology businesses. The TIM Review focuses on the theories, strategies, and tools that help small and large technology companies succeed.

Our readers are looking for practical ideas they can apply within their own organizations. The TIM Review brings together diverse viewpoints – from academics, entrepreneurs, companies of all sizes, the public sector, the community sector, and others – to bridge the gap between theory and practice. In particular, we focus on the topics of technology and global entrepreneurship in small and large companies.

We welcome input from readers into upcoming themes. Please visit timreview.ca to suggest themes and nominate authors and guest editors.

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Contribute to the TIM Review in the following ways:

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Editorial: Local Open Innovation

Chris McPhee, Editor-in-Chief

Christophe Deutsch, Guest Editor

From the Editor-in-Chief

Welcome to the March 2013 issue of the *Technology Innovation Management Review*. This month's editorial theme is Local Open Innovation. It is my pleasure to welcome our guest editor, Christophe Deutsch, who is co-founder of En Mode Solutions (enmodesolutions.com) and R&D Manager at Telops (telops.com), in Quebec City, Canada. The authors of the five articles in this issue provide diverse international perspectives on local open innovation; the issue also includes a report on a recent TIM Lecture on the same topic, given by Christophe and one of his co-founders at En Mode Solutions, Philippe Dancause.

In April, we remain on the topic of open innovation with the theme of Open Innovation and Entrepreneurship, and the guest editor is Jean-Pierre Segers, Dean of the Business School at PXL University College in Hasselt, Belgium (pxl.be).

Last month, I announced the publication of the TIM program's first ebook: *Best of TIM Review for Technology Entrepreneurs* (amzn.to/XLs9JO), which features 16 of the most insightful, most relevant, and most popular articles on technology entrepreneurship published in the TIM Review. All net proceeds from the sales of this ebook will go to pay for the operating costs of the TIM Review, and I am pleased to report that initial sales placed the ebook in several bestseller categories in Amazon's Kindle Store: tinyurl.com/co6nacw

We hope you enjoy this issue of the TIM Review and will share your comments online. Also note that we still have a spot available in the unthemed issue we are planning for late spring. This is a good opportunity for authors to submit an article on any topic within our overall scope, so please contact us (timreview.ca/contact) with article topics and submissions. We also welcome suggestions for future themes and any other feedback.

Chris McPhee
Editor-in-Chief

From the Guest Editor

You might be surprised by the title of this issue – Local Open Innovation – because it mixes two concepts that seem to be in opposition. Why should you stay local when open-innovation techniques allow you to access the world? How can open innovation benefit from being local? These are some of the questions the authors explore through their articles in this special issue.

As stated by Frank Piller (2012; tinyurl.com/d4w286m), one of the biggest benefits for a company participating in open innovation is the chance to explore new domains of knowledge to help them solve problems or develop new opportunities. However, many open-innovation projects never concretize themselves because the solution provider is too far away, not only geographically, but also in culture, background, or capability to collaborate with the solution-seeking company. Here is the first reason why local open innovation enables new possibilities: the solution provider is next door, speaks the same language, and shares common values. It is much easier to concretize a project and benefit from the openness brought by this "neighbour", who may be from a different organization and disciplinary background.

The second reason why local open innovation will become more and more popular comes from the fact that this concept includes the concept of collaboration. In many industrialized countries, the rarefaction of highly educated people will require companies from the same region to share this resource. Local open innovation can help us overcome this new challenge, as you will see through the various examples shared in this issue of the TIM Review.

Finally, local open innovation brings, as a byproduct, a new light to different facets of the motivation behind open innovation: networking, curiosity, recruitment, and social exchange.

This issue of the TIM Review will present an overview of different initiatives from around the world that illustrate this new concept of local open innovation. The articles will provide readers with insights of different

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approaches, with examples of results that can be achieved, and with methods that readers can use to implement their own version of local open innovation.

In the first article, I present the Seeking Solutions approach to local open innovation, and I illustrate the concept with details and results from the first Quebec Seeks Solutions event. This new approach is at the origin of the term *local open innovation* and allowed the creation of a new company, En Mode Solutions, to promote the approach.

Sally Davenport, **Stephen Cummings**, **Urs Daellenbach**, and **Charles Campbell** present the *problem-sourcing model*, which they illustrate through the analysis of the "What's Your Problem New Zealand?" competition that was launched in 2009. The approach brings very interesting strategic possibilities for R&D organizations to show their value to local companies and to help them innovate. It is a very nice manifestation of local open innovation because of the collaboration it introduces and by the adaptation of crowdsourcing approaches. I strongly believe that all managers from R&D organizations should read this article and see how this approach could be applied in their own organizations.

In describing the Quest for Solutions initiative, **Oscar Smulders** gives another example of local open innovation. This initiative enables an industrial cluster in the Netherlands to find solutions to common issues faced by companies in the process industry. The idea creation, the real implementation of some solutions, and the dynamic that was created locally thanks to this initiative, confirm the value of local open innovation but also show the challenges in achieving results and highlight the cultural change that is required.

Alexandra Berger Masson offers us the perspective of an economic development agency, Quebec International, on the value of supporting the implementation of local open innovation techniques within a region. She shows how her organization has been able to better achieve its mission of increasing the growth of local companies through the Quebec Seeks Solutions events. She shows also how the mobilization of all the innovation actors was crucial to the success of the events.

Isabelle Deschamps, **Maria Macedo**, and **Christian Eve-Levesque** give us a rigorous study about the readiness of small and medium-sized enterprises to increase collaboration with universities or R&D centres, and how open-innovation techniques are used in the Province of Quebec. Through several case studies, they present their key findings and identify what types of challenges await participants in local open innovation: constructing a systemic approach for collaboration and thoroughly understanding the role of intermediaries. From my perspective, their conclusions apply not only to the Province of Quebec, but could be generalized to all regions around the world.

Chris McPhee also provides a report of the February TIM Lecture, which I presented with my colleague, **Philippe Dancause**, on the topic of local open innovation. This lecture included a formal presentation along with a real-time, interactive experience of the Seeking Solutions approach. The audience proposed eight problems and then collaborated in groups to help find solutions to the problems. The session gave just a flavour of the benefits of local open innovation, but the feedback from the participants was nonetheless positive.

Finally, I would like to give some special thanks. Thanks to Frank Piller, who inspired the local open innovation movement; thanks to Nadia Noori, for putting me in contact with the TIM program; thanks to Tony Bailetti for the opportunity of contributing to this issue of the TIM Review; thanks to the authors, for their inspiring articles; and special thanks to Chris McPhee, this journal's Editor-in-Chief, who pushed us all to improve our articles and who contributed largely to the quality of this issue.

I hope that you, your colleagues, and your organizations will benefit from reading this issue and that you will integrate the local open innovation mindset to increase value creation in the future.

Christophe Deutsch
Guest Editor

Editorial: Local Open Innovation

Chris McPhee and Christophe Deutsch

About the Editors

Chris McPhee is Editor-in-Chief of the *Technology Innovation Management Review*. Chris holds an MASc degree in Technology Innovation Management from Carleton University in Ottawa and BScH and MSc degrees in Biology from Queen's University in Kingston. He has over 15 years of management, design, and content-development experience in Canada and Scotland, primarily in the science, health, and education sectors. As an advisor and editor, he helps entrepreneurs, executives, and researchers develop and express their ideas.

Christophe Deutsch is R&D Manager at Telops (telops.com), an innovative company in the field of high-performance infrared sensors. He is responsible for the successful realization of product development and R&D projects. Previously, he was Vice President Operations at INO, an applied R&D centre in the field of optics, where he implemented project-management and technology-development processes and co-founded the RCR, a circle of R&D managers. Christophe has also worked for ABB Analytical Solutions, where he developed his competencies in system engineering and project management in several aerospace projects. As a member of ISPIM's advisory board, he promotes innovation management to increase efficiency of R&D. In 2012, he co-founded En Mode Solutions (enmodesolutions.com).

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The Seeking Solutions Approach: Solving Challenging Business Problems with Local Open Innovation

Christophe Deutsch

> *"The world is becoming too fast, too complex, and too networked for any company to have all the answers inside."*
>
> Yochai Benkler
> Law Professor and Author
> *The Wealth of Networks* (tinyurl.com/alrsa4j)

How can small and medium-sized enterprises try open innovation and increase their level of collaboration with local partners? This article describes a possible solution: the Seeking Solutions approach. The Seeking Solutions process consists of four steps: a call for problems, problem selection, problem broadcast, and a collaborative event. This approach has been successfully used for the Quebec Seeks Solutions events in 2010 and 2012 with concrete results and real impacts. By mixing open innovation and collaboration, the Seeking Solutions approach has introduced a new concept: local open innovation.

Introduction

According to Geoffrey Nicholson, a former Vice President at 3M, "innovation is the transformation of knowledge into money" (tinyurl.com/38bfjeq). With such a definition, it is no surprise that innovation is a process that every company wants to master. Unfortunately, there is no magical recipe for innovation, only good practices.

Open innovation is increasingly recognized as one of the key practices to enhance the productivity of R&D and to improve an organization's capability for successful innovation. Several definitions of open innovation exist but I prefer the definition put forth by Frank Piller and colleagues (2010; tinyurl.com/ac7jqsh): "Open innovation is the formal discipline and practice of leveraging the discoveries of unobvious others as input for the innovation process through formal and informal relationships."

Piller's definition helps researchers and managers understand what open innovation is, but there still remains the question of how to do it. Although many large companies have established dedicated structures and methods for open innovation, few small and medium-sized organizations have truly embraced the open-innovation approach. There are three main reasons why "traditional" open innovation does not apply to small companies: i) they lack a means for enabling it – for example, they may lack knowledge about intellectual-property management or cultural-change management to overcome the "not invented here" syndrome; ii) there are monetary barriers to try open innovation through intermediaries such as Innocentive (innocentive.com) or NineSigma (ninesigma.com) – the cost to post a problem with one of these companies is rarely below $30,000; and iii) there are few open-innovation success stories in the current literature that relate to small or medium-sized organizations. To reinforce this point, Wim Vanhaverbeke (2012; tinyurl.com/ceq43m6) cautions that: "different rules apply and open innovation has to be reinvented to manage open innovation successfully in small companies."

Therefore, to reach small and medium-sized enterprises and to increase their capabilities to better innovate, one has to reinvent open innovation. I propose that a com-

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bination of open innovation techniques and collaboration on a *local* basis is a solution that overcomes the key reasons why open innovation has not been widely adopted by small and medium-sized enterprises. The Seeking Solutions approach has been developed to realize this important combination of open innovation and collaboration at a local scale. Using a web-based broadcast technique, the approach encourages companies to diffuse a problem that they are not able to solve on their own. However, instead of ending the process with solutions proposed virtually – without any collaboration amongst the different solvers – a face-to-face working session is organized to stimulate collaboration and idea exchange around the problems that have been submitted. Seeking Solutions is neither just another open-innovation technique nor just another collaboration approach. It is a new mindset that combines both aspects to achieve *local open innovation.*

In this article, I first describe the genesis of the Seeking Solutions approach: the catalyst for the idea and the subsequent steps taken to refine it. Next, I describe the four steps of the methodology in detail: i) the call for problems, ii) problem selection, iii) problem broadcast, and iv) the collaborative event. I then report on concrete results following the first Quebec Seeks Solutions conference, which was held in 2010. Finally, I outline current and future development of the approach and provide conclusions.

The Genesis of the Approach

In 2009, I was Vice President of Operations at INO, an applied R&D centre in the province of Quebec, Canada. INO was part of the IDTEQ group (*Regroupement pour l'innovation et le développement technologique de Québec*; idteq.ca) with four other R&D centres from the Quebec region. IDTEQ initiated a common project to increase collaboration amongst its members. The goal of the project was to build a database of available expertise as a starting point for future collaboration projects.

In June of that year, I participated in the International Society for Professional Innovation Management Conference (ISPIM; ispim.org) in Vienna, Austria, where I assisted the keynote presentation about open innovation given by Frank Piller (tinyurl.com/csy53hl). Although I was familiar with open innovation as a buzzword at many of the innovation conferences I had attended, this was the first time I truly appreciated what it was and what could be achieved with it. I found the concept both novel and exciting. When I returned to Quebec, I enthusiastically shared my thoughts with my colleagues from the IDTEQ project about this new way to innovate; they were quickly convinced that open innovation could help us collaborate more effectively, well beyond what we could hope to achieve through the expertise database we were then building.

From there, we attacked our collaboration project from another angle. First, we decided to prepare a training session on open innovation so that we would have a common understanding of the concept and be able to "speak the same language" of open innovation. In March 2010, we invited Frank Piller for a two-day working session, and around 80 people participated in the first training day. Attendees came from industry, research centres, academic institutions, and public sector organizations; they included researchers, engineers, technicians, managers, and representatives of municipal and provincial governments. The training was designed as an interactive learning experience, helping not only to deepen the understanding of open innovation but also offering also a new way to network.

For the second day, we limited the audience to the people from IDTEQ in order to prepare an action plan based on the following question: "From what we learned about open innovation, what should be done now?" The group was composed of people from different horizons – researchers, technicians, and managers – to ensure there would be a real output, not just a management decision. The main outcome of this session was a plan to organize a conference where people from the industry would present problems they face and that they are not able to solve themselves. Frank Piller found the idea interesting because most open-innovation initiatives typically arise from individual companies, whereas we were proposing a *regional* initiative. He challenged us to hold such an event before the end of 2010, and we readily accepted his challenge.

In April 2010, we announced our intention to hold a "problem-solving conference" was announced on December 14th of that same year. A small group of champions from IDTEQ and Québec International (quebecinternational.ca), the economic development organization for the Quebec region organized this first event with support from consultants from Grisvert (grisvert.com), a company that specializes in the design, organization, and facilitation of collaborative events and organizational change. Later in the article, I will present concrete results from this first event, but in the next

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section, I will first describe the local open innovation approach we developed for the event and refined through the initial conference and several other events that took place between 2010 and 2013.

The Seeking Solutions Approach

The Seeking Solutions approach to local open innovation consists of four major steps: i) the call for problems, ii) problem selection, iii) problem broadcast, and iv) the collaborative event. The four steps are illustrated in Figure 1, with further details provided in the subsections that follow.

1. The call for problems

The first step in the Seeking Solutions approach is the "call for problems", which is comparable to a call for papers in a traditional conference. However, in this case, the organizers are asking the wider community to submit challenging business problems that they have been unable to solve on their own. Sally Davenport and her co-authors in this issue (2012; timreview.ca/article/665) have described this type of call as "problemsourcing" because it is the inverse of crowdsourcing. With crowdsourcing, companies ask "a crowd" for solutions to a known problem; here, the crowd is being asked to put forth their problems, not their solutions.

The call for problems is an important step because the organizers of the conference have to convince people to submit a problem that can be put to the community. Common barriers for solution seekers include the "not invented here" syndrome (tinyurl.com/yuwk96) and inexperience with open innovation. Previous experience of open innovation, training, and testimonials from others can help solution seekers in the community overcome these barriers. If their problem is selected during the second step, the solution seekers will benefit from outside help working on their problem. However, the solution seeker will have to pay to participate to the event.

In our experience, a broadly cast call to a general "crowd" does not yield a sufficient quality or quantity of problems; a more targeted approach using the event organizer's network is often required. Even so, the organizers must carefully prepare the call for problems so that the advertisement is not perceived as spam, but as a real, value-added opportunity. A well-crafted call for problems will convince solution seekers that they cannot afford to miss this opportunity to try a novel approach to solving their important business problems.

The call for problems must last long enough to allow the advertisement to propagate and to give potential solution seekers time to consider and prepare their submissions. However, the call must be ended some time before the event to allow time for the next steps in the overall process. We recommend starting the call for problems at least six month prior to the event, and it should last for at least two months. These timelines can

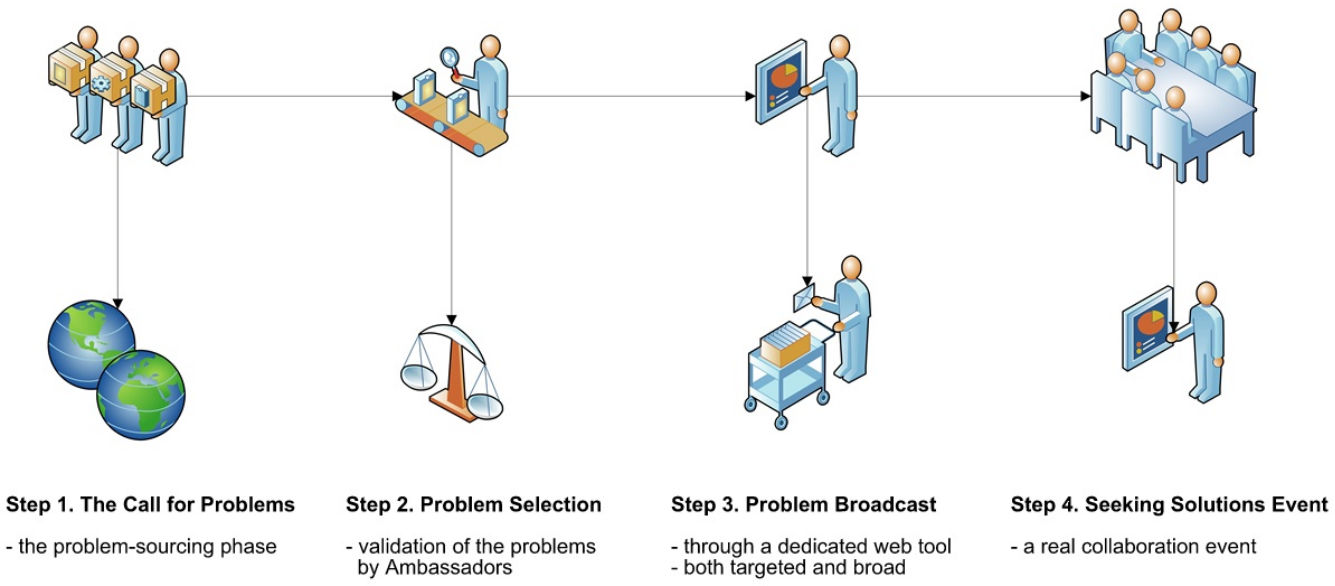

Figure 1. The four steps in the Seeking Solutions approach

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be adjusted depending on the type of community. For example, if the event is aimed at an established industrial cluster where members are keen to try open innovation, a brief call for problems may be sufficient. At the end of this first step, a number of companies or institutions should have submitted some of their most critical and unsolved problems, and it will be up to the organizers to evaluate and select the most suitable of these problems.

2. Problem selection

The second step in the Seeking Solutions approach is "problem selection", which is required for two main reasons. First, the call for problems may have brought in more problems than could be addressed during a single event, for logistical reasons. Second, the selection process validates whether or not the problems submitted will really benefit from the approach. Just as not all types of problems can benefit from crowdsourcing (Piller and Wielens, 2012; tinyurl.com/bh7jq6n), not all types of problem can benefit from the Seeking Solutions approach. We use a common approach to validating problems that is used by NineSigma (ninesigma.com) and other open-innovation intermediaries. An expert of the problem's domain, called an ambassador in our case, is put in contact with the solution seeker. Just by asking some basic questions, the ambassador is able to help the solution seeker further define the problem and ensure that the description that will ultimately be posted on a web-based platform (in step 3) is sufficiently clear and broad.

Ambassadors play a key role in problem selection, and it is therefore important to identify potential ambassadors as early as possible when planning a Seeking Solutions event. An ambassador has to be a technical person with a good systemic view of the domain. They do not need to be an expert, but they have to be able to analyze a problem correctly and deeply. The ambassadors will not only help to define the problem but will also be the main point of contact for the solution seekers. Training in all aspects of the Seeking Solutions approach helps ambassadors guide the solution seekers throughout the process leading up to the event and during the event itself.

3. Problem broadcast

The third step in the Seeking Solutions approach is the "problem broadcast". The problems gathered and selected in steps 1 and 2 are broadcasted through a web-based platform including as much information as possible, such as figures, references, or details of failed solutions. The purpose of this step is to recruit potential problem solvers.

Two strategies are employed during the problem-broadcast step to reach potential problem solvers. First, the problems are broadcasted widely to reach a diverse range of potential problem solvers, without any preconceptions or constraints. A general broadcasting approach ensures that everyone who thinks they could help has the opportunity to participate in the collaboration event; this is an important, open-minded philosophy that allows solution seekers to gain all the potential benefits of open innovation. Links with local partners such as universities, R&D centres, and other members of the innovation community can help broadcast the problems wildly. Also, social media tools such as LinkedIn, Twitter, and Facebook have proven very efficient in broadcasting the problems to a large audience. Second, specialists are targeted based on expectations about what type of expertise might be relevant to a particular problem. In fact, we have seen that the solution seekers often already have an idea of who could help them; this information is used to target the broadcasting of problems to specific experts.

For the organizers of the event, this phase of the process is stressful because they do not fully know who will participate until a few days prior to the event. Will there be solvers for each of the submitted problems? Will there be enough solvers to make the event a success? In order to reduce this risk and complement the broadcasting strategy, different strategies can be applied, such as offering a reduced fee for students, inviting sponsors to pay for the participation of a specific group of people, or organizing a monetary reward for one of the problems. In our experience, such strategies were useful for initial events, but as more and more people become aware of the Seeking Solutions approach and the results it delivers, the less these strategies are required.

4. The Seeking Solutions event

The last step is what differentiates the Seeking Solutions approach from other open innovation techniques, because it involves a real event where non-virtual collaboration arises. Solution seekers and problem solvers come together during a full-day session to focus on the selected problems. This last step is crucial; careful preparation is required to ensure maximum output from the event. The process used for the event is simple and inspired by a framework described in the book *Game Storming* by Dave Gray and colleagues (2010; gogamestorm.com). The collaboration process is divided into three phases: i) divergence, ii) exploration, and iii) convergence.

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The opening, or divergence, phase ensures that all the problem solvers understand the problems and that nothing important has been overlooked. Problem solvers are encouraged to ask questions so they fully understand the problems. This phase is significant and should not be rushed; although the event is just getting started, the foundations for later collaboration are being laid and potentially disruptive ideas may even arise at this point.

The second phase involves exploration and emergence: this is the moment where new ideas can arise and where the real collaboration happens. During this phase, the audience is guided with some generic questions from the facilitator, but each group can self-organize and use their time in their own way, depending on the progress being made. In this way, the exploration phase is an adaptation of the open-space technology introduced by Owen Harrison (2008; tinyurl.com/b7ppluw).

To end up with some concrete actions to solve the problems, the last phase helps people to converge. From the new ideas that have been submitted, the group decides which one is the best and how the solution seeker should act to validate it.

These three steps seem straightforward, but productive collaboration does not usually happen on its own; experienced facilitators are required. Facilitators can adapt the process in real-time, depending on the audience and on the progress made during the day. Grisvert (grisvert.com) has been an excellent partner for us in this regard.

Finally, to get the best out of this approach, it is also important to have a good environment. Figure 2 gives an example of a setting used during a Seeking Solutions event. Each solution seeker has their own "laboratory" where the participating problem solvers can engage in the collaboration process. In the laboratory, the solution-seeking company can display materials related to the problem, and computers are available to search the Internet or to sketch some initial ideas. The walls around the lab are used to capture the results of the different phases. The participants take notes at each of the tables in the laboratory and place them on the wall, leaving the solution seeker with the notes and ideas arising from the discussion of their problem.

The process is not designed to necessarily solve each problem within the timeframe of the event; rather, the goal is to explore each problem sufficiently to let new ideas emerge and to define concrete actions toward proposed solutions. We base our approach on Einstein's well-known quote: "If I had an hour to solve a problem, I'd spend 55 minutes thinking about the problem and 5 minutes thinking about solutions." The Seeking Solutions approach focuses on the 55 minutes spent thinking about the problem.

Figure 2. Solution seekers and problem solvers collaborating at a Seeking Solutions event

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The First Event: Quebec Seeks Solutions 2010

The call for problems for the first event – Quebec Seeks Solutions (QSS) – was launched in June 2010. Ten problems were submitted by nine industrial companies from the Quebec area, despite the doubts and scepticism of many actors in the Quebec innovation ecosystem. The problems were broadcast online early in November 2010 thanks to the ambassadors. On the 14th of December 2010, 175 people gathered at the convention centre in Quebec City to attend the first problem-solving conference.

As mentioned earlier, solution-seeking companies were required to pay to participate, although the fee was set low to ensure participation and because the effectiveness of the approach had not yet been demonstrated. Notably, problem solvers were also required to pay to participate in the collaboration event. This fact astonished external analysts, who doubted whether anyone would be willing to pay to help solve companies' problems. However, there were two reasons for charging problem solvers. First, a fee ensures that everyone is committed to the process; it filters out those who would attend just "to see what's going on". Second, the fee reflects that there is significant value in participating in the event as a problem solver. In fact, demonstrating your capabilities to a potential customer in a real-life problem-solving context is probably the best way to do business development.

Short-term feedback

Immediately after the event, we interviewed a number of solution seekers and problem solvers to capture their direct feedback. All solution seekers confirmed that they gained a better understanding of their problems through the event. And, they either received new ideas they would not have found inside their companies or they confirmed that a pre-existing idea they were considering was the right one to pursue.

Both solution seekers and problem solvers rated the networking opportunity as the highest-value aspect of the event. One of the seekers told us that it would have taken weeks to meet as many interesting people if they had to contact them themselves and that they probably would not even have contacted some of them because they were outside their "traditional" network. Another seeker told us that it was incredibly valuable to meet people interested in the company's problems; they usually only encounter people who are pre-occupied with selling their own products or services to the company.

Finally, on the problem solver's side, participants appreciated the opportunity to prove their value to the companies. For example, one consultant had been trying (unsuccessfully) to get an appointment with one of the solution-seeking companies; after he had actively and constructively participated during the event to solve the company's problem, the R&D manager of this company asked the consultant for a meeting.

Observers were surprised that no intellectual-property issues were raised during the event. Prior to the event, we had clearly stated that all the discussions would be "open source" and each participant had to sign a disclaimer when they registered. Our major sponsor, Fasken Martineau (fasken.com), supported us in kind by offering to all the participants the support of two intellectual-property lawyers to answer any questions that arose during the event. However, no such questions stopped any of the discussions or restricted the emergence of new ideas. It was only after the event – when companies began implementing the solutions – that questions about intellectual property arose. With hindsight, we realize that this was the right time for intellectual-property issues to come up. The event itself is an exploration of the problem where everybody feels free to contribute; intellectual-property challenges typically arise "downstream" from this initial exploration. The reason that intellectual-property issues arise later in the process is likely related to the complexity of the problems and their potential solutions. When a promising idea on how to solve a problem is submitted, the intellectual property required to implement the idea might not be straightforward; in many cases, it is more efficient for the solution seeker to work with the solver that came up with the idea than to try to implement the idea on their own.

Finally, due to the open-innovation aspect of the Seeking Solutions approach, we were expecting that some unobvious connections would happen. Take the example of Kruger, a paper mill company that submitted the following problem: they needed to find innovative applications to use their new coating machine in their Trois Rivières' plant or else they would be forced to close the plant. Natural problem solvers would have been found within the paper industry, but the innovative solution actually came from a researcher in the agro-environmental domain who proposed that Kruger should produce paper tarpaulins with embedded fertilizer to preserve soil humidity and fertilize the crops. This solution was unobvious and highlighted the importance of "outsider" input into the innovation process.

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Direct impacts one year later

We decided to follow up with the solution seekers to validate that the enthusiasm of the direct feedback after the event was not only a short-term result. When we contacted the companies 10 months after the event to measure the real impact of the event, we found the following results:

1. Sixty per cent of the solution-seeking companies stayed in contact with people they met during the event. For example, one company developed a sustained relationship a research centre and two technology transfer centres following on from their interactions during the event.

2. The largest perceived impact for all the companies remained the value-added networking.

3. Real business opportunities appeared, and some companies did award contracts to problem solvers that proposed good ideas during the event. The most significant result is the Kruger case mentioned earlier. Two R&D centres proposed a feasibility study to Kruger, developed a tarpaulin, and began testing it less than eight months after the event. Following this preliminary feasibility study, these two R&D centres, along with Kruger and other industrial partners, proposed a half-million-dollar joint project that has been funded by the Province of Quebec.

4. The fourth impact was less concrete, but is just as important. It involved a change in culture or mindset among the participants. Some companies increased their level of openness as a result of some of their staff experiencing this open innovation approach. One solution-seeking company told us that they did not solve their problem directly during the event, but six months later, when facing a new problem, the team said: "Shouldn't we apply what we learned from the Seeking Solutions approach and try to see if there's not a solution outside our domain?" This question stimulated an Internet search for similar problems, and they discovered that the pharmaceutical industry had experienced exactly the same type of problem and had solved it. An inexpensive product existed already on the market and they bought it.

Other Events and Next Steps

A second edition of Quebec Seeks Solutions took place in May 2012. Nine solution-seeking companies and 162 problem solvers participated in the two-day event. We are in the process of analyzing the results gathered 10 months after that event; the initial feedback suggests that the concrete results will be equivalent to the 2010 event.

We also conducted a workshop called ISPIM Seeks Solutions during a June 2012 conference in Barcelona, Spain. The process was slightly adapted to the duration of the event and the context of the conference. The workshop lasted less than two hours and the call for problems was targeted only to innovation management problems. Thirteen 13 problems were submitted and five were selected for the workshop. The solution seekers appreciated the experience even though it only gave them a preview of what could be achieved in a full-day event.

Thanks to the success of the first editions of Quebec Seeks Solutions, and thanks to the support of contributors such as Quebec International (quebecinternational.ca) and IDTEQ (idteq.ca), I co-founded a new startup company called En Mode Solutions (enmodesolutions.com) in fall 2012. En Mode Solutions promotes the Seeking Solutions approach and offers its services to help companies, conferences organizers, industrial consortia, cities, and economic development organizations to hold Seeking Solutions events all around the world.

In February 2013, we conducted a similar workshop with the Technology Innovation Management (TIM; carleton.ca/tim) program at Carleton University in Ottawa, Canada; a summary of this event is provided later in this issue of the *TIM Review* (timreview.ca/article/669).

Several other events are already planned for 2013.The third edition of Quebec Seeks Solutions will take place in November. "Polymères en mode solutions" is an event for the Quebec Composite Industrial Consortium (tinyurl.com/be62b38) and will take place in September in Saint-Jean-sur-Richelieu, near Montreal, Quebec. The second edition of the ISPIM Seeks Solutions workshop will be held in Helsinki in June around innovation management problems, and we encourage you to submit problems here: tinyurl.com/9whhvhs

The growing interest in the Seeking Solutions approach confirms that local open innovation holds appeal to companies looking for innovative solutions to their challenging problems.

Seeking Solutions: Solving Challenging Problems with Local Open Innovation

Christophe Deutsch

Conclusion

The Seeking Solutions approach, as developed through the Quebec Seeks Solutions events, has introduced a new concept: local open innovation. This new concept is a combination of open innovation and collaboration on a local scale. This approach brings new ways to solve problems, to network, to create business opportunities, and to innovate. Small companies tried the approach and received real benefits from it, thereby demonstrating that the Seeking Solutions approach has reinvented open innovation so that it is now accessible to small and medium-sized enterprises.

Aside from the contexts described in this article, the approach can be used to encourage open innovation with large companies, inside local consortia, as a conference workshop, or simply to bring a new dynamic within a region.

Many problems that company faces today are not only complicated they are complex, often mixing technical, environmental, social, and political aspects. To face this growing complexity, classical problem-solving methodologies are no longer appropriate. The Seeking Solutions approach has the potential to address our complex challenges, and we believe that it can help us to migrate from a collection of intelligences to a real collective intelligence. The next step is to encourage more and more companies to try local open innovation.

About the Author

Christophe Deutsch is R&D Manager at Telops (telops.com), an innovative company in the field of high-performance infrared sensors. He is responsible for the successful realization of product development and R&D projects. Previously, he was Vice President Operations at INO, an applied R&D centre in the field of optics, where he implemented project-management and technology-development processes and co-founded the RCR, a circle of R&D managers. Christophe has also worked for ABB Analytical Solutions, where he developed his competencies in system engineering and project management in several aerospace projects. As a member of ISPIM's advisory board, he promotes innovation management to increase efficiency of R&D. In 2012, he co-founded En Mode Solutions (enmodesolutions.com).

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Problemsourcing: Local Open Innovation for R&D Organizations

Sally Davenport, Stephen Cummings,
Urs Daellenbach, and Charles Campbell

> *"There are no problems we cannot solve together, and very few that we can solve by ourselves."*
>
> Lyndon B Johnson
> 36th President of the United States

Open innovation and crowdsourcing are usually focused on using others external to the organization to solve your problems. How then do R&D organizations, who traditionally solve the problems of others, harness the benefits of open innovation and crowdsourcing yet maintain their mission and capabilities? "Problemsourcing" may provide the answer. In this mode of open innovation, the open call to the "crowd" of businesses is for them to suggest problems that, if solved by the R&D organization, could greatly enhance the business' competitive advantage and therefore the nation's economy.

In this article, we describe a problemsourcing initiative developed by Industrial Research Ltd (IRL), a government-owned R&D organization in New Zealand. The "What's Your Problem New Zealand?" competition promised NZ$1m worth of R&D services to the winning business. Using this case study, we map a range of benefits of crowdsourcing for R&D problems, including generating a potential pipeline of projects and clients as well as avoiding the challenge to the professional status of the organization's research capability. A side-effect not initially taken account of was that, by demonstrating openness, accessibility, and helpfulness, the reputation of the research organization was greatly enhanced.

The problemsourcing model provided by the "What's Your Problem New Zealand?" competition represents a new strategic possibility for R&D organizations that complements their traditional business model by drawing on the openness that open innovation and crowdsourcing seek to leverage. As such, it can provide insights for other research organizations wishing to make use of the connectivity afforded by open innovation and crowdsourcing.

Introduction

How do R&D organizations harness the benefits of open forms of organizing for innovation, yet promote their traditional mission to provide excellent and useful scientific services and maintain their research capabilities? Crowdsourcing, whereby the "wisdom of the crowd" is harnessed for organizational problem-solving, is one form of open innovation that has received a great deal of attention in recent years (Albors et al., 2008; tinyurl.com/arnvgn5), spawning many variations including crowdfunding and crowdvoting (Brabham, 2008; tinyurl.com/aapna9g). The benefits of crowdsourcing practices are claimed to include (Howe, 2006; tinyurl.com/lxbf7; Whitla, 2009; tinyurl.com/a8jdwsp):

1. Access to capability: An organization can tap into a wider range of talent than might be present within its own boundaries.

2. Customer intelligence: By interacting with "the crowd", organizations can gain insight into customers' or potential customers' preferences.

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3. Rapid problem-solving: Problems may be explored and solved quickly, without diverting an organization's staff away from their current tasks.

4. Low cost: Crowdsourcing tends to be cheaper than alternatives – payment is only for the solution chosen or may even be omitted/substituted with a prize or even just the kudos associated with winning.

5. Public relations: Good crowdsourcing competitions can create a media buzz that can add to marketing efforts.

6. User community: By interacting with a crowdsourcing company, participants may develop a kinship from a sense of ownership of the company's destiny.

Despite its popularity, however, crowdsourcing is not without its problems (Kleeman et al., 2010; tinyurl.com/b47qrtv; Brabham, 2012; tinyurl.com/b6pjfp2; Chanal and Caron-Fasan, 2010; tinyurl.com/az6ryjm). Resistance to crowdsourcing is perhaps most evident in the advent of "crowdslapping" whereby the crowd subverts the sourcing process for different means. In particular, crowdsourcing may face the following eight issues:

1. Project delays: Because there is no guarantee that the crowd has the ability to provide the solutions sought, or the motivation to see a project through, projects may drag on and not be brought to an acceptable conclusion.

2. Solution quality: Because crowdsourcing participants are often amateurs, their solutions may be unrealistic or of a poor standard.

3. Ambiguous liability: Because of the lack of employment contracts, liability for faulty or poor-quality work lies completely with the company that used the crowdsourcing solution.

4. Temporary relationship: It may be difficult to maintain an ongoing working relationship with a winning crowdsourcing participant beyond them being declared the winner, which may also impact on the quality of what is implemented.

5. Professionalism challenge: Crowdsourcing can annoy and discourage internal employees or traditional contractors who see their professionalism being undermined.

6. Identity clash: Because crowdsourcing winners are not part of the company and have no ongoing relationship with it, their solutions may not fit with the identity or culture of the organization.

7. Exploitation and reputation effects: Below-market wages, or no wages, and the opportunity to exploit the intellectual property and labour of crowdsourcing participants because of a lack of contractual obligations raises ethical issues that may damage a firm's reputation.

8. Losers disenfranchised: Crowdsourcing can discourage those participants who do not win and lessen their opinion of the company that sponsored the crowdsourcing initiative.

When crowdsourcing is aimed at generating novel R&D solutions, several of the issues listed above may be exacerbated. Not only do the problems and potential solutions tend to be of far greater complexity, but the value of the intellectual property may be several orders of magnitude greater than, for example, the typical crowdsourced clothing design solutions. Crowdsourcing can be more time- and effort-intensive and the solution may not "stick" within the firm because it was not internally generated – the "not-invented-here" syndrome at work. If the solution is viewed as good, it may also be perceived as a threat to the professional integrity of the internal research staff.

Thus, for organizations that have been the traditional provider of basic and customized R&D, crowdsourcing has the potential to undermine their traditional business models. With governmental debt crises growing around the world, public R&D investments are forecast to decline in relative terms, placing significant pressure on organizational budgets and raising questions about how new revenue sources may be attained. Can elements of crowdsourcing help solve these challenges for R&D organizations?

In this article, we look at how an R&D organization in New Zealand developed a variant of crowdsourcing processes that addresses some of the dilemmas identified above. The R&D provider's novel approach delivers the benefits of greater openness by developing new connections outside of the organization. In continuing to prioritize and leverage the expertise of R&D staff, it has the potential to avoid some contentious aspects of crowdsourcing for R&D organizations. Because this practice

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seeks to build relationships by exploring problems, we have termed this approach problem-oriented crowdsourcing, or "problemsourcing". Problemsourcing is akin to crowdsourcing *in reverse* in that the open call initiator, not the crowd, holds the problem-solving capabilities, and the crowd-members offer not solutions but promising problems that would create substantial value if solved.

Problemsourcing: What's Your Problem New Zealand?

Industrial Research Limited (IRL; recently rebranded as Callaghan Innovation: callaghaninnovation.govt.nz) is a government-owned Crown Research Institute (CRI; tinyurl.com/ajy5omm), charged with providing R&D support to industry in New Zealand. IRL was founded in 1992 and has a broad mission to encourage firms to invest more into R&D, and thereby improve New Zealand's economy. In 2009, IRL launched the "What's Your Problem New Zealand?" competition by putting out an open invitation to all New Zealand firms to describe their challenging R&D problem that, if selected and solved by IRL, would advance their business and contribute to the national economy. IRL offered the winning firm $1 million of R&D services at its facilities.

The idea behind the competition came from IRL staff members. One of them, Dr. Benjes, stated that "by getting industry to talk to us, we will be far better placed to understand, and respond to, their changing R&D needs". IRL's CEO, Shaun Coffey, commented that "part of IRL's strategy is to better engage with industry over the coming years and when the team came up with "What's Your Problem New Zealand?", the idea really resonated with me". A "whole of IRL approach" was taken to promoting the competition, involving "not just the marketing guys" – IRL also had all its employees talking to existing and potential clients.

The competition attracted over 100 applicants and involved two stages. In the opening stage, applicants submitted a two-page proposal and completed a brief questionnaire. IRL examined the proposals and selected 10 finalists. Coffey stated that it was "particularly encouraging that we got quality entries from across the variety of sectors we serve". Given New Zealand's small size, the high number of applicants indicated to Coffey that "there is clearly a stronger interest in innovation and research and development in medium and small businesses than most New Zealanders realise". He was particularly impressed by the number of organizations applying given the deteriorating economic conditions and financial climate, noting that this indicated many of New Zealand's leading firms were still thinking ahead. (A working paper containing a demographic analysis of the competition entrants is available at the Problemsourcing website: tinyurl.com/ak95t7n.)

One of IRL's main objectives for the competition was to forge new relationships with New Zealand firms because, in addition to fulfilling its mandate from the New Zealand Government, IRL also needed to secure fresh sources of revenue in response to the global financial crisis. Indeed, the initiative allowed IRL to gain very good market intelligence and create a strong platform of potential future business. This objective was partially met mid-competition. In late 2009, Coffey stated that the "What's Your Problem New Zealand?" competition had already increased the value of IRL's potential contracts pipeline with the IRL business development team working with all the finalists and potentially many more of the applicants – "the lines of communication have been opened with many ambitious firms".

The second stage of the competition required the 10 finalists to consult with IRL science and commercialization experts in submitting a second application form and determining a possible path to solving their problem. The competition's independent judging panel was made up of several business and science leaders including specialists in market development, commercialization, investment, intellectual property, and science. In assessing the applicants' proposals, the judging panel was looking for the following:

1. An accurate description of the business' vision and direction, its target markets, and market positioning.

2. A clear definition of the technology problem or R&D need of the New Zealand company.

3. An identification of key IRL capabilities required to develop the novel solution.

4. A description of the impact (e.g., financial, spill-over, or economic benefits) the $1m solution will have on the business.

5. An identification of the additional resources within the company to take the novel solution into growing markets.

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IRL scientists and business development staff liaised with the judges to ensure they ultimately selected a project that could be feasibly delivered. The judges determined that the 10 finalists were all well deserving of the million dollars' worth of R&D spend, but paint manufacturer Resene's "problem" was determined as that most likely to benefit from the application of IRL expertise and was announced as the competition winner.

Resene (resene.com) proposed to develop a resin-based waterborne paint made of 80 per cent sustainable ingredients. Resene's technical manager Danusia Wypych explained that the firm had been unable to find such a product on the market. At this time, paints with only 30 or 40 per cent sustainable ingredients were considered environmentally friendly. Wypych described today's improvements in paint sustainability as small tweaks of current technology, whereas Resene wanted to challenge the fundamental dependence on petrochemicals. Sustainable paints are typically twice as expensive as ordinary paints; Resene hoped to make a superior sustainable paint for around four-fifths the price of competing sustainable paints. Wypych stated that "we had a clear idea of what we wanted. More than anything, we knew where the gap in the market was".

Yet, Resene lacked the necessary resources to develop its environmentally friendly paint on its own, and therefore entered IRL's competition. Resene expected the million dollar prize to provide around 18–24 months of R&D at IRL. Wypych believed that $1 million worth of access to IRL's world-leading facilities and expertise was much more valuable than $1 million cash in hand. She argued that without IRL's help, developing a sustainable resin-based paint would have otherwise required enlisting the help of an international partner and conducting up to six years of research and development.

IRL made sure to capitalize on the opportunity offered by the competition to acquire new technical knowledge and skills. The CRI put a team of four scientists on the full-time job of solving Resene's problem who were excited by the project because it took them one step beyond what they normally do. Dr. Simon Hinkley, lead IRL chemist stated: "We have had access to the significant expertise within Resene and some of its international partners. As a result, we've learned a huge amount, uncovered a range of techniques and abilities held by our colleagues in IRL, and moved into a whole series of new fields we didn't realise we had the skills to tackle".

The media attention generated by the competition did, however, render it essential for IRL's reputation that the team succeed in solving Resene's problem. By January 2010, Resene announced that the team had discovered the secret ingredient required to produce its environmentally friendly paint. By mid-2012, a novel binding ingredient had been developed and a patent application had been submitted. After teaming up with Auckland University (auckland.ac.nz), a larger four-year grant to develop a full coating system was obtained from the New Zealand Government. The potential for significant future earnings seemed secure.

A potential drawback of the competition format was that the losing finalists were disappointed. Even so, in addition to the Resene project, several other proposals from the competition were also negotiated as research projects. IRL science group leader Richard Furneaux confirmed that "we hope to find ways to get all of the 10 finalists' ideas into proper business cases and then funded in one way or another". IRL had anticipated the need to help losing contestants find funding, and had required all applicants to write their proposals in a similar format to that used by the main government funding body.

Although IRL offered the competition winner R&D valued at $1 million at market rates, it did not actually cost IRL that amount. Moreover, the competition added to IRL's bottom line through other companies that did not win providing new business. IRL's Communications Department claimed that the organization expected to be "reaping the rewards over the next few years... we've built some relationships with companies that we hadn't in the past, and strengthened some other relationships".

Finally, IRL ran the competition partly to stimulate industry thought on how to improve New Zealand's competitiveness as the global economy moved toward recovery. Naturally, IRL's answer to this competitiveness question was a greater commitment to innovation from New Zealand firms, and the competition was viewed to have significantly helped IRL toward its goal of raising the profile of R&D. With IRL leveraging the competition as a newsworthy event, some of the finalists also contributed to the competition's media coverage, helping to tell the story that their involvement in the competition helped them to activate or reactivate their engagement in structured R&D.

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Problemsourcing as a New Open Innovation Practice

For IRL (and Resene), the competition was a great success and not just because the organization managed to source one good problem to solve from the "crowd" of business organizations in New Zealand. Using the framework of eight issues that may befall the use of crowdsourcing outlined earlier, we can reflect upon how this new practice of "problemsourcing" may offer R&D service organizations a number of strategic benefits when looking to take advantage of the new possibilities granted by open innovation.

1. Project delays
When crowdsourcing competitions are not successful, the cause is typically crowd-member disengagement fuelled by vague project descriptions and opaque winner-selection processes. Project delays are less of an issue with problemsourcing, at least at the front end of the project, because there are incentives for both parties to ensure the problem and path towards a potential solution are well-defined. In the case of the "What's Your Problem New Zealand?" competition, this involved negotiations between applicants and IRL staff, so an understanding of each other's requirements was established in the lead-up to the competition deadline. Where project delays may still be an issue is in the phase following the commencement of the research into solving the problem. Once again, though, both sides are motivated to make sure the project stays on track. In the winner's case, Resene is keen to establish these products in their markets and the IRL team is motivated to show that it can solve such business problems in a realistic timeframe.

2. Solution quality
Similar to the factors in problemsourcing that reduce the likelihood of project delays, the second phase of developing applications for the "What's Your Problem New Zealand?" competition significantly reduced the risk of poor-quality problems being serious contenders for the prize. One of the central criteria used in the competition was a consideration of whether it was thought that IRL held the capabilities to potentially solve the problem. Of the 90 non-finalist applications, some problems were filtered out as being either unrealistic ideas or a poor fit for IRL's capabilities. Thus, the issue about professional qualifications of the solvers is more about fit to the problem. The remaining challenge for IRL's professional researchers is to make sure the problem is solved in a high-quality way, but unlike in the case of crowdsourcing, this can be monitored and controlled given that the solution is being developed inside IRL.

3. Ambiguous liability
Because the problemsourcing organization is sourcing a problem rather than a solution, any liability that may originate from its involvement is less likely to be an issue, particularly as the relationship is an ongoing one rather than the more fleeting interactions that can typify crowdsourcing. Given that, in the problemsourcing model, most of the research into finding a solution is conducted inside the problemsourcing organization, and any liability issues can be more easily managed. In the IRL case, the nature of the competition process meant that, by the final selection, thorough contracts with well-defined responsibilities and expectations were in place, which also should have minimize any liability resulting from poor-quality work.

4. Temporary relationship
Unlike solution-oriented crowdsourcing whereby the relationship often starts and finishes very promptly after the solution has been submitted, with problemsourcing there is an ongoing relationship for the duration of the ensuing research project. It is also likely that, if a viable and profitable solution is developed through the collaboration, subsequent projects may result. In this case, the IRL team becomes an essential part of Resene's innovation capability, and it would be very hard for another research organization to replicate the depth of customer understanding that is likely to result from the competition. In addition, relationships with the other nine finalists are also likely to develop to varying degrees, depending on the availability of other funding sources. Because of the staged nature of the competition, IRL and the other companies had all worked together to develop a project and IP plan, so trust and mutual knowledge generation has already been developed to a far greater level than existed prior to the competition. Thus, problemsourcing has the potential to initiate multiple relationships.

5. Professionalism challenge
Problemsourcing potentially has the opposite effect to crowdsourcing in terms of how it affects the professional researchers' credibility, given that it is based on the internal professionals' ability to produce a solution that the competition winner is unable to develop without their help. Thus, employees are most likely to support and actively participate in the problemsourcing activity, unlike the case when external professionals are

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used. Once again though, issues may arise if a solution is not delivered, because the professionalism of the internal researchers could be seriously questioned. Although practicable steps can be taken during the selection process to reduce uncertainty and increase the likelihood of solution delivery, non-delivery will always remain a risk with problemsourcing.

6. Identity clash
In problemsourcing, the problem will always be aligned with the identity of the company that needs a solution, and the open-call initiator should only agree to develop a solution if they have the resources and capabilities to do so. Both crowdsourcing and problemsourcing cannot operate without companies disclosing information about their problems to outsiders, and there will always be some companies that cannot make this reputational "leap of faith". Problemsourcing, however, enables the R&D organization to only tackle problems that are aligned with its identity as reflected in its capabilities. The R&D organization's identity will be reinforced if a solution is successfully delivered and then commercialized. As indicated in the IRL case, the underlying "asking the nation" theme behind the "What's Your Problem New Zealand?" problemsourcing challenge played to IRL's identity as a Crown-owned enterprise charged with providing "public good" research that will enhance the economy. Thus problem-oriented crowdsourcing for R&D or innovation projects is more likely to reinforce than negate the research organization's identity.

7. Exploitation and reputation
Crowdsourcing is often critiqued as commercial exploitation of labour given that crowd members usually lose their intellectual property. Problemsourcing's greatest advantage over crowdsourcing relates to this issue. Although the process of defining the winner's problem could potentially generate points of contention around intellectual property, most of these issues would be uncovered during the problemsourcing negotiation and development of the eventual solution. In the IRL process, these aspects were carefully negotiated with advice from a patent law firm during the competition process. In addition, the researchers internal to IRL are "paid" at their normal salary rate during the problem-solving process so there are no unpaid workers to be exploited during the competition.

Granted, those companies that did not win the competition could potentially be seen to have incurred opportunity costs from the application process. However, the fact that advice about intellectual property was made available and the application form was designed to align with funding agency requirements meant that the problem-providing companies still potentially benefited from the process.

With standard, solution-oriented crowdsourcing, the sourcing company may be accused of unethical behaviour because it stands to gain even from the unsuccessful solutions, and this aspect can significantly damage its reputation. In contrast, the experience here was that IRL's reputation was greatly enhanced in the eyes of many stakeholders. Overall, IRL was seen to be far more responsive to industry needs, to be contributing to lifting the performance of the economy, and to be encouraging greater private sector productivity through enhanced R&D in New Zealand's firms.

8. Losers disenfranchised
Disenfranchisement of the crowd-member companies that do not have their problem selected is a potential pitfall with problemsourcing. As indicated in the case study, though, the process IRL instituted was predicated on developing potential relationships with all of the finalists rather than just a focus on the winner. The finalists all would have benefited from the knowledge development and sharing that ensued during the negotiation process. Even the companies further down "the tail" of applicants were given some level of advice with respect to market opportunities and intellectual property. Thus, a process for aligning expectations is very important for minimizing the disappointment felt by problemsourcing losers.

Conclusion

The success of the "What's Your Problem New Zealand?" challenge is at this stage measured primarily by the range of high-quality problems that were proposed as well as the sheer number of companies (in a small nation) that, by submitting problems, indicated an interest in participating in such a process. Whatever the eventuality for IRL and Resene, we believe that this case represents an interesting new organizational manifestation of local open innovation, which is a variant of crowdsourcing for corporate R&D and complex innovation. One essential difference between crowdsourcing and problemsourcing is the location of the innovative activity. With crowdsourcing, innovative activity is distributed somewhere in the crowd, but with problemsourcing, it remains firmly within the boundaries of the R&D organization, which we propose mitigates many of the risks and pitfalls associated with typical crowdsourcing initiatives.

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Problemsourcing by R&D organizations has many advantages over solution-oriented crowdsourcing, especially when the process is designed to be considerate of issues relating to the development of intellectual property longer-term relationships with both winners and promising losers. For the competition winner, the prize was seen to be valuable beyond the equivalent cash amount and yet, for IRL, the direct cost was even lower. Both firms view the outcome as a win. The case study also highlights that, by considering the competition participants' objectives and motivations early on, some wins can also be achieved for other contestant firms.

Our study presents a range of implications for managers and researchers. For IRL, as a professional R&D organization, simply sourcing solutions from the crowd would have run counter to its traditional business model and primary means of generating value. Yet, by recognizing that the organization and its potential clients were overly closed to the possible benefits of collaborative relationships, IRL embraced open innovation through the competition. Similar benefits may be attainable for other types of organizations if they adapt their initiatives to achieve a combination of their own objectives and those of their targeted stakeholders. In conclusion, while considerable attention has been paid to open innovation and crowdsourcing, we believe that our case study highlights that companies can still be creative in adapting open innovation and crowdsourcing to suit their business circumstances.

About the Authors

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Local Open Innovation: How to Go from Ideas to Solutions

Oscar Smulders

> *"We are apt to think that our ideas are the creation of our own wisdom but the truth is that they are the result of the experience through outside contact."*
>
> Konosuke Matsushita (1894–1989)
> Industrialist and Author; Founder of Panasonic
> Known in Japan as "the god of management"

Local open innovation can be used to create a powerful dynamic within a local multi-stakeholder environment. This article shares the experiences of setting up a collaborative innovation process in a regional initiative in the Netherlands. In the first phase of the process, a couple of interactive idea generating sessions have been organized. These so called Quest for Solutions sessions have not only generated a rich set of useful solutions, but they also created a positive vibe within the local community. Factors that have contributed to the success of the idea generation sessions are working around real-life problems involving people who are directly affected by the problem. The structure of the sessions with alternating phases of divergence, exploration, and convergence allowed for broad understanding of the problems, exploration of potential solutions, and working towards result-oriented value statements. Key challenges in translating the ideas into solutions have been determining the value case and dealing with intellectual property. Special attention is given to the notion of innovative contract design as a means of dealing with intellectual property in an environment of local open innovation.

Introduction

This article focuses on a local open innovation initiative in the Netherlands. A new industrial site is being built to provide the maintenance function for the regional process-industry plants. Besides the physical development of the industry park, the main objective of the Maintenance Valuepark Terneuzen is the creation of a regional innovative ecosystem. Innovation in this ecosystem is both open and locally focused. Innovation is open in the sense that more than 25 partners collaborate and share knowledge, ideas, and insights. Third parties can also be involved in specific innovative projects, and results are exploited on a worldwide scale. Outside expertise of knowledge institutes, research agencies, and universities is actively solicited. Innovation is local in the sense that it is linked to the establishment of the industrial site and the regionally based operational activities of the project partners. Furthermore, the initiative focuses on the regional development and the active participation of the locally established partners.

This article shares insight into the development of the innovation process used in the industry park, specifically focusing on the idea-generation phase and the subsequent challenges of translating ideas into successful projects. Key issues have been determining the value case and dealing with intellectual property. Therefore, special attention is given to the notion of innovative contract design as a means of dealing with intellectual property when setting up collaborative or open innovation processes in multi-stakeholder environments.

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Oscar Smulders

Maintenance Valuepark Terneuzen

The Maintenance Valuepark Terneuzen (MVP; maintenancevaluepark.com) is an important industrial development project consisting of a cluster of more than 25 companies offering maintenance solutions for process industries, located in the Southwest of the Netherlands. The MVP's mission is to strengthen, renew, and improve the maintenance function in the process industry, which is very important to the region. By developing new organizational structures, innovative methodologies, and new services, the MVP works to improve the competitiveness of regional industry. Furthermore, the MVP aims to be the regional, national, and international hotspot for maintenance knowledge in the process industry.

The MVP project includes a real estate development initiative that focuses on the realization of the facilities needed to perform the maintenance services (e.g., offices, workshops, shared facilities, and infrastructure). The physical site will be newly built and is currently under development. The MVP is expected to be ready for business in 2014. However, the innovation process is not dependent on 'bricks and mortar'. Forming the heart of the MVP is the Knowledge and Innovation Centre (Ki<; tinyurl.com/b49cxnc), which focuses on creating new innovative maintenance services, developing, linking, and sharing knowledge and setting up education and training facilities. When the Knowledge and Innovation Centre was set up at the start of 2011, its main tasks were to set up an innovation process; establish the maintenance innovation agenda; and involve and engage the MVP partners. A particular challenge was securing and maintaining the commitment of partners before the establishment of the physical site; this was accomplished by demonstrating that, through collaboration, the MVP can create value for its partners from the very beginning.

Besides designing an open-innovation process and setting up related tools and methodologies, the Knowledge and Innovation Centre involved the MVP partners and created an innovation community that also comprises experts of technical universities and research institutes. At first, a thematic innovation agenda was developed, based on interviews with maintenance leaders within the local process industries. In total, the community defined eight themes, which varied from technical themes such as "corrosion under insulation" to more organizational themes such as "the availability of well-trained employees". These themes were seen by the maintenance leaders as the key areas where new ideas and solutions were necessary. The themes were extensively worked out and prepared with experts, and served as the input for two large brainstorming sessions in February and April 2011, which we baptized as the Quest for Solutions (Q4S) sessions. Our Q4S sessions were partly inspired by the Quebec Seeks Solutions event, which focused on finding innovative solutions to complex problems faced by companies in the region of Quebec, Canada. Christophe Deutsch (2012; timreview.ca/article/664) provides details of the Quebec Seeks Solutions and its underlying approach to local open innovation in this issue of the *TIM Review*.

The Quest for Solutions Sessions

The Q4S sessions brought together large groups of more than 90 interested experts; the first session involved 45 different companies, and the second session involved 60 different companies and organizations. The unique aspect of the Q4S sessions is that they take place within the context of a local community, where participating companies very often have commercial relationships (i.e., client-supplier relationships, subcontracting relationships, or direct-competitor relation ships). What is more, the local maintenance industry does not have a record of openness, collaboration, or knowledge sharing. The parties are either locally established small or medium-sized enterprises, or they are part of multinational concerns. New services or other innovative ideas typically come from the entrepreneurial mindset of the local companies or are delivered by the internationally established R&D centres of the mother companies.

In an era where open innovation is mainly thought of as a fully web-enabled approach where crowds and clouds are used to generate new ideas, it is refreshing to see that physical meetings still have an important role to play. Bringing people physically together and invite them to participate in a structured process may even offer very good, creative outcomes. The Q4S events were successful in creating a very positive dynamic, generating new ideas for old problems, and making new combinations, and they were key in setting the collaborative innovation process in motion. Bringing together a group of people and let them free in a well-prepared, structured process is a powerful means of generating new ideas and offering solutions that had not been imagined beforehand. The operational nature of most of the innovation themes put forward by the maintenance leaders was perceived as an extra challenge. Although

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knowledge and expertise of the R&D departments is within reach, the context of the MVP is such that most of the relevant themes are relatively operational in nature and are often directly linked to the operational processes of the plants and the maintenance services.

Box 1 provides an overview of the steps followed in preparation for the Q4S sessions. The sessions were thoroughly prepared and the themes were translated into seven challenging problem definitions in the first Q4S session, with another 10 problem definitions in the second Q4S session. For every problem statement, a problem owner was appointed. The problem owner was always someone who had direct interest in the resolution of the problem and played the role of ambassador during the sessions. In the preparation, the problems were analyzed using extensive mindmaps that identified all the relevant information (e.g., technical aspects, barriers, relevant processes, cost drivers, methods). The detailed mindmaps were then handed over to graphic artists, who translated them into much more abstract graphic impressions, which were printed out on large sheets of paper and served as the starting point of the brainstorming session. The detailed preparation and the presence of the ambassadors assured that all the necessary information was available during the brainstorming sessions, and at the same time, the abstract graphical mindmaps gave the groups that gathered around the different themes a lot of freedom to let their creativity flow.

The first Q4S sessions resulted in a range of ideas for potential solutions to the problems stated at the beginning of the session. In between the two sessions, all necessary background information was collected and translated onto poster boards, screen presentations, and information booklets. When needed, people with specific expertise were directly invited to participate in the second session. The second Q4S session then took off where the first one ended with the potential ideas for solutions. During the second session, these ideas were elaborated upon and further analyzed using a broad range of tools, resulting in so-called value statements, which are high-level project charters with short descriptions of the ultimate ambition and goals, the expected value that will be generated, the scope and boundaries, and necessary competences and investments. Given the success of the graphics during the first session, the same artists were asked to translate each value statement in a more detailed graphical impression that was presented back to the participants in a closing plenary session.

Box 1. Steps followed in the Q4S sessions: open idea generation within a local community

1. Identify main innovation themes and translate them into clearly formulated problems.

2. Identify a problem owner for each problem.

3. Prepare first brainstorming session:

   - Conduct in-depth interviews with problem owners, leading to detailed mindmaps of each problem/issue.

   - Translate the mindmaps into a visual impression using graphic designers.

4. First Q4S session: generating potential solutions

5. Preparation of second Q4S session: three extra problems added

6. Second Q4S session: translating ideas into "value statements" and project charters

Success Factors

The following aspects proved to be important success factors in the local open innovation sessions:

1. Real-life problems: Both the Quebec Seeks Solutions and Q4S events have been set up around real-life problems, often structural problems that companies have been struggling with for some time but prove to be hard to solve. The events create the opportunity to get fresh ideas and invite different competencies and experts to have a look at the problem.

2. Role of the problem owner: The individuals who have the most to gain by finding a solution to a problem provide the drive to make progress. The enthusiasm of the problem owner is one of the keys to bringing the group dynamics into action, thus generating creative and innovative solutions.

3. Asking the right questions at the right time: Instead of directly narrowing down within the boundaries of the initial problem statement, the process leads participants first through a phase of *divergence*, which is

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very important. We had structured the Q4S sessions in such a way that the first session would stimulate divergence, starting with the abstract mindmaps and quick brainstorm sessions, where participants were invited to rotate between the different theme-tables. In this open and creative phase, a broader understanding of the problem is pursued. In a next step, ideas for potential solutions are *explored*. Tellingly, it proved that often the best ideas do not come from the expected direction. At the end of the first Q4S session, a first phase of *convergence* took the form of identifying ideas for potential solutions, where the most promising ideas were selected and worked out further. The second Q4S session also started with a series of quick brainstorming sessions, but had a much more convergent character. The efforts to come up with a relatively detailed value statement for each issue generated a certain confidence amongst the participants that not only had they participated in a dynamic and fun event, but that the results would also be of serious use to the regional community.

4. The use of images: The team of graphical artists was also present during the brainstorming sessions and assisted the groups in translating ideas, solutions, and concepts into clear images. Sometimes, a lot of words were very quickly summarized by one clear image; as the proverb states: "a picture is worth a thousand words". The impact of the use of images in creative processes was an eye-opener for us; the graphic artists positively contributed during the preparation of the sessions (i.e., by creating the mindmaps) and during the session in facilitating the "quest for solutions".

From Idea to Solution

The two interactive Q4S sessions were seen as very successful by the participants. The logical next step is to translate the solutions and ideas into innovative business projects. This has proven to be a challenging task. It demands a shift of mindset from "doing business as usual" within the relatively safe boundaries of the company towards a much more open mindset where collaborating and exchanging knowledge and expertise is key to achieving innovative results. Translating ideas into successful projects is also a challenge that needs time and patience to be fulfilled. In the past year and a half since the Q4S sessions were held, more than 25 different innovation projects have been started. These projects vary from designing decision-making models so that the best methodology is chosen for a specific job, to breakthrough innovations and designing totally new maintenance services and ways of working.

However, because the participating companies are sometimes competitors, or have commercial customer-supplier relationships, collaboration does not happen overnight. Trust obviously plays a central role. One of the main efforts of the team at the Knowledge and Innovation Centre has been focused stimulating and facilitating collaboration between companies. Because the partners within the MVP range from large multinational concerns to small, family-owned companies, the degree of maturity and access to knowledge and specific expertise among participants diverge enormously.

In addition to the more traditional toolset of project management needed to manage the project portfolio, the Knowledge and Innovation Centre also has an important function in bridging the knowledge gap and linking the MVP partners to universities, knowledge and research institutes, or specific experts. In particular, most small and medium-sized companies have difficulty building these bridges and links on their own.

One of the MVP initiatives is the creation of a body of knowledge. To make all relevant maintenance knowledge easily available to MVP partners, a "maintenance wiki" is being built to make all the innovative projects, best cases, and new insights available to the MVP community. Although this creates a certain transparency and openness, it also touches upon one of the bigger barriers that have been encountered in the process: the issue of protecting the strategic knowledge and intellectual property of the participating companies. Some recent insights concern the question of how to deal with intellectual property in multi-stakeholder environments and how to make sure that all partners – from the smallest companies to the largest multinationals – get their fair share of the overall "cake". As one sees in other initiatives where modern business environments and open innovation models are set up, free exchange of information, collaboration, and co-creation are in many cases hampered by issues relating to intellectual property rights.

Especially in the early stages of innovation projects, companies are afraid to be too open because they worry they will give away their insights for free. As stated before, small and medium-sized enterprises are especially reticent to share their ideas with multinational companies due to the imbalance of power. This reluctance is counterproductive to successful open innovation. The openness that was very present during the Q4S sessions diminished notably once ideas became more concrete and more ambitious projects were

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started. This was not so much the case in the safer or more general project phases (i.e., projects on broadly shared interests or inventory studies of applied methodologies). The closer the projects touched on the operational activities of project partners, or when commercial or competitive aspects play a role, the more intellectual property would be mentioned as an explanation for a certain reluctance to actively participate.

By nature, there is a contradiction between open innovation and intellectual property rights. Open innovation typically demands openness, trust, and collaboration. Intellectual property rights, on the contrary, are designed to exclude individuals or organizations from using specific knowledge or technology. Very often, this puts up an important barrier to collaboration and the sharing of relevant knowledge in innovative projects. More than once, this issue has been put to the fore as a reason why companies are hesitant to become actively involved in open-innovation initiatives. At the same time, practical experience hints to the necessity of bridging the gap between these contradicting outlooks.

Another important factor influencing the successful start of the innovative projects is the determination of the expected added value of the project. Although early on in the projects, attempts have been made to clarify the expected results, it has often proven difficult to give robust estimates of the added value of specific projects. This challenge is especially difficult for the more ambitious projects where new services are created or breakthrough innovations are being pursued.

With the ambition to find adequate answers to these challenges, the Knowledge and Innovation Centre has recently joined in a research initiative by the faculties of Economics and Law at Tilburg University (tilburg university.edu). The research aims to develop an economical value-mapping tool that will enable adequate estimates of the value of open-innovation projects in every phase. The research is especially of interest because it will also investigate the various types of contract design, and because it focuses on the differences between transactional contract design (law-based or IPR-based) and relational contract design (norm-based or open-innovation based). The aim of the research initiative is to design a framework of contract rules for the various stages and occurrences of open-innovation environments. The framework should stimulate openness and knowledge sharing and protect intellectual property rights of individuals and organizations. It should also support a common understanding of rules to be applied during idea generation and conceptualization phases in open-innovation processes. Furthermore, the research will support a common understanding that sharing of knowledge could be a good alternative to rigorous intellectual-property rules and defining contracting mechanism to support open innovation in multi-stakeholder environments.

Some of the collaborative innovation projects that are currently being supported by the Knowledge and Innovation Centre serve as empirical pilots for the research project. Some first findings are that the specific and explicit attention to the value case is beneficial for accurate estimates of the value that will be created. The discussions around intellectual property and project risks have become more objective. This objectivity, in turn, enhances the confidence and commitment of the project partners. Also, we find that, for participants in open innovation, just knowing that tools exist and that the process will be guided and supported, has value in that it takes away some of the fear regarding the complexity and challenges of open innovation.

Conclusions

Local open innovation can help generate new ideas and create a powerful dynamic within local communities. In our case, the Q4S sessions have been instrumental in the establishment of a local community of maintenance professionals. It has put the MVP "on the radar", long before the physical industry park has been established. The sessions also generated an important number of ideas for innovative solutions, a lot of which have since been converted into actual projects. Some important drivers for the success of the session are the use of real-life problems, working with problem owners who really have interest in the solution of their problems and the structure of the sessions, imposing a phase of divergence and underlining the importance of asking the right question, followed by a phase of convergence and efforts to make the outcomes more concrete. A specific mention is owed to the graphic artists who have not only been a "fun factor", but have allowed broad, complex issues to be captured by very insightful images.

Whereas the idea generation phase has been perceived as very successful, translating the innovative ideas into business results in our local innovation community has, at times, proved to be challenging. In particular, questions around intellectual property and the expected value of a project have been key barriers to getting companies actively involved in the open-innovation

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process. The iterative value-mapping process and conscious efforts to work with the value statements have already been helpful. So, although we are still just at the beginning of the process, we can say that the specific attention to the iterative value-modeling process and its implication to contracting aspects promise to be of great interest to the companies participating in the innovative projects.

About the Author

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Quebec Seeks Solutions: An Economic Development Agency's Role in Local Open Innovation

Alexandra Berger Masson

> *"The best way to have a good idea is to have a lot of ideas."*
>
> Linus Pauling (1901–1994)
> Two-time Nobel Laureate (Physics and Chemistry)

This article offers an economic-development perspective on a new method for local companies to find innovative solutions to their most challenging business problems: local open innovation. Quebec International, the economic development agency for the Quebec City area, contributed to the development of the Seeking Solutions approach to local open innovation, which included the hosting of problem-solving conferences with local research centres, economic development actors, and companies. Looking back on our experiences and outcomes since 2010, this article shows how the development and introduction of this new approach to local open innovation has changed the rules of the game in the region.

Introduction

Innovation and collaboration between local actors are seen as key ingredients for successful economic development. Thus, Quebec International (QI; quebecinternational.ca), the economic development agency for the Quebec City area, was keen to contribute to the development of a new approach to bringing local partners together to solve complex business problems: the Seeking Solutions approach to local open innovation. The opportunity arose in 2010 when Quebec International was approached by IDTEQ (*Regroupement pour l'innovation et le développement technologique de Québec*; idteq.ca), a group of research centres that sought new methods of business development. The approach took the form of a conference where real company problems are discussed and where the regional economic actors can interact to bring solutions. The first "Quebec Seeks Solutions" event took place in December 2010, in parallel with a symposium of the International Society for Professional Innovation Management (ISPIM; ispim.org). Here, we look back on this first event and subsequent similar events to show how local open innovation can support economic development.

Although it is common for regional economic development agencies to work with research centres and companies, these interactions are not usually simultaneous, and encouraging these two parties to work together was not traditionally part of most agencies' day-to-day activities. Nonetheless, with Quebec being home to the second-highest number of researchers per Canada, Quebec International decided that it should take advantage of these regional competencies and help in developing a new approach to collaboration. The result – the Seeking Solutions approach – brought new ways for the industrial research centres in Quebec City to collaborate, and it provided a new method for local companies to find innovative solutions to their most challenging business problems. It also changed the game in terms of redefining the role that an economic development agency can play in stimulating collaboration and innovation among regional actors.

In this article, we describe how an economic development agency can act as a catalyst to combine regional strengths and allow companies to be more efficient with the help of external innovation from nearby research centres. We first provide background informa-

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tion to set the scene for the development of the approach. Next, we show how Quebec International has helped mobilize the region and position local open innovation as "a new reflex". Finally, we present some key results and show how the model has even inspired other regions in the world to similarly engage local actors and stimulate open innovation.

Context

As an integrated economic development agency, Quebec International promotes the Quebec City metropolitan region's competitive business environment in order to attract foreign investment and qualified workers. However, Quebec International does much more than promoting and attracting investment. In fulfilling its mission of fostering company growth, supporting key sectors, and attracting talent, it offers companies a full and varied slate of services. As with other economic development agencies, Quebec International also supports marketing and export-related initiatives; high-tech innovation; and entrepreneurship. Quebec International focuses on the development and growth of the following key sectors of excellence: i) information and communications technologies (ICT) and electronics; ii) life sciences; iii) food processing, iv) insurance and financial services; and v) green and smart building. With this mission, the agency develops tight and privileged links with local companies, especially those from the key sectors. Quebec International's role includes introducing new methods of working to organizations throughout the region, thereby promoting the diffusion of the best international practices.

Considering these premises, Quebec International was immediately interested in participating in an initiative to stimulate innovation in companies. In partnership with the five research centres of IDTEQ (Box 1), SOVAR (sovar.com; an organization devoted to the development and commercialization of new technologies derived from university research and from partnering research centres), and the Quebec Metro High Tech Park (parc techno.com; in which all of these organizations are situated), Quebec International started to work on the Quebec Seeks Solutions conference that had been initiated after a two-day workshop on the topic of open innovation. Quebec Seeks Solutions is a problem-solving conference where companies submit challenging problems that they are not able to solve themselves. Following a broadcast of the problems, problem solvers are invited to collaborate with the problem owners during a one-day working session. For details of the Quebec Seeks Solutions events and the Seeking Solutions approach to local open innovation, see Christophe Deutsch's (2013; timreview.ca/article/664) article in this issue of the TIM *Review*.

Because of its mandate to help companies to grow, Quebec International decided to place the Quebec Seeks Solutions event at the centre of its strategic plan to increase the innovation in the Quebec region. In fact, such an event helps to compensate for the lack of link between the needs for innovation (i.e., the companies) and the actual offer that can create high value (i.e., the local R&D centres, universities, others). The event also helps the whole local ecosystem of innovation to acquire the ability of using open innovation to create value more quickly. Relative to Europe and the United States, we perceive delayed progress with open innovation in Quebec and Canada; it is our hope that a focus on local open innovation can help us close this gap.

Mobilization

Quebec International regularly organizes large conferences at regional, national, and international scales; however, a Quebec Seeks Solutions event is unlike any other conference and therefore needed a new framework. The challenges for Quebec International were directly related to one of its main activities: mobilizing the local innovation system in order to increase value creation.

Mobilizing companies to submit a problem

The first mobilization challenge was to encourage local companies to submit problems. In effect, Quebec International, with the help of its partners and relays, had to sell the Quebec Seeks Solutions model to the compan-

Box 1. IDTEQ research centres

- **CRIQ:** the industrial research centre for the Province of Quebec
- **COREM:** a consortium of applied research organizations for the processing and transformation of mineral substances
- **FP Innovations:** a forest research centre
- **INO:** the National Institute for Optics Research
- **IRDA:** the Research and Development Institute for the Agri-Environment

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ies. The major problem was that we had no idea of what the event would look like. The premises used to sell the concept were mainly based on the fact that Quebec Seeks Solution was a large experimentation field where the companies could test open innovation in a real-life scenario.

We could not ask companies to simply make a "leap of faith"; rather, we convinced them to submit problems by presenting the key assumptions behind the concept. The first assumption was that open innovation is used more and more in the United States and in Europe by large enterprises, with excellent success stories and return-on-investment stories (e.g., Forrester Consulting; 2010; tinyurl.com/alp9ujl). We asked: can a Canadian company that wants to innovate really not even *try* open innovation?

The second assumption related to the complexity of the problems. Due to its knowledge of local companies, Quebec International knew that some important, complex problems were lying unsolved for far too long and were limiting the potential expansion of some enterprises. There was therefore more to gain than to lose in exposing these problems. The worst that could happen was that the problem would stay unsolved. Quebec International challenged some managers to participate based on this assumption. When a company has lost months or years trying to solve a complex problem, the chance that it could finally solve it became attractive – the company just had to confess its inability to solve the problem itself. And so, Quebec International was able to convince several companies that only risk was the *status quo*. We explained that Quebec Seeks Solutions is not only about finding new solutions to old problems; the event also provides companies with an opportunity to validate or invalidate existing solution ideas, to refine and better understand a problem, and to find "the real problem" behind a problem.

Furthermore, Quebec International had extensively surveyed local innovation resources and found that many local companies were underutilizing the potential of researchers from applied R&D centres such as IDTEQ or from universities. The main reason for this underutilization related to perception and communication. Offering efficient researchers the opportunity to work for an entire day on a real industrial problem will bring a double benefit. For the researcher, it is a good way to orient their future research on industry problems. For company's employee; it could be a good way to see how researchers could quickly bring about potential solutions. The potential expected benefit of solving complex, long-term problems would therefore be larger than only solving a short-term problem, and it held promise for fostering a culture of openness in the region.

However, even with all these excellent augments in favour of participating, companies were still reluctant to share their problems. In particular, large companies were afraid to expose their information, because the market is global and a competitor can emerge from anywhere; strategic information is highly sensitive. Controlling the message was a major concern, and thus, the final obstacle in mobilizing companies to submit problems related to intellectual property. Thanks to Quebec International's network, the law firm Fasken Martineau (fasken.com) agreed to answer questions and guide the participating companies with respect to intellectual property issues during the event. Intellectual property in the context of collaboration is a specialty of Fasken and more specifically of one of its partners: Jean-Nicolas Delage (tinyurl.com/agdbl9n).

Small and medium-sized enterprises were also concerned about losing time and money. Since we had no success stories to share, we proposed flexible ways of engagement for smaller companies and we lowered the barrier to entry by making the costs of participation low for the first event.

Thanks to the efforts of Quebec International and its partners – particularly IDTEQ – nine pioneer companies proposed ten problems to the first event in December 2010. Even with concrete results from the first event, the call for problems for the second event in 2012 remained a time-consuming task. It was still a question of convincing people they had more to gain by participating. However, eight companies submitted nine problems in May 2012. For the third event in fall 2013, Quebec International expects that this task will become easier because of the concrete results from the two first events and because of the cultural change is slowly taking place in the region.

Mobilizing problem solvers to participate in the event

Once the problems are submitted, the work to make the event a success is still not finished. One has to ensure that the right people will participate in the event to maximize the likelihood that novel and effective solutions to the problems will be proposed. For the Quebec Seeks Solutions events, we drew upon the entire economic development ecosystem to help recruit potential solvers from within and beyond their organizations. This ecosystem includes all of the public and private organizations that support innovation and growth, such

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as the chambers of commerce, sectorial associations, and government services. Of course, the fact that IDTEQ was a major partner ensured the participation of at least 30 researchers, and their participation encouraged other partners to participate as well.

IDTEQ also designed the research component of the event, which included assigning researcher "ambassadors" to the companies whose problems were selected. The role of the ambassadors was to delimitate and properly describe a company's problem so that the problem solvers would have a clear and well-defined starting point. As they gained in-depth knowledge of the problems, the ambassadors were able to identify expertise that may be required to solve the problems. Thus, we were able to make targeted calls to specific university departments and companies to invite them to participate as problem solvers, based on their relevant expertise.

Public partners for research and innovation financing were also contacted to advise companies on funding options for later implementation of any solutions that arose during the event. These organizations provided advice on tax credits, innovation audits, and innovation marketing support, as well as direct access to the public innovation-financing programs provided by the Natural Sciences and Engineering Research Council of Canada (NSERC; nserc-crsng.gc.ca) and the National Research Council of Canada's Industrial Research Assistance Program (NRC-IRAP; nrc-cnrc.gc.ca/eng/irap/).

In December 2010, 170 people participated in the first Quebec Seeks Solutions event, and in May 2012, 160 people participated in the second event. Quebec International and its partners are very proud of these two events, not only because companies so many companies and problem solvers decided to try the process, but because real results were achieved, as will be described in the next section. These events directly align with the mandate of Quebec International as an economic development agency. We have therefore already announced the 2013 event and are convinced that an annual event of this type will continue to generate high value for the region. Mobilizing the problem owners and problem solvers required a substantial effort from Quebec International and its partners, but we feel that the value of results demonstrate that these efforts were worthwhile.

Numbers and Facts

Real results for the participating companies
To evaluate the impact of the Quebec Seeks Solutions events on the participating companies, Quebec International monitors their progress every six months during the first year after the event and then every year thereafter. The partial results in the beginning of 2013 reveal that 6 out of 17 companies are still working on a solution proposed during the Quebec Seeks Solutions process. Considering the problems these companies submitted were complex and long-standing, these results are encouraging. Four of these companies entered into contracts with research groups and most of them invested in research and development (internally) to apply pieces of the solution they received at the event. Within the first cohort of 2010, 7 out of 9 companies reported one or two direct benefits from their participation.

One of the companies from the first event is shortly going to market with a new product that directly resulted from a solution proposed during the 2010 event. Another company from the 2012 edition is realizing a huge economy of time – and consequently money – by applying a new process originating from the 2012 event; this solution may transform the company's business model with an investment of a few hundred dollars. Another company, through its interactions with problem solvers, learned about a regional industry that it was previously unaware of; it found a new supplier, its products now will be 100% made in Quebec, and the market value of its products will increase.

Indirect impacts
In 2011, Quebec International organized two smaller Seeking Solutions events in the Geospatial sector (one of the key sectors of the region). We took the opportunity to apply what we perceived as a "winning approach" in dedicated sectorial clusters in order to renew the way that an economic development organization can support these clusters. The reception by the industrial partners has been very positive and the initiative gave birth to two major regional projects. As a catalyzer in the area, Quebec International can now play its role of gathering the different community members together to solve problems even more effectively with the Seeking Solutions approach.

Another major impact of the approach resulted from the unique, high-value networking that occurs through collaboration during the events. The event allowed people from different organizations and different fields to communicate in a way that is far more profitable than the typical networking model of "brief chats and business-card exchanges". Two companies from the first event have discovered how they are complementary and how they could work together on common pro-

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jects. Two research centres proposed a common service offer to a company and won a contract they could not have won on their own.

For Quebec International, simply achieving collaboration between companies is an impact all on its own, and is a positive indicator for the future development of the region. The rarefaction of highly educated people (due to an aging population) and the pressure from developing countries with more dynamic demographies will increase the need for new approaches to collaboration. Thanks to its experience with Quebec Seeks Solutions, Quebec International is ready as an economic development entity to support its region for these future challenges.

However, the indirect impacts of the events extent beyond the province of Quebec; the approach responds to a need in many other regions or cities. For example, the Maintenance Value Park initiative in the Netherlands – described in this issue of the *TIM Review* by Oscar Smulders (2013; timreview.ca/article/666) – has been inspired by what has been developed in the Quebec region. Therefore, Quebec International also contributes to the creation of an international community around local open innovation. In fact, Quebec International invited Oscar Smulders to participate in the second Quebec Seeks Solutions event and this relationship works toward the goal of including working sessions in future events to exchange knowledge and good practices of local open innovation. This side effect also helps the region to been seen internationally as very dynamic and innovative.

Finally, some of the key players behind the two Quebec Seeks Solutions events created a company – En Mode Solutions (enmodesolutions.com) – in order to offer the Seeking Solutions approach to other regions, to industrial clusters, to conferences, or even to large companies. The creation of this startup is another important result and demonstrates that the investment of Quebec International into the Quebec Seeks Solutions events has created great value.

Conclusion

Quebec Seeks Solutions events create a meeting point between companies who need support to solve some of their most complex problems and potential solvers, such as other companies, research centres, and universities, which may have already faced the same type of problem or can bring relevant expertise and novel solutions. Quebec International, as the regional economic development agency, had to be part of this initiative because it corresponds directly to its mandate of helping companies grow and increasing value creation in the region.

Due to its central role of support for the different economic development actors within the entrepreneurial ecosystem of the Quebec City area, Quebec International has been able to contribute to the development of this initiative and help make it a success. The main contributions of Quebec International were to research financing, to find partners to address the intellectual-property questions, to mobilize the innovation ecosystem to encourage companies submit problems, and to help recruit problem solvers. Furthermore, Quebec International contributes by monitoring and documenting the results obtained from the different events to validate that the perceived value is proven over time. Of course, Quebec International was not alone in this initiative, and IDTEQ played a central role in the success of Quebec Seeks Solutions.

In terms of cultural change within the region, Quebec International has played a key role in promoting innovation in companies through this model of local open innovation. Research centres and companies can now count on using Quebec Seeks Solutions events to solve complex problems together in the Quebec region. These collaborations between research centres and companies will make Quebec the most efficient region in the world for solving complex problems. Quebec International is very proud to be associated with this new approach to innovation: local open innovation.

Quebec International is already working on the next Quebec Seeks Solution event, which will be held on November 6, 2013, and on other Seeking Solutions events in the key sectors of activities of the Quebec region, in collaboration with the newly formed company: En Mode Solutions. Quebec International will therefore continue to innovate in the best practices of economic development.

Recommended Reading

- "Local Open Innovation: The 'Seek Solutions' Approach" (tinyurl.com/a846dl9)

QSS: An Economic Development Agency's Role in Local Open Innovation

Alexandra Berger Masson

About the Author

Alexandra Berger Masson is Director of Corporate Affairs at Quebec International, which includes responsibility for innovation projects. She has worked for Quebec International since 2008 and lived the second Quebec Seeks Solution experience as the Project Manager. In previous economic development roles with Quebec International she, managed projects in applied technology and technology entrepreneurship. She has a PhD in Philosophy and in Cognitive Sciences and has worked on the creation of an expressive language for artificial agents in the artificial intelligence domain.

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University-SME Collaboration and Open Innovation: Intellectual-Property Management Tools and the Roles of Intermediaries

Isabelle Deschamps, Maria G. Macedo, and Christian Eve-Levesque

"*Les hommes construisent trop de murs et pas assez de ponts.*"

(Men build too many walls and not enough bridges.)

Joseph Fort Newton, Priest and Author
as paraphrased by
Dominique Pire, Nobel Laureate (Peace)

In 2009, the *Conseil de la science et de la technologie du Québe*c (CST) made 13 recommendations to the Government of Quebec in order to shift innovative actors towards open-innovation practices adapted to the province's context: diversified economic sectors, a majority of small and medium-sized enterprises (SMEs), public universities, etc. Among these recommendations are: i) to set up flexible mechanisms to promote research collaboration between public-private sectors such as universities and SMEs, and ii) to optimize intermediation bodies' contribution to establish open-innovation practices. Furthermore, the lack of adequate understanding and tools for the management of intellectual property (IP) was identified as a major inhibitor of open-innovation practices, to which actors should pay specific attention. In this article, we present results and recommendations from a field study focused on two groups of actors: i) companies involved in collaborative innovation and ii) intermediary agents enabling innovation and technology transfer. Our first goal was to shed some light on factors that facilitate open innovation through improved university-enterprise collaborations and, more importantly, that attempt to overcome the irritants related to IP management. Our second goal was to analyze the roles of diverse intermediaries in the fostering of successful collaborations between universities and SMEs.

Our study yielded three findings: i) SMEs do not care about understanding and improving their capabilities about IP and are not equipped with adequate tools and best practices for managing IP and for managing the overall collaborative mechanisms in general; ii) this gap in preparation for open innovation is persistent, since even the intermediaries, whose role is to guide SMEs in university-enterprise collaborations, suffer themselves from the lack of appropriate IP transfer and sharing tools, and do not perceive the need to offer better support in this regard; and iii) overall, current IP-transfer and collaboration-management tools are not sophisticated enough to provide appropriate support for the implementation of open innovation, by which we mean more open and collaborative innovation in the context of university-enterprise collaborations.

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Introduction

In the current industrialized world, governments and their diverse agencies emphasize the need to increase the propensity and success of open and collaborative innovation (OECD, 2008; tinyurl.com/b3b9kkt; Chesbrough, 2006; tinyurl.com/aqkav9t). The Government of Quebec is no exception, and this emphasis is shared across the rest of Canada as well. In its last Advisory Report, the *Conseil de la science et de la technologie du Québec* (CST, 2011; tinyurl.com/b9prarq) reinforced the findings from both the Organisation for Economic Co-operation and Development (OECD; oecd.org) and the Government of Canada regarding the poor rates of innovation and success shown by Canadian private enterprises.

One of the important dimensions of successful innovation – beyond sufficient direct investment in academic or private R&D – is the extent of collaboration between universities and enterprises through technology transfer (e.g., R&D partnerships, industrial chairs, licenses, and spin-offs). However, Canada performs poorly in this regard (Government of Canada, 2011; tinyurl.com/bes59r9).

Moreover, experts and governments attribute the poor university-enterprise collaborations performance to: i) a large proportion of SMEs in most developed economies, knowing that small businesses show much lower innovation-absorption capabilities than their larger counterparts and ii) a lack of effective technology transfer and flexible IP-management rules from universities. Indeed, the organizational structures and institutional rules of universities are aligned with a long-term vision of knowledge development and diffusion, which tends to inhibit IP transfer and sharing, and is out of phase with SMEs' short-term need for commercialization of innovations (OECD, 2008; tinyurl.com/b3b9kkt).

Those observations renewed our interest in a field study on best practices and factors that facilitate (or inhibit) a more open and collaborative approach to university-enterprise collaborations, and that foster technology transfer, facilitate IP management, and accelerate commercialization of outputs from university-enterprise collaborations, and specifically from university and SME collaborations (CST, 2009; tinyurl.com/c42jjhu). Based on this fundamental premise, our central research question was: *How can intermediaries increase the propensity and the openness of university-enterprise collaborations, and more precisely university and SME collaboration?* Subsidiary questions were:

1. How do the SMEs involved in university-enterprise collaborations approach the relationship and the management of IP issues?

2. What is the role of diverse intermediaries in the management of university-enterprise collaborations relationships?

3. What type of tools and management practices are (and should be) used by these intermediaries to better support SMEs in university-enterprise collaborations?

Our Research Mandate

This article contains data and insights from a Report based on the authors' field research (Deschamps and Macedo, 2011; tinyurl.com/cz6nvmn). The research took the form of: i) four case studies that retrospectively explain, from the point of view of the companies, recent success stories of university-enterprise collaborations in Quebec, and ii) a survey, combining questionnaires and face-to-face interviews with intermediaries and experts from diverse governmental agencies and not-for-profit organizations supporting university-enterprise collaborations. Our mandate was to guide the CST in its recommendations to bodies of the Government of Quebec regarding the methods and tools to be used by intermediaries in managing IP transfer and implementing open-innovation principles during university-enterprise collaborations.

Part I: Case Studies of Innovative SMEs Active in University-Enterprise Collaborations

Finding 1: *Even very innovative SMEs are barely active in terms of searching for IP tools and best practices for collaborative innovation management*

The enterprises under study were very innovative SMEs – they could be considered to be in the top 5%–10% of the SME population. They collaborated with universities or research centres on a continual basis, and their top managers considered that they simply had no choice but to be successful in university partnerships and IP transfers.

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Our case studies of companies involved in university-enterprise collaborations corroborated some issues found in our literature review:

1. SMEs are usually not very active in their search for external information and knowledge, and they very seldom seek out collaborations with universities. According to a recent survey from the Board of Trade of Metropolitan Montreal (2010; tinyurl.com/ck9j6v6), only 10% of SMEs with more than $5 million in sales report an academic collaboration, and only 1% report a technology transfer.

2. SMEs are, in general, not proactive – even reluctant – to be involved in IP protection and management in general (CST, 2009; tinyurl.com/c42jjhu).

3. University-enterprise collaborations are profitable to enterprises of all size, even with cultural and sector-related differences.

4. IP management is an irritant to innovative SMEs during contract or license negotiations, but it is not truly an obstacle for the development of a long-term partnership with universities.

5. Innovation success requires that those irritants be appropriately managed with an open-minded approach and appropriate tools. Trust, communication, and complementary objectives and activities are the key factors for the development of a long-term university-enterprise collaborations in the companies under study.

During our interviews with successful entrepreneurs, we found that challenges related to IP management during university-enterprise collaborations vary, but in all instances, they remain an important issue to establish a sound context with their innovation partners, and that the diverse intermediaries involved had played a central role on the settlement of their collaborative relationship with the university or research centre.

We have observed during our own case studies the following set of attitudes and behaviours of entrepreneurs vis-à-vis university-enterprise collaborations and IP issues:

1. Even in the case of these very innovative and successful enterprises, the management of university-enterprise collaborations is performed on an ad-hoc basis, in a reactive or defensive mode, when the entrepreneurs are forced to because controversies about IP ownership arose.

2. Entrepreneurs were not proactive; they were not actively looking for information on open innovation or for university-enterprise collaboration "best practices" to improve their relationships or to facilitate the technology transfer.

3. This passive, “no-need-to-improve” attitude persists, even when they realize that it impedes the IP sharing and restrains the information-exchange process during university-enterprise collaborations, which they considered as the basis of their competitive edge.

4. In the long run, they did not look for a fulfilment of this gap in their competencies, mainly because of lack of time, but also because they simply did not know where to find advice in this domain.

In conclusion of our case studies, we inferred that most SME leaders do not have an adequate knowledge of IP management, do not perceive an urgency to improve their capabilities, and do not seek IP training or external advice (i.e., "they don’t know what they don’t know"). This inference motivated us to better understand how intermediaries could improve the situation and help to break the vicious circle.

Part II: Study of Intermediaries’ Roles in University-Enterprise Collaborations

The collection of primary and secondary data was performed in steps, through three different methods. Firstly, we performed an Internet search with the aim of identifying intermediaries involved in the Quebec Ecosystem of Academic Research and Technology Transfer. We identified nearly 500 entities and categorized them into profiles, according to their direct or indirect intermediary roles during university-enterprise collaborations:

1. Intermediaries and liaison agents within universities (technology-transfer offices)

2. Societies for university technology commercialization

3. Industrial associations

4. Pre-competitive R&D consortia

5. Collegial technology-transfer centres

6. Government agencies (advisors affiliated with industrial R&D support programs)

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7. Private consultants (specialists)

8. Research centres and universities

Secondly, a survey was conducted with 26 intermediaries chosen among these entities, having different profiles, acting in diverse roles and industrial sectors. Responses from 15 organizations were analyzed, and representatives from each of the above profiles were in the final sample. Our questionnaire had two parts: i) closed-questions with multiple choices to evaluate the degree of use of diverse IP-management tools and the level of appropriate training to use these tools, and ii) open-ended questions asking intermediaries to identify services offered, links with SMEs, self-reported competencies, contacts, and internal resources.

Thirdly, in order to validate the responses to our survey, we collected contextual and qualitative information during exchanges with major players active in the innovation ecosystem in Quebec. This additional data helped us to establish IP-management best practices; to get a better understanding of gaps, missed links, and related issues; and to interpret our results with a broader perspective.

Listing and classification of IP-management tools and collaboration-management tools in university-enterprise collaborations

To build our questionnaire, based on our literature review, we established a classification of diverse IP-management and collaboration-management tools useful in university-enterprise collaborations, within a general context of open innovation. Our 17 categories (Box 1) include specific tools and general guides, covering diverse phases of the innovation process and of collaboration relationships, including management practices, tools, and databases useful at both the operational level (e.g., project management, technical issues) and the strategic level (e.g., collaboration objectives, IP sharing, legal issues).

Finding 2: *Intermediaries show a very low usage of IP tools and collaboration-management practices during university-enterprise collaborations*

Based on our survey, we found that intermediaries show very low-to-medium usage rates of IP-management tools and guides of open-innovation best practices for university-enterprise collaborations. Moreover, most intermediaries apply these tools for their own use only

Box 1. Categories of IP tools, guides, or sources of information useful for IP transfer and open-innovation approaches during a university-enterprise collaboration project

1. Tools to identify nature of the IP
2. Tools to decide or analyze diverse type of IP protection
3. Tools to search for patents
4. Tools to search for technologies
5. Directory of patents/technologies/expertise available for technology transfer
6. Tools for the management of IP rights/IP ownership
7. Tools for the monitoring of industrial sectors and norms
8. Guides for the commercialization of IP
9. Standard models of university-enterprise contracts and licenses
10. Guides for collaboration with universities
11. Guides for collaboration with enterprises
12. Guides on principles and good practices of open innovation
13. Guides on the financing of collaborations and technology transfers
14. Best practices of transfer agents
15. Publications/journals/specialized review/books
16. Internet blogs on litigation/case studies
17. Guides on where to find important information/references

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and do not diffuse those tools to SMEs, except for one governmental agency that directly supports SMEs and a few intermediaries, such as R&D consortia.

Degrees of usage of tools and management practices used by intermediaries are as follows:

1. Traditional monitoring tools that help intermediaries stay informed about technology and industry trends in general but not specific for IP management (50% usage)

2. Patent-management tools (30% usage)

3. Sophisticated tools associated with open-innovation practices, commercialization modes, and IP litigation (15% usage)

Finding 3: *Intermediaries perceive no need for improving IP tools and collaboration practices*

A very low proportion of intermediaries reported a need for change in their role during university-enterprise collaborations, and they did not anticipate any improvement. Only 12% of all interviewees reported plans to acquire or to develop new tools in a near future, and less than 10% reported plans to provide their personnel with training on those tools.

General Insight 1: *Intermediaries active in university-enterprise collaborations perceive themselves as generalists and they are reluctant to be involved when facing IP and collaboration issues*

This lack of motivation by intermediaries to offer better university-enterprise collaboration support and IP tools to SMEs seems to be related to two main factors. First, there is an external perception of a scarce demand of support from SMEs, this perception being consistent with our precedent findings of a passive attitude of SMEs towards IP issues. Second, there is an internal perception by intermediaries that providing tools and support to SMEs is not part of their mandate. Some of our respondents even emphasized that their mandate was the opposite: to represent and defend the interests of the university during the negotiation of IP agreements in university-enterprise collaborations.

In search for an explanation for the low usage of IP tools and collaboration-management best practices inspired by open-innovation principles, we infer from our analysis that most intermediaries consider themselves as generalists. IP tools and collaboration management are neither perceived as one of their specialities, nor as parts of their mandate. This negative perception might explain their very low propensity to search for, learn, use, and master more effective IP-management and collaboration-management tools.

General Insight 2: *Specialists, mainly private consultants, play positive but limited roles for SMEs*

Since most intermediaries, considering themselves as generalists, and prefer to avoid involvement with SMEs, IP-management issues are most often left in the hands of specialists, such as technical analysts, legal negotiators, and professional collaboration and open-innovation trainers (e.g., patent agents, lawyers, IP consultants and brokers, management firms).

Our study highlights that the actual main sources of specific advice for SMEs in terms of IP management and university-enterprise collaborations are private consultants (technology brokers, patent agents, etc.); they correspond to the seventh profile in our earlier classification of intermediaries. Some consultants bring state-of-the-art and available knowledge on business or legal dimensions, whereas others bring more technical expertise or specific information about IP transactions and litigations.

This presence of specialists seems to be positive, from the point of view of our respondents; however, the scope of their intervention is restrictive in terms of general impact on university-enterprise collaborations at large:

1. The number of private consultants is limited and they normally prioritize large enterprises; they have less time available for SMEs.

2. They are practically absent outside metropolitan areas.

3. Their services are expensive for SMEs, which have normally a limited budget.

4. They are often too specialized and SMEs do not know how to communicate with them.

5. They tend to focus on specific issues or problems, not considering the general context and the building of the university-enterprise relationships.

6. They work on a case-by-case basis, and are not preoccupied by the systemic nature of university-enterprise collaborations.

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General Insight 3: *Complementary profiles of intermediaries (generalists and specialists) are involved at diverse phases of the innovation process*

As a general insight, we infer that it is important to better analyze and comprehend the relative and complimentary roles of intermediaries in university-enterprise collaborations, in order to fulfill the multiple needs of SMEs in terms of management tools and guides. We conclude that it is important to carefully separate the respective roles of the generalists who play a general management advice role, versus IP specialists, the latter group coming into play later on in the university-enterprise collaboration process. Based on our case studies with successful entrepreneurs (Part I) and our survey of intermediaries (Part II), it is clear that a specific attention should be given to enrich the role of the generalist intermediaries, who are active upstream in the innovation process, and therefore act early on in the establishment of a collaborative climate.

The following consensus emerged after our survey and our consultation with experts active in the innovation ecosystem: front-line generalists do not need to fully master the sophisticated tools in order to perform the complete analysis in terms of IP management or patentability on their own. However, they do need to understand enough about the specific university-enterprise collaboration context in each project, upstream of the innovation process, in order to identify at an early stage the potential IP issues at stake. Furthermore, they should aim to establish a common agenda and language between the two parties.

This role of front-line intermediaries is a key one, because it is presumed that it will fuel positive and more open-minded discussions and exchanges between SMEs and universities. Moreover, a positive context sets up a framework for discussion and collaboration between the generalists and specialists, the latter group being involved during the multiple transactions, as an innovation project unfolds. For example, in Quebec, R&D consortia are typically involved first, college technology-transfer centres are second, and private consultants are third.

General Insight 4: *A lack of knowledge and a poor mastering of the best practices by intermediaries limit the propensity of SMEs to engage in university-enterprise collaborations*

We infer from our multiple conversations with experts and actors in Quebec's innovation ecosystem that very little systematic and collective effort is made by all players to increase the number of university-enterprise collaborations involving SMEs and to improve their levels of success. Intermediaries do not significantly use guides for collaboration in order to establish a systematic and more standardized method of building numerous, sound, and long lasting university-enterprise collaborations. When SMEs look for a university collaborator, intermediaries emphasize informal and personal networks of contacts. This decreases the probability of finding the right partner, and reduces the number of university-enterprise collaborations initiated. Overall, this impedes the establishment of the most-needed SMEs' orientation towards open and collaborative innovation. With very little support, and because they are naturally passive about collaboration, SMEs are more likely to show a very low sense of urgency for expanding their collaboration networks, for learning new open-innovation management practices for university-enterprise collaborations, and for absorbing innovations from external sources.

General Insight 5: *A lack of front-line intermediaries' expertise and support with innovative SMEs impedes collaboration, fuels distrust, and leads to lost opportunities*

The relatively static and "closed" state of mind about collaborative innovation, shown both by SMEs and intermediaries, including liaison agents within universities, is quite troubling. The globalizing industrialized world is continuously accelerating the rate of IP exchange all around the world. In such a context in favour of open innovation and IP transactions, growing opportunities for collaborations arise, both for SMEs and universities. From a local socio-economic development point of view, the actual low level of university-enterprise collaborations represents an enormous loss of potential.

Generalists who are dispersed throughout the territory and who act as front-line intermediaries during university-enterprise collaborations are naturally involved in early discussions related to IP. At that stage, they should master some basic IP-management concepts, perhaps less than specialists such as patent agents, but at least more than average SMEs. The reported lack of knowledge about IP-related issues among SMEs inhibits university-enterprise collaborations – it is a source of distrust (Board of Trade of Metropolitan Montreal, 2010; tinyurl.com/ae828tx). If most intermediaries know almost nothing about IP management, as reported in our survey, it becomes highly probable that any type of IP subject matter will easily become a dispute, due to lack of appropriate knowledge to solve the raised questions.

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Front-line intermediaries, even if they are generalists, must be knowledgeable and reassuring with SMEs, so they need to grasp a minimal level of knowledge and to build self-confidence in their mediator's role in order to increase mutual trust and credibility.

Conclusion

Conclusion 1: *A systemic approach for collaboration is needed, beyond fixing symptoms and solving IP-related problems between SMEs and universities.*

Our analysis of practices in the Province of Quebec reveals multiple challenges related to IP management in university-enterprise collaborations and proposes some avenues to reinforce the roles of intermediaries and to diffuse some "best practices" about the management of IP. Each of those challenges must be perceived as part of a whole, in which IP is only one aspect.

Our analysis of intermediaries' profiles and attitudes clearly depicts a lack of pro-activity and reveals gaps in knowledge of appropriate tools. This attitude represents a strong barrier to the implementation of open-innovation principles in university-enterprise collaborations. This situation might also explain the very low proportion of SMEs that are likely to engage in university collaboration: the entrepreneurs interviewed during our case studies reported that they feel that most of intermediaries are either too passive to support them or even working against them. Of course, this does not imply that all universities and intermediaries are behaving in the same way; on the contrary, interviews confirmed the existence of wide spectrums of support from intermediaries, collaboration attitudes, and IP-management rules in universities.

Conclusion 2: *More open and collaborative innovation is possible in university-SME contexts if intermediaries play a more proactive and opportunity-driven role.*

Our study leads us to strongly believe that the simultaneous implementation of IP-management tools and a better understanding of general collaboration-management issues could create a virtuous circle of improvement, towards more successful university-enterprise collaborations and better open-innovation management practices. A *rapprochement* of SMEs with universities, through upstream intermediaries who would be better prepared to foster a positive climate for match-making, could stimulate a willingness to collaborate from both parties. A better and reciprocal matching of opportunities would set the stage for more productive discussions, and would encourage intermediaries to invest in more sophisticated networks, tools, and practices to manage university-enterprise collaborations. In particular, better tools are needed to analyze the stakes and the respective IP positions upstream in order to facilitate dialogues and accelerate negotiations. Overall, win-win agreements would be reached, universities would appear more open to the community of SMEs, and the proportion of SMEs willing to be involved in university-enterprise collaborations would increase.

Conclusion 3: *Generalists and specialists play two inextricably interrelated roles.*

Based on the results of our survey, we can observe two categories of intermediaries: i) front-line generalists and ii) specialists. The first group is diverse in nature, and most of them work for governmental agencies or not-for-profit organizations; the latter group is mainly composed of private consultants. It would be very important to carefully distinguish the respective roles of front-line generalists from those of specialists given that there is currently a significant gap in the level of knowledge in terms of IP-management tools. During first phases of an innovation project, SMEs generally turn to generalist intermediaries for support, but these intermediaries know almost nothing about complex IP issues. There is a need to raise the level of knowledge of those front-line intermediaries who could be subsequently able to refer SMEs to appropriate specialists and to work in cooperation with them – as a complementary team. In order to allow specialized private consultants to offer useful services to SMEs, which are specific and customized to their project, all front-line intermediaries must master at least a basic understanding of the content, vocabulary, and usefulness of specialized services offered. This knowledge is especially crucial for referring the SMEs in a very timely manner to the appropriate specialist in IP protection and transfer, because a lack of upstream preparation in this matter significantly slows down the collaboration process between SMEs and universities in downstream activities, and it could lead to disputes that will jeopardize the commercialization phases.

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Recommendations

Based on our general observations and overall analysis of their roles, it appears that all intermediaries, and especially the front-line generalists, should not only master the basics of IP-management tools, but they should also become liaison agents – even coaches or mediators – between universities and SMEs. We offer the following recommendations to put in place such measures:

1. Financing agencies that support intermediaries must consider the expansion of intermediaries' capabilities and roles, and eventually renew their missions as well as their financing and business models. Intermediaries, and especially the front-line generalists, could more directly and effectively support SMEs in their search for more open and collaborative university-enterprise collaborations.

2. Government agencies would benefit to envision a reorganization of roles and responsibilities of intermediaries, including generalists and specialists, which should evolve towards more pro-activity in terms of usage and diffusion of best practices in IP and collaboration management. However, those changes cannot be implemented on a case-by-case basis. Intermediaries are dependent on one another. Governments must aim to create an integrated chain of intermediaries with complementary profiles and common practices, to better support SMEs at all phases of the innovation process.

3. This integration requires closer interactions between diverse government levels (i.e., federal, provincial, local or regional, sector-specific), universities, intermediaries, and SMEs in order to harmonize rules of IP sharing and trading as well as to better integrate stakeholders so that they work together and create synergy throughout the chain of technological innovation.

Implementing these recommendations requires a global and systemic approach; otherwise, it is possible that isolated changes, on specific IP rules or mechanisms aimed to improve some collaboration activities at early innovation phases, could have a counter-productive effect at subsequent steps of the open and collaborative innovation process.

The objective of those new or improved methods discussed above is not primarily quantitative, but qualitative. Beyond the desire to increase the absolute amount of university-enterprise collaborations and to speed up negotiations, the objective is to improve – in a sustainable manner – the capacity of SMEs to manage innovation in an open and collaborative way with university partners. We collectively need SMEs that are able to absorb and create IP in order to generate the maximum commercial outputs from all sources of IP, and especially form local universities. To accomplish this, our innovation ecosystem needs to rely on well-prepared intermediaries with expanded roles.

As a final note, since data was collected in 2010, we have observed that some intermediaries have improved on some of their services, support mechanisms, and tools. It would be interesting to repeat our survey and measure progress along the suggested lines in our conclusions and recommendations.

About the Authors

Isabelle Deschamps is Professor and founder of graduate programs in Innovation Management at École de technologie supérieure in Montreal, Canada. A professional engineer, she has been active for 30 years as a consultant, trainer, investor, and researcher in the fields of collaborative technological innovation. She has been advisor and manager in governmental agencies, incubators, transfer centres, and clusters in industries such as aluminum, environment, information technologies, nanotechnologies, and life science. Directly active for more than 15 years in the Quebec innovation ecosystem, she coached and financed startups and university spin-offs as Vice-President of Inno-centre, a technological incubator and as Partner of Capimont Technologies, a private venture capital group. Since 2007, she has been involved in fast-growing high-tech SMEs for the management of innovation and university-enterprise collaborations. She holds an MBA from HEC-Montréal and a DBA in Innovation Management from Harvard University.

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Keywords: open innovation, university-SME collaboration, university-enterprise collaboration, intellectual property, IP management, technology transfer, intermediaries

TIM Lecture Series

Local Open Innovation and the Seeking Solutions Approach

Christophe Deutsch and Philippe Dancause

> *"Open innovation is the formal discipline and practice of leveraging the discoveries of unobvious others as input for the innovation process through formal and informal relationships."*
>
> Frank Piller
> Professor of Technology & Innovation Management

Overview

The second TIM lecture of 2013 was presented by Christophe Deutsch and Philippe Dancause, co-founders of En Mode Solutions (enmodesolutions.com), a new startup that has arisen through the development of the Seeking Solutions approach to local open innovation. The lecture provided the opportunity for the audience to not only learn about this new approach to open innovation, but also to experience it through an interactive session. The event was held at Carleton University in Ottawa, Canada, on February 7th, 2013.

The TIM Lecture Series is hosted by the Technology Innovation Management program (carleton.ca/tim) at Carleton University. The lectures provide a forum to promote the transfer of knowledge from university research to technology company executives and entrepreneurs as well as research and development personnel. Readers are encouraged to share related insights or provide feedback on the presentation or the TIM Lecture Series, including recommendations of future speakers.

Summary

In the first half of the event, Deutsch and Dancause provided an overview of the benefits and barriers of open innovation generally, then described how a new approach – *local* open innovation – could help companies solve particularly challenging business problems that they have been unable to solve on their own. For the second half of the event, the room was reconfigured to suit an interactive session that would reinforce the insights from the lecture through hands-on experience. Audience members became participants in local open innovation as either problem owners or problem solvers.

Part I: Local Open Innovation

To explain the differentiating features of their approach, Deutsch and Dancause first built up the term "local open innovation":

1. At the heart of the approach is *innovation*, which they defined as "disciplined problem solving".

2. By opening up a problem to outsiders and thereby bringing new knowledge to bear on a challenge, *open innovation* increases the productivity of problem-solving tasks. Here, Deutsch and Dancause stressed the importance of fostering: i) input from "unobvious" sources; ii) informal relationships and interactions; and iii) serendipity. These elements open the innovation process to encourage new ideas, new visions, and breakthroughs.

3. Although open innovation typically operates over a large geographical scale, often exclusively using Internet platforms, the levels of interaction and collaboration between problem owners and problem solvers is low. By operating at a *local* scale, local open innovation takes advantage of proximity, both in terms of enabling face-to-face interactions between collabor-

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ators and in terms of bringing together diverse "neighbours" who might not otherwise discover each other's capabilities.

Next, Deutsch and Dancause described the four key steps involved in the Seeking Solutions approach to local open innovation:

1. **The call for problems:** the organizers reach out to companies and encourage them to submit challenging business problems they have been unable to solve.

2. **Problem selection:** the organizers select and refine appropriate problems.

3. **Problem broadcast:** through broad and targeted means, the problems are distributed to potential problem solvers.

4. **The collaborative event:** problem owners and problem solvers come together to further understand the problems and develop solutions during a full-day collaborative event, with support and facilitation provided by the event organizers.

Further details of the approach and its development, including results from past events, are provided in this issue of the *TIM Review* by Deutsch (2013; timreview.ca/article/664) and Berger Masson (2013; timreview.ca/article/667).

Lessons learned

In the discussions that followed the first part of the presentation, audience members shared the lessons they learned from the presentation and injected their own knowledge and experience into the conversation. The speakers and audience members also identified the following key takeaways from the presentation.

General insights about open innovation:

1. Most companies are looking for problems they can apply their solutions to. Open innovation turns this perspective around, and thus it requires a change in mindset. In fact, open innovation is more about a mindset change than a process change.

2. Open innovation requires a balance between the formal aspect of managing openness (and related processes) and the informal aspect of being receptive to new ideas.

3. Many service providers think they can do "something" for a potential customer, but they do not always have a clear answer as to what that might be. Equally, every company has its own knowledge of its problems and its own capability to solve them. With virtual interactions alone, it can be difficult to bridge these gaps; it requires problem solvers to gain a deeper understanding of a company's problems and a means to demonstrate their capabilities in a direct manner that is relevant to an existing problem.

4. Organizers need to harness the "Power of Q" (Uzzi and Spiro, 2005; tinyurl.com/5ggvmx), which means striking the optimal balance between "outsiders" and people who are already used to working together. A local approach to open innovation helps increase the intimacy of the collaboration by ensuring the group is not too diverse.

Specific insights about the Seeking Solutions approach to local open innovation:

1. In Seeking Solutions events, the business aspects become secondary to the creative challenge of solving the problem. Thus, problem solvers are not concentrating on "selling their stuff"; instead, they are driven by the problem. This environment is beneficial for all parties. Problem solvers can effectively demonstrate their relevant capabilities; problem owners receive focused attention on their actual problems.

2. Both problem owners and problems were willing to pay to attend the events. Fees for problem solvers ensured that there would be no "passengers"; only committed participants would be in attendance.

3. Problem owners gain benefits beyond any new solutions that may arise: they receive help in better defining their problem, better understanding their problem, and validating any existing solutions they are considering. Better-defined problems to help solve also benefit the problem solvers.

4. Beyond the actual problem-solving activities, participants greatly appreciated the events as a unique, high-value networking opportunities.

5. The role of the facilitation team is very important. People may be outside their comfort zones, and an open, playful, and creative atmosphere must be created to encourage the flow of new ideas.

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6. Contrary to expectations, intellectual-property issues did not arise during the events; this was possibly due to an expectation of openness among all participants. Legal aspects seem to emerge later, only once the proposed solutions become more concrete.

7. Local open innovation has benefits for economic development: it creates value in the region and builds connections between industries.

Part II: A Taste of the Seeking Solutions Approach

In the second part of the lecture, Deutsch and Dancause put some of aspects of the Seeking Solutions into practice by asking the audience to participate in an interactive session of local open innovation. Due to time constraints, the session compressed or skipped over key steps in the process, but the intention was just to give audience members "a taste" of the approach.

Box 1 lists the problems that audience members proposed and were selected for the interactive session. In contrast to full Seeking Solutions events, the session focused on non-technical problems, most of which were general (i.e., there was no single or "true" owner of a given problem). Equally, the problem solvers did not know what problems would be proposed; they were not in attendance because they had any particular affinity to a particular problem, nor did they pay to attend the event. These and other differences meant that the interactive session would just "skim the surface" of the overall approach, but it was hoped that the session would be realistic enough to show how such an event could help problem owners and problem solvers collaborate around challenging problems.

Box 1. Problems put forth by TIM Lecture participants

1. *How can local technology startups globalize early and rapidly?*
2. *How can we find companies that want to "go global"?*
3. *How can we match company problems to immigrate talents?*
4. *How can the TIM program attract more students from around the world?*
5. *How can the region avoid losing companies when the owner retires?*
6. *How can we attract large employers to Ottawa?*
7. *How can entrepreneurs find compatible co-founders?*
8. *How can we eliminate or minimize university tuition fees?*

Each problem owner was assigned a table in the room and the other participants (i.e., the problem solvers) were asked to sit at the table with the problem that most interested them or to which they felt they could add the most value (Figures 1 and 2). Deutsch and Dancause facilitated the event by guiding the problem owners and problem solvers through a series of questions designed to help everyone understand the problem and then start contributing novel solutions to it:

1. What is the problem and why does it need an answer?

2. What is missing in our understanding of the problem?

3. What are the new ideas that may help solve the problem?

4. Problem solvers move to a new table, then question 3 is repeated.

5. Problem solvers return to their original table, then question 3 is repeated again.

6. What are the best leads and what should the next steps be?

Figure 1. Participants in the TIM Lecture interactive session on the Seeking Solutions approach to local open innovation

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Participant feedback

Despite key differences between the one-hour session and a full Seeking Solutions event, the TIM Lecture participants contributed enthusiastically and gave the following, largely positive feedback on the experience:

- *"This felt awesome. And the results were awesome."*
- *"Although we were pretty much a group of total strangers, we immediately became very engaged around the problem."*
- *"Our problem was large and complex. However, as we worked through it, we uncovered smaller sets of problems that, by being solved, could greatly contribute to solving the overall problem."*
- *"Unfortunately, we spent a lot of time returning to the original question and trying to redefining it, rather than understand it. So, we were really starting to solve a different problem than the one I originally proposed."*
- *"It didn't take us long to realize that we had a table full of very smart people, ready to work together."*
- *"As the 'owner' of the problem, I am quite satisfied with the quality of the discussion and the outcome in terms of next steps. I would not have been able – on my own – to do such a thorough analysis of the problem, as complete an identification of potential solutions, or as relevant zeroing-in on initial first steps toward addressing the problem."*
- *"The problem has not been solved, but we managed to find a good direction to move forward, and we confirmed what we think needs to be done."*

Figure 2. To a group of problem solvers, Dr. Tony Bailetti describes the challenges technology startups face when trying to globalize early and rapidly

- *"I personally think the value lies in the people around the table with similar interests in terms of wanting to find a solution to the problem at hand. It not only redefines and perfects the question at hand, it brings about solutions to secondary problems lurking in our minds."*
- *"Progress was made by providing: i) a better understanding of the problem and ii) actionable next steps."*
- *"It was great to start with brainstorming on the true or underlying problems from a variety of perspectives. Thereafter, the juxtaposition, combination, and collision of perspectives, ideas, and options makes it possible to ascertain quickly what holds water and what doesn't, what might be feasible or not, and what conditions must be met to ensure viability."*

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This report was written by Chris McPhee, with photographs by Yahya Baby.

About the Speakers

Christophe Deutsch is R&D Manager at Telops (telops.com), an innovative company in the field of high-performance infrared sensors. He is responsible for the successful realization of product development and R&D projects. Previously, he was Vice President Operations at INO, an applied R&D centre in the field of optics, where he implemented project-management and technology-development processes and co-founded the RCR, a circle of R&D managers. Christophe has also worked for ABB Analytical Solutions, where he developed his competencies in system engineering and project management in several aerospace projects. As a member of ISPIM's advisory board, he promotes innovation management to increase efficiency of R&D. In 2012, he co-founded En Mode Solutions (enmodesolutions.com).

Philippe Dancause is a founding associate at both En Mode Solutions and Grisvert, and he is an owner at Groupe Dancause. He currently works with organizations that face challenges in identifying orientations and reaching their goals in a constructive and sustainable manner. For the last 15 years, he has been acting as a project-management expert, a business strategy consultant, an executive adviser, and a facilitator in the design and animation of collaborative processes. He works with private and public companies that are willing to use all their depth, experience, and diversity in order to innovate, reach new goals, and improve the world. His past assignments have been with local and multi-national companies, in Quebec, Europe, and the United States.

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