Écotech and its role in the internationalization of cleantech companies[1]

Painting 1: Clean technologies (Painting by Ekaterina Turkina)

On a sunny, but rather chilly morning in early March, Victoria Smaniotto, Director of Branding & Internationalization at Écotech, Québec's cleantech cluster, arrived at her office at 7 am to prepare for the meeting with the Écotech's team, which was scheduled to start at 9:30 am.

Victoria graduated from HEC Montréal in International Business and Marketing with a specialization in Corporate Social Responsibility. After living in Paris, Hong Kong and Chile, Victoria Smaniotto moved to Montréal and held various positions in the cleantech sector: from 2012 to 2014, as a business development analyst and marketing coordinator at Carnot Refrigeration, a Québec SME that develops HFC-free refrigeration systems; from 2014 to 2015, at Écotech Quebéc as Project manager and coordinator of two task forces; then in 2016, she

[1] IGC research assistants: Meaghan Girard, Andriana Hnatykiw, Bazhena Ivanova; IGC linguistic editor: Meaghan Girard

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held the one-year position of Head of Secretariat of the International Cleantech Network, before going back to Écotech Québec. Today, she coordinates two task forces, Internationalization & Branding and People, and assumes the role of VP Development & Partnerships within the new CanadaCleantech Alliance.

Photo 1: Victoria Smaniotto, Director of Branding & Internationalization, Écotech Québec

Victoria's task for today's meeting was to update the team on Écotech's potential as an organization and discuss the international exposure of its companies. She had received two excellent reports on these topics. Victoria was browsing through the reports as she needed some time to review them and to think about the major points before presenting them to the team.

First, she wanted to present the analysis of Écotech as an organization, which also included some important management recommendations for Écotech. The second report was on the internationalization of Écotech's companies, which had been prepared by an intern and was based on a thesis written by Christophe Mariage-Beaulieu. The second report was well linked with the first report as it contained very useful information on the local social network infrastructure of Écotech.

Victoria knew that internationalization was a very important topic. Over 90% of cleanteach companies are SMEs and face a rather small domestic market for their products. In addition, Québec's environmental legislation is not very progressive. As such, the companies are often forced to internationalize, sometimes upon inception. However, due to a lack of experience,

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Québec companies face a lot of challenges in the international markets. Therefore, Victoria was very interested by the recommendations presented by the second report.

Écotech as a cluster association

The first organization of its kind in Canada, Écotech Québec is a cluster association that brings together decision-makers in the clean technology sector from across the Québec, such as innovative companies, research and development centers and technology transfer centers, large enterprise users, the financial community, educational and training institutions, trade union confederations and industry associations and other clusters in clean technologies. Écotech Quebéc's mission lies with the development, financing, adoption, marketing and export of clean technologies. It is helping to position Québec as a centre of excellence for technologies in North America and globally, and to make Québec a more competitive, greener and healthier place.[2]

Cleantech is classified by sector of activity in Québec: air, energy efficiency, green chemistry, renewable energy, residual waste, soil and groundwater, sustainable mobility and water.

Écotech Québec is distinguished by its four levers of action that guide its activities in order to:

- Contribute to the creation of the most favorable conditions in Québec for:
  - Technological development
  - Financing clean technology projects and companies
  - Commercialization of innovations here and internationally
- Propel technology companies to reach their full potential by supporting them in the development of technological, commercial and financial partnerships

1. Mesh
   - Referencing, linking, networking between companies, users, and partners
2. Presentation
   - Influence of public policy, regulation and taxation
   - Mobilization of public decision-makers
3. Influence
   - Discovery of innovations by users from Québec and elsewhere
   - Increased visibility of entrepreneurs in appropriate forums
4. Business Intelligence
   - Dissemination of market information, assessment of trends, business environment and best practices

[2] Écotech, 2016, Annual Report

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Écotech Québec is the first cleantech cluster association in North America to receive a certification of Cluster Management Excellence. It is a member of the CanadaCleantech Alliance and International Cleantech Network (ICN), an exclusive network of cleantech clusters in the world's leading cleantech regions, aiming to generate new business opportunities, enhance competitive advantages and create value for companies, knowledge institutions and local authorities across cluster regions.[3] Denis Leclerc, President and CEO of Écotech is also the chairman of the International Cleantech Network, as well as the chairman of the CanadaCleantech Alliance.

Clean technology, also known as cleantech, green technologies, greentech, eco-innovations, ecotechnologies and ecotech, is part of a sustainable development outlook that includes new products, services, technologies and processes that:

- Significantly reduce negative impacts on the environment (environmentally effective)
- Offer users superior performance at a lower cost (economically superior)
- Help improve quality of life by optimizing resource use (socially responsible)

Distribution of Income[4]

In 2015, Écotech Québec was able to count on the support of the private sector (membership fees and other donations) and the three levels of government (local, provincial and federal). The portion of private funding compares very favourably with that of the technological clusters internationally.

Public sector: 58%

Private sector: 42%

Task forces[5]

Écotech Québec's work is organized into specific groupings called task forces. Task forces, composed of Écotech Québec members and other specialists in the field, are searching for solutions to the issues identified during the public consultations and are preparing concerted courses of action. These work groups aim to optimize interventions within the ecosystem to create the most favourable conditions for the development and commercialization of clean technologies.

[3] http://internationalcleantechnetwork.com/members/ecotech-quebec/

[4] Écotech, 2016, Annual Report

[5] Informaiton taken from http://www.ecotechquebec.com/en/task-forces/

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There are 5 active task forces:

- Regulatory Framework & Taxation
- Financing
- Innovation & Commercialization
- Branding & Internationalization
- Skills & Expertise

Branding & Internationalization

Québec companies seeking to commercialize innovative products, procedures or services face a sizeable challenge: they need to find buyers for their technologies here in Québec while investigating international trade options due to Québec's (and Canada's more generally) small market size. However, Québec companies may lack information and resources to promote their products in the global market. Therefore, this task force focuses on assisting Québec's cleantech companies with their internationalization process.

Mandate of the Branding & Internationalization Task Force:

- Increase the notoriety of Québec expertise in order to generate even more business opportunities for the sector, and accelerate the development and commercialization of cleantech.
- Participate in the creation of a tool set that adequately fulfills the needs of exporting companies.

In addition, this working group seeks to maximize the relationships with other cleantech organizations, such as international clusters, so that they can become gateways for Québec's companies to penetrate international markets and increase their success rate.

Members of this task force are:

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Co-présidents	Organisation
Simon BÉRUBÉ	Le Groupe Brio
Diane LEBOEUF	Technologies Écofixe – Idénergie
Participants	**Organisation**
Myriam BLAIS	Ministère de l'Économie, de l'Innovation et des Exportations
Mario GRENIER	Pyromaitre
Alida GUALTIERA	Davies
Jean LACROIX	AQME/RÉSEAU Environnement
Michel LAFOREST	Spiral Trans
Alexandra LAUZON	Export Québec
Maroun MASSABKI	OPTECH
Annie PARÉ	Enerkem
Simon PILLARELLA	Novothermic
Benoit SICOTTE	Bell Canada
Gilles TROTTIER	Idénergie
Coordonnateurs	**Organisation**
Victoria SMANIOTTO	Écotech Québec
Denis LECLERC	Écotech Québec

Membership

Appendix A gives a full membership list. Écotech's members—companies and organizations—come from the following sectors: air, green chemistry, water, eco-mobility, energy efficiency, renewable energy, waste, soil and groundwater, enabling technologies. For more information on each sector, please visit: http://www.ecotechquebec.com/en/clean-technologies/sectors/.

Écotech also created an elaborate interactive map of all the cluster stakeholders.

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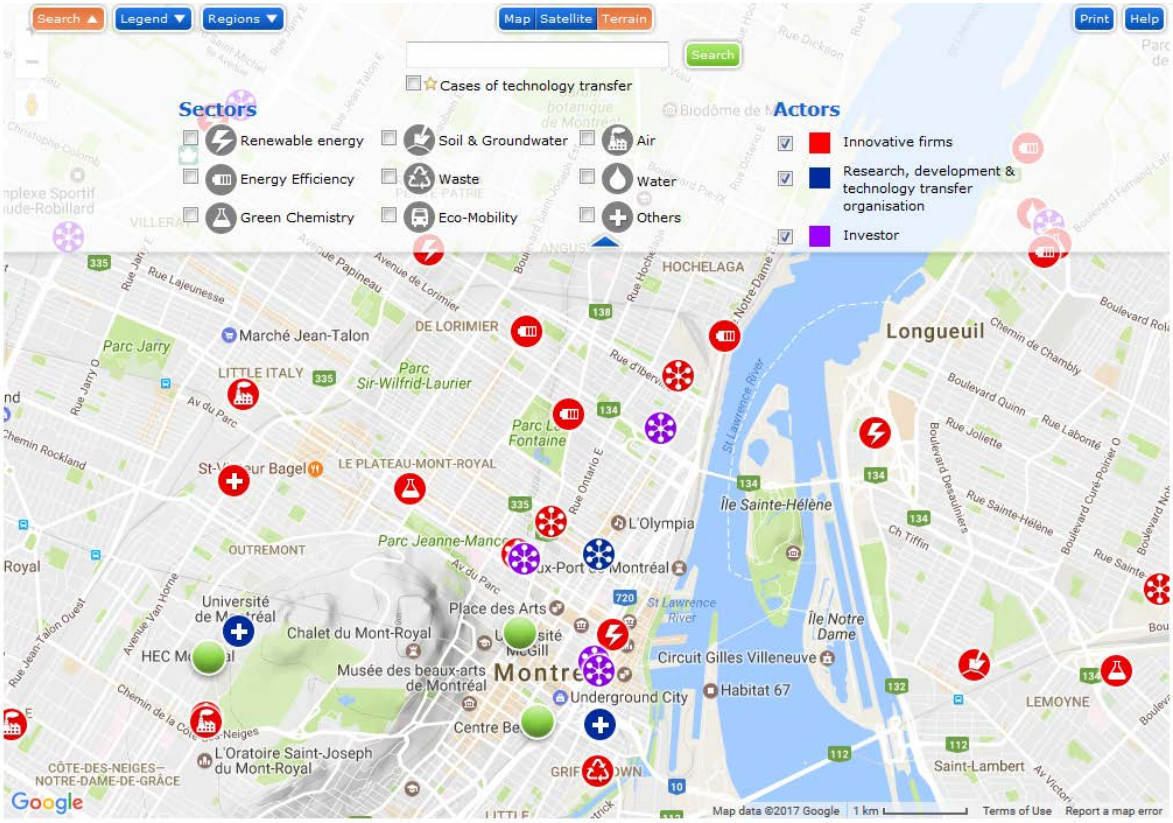

Diagram 1: interactive map of stakeholders

To explore the interactive map in detail, please consult the following web page (click on the icon at the left side of the page): http://www.ecotechquebec.com/en/members/why-join-us/.

Écotech's members get many benefits, including a direct access to a unique ecosystem (ordering parties, financiers, researchers, cleantech developers); opportunities to increase their company's visibility on the web with the company's own marketing fact sheet on Écotech's website; access to meetings with international buyers reserved exclusively for Écotech members; opportunities to obtain privileged information on the most recent national and international clean technology trends and developments; opportunities to attend workshops offered by renowned experts; opportunities to obtain rebates on registration fees for events on the national and international scene; and access to policymakers.

For information on membership fees, please visit:

http://www.ecotechquebec.com/en/members/become-a-member/

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International Partners

As members of Écotech Québec, companies and organizations have an exclusive access to services of the top 12 cleantech clusters. The Cleantech Network International (ICN), created in 2009, brings together clusters in Asia, Europe and the United States.[6] The aim is to generate new business opportunities, improve competitive advantage and create value for the member companies in all regions.

- Austria – Green Tech Cluster
- Denmark – CLEAN
- France – TENERRDIS renewable energy cluster
- Germany – Renewable Energy Hamburg
- Italy – Lombardy Energy Cluster
- Norway – Oslo renewable energy and environment cluster
- Netherlands – Clean Tech Delta
- South Africa – Western Cape Province Greencape
- United States, Northern Carolina – Research Triangle Cleantech Cluster
- Sweden – Sustainable Business Hub
- Belgium, Walloon Region – Cluster TWEED

Other International Partners

- Brazil – Ministerio do Medio ambiante
- United States, Massachusetts – ACTION New England
- China – Yixing Industry Park for Environment Science and Technology
- China – Qingdao City Construction Investment Group
- Bayern, Germany – Umweltcluster Bayern

Examples of Écotech's activities related to firm internationalization

Business activities

Écotech Québec organizes events, called Rendez-Vous, to showcase the potential of new markets. For instance, knowing that the City of Hong Kong, an excellent gateway to penetrate the Asian market, has to invest several billion dollars in the green economy (waste treatment, green building, energy efficiency, water treatment), Écotech Québec jumped on the

[6] For more information on the ICN, please visit: http://internationalcleantechnetwork.com/

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opportunity when Hong Kong stakeholders were passing through Montréal. Last June, a Rendez-Vous was organized for Québec and Hong Kong company representatives in collaboration with the Hong Kong Canada Trade Association (ACHKC). The objective was to explore business opportunities and meet partners to help companies start or accelerate their efforts in this region of the world. The speakers shared the secrets to entering the Hong Kong market and exchanged with participants during the mesh activity.

In anticipation of a mission led by Prime Minister Philippe Couillard to Mexico and a second mission to Colombia led by the Minister of Economy, Innovation and Exports, Jacques Daoust, Écotech Québec organized the Rendez-Vous for participants from Québec, Mexico City, and Bogota. The meeting, organized in collaboration with Export Québec, provided an opportunity to better identify priorities and opportunities for Québec's cleantech companies in Mexico City and Bogota. Successful advice to support the process abroad was presented by Export Development Canada (EDC).

International Mesh

Écotech Québec collaborates intensely with the International Cleantech Network (ICN), an exclusive network that brings together clusters of clean technologies located in Asia, Africa, Europe and North America with headquarters in Copenhagen. This international collaboration aims to generate new business opportunities and improve the competitive advantage of each by creating synergies between companies, research centers and local authorities in each of the regions concerned. As mentioned above, the President and Chief Executive Officer of Écotech Québec, Denis Leclerc, is the Chairman of the Board of Directors of the ICN, which helps Écotech Québec to be at the center of different international activities.

Building on the initiative of Écotech Québec, members of the ICN held their annual meetings in Montréal in March. The objective of the meeting was to define the CCM's action plan, which also includes strategic vision and the exchange of good practices for cluster management. As part of the 20th edition of the Salon d'Americana, Écotech Québec also organized a technical briefing for members of the ICN with representatives of the Communauté métropolitaine de Montréal and the Government of Québec to give them an overview of the context and business opportunities in Québec. Écotech Québec has helped develop the ICN Passport, which provides cluster members with international membership (access to all the cleanteach clusters-members of ICN), including the provision of temporary office space and the linking of relevant organizations to each region. Finally, an agreement with the grouping of megacities, the C40, was announced at the COP21, and now offers privileged access to companies wishing to pitch their innovations to large metropolises.

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Missions in Japan and China

In an effort to propel Québec companies internationally, Écotech Québec has been involved in two trade missions organized by the Board of Trade of Metropolitan Montréal and the World Trade Center. During the mission to Japan in February, participants had the opportunity to participate in the Kansai-Canada Greentech Forum in Osaka to present and showcase their expertise to potential partners. The mission then traveled to Tokyo to participate in the World Smart Energy Week, a world-renowned fair. The second mission, led by the Mayor of Montréal, Denis Coderre, took place in China in November. Écotech Québec offered companies a special clean technology program that included a day at Eco Expo Asia (Asia's largest trade fair for environmental technologies and green buildings), which led to scheduled, personalized meetings with the Consulate of Canada. In addition, thanks to its partnership with the China Yixing Industrial Park for Environmental Science and Technology, Écotech Québec has offered companies the opportunity to meet potential partners. In fact, Dagua Technologies seized this opportunity to find a great business partner. For more information on this innovative Québec company, please visit: http://www.dagua.com/.

Internationalization of cleanteach companies

The report on the internationalization of Québec cleanteach companies compiled by the Écotech intern was based on a thesis written by Christophe Mariage-Beaulieu, supervised by Ekaterina Turkina in 2016.[7] Christophe is now an economist working for Innovation, Science and Economic Development, with the Government of Canada.

In his thesis, Christophe tried to explore whether firms in the Écotech cluster internationalized and established global pipelines, or in other words, linkages to foreign markets and foreign companies that could also serve as bridges for the transfer of foreign knowledge to the Écotech cluster. There is a vast literature on the phenomenon of global pipelines and its importance for industrial clusters. Over time, local cluster networks create similar routines, norms and practices and companies risk over relying on the local sources of knowledge to generate innovation, a phenomenon called isomorphism (DiMaggio and Powell, 1998; Sotarauta, 2011; Boshma, 2004). Therefore, it is very important for a cluster to have access to diversified external knowledge, what researchers call global pipelines (Bathelt et al., 2004; Bathel et al., 2011; Bathel et al., 2014). Global pipelines are not just simple external linkages that allow a company to export its product to an international market; they are rather deeper linkages through which a company can obtain important knowledge and know-how at the international market, and transfer back to its local community. There are many recent studies that show that

[7] Christophe Mariage-Beaulieu, 2016, Des influences institutionnels sur les pipelines mondiaux : étude de cas de la grappe des technologies propre du Québec, HEC Montréal, thesis

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internationalization that is accompanied by the creation of such a global pipeline is highly beneficial to a company and its local environment.

At the same time, the issue with the Écotech cluster is that due to a rigid environmental legislation and harsh policymaking environment (e.g. heavily regulated environmental sector with long time for issuing permits; heavy taxes, fees, etc.) in Québec, as well as the rather small size of domestic market, many cleanteach companies are forced to internationalize from early on. Thus, during the data collection, Christophe did identify many external links. However, as part of the analysis of global pipelines, it is necessary to go beyond simple external links to see if there has been a formation of global pipelines by Québec companies. To obtain more precise information on the role of the external linkages, Christophe also identified the motivations guiding the internationalization of Québec firms. This information made it possible to observe whether international links had been established with the objective of forming global pipelines (with the purpose of knowledge creation, acquisition and transfer). Then, the motivations were crossed in metamatrices with information concerning the transfer of knowledge. This made it possible to draw a more precise picture of the external linkages of some of the Écotech cluster firms.

Whether going into the general reasons for internationalization or the specific reasons for each project, several explanations were given by the company representatives during the interviews conducted by Christophe. They were grouped into four distinct categories. Table 1 summarizes the answers to the question "Why internationalize?" and the reasons for the internationalization projects.

Table 1

	N° of the interviewee	**Projects related to the motif**
Host market potential	1, 2, 5	A, B, C, D, E, F, H, I
External request(s)		A, B, C, G, H, I
Problems in the domestic market	1, 4, 8	
Search for specific characteristics	4	E

Cleantech company representatives proposed several reasons for the internationalization of firms in the sector. During the interviews, the most mentioned motivation was that companies were trying to reach foreign market shares. For example, according to one of the interviewees:

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"Enterprises in the sector decide to internationalize because there are no markets in Québec! [...] There are even some who are unable to find buyers in Québec, but who sell all over the world."

Therefore, such responses were grouped by Christophe under the heading: Potential Host Markets. According to this motivation, the companies decided to internationalize because the foreign market was interesting in terms of sales. There were many explanations for the importance of this motivation. The first was that the clean technology sector was a sector with international needs—environmental issues would be similar across markets. In addition, as noted by one of the interviewees, once in external markets, products and services needed little adaptation. Third, the conditions related to access to resources or to more polluting activities (high tariffs, rarities, stringent regulations, etc.) meant that using clean technologies in some regions was attractive and thus had good sales potential for cleantech products and services. For example, for project D, the company representative explained that one of the reasons for participating in a trade mission in a given country was getting access to a market with high potential:

"We saw that it would be really interesting for our company to get there. Our product could be very practical in the market and, most importantly, it is a large market. So there are a lot of opportunities and potential customers. "

Among other reasons, participants explained that in some projects, it was the interest of foreign firms in their product that had led them to focus on certain markets. For example, for one of the projects the interviewee noted:

"[Our partner] wanted to green its product portfolio. [...] For them, it is interesting to work with a technology like ours [...]. They approached us. It is part of a European vision to become part of a circular economy."

Christophe therefore proposed a second motivation: the External Request. This was the second motivation in terms of importance for project formation. This motivation was similar to the first on some points. That is, it stemmed from the fact that the problems faced by the products and services sold by the company were international, because they were easily adaptable. However, unlike the first category, the undertaking was first and foremost "solicited" by an actor in order to enter a market, irrespective of whether the intention to enter the market was preliminary or not. This situation could be explained by a contact already present on the spot (e.g. project "B") or by the reputation the firm had built up that made foreign partners solicit its products or services (e.g. "H" project). Again, under this category, the motivation was to sell.

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In discussing the general motivations (and not the ones related to specific projects), a few company representatives explained that Québec and Canada were not the best places to work in the clean technology sector. This point was precisely emphasized by one of the interviewees who explained that:

"The regulation here does not favor the use of clean technologies. For example, for ozone-depleting substances (ODS), we have [in Québec] a regulation for 90 substances. In Ontario there are 300 of them regulated and in New York there are 1100."

These numerous claims identified a third motivation: the Problems of the Market of Origin. This category encompasses situations where, for reasons affecting the company, poor conditions in the Québec and Canadian markets created a motivation for internationalization. In other words, in some cases, Québec's clean technology companies were internationalizing because of market limitations. This could be explained by many reasons. One of the most important was the size of the market: Québec and Canada are small markets with few opportunities for environmental products. A company in the sector could therefore hardly survive by having activities only in its region of origin. A second factor made it difficult to do business in the region without internationalization: local regulation. Unlike in other regions, it did not promote the smooth running of business.

Finally, some interviewees mentioned specific factors. One firm representative argued:

"It's hard to have a permanent presence anywhere in the world. We therefore sought to partner with companies that had, on the one hand, the ability to serve our clients and on the other hand, had skills in our field. So they already had those skills, they did not want to form a company to do that. [...] We have not chosen this market specifically [...], but this country is fairly recognized for the high level skills in our field, there are many manufacturers."

Such answers were grouped by Christophe into the following category: Search for Specific Characteristics. This is the motivation that was least discussed during the interviews. According to this motivation, a firm internationalized and selected markets to search for something other than merely market share. These motives could be related to such needs as specific expertise, getting closer to development sites, joining a partner with a specific profile, etc. For example, in the "E" project (project referred to by the quoted passage), the firm had selected the region for its project mainly because it had a partner with a good expertise in the field that suited it.

Of course, these categories are non-exclusive. This means that, for example, the "A" project would have been set up for two reasons: there was good potential in the external market and there was a request from outside (foreign company) to enter the market.
Of the projects mentioned, only the "G" project had not been set up because the firm was seeking access to an external market. This was due to the fact that the case was special: it was a

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foreign firm that was looking for a local (Montréal-based) supplier. Out of all the company representatives interviewed, only interviewee no. 4 explained that one of the general objectives of internationalization was the search for specific characteristics outside Québec and Canada.

Later, in order to understand whether the choice of the form of international projects could be guided by an explicit intention to form global pipelines, Christophe cross-referenced the previous categories with the answers concerning the transfer of knowledge. The idea was then to observe, by a metamatrix, which category of motivation matched the formation of pipelines and if there really were global pipelines. The results are summarized in Table 2. The "D" and "I" projects were not included in the following analysis as they were trade missions to find partners in a new market. Table 2 indicates that the pipeline construction process had only just began.

Table 2

Motivations	**Projects related to the motive**	**Knowledge transfer?**		
		Yes	**Possible**	**No**
Host market potential	A, B, C, E, F, H	1/6 (16%)	2/6 (33%)	3/6 (50%)
External request	A, B, C, G, H	1/5 (20%)	1/5 (20%)	3/5 (60%)
Problems in the origin market		S/O	S/O	S/O
Research on specific characteristics	E	1/1 (100%)	0/1 (0%)	0/1 (0%)

Of all the projects discussed during the interviews, as indicated in Table 2, only two were explicitly recognized by the participants as having resulted in a transfer of knowledge. The two projects were from the same firm—the only one where the speaker had specified that one of the aims of internationalization was search for specific characteristics. Moreover, these two cases were unique in terms of categorization. Indeed, project "E" was the only one to have been set up in order to access the peculiarities of the market. The characteristics sought underpinned the search for expertise in the sector. This access to external expertise then served as a global pipeline. The "G" project, on the other hand, was the foundation for a firm coming to establish itself in the Montréal region. The latter had developed a good expertise in the sector and setting up an innovative project with a local Québec company would enable the Québec company to innovate. This project would also allow for the creation of global pipelines.

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As far as all other project are concerned, two of them allowed for a "possible" transfer of knowledge. Christophe used the phrase "possible" because, although the answers were not explicitly "No," the company representatives did not verbally express a willingness to use these links as global pipelines to draw information and knowledge from. In fact, if the two projects attributed to the "Yes" answer are compared to the projects assigned to the "No" and "Possible" responses, the difference lies in the motivations for internationalization. That is, projects that have demonstrated proven knowledge transfers were not set up primarily to gain access to attractive market shares in a given country. In contrast, for all the other responses, the emphasis in the interviewees' discourse was placed on market potential and the need to sell the product/service.

In other words, according to the results of the analysis, global pipelines were not formed in projects where there was no other purpose than to penetrate international markets to begin selling the product. Moreover, the firm that had set up the two international projects and formed global pipelines was the only one in which the company representative explained that one of the motivations for internationalization was to get closer to external expertise. From these results, it is possible to conclude that the establishment of global pipelines was not so widespread among Écotech Québec cluster companies. As such, the issue of motive was central to internationalization. The establishment of global pipelines stems from a willingness to acquire and transfer knowledge and to innovate. Christophe's results indicate that global pipelines in Québec's clean technology sector are not so frequent. Of the firms studied, only one had set up such channels. This corroborates the results of Turkina (2015) on the same cluster: the formation of knowledge pipelines is still in its infancy. Among the explanations for this low frequency are challenges in the home market (size, rigid regulations, etc.) and the need to internationalize specifically to find a market for a product or a service, or difficulties encountered abroad.

To understand the problems faced by firms internationally, Christophe grouped together the difficulties that were discussed by the company representatives during the interviews. This analysis helped to identify the barriers to the formation of global pipelines. To do this, after coding the interviews, Christophe classified the data concerning the difficulties into 3 specific groups. The same process was used for the solutions. Christophe identified two types of solutions. The result of these groupings of difficulties and solutions is shown in Table 3. At the intersection between the difficulties and the solutions are interviewee numbers (who mentioned the combination).

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Table 3

Source of the difficulties	**Solution mentioned**		
	Help from the institutional infrastructure	**Help from the "good partner"**	**No help**
Administrative difficulties	2, 5	4, 8	2, 5
Cultural difficulties		4, 8	5
Liability of Newness	1, 2	1, 4	

During the interviews, several participants mentioned that one of the greatest difficulties internationally was that there was a great variation between countries in relation to the regulations, the necessary certifications, permits, and relations with the State:

"The problem is that in some places it is too regulated in some ways. [...] These are old laws that no longer apply to the current situation and that should be changed."
Such answers were grouped in the category: administrative difficulties. Within a market, firms must behave in accordance with the constraints imposed by formal institutions. These sources of constraints can take the form of certifications, regulations, intellectual property protections, subsidies to domestic companies, etc. At the international level, companies operate in regions with different political and administrative systems. Not being in their region of origin, the firms are often not fully aware of the rules of the game (both explicit and implicit). The interviewees noted that the administrative system was not the only factor that varied between countries. Depending on the regions, the companies faced other problems related to social relations and cultural distance. One of the participants explained that these differences in culture had a significant impact on their business:

"It is certain that the main difficulty in some markets is business culture. [...] There are markets, like India, where the realities of business are different. People will not understand that sometimes it takes time to provide certain products, they want everything now, or in their business culture, they pay when they receive, not before. There are things like that."

There was also a group of factors relating to the liability of newness. According to Stinchcombe (2000), liability of newness is a problem to which new organizations are exposed, where greater efforts must be made to succeed than the efforts made by established actors. These difficulties can be explained by the fact that a new firm has no established knowledge, no defined roles, has to rely on external agents and has no relational basis in the new environment. Companies must make additional efforts to build legitimacy for their product or activity. In short, new actors do not fit within a pre-established framework around which pre-established actors obey

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and normalize their behavior. Coming from a very young and highly innovative sector, cleanteach companies are exposed to such difficulties. For example, they have to invest significant amounts of time and resources to gain legitimacy in their new market. These include, among other things, costly project demonstrations.

In addition to the problems, Table 3 mentions two categories of solutions obtained by the interviewees that helped them overcome these challenges. Although there was a variation between the solutions adopted, two main categories of solutions were suggested by the interviewees: help from the institutional infrastructure and help from a good partner.

Social network model of Écotech cluster

The figure below illustrates the social network of the Écotech cluster based on the interviews conducted by Christophe with the major cluster actors. The linkages are modelled on the basis of existing interactions: joint projects, joint ventures, partnerships. The size of the nodes is proportional to the number of links maintained.

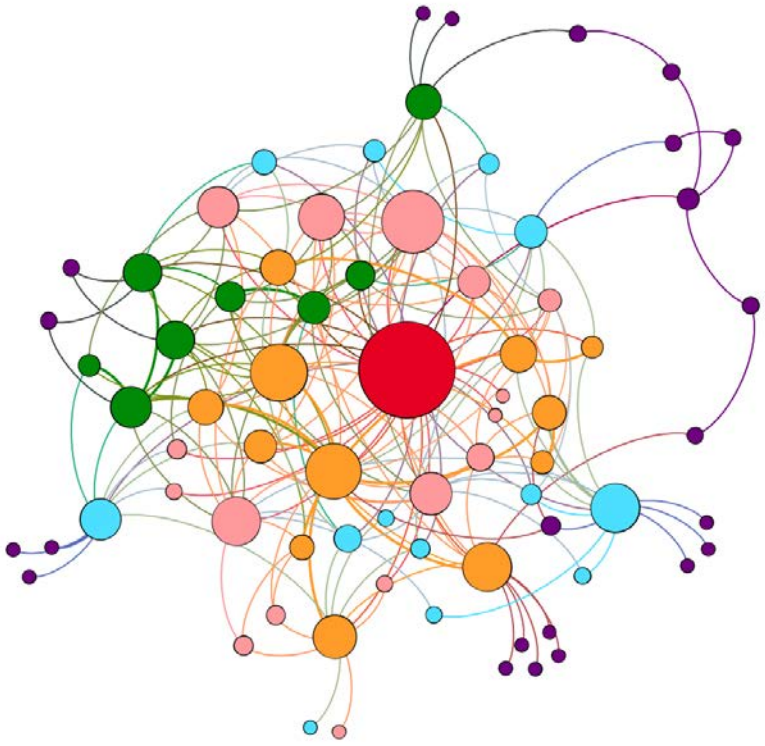

Diagram 2: social network model of Écotech cluster

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• The cluster association (Écotech) is red
• Different groupings and other associations are pink (e.g. CRIBIQ, le Consortium de recherche et innovations en bioprocédés industriels au Québec).
• Academic organizations are green
• Government agencies are orange
• Companies are light blue
• Organizations outside the country are purple

The figure demonstrates that firms provide the principal links between the cluster and international actors and markets. At the same time, academic organizations and government agencies also demonstrated the presence of some external linkages.

Conclusion

Victoria Smaniotto enjoyed reading the report that summarized the main points of Christophe's investigation. Victoria decided to contact Christophe to see if he could be available for a meeting so that she could get further insights. She felt like this type of research was extremely important to help Écotech understand the major challenges faced by the cleanteach companies in Québec, the motives for their internationalization, and the problems encountered when internationalizing. Victoria also thought that Écotech could do more to help the companies establish global pipelines to benefit from the external knowledge and enrich the local cluster with new ideas and approaches. She also realized that before the companies could benefit from the knowledge transfers, it was important to solve their more immediate needs: to improve conditions in the local market, help them find better matching foreign markets for their products and services, do more profound work to help them to internationalize and grow on the foreign markets. Victoria liked some recommendations mentioned in the report, but she also developed some other ideas. She felt very content and knew she had some important information and ideas to deliver to her team during the upcoming meeting.

Task:

1. Analyze the motivations for the internationalization of Écotech's companies and the challenges they face in the process.
2. Propose an action plan for Écotech so it can help its cleantech companies derive the maximum benefit from their internationalization and properly manage the difficulties encountered on international markets.

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Appendix A:

Écotech's members and areas of expertise:

3R MCDQ - Waste
AEPONYX-Energy Efficiency - Enabling Technologies
Aéronergie-Energy Efficiency - Air
Airex Énergie-Green Chemistry - Waste
Alliance Magnesium - Enabling Technologies - Energy Efficiency
AquaRehab -Water
AQUARTIS - Water - Energy Efficiency
Aquatech, Societé de gestion de l'eau - Water
architecture R&D - Energy Efficiency
ADICQ – Green Chemistry - Energy Efficiency
AQT - Others
AQME - Energy Efficiency
Atis Technologies - Energy Efficiency

Bell - PARTENAIRE DE PRESTIGE

BioFuelNet Canada

Biothermica Technologies - Air - Renewable Energy
Bourse de croissance TSX / Bourse de Toronto – Others
BXA Innovation - Waste - Enabling Technologies
C3E - Others - Energy Efficiency
Carboniq - Renewable Energy - Air
Carnot Réfrigération - Energy Efficiency
CCTT – Optech - Others
CelluForce - Green Chemistry

CRIQ - Others

CTTÉI - Others

CÉPROCQ - Green Chemistry - Others

CNETE
CCI Française au Canada – Others
Chambre de Commerce Italienne au Canada - Others
Chimie ParaChem - Green Chemistry
Ciment McInnis - Air - Energy Efficiency

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Confédération des syndicats nationaux - Others
CETEQ - Others - Waste

CRIBIQ – Others

Coop Carbone - Air
Corporation Larvatria - Green Chemistry - Air

Créneau ACCORD Bio-industries environnementales - Renewable Energy – Waste

Cycle Capital - PARTENAIRE DE PRESTIGE – Others
Davies - PARTENAIRE DE PRESTIGE - Others
DDI Heat Exchangers - Renewable Energy - Waste
DEL Innovation Design - Energy Efficiency
Derichebourg Canada - Waste - Others
Développement économique Longueuil - Others
E2Metrix - Water
Ecofuel - Others
École de technologie supérieure - Others
École Polytechnique de Montréal - Others
Écopoto - Green Chemistry
Ecosystem - Energy Efficiency - Renewable Energy
Ecotuned Automobile (ex GranTuned) - Eco-Mobility
Effenco - Eco-Mobility - Energy Efficiency
Electrochem Technologies & Materiaux Enabling Technologies - Green Chemistry
Énergère - Energy Efficiency - Renewable Energy
Enerkem - Green Chemistry - Renewable Energy
Enviro-accès - Air - Others
EnviroCompétences - Others
Éocycle Technologies - Renewable Energy
ECPAR - Others
Ethanol GreenField Qc - Renewable Energy
Export Development Canada – Others

Fédération des Caisses Desjardins du Québec - PARTENAIRE DE PRESTIGE

FilmOrganic - Green Chemistry - Others
Fondaction CSN - PARTENAIRE DE PRESTIGE - Others
Fonds de solidarité FTQ - Others
FPInnovations - PARTENAIRE DE PRESTIGE - Others
Gaz Métro - PARTENAIRE DE PRESTIGE - Energy Efficiency -Renewable Energy
Gazoil Doux - Waste
GCM Consultants - Energy Efficiency - Air

Génome Québec

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GHGSat - Air
Groupe Briom - Water - Energy Efficiency

Groupe Robert

Idénergie - Renewable Energy

Inno-3B - Energy Efficiency

Innofibre - Waste - Renewable Energy

Innovaserft - Green Chemistry

Innoveox Canada - Waste – Water

INO – Others

Inocucor Technologies

Island Water Technologies

Kosmos Innovation - Waste – Water

LEKLA - Energy Efficiency - Renewable Energy

Les Systèmes Nordry - Energy Efficiency – Air

LITO Green Motion

Montérégie

Mabre Canada - Renewable Energy – Air

Manufacturiers et exportateurs du Québec – Others

Marmott Énergies - Renewable Energy - Energy Efficiency

Mogile Technologies - Eco-Mobility - Enabling Technologies

More Technologies et Industries - Waste - Renewable Energy

Nanophyll - Green Chemistry - Energy Efficiency

Northex Environnement - Soil & Groundwater – Others

Nova Bus - Others

Odotech - Air - Energy Efficiency

Polystyvert – Waste

Pompaction - Water

PRÉCICAD - Eco-Mobility - Enabling Technologies
Prima Québec (Nano Québec)
Produits Chimiques Magnus - Green Chemistry - Water

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PureSphera (Recyclage ÉcoSolutions) - Waste - Air
Pyrobiom Énergies - Renewable Energy - Green Chemistry
PyroGenesis Canada - Renewable Energy - Waste
Pyromaitre - Energy Efficiency
Pyrowave - Waste - Renewable Energy
RBC - Industries des sciences et des technologies - Others
RD Capital
Réseau Environnement - Water - Soil & Groundwater
Ressources Dragon Nippon - Soil & Groundwater
SADC de la Région de Matane - Others
SAQ - Others - Waste
Section du Québec du CBDCa - Energy Efficiency - Others
Service aux Entreprises - Commission Scolaire des Affluents - Others
Sherbrooke Innopole - Others
Sigma Energy Storage
Suncor Énergie
Swiss Business Hub Canada
Sysgaz - Renewable Energy - Waste
Systèmes Lyko - Renewable Energy – Others
Tandem Expansion - Others
Technologies du développement durable Canada - Others
Technologies ECOFIXE - Water
Technologies et Service OXX - Ro Poirier - Air - Water
Technologies Propres TGWT - Green Chemistry - Water
Technoparc Montréal - Others
Technopole Maritime du Québec - Others
TM4 - Eco-Mobility - Renewable Energy
Trigo Energies - Renewable Energy - Energy Efficiency
Ubios - Energy Efficiency - Enabling Technologies
Université de Sherbrooke - Others
Université McGill
UQAM - Faculté des sciences - Others
Varitron - Energy Efficiency
Vertal - Waste - Air
Ville de Montréal-Est – Others
Ville de Varennes - Others
Viridis Environnement - Waste
VIZIMAX - Renewable Energy
Volts Energies - Energy Efficiency - Renewable Energy
WaterShed Monitoring - Water
Xebec Adsorption - Renewable Energy - Air

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