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The difficult path of startups towards becoming middle-size firms: the case of entrepreneurial learning in Québec's multimedia-IT firms.

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ABSTRACT

SMEs and their growth are critical to the prosperity of economies around the world and our research tried to determine the factors which explain the growth of these firms.

Our research questions are the following: How is it possible to develop more middle-size firms in the Québec MM-IT¹ sector? And how can the competitiveness of Québec's startup MM-IT sector be improved? We provide a SWOT analysis of the measures to improve the competitiveness of Québec's MM-IT sector in order to support growth of SMEs. We wanted a global perspective of

¹ Multimedia-Information Technologies

the Québec's startup multimedia-IT ecosystem, so we also interviewed some large firms, support organizations, governmental officials and professional organizations.

On the basis of a literature review of relevant reports on Québec entrepreneurship and innovation and relevant key scientific papers, we drew up an interview guide and conducted 30 semi-directed interviews. We then made a thematic analysis and a synthesis of the results, underlining the most important quotes on each theme and research question.

Based on a literary review of academic and professional studies combined with analysis of interviews with 30 actors, we suggest nine main implications for policy and practice.

Keywords: startup, SME, middle-size firms, entrepreneurship, entrepreneurial learning, innovation, multimedia, IT, sector, competitiveness, Québec

1-Introduction

SMEs² and their growth are critical to the prosperity of economies around the world. In Canada and the US, they contribute significantly to job creation and to the GDP³. Firms with fewer than 100 employees represent 98% of total firms in Canada while middle-size firms (100-499 employees) represent 1.6% and large firms (over 500 employees) 0.1% (Normand, 2016). A key component of Canadian SMEs' success is the export capacity: 90% of Canadian SMEs are exporting (Normand, 2016). The evolution of their business models is what is enabling SMEs to thrive and survive. By doing 30 interviews on the Québec multimedia and IT sector we collected many examples of startups struggling to survive, while some SMEs have had great success and are becoming the new emergent growing middle-size firms in Québec. These leaders are relatively new in Québec's MM-IT ecosystem. According to Industry Canada (2016), only 51% of the Canadian startups created in 2001 had survived after five years.

Québec's economy is mainly composed of SMEs. The IT sector has some large firms but the multimedia sector much less. The relative newness of the sector can partially explain the small

² Small and medium-size firms.

³ Gross Domestic Product.

size of these firms. However, some emergent middle-size firms are thriving and this led us to investigate the conditions for this growth.

Our research questions are the following: How is it possible to develop more middle-size firms in Québec's MM-IT sector? And how can the competitiveness of Québec's startup MM-IT sector be improved?

We thus provide a SWOT analysis of the measures to improve the competitiveness of Québec's MM-IT sector in order to have larger firms. We wanted a global perspective of Québec's startup multimedia-IT ecosystem, so we also interviewed some large firms, support organizations, governmental officials and professional organizations.

2- Context and Literature Review

In order to answer our research questions, we did a literary review of relevant reports on Québec entrepreneurship and innovation and relevant key scientific papers.

A recent Credo report (2016), covering the 2011-2015 period, proposes an overview of Montreal's digital startups. They define them as companies with less than 5 years that have digital innovation as the core activities of their business models with important growth. They evaluate that there were between 800 and 2,600 startups on the island of Montreal with over 8,000 employees and a value of \$CAN 700M in direct and indirect production. Thus, Montreal's startup ecosystem has evolved very quickly and is already in a growth and expansion mode.

Many support organizations have been created such as incubators, accelerators, venture capital (VC) firms, professional associations and governmental organizations (XXX and YYY, 2016) in order to favor the growth of medium as well as large-size firms ⁴. The development of a governmental digital strategy is considered to enable an enhanced harmonization in the effort to improve Québec's tech competitiveness. It is an objective that would strengthen the whole IT-multimedia ecosystem of Québec. As mentioned above, our main research question tries to determine why so many startups are created but so few manage to grow to become middle-sized or large firms. We want to understand the dynamics and the factors that assist startups and SMEs

⁴ Intentionally left blank.

in their growth.

In Québec's economic history, the 1980s were known as years of fast growth for many SMEs which have become large firms ('Québec inc. '), with the help of governmental direct and indirect incentives (i.e. easier financing on the stock exchange with the "REA" (Equity Savings Plan) and financing from the Québec pension plan (Caisse de dépôt et placement du Québec (CDPQ) as well as new financial organizations (like the Fonds de Solidarité FTQ, a union venture capital). The REA doesn't exist anymore and fewer Québec firms are entering the stock exchange. Québec venture capital investments are the second biggest in Canada after Ontario. Many experts from the interviews and from the industry reports suggest that the VC sector has known important growth and new players have emerged in Québec recently (Credo, 2016). However, it is still less efficient than in the USA: many high growth Québec or Canadian firms must get financing in the USA.

According to Startup Genome (2015), Montreal is the 20th best city in the world for its startup ecosystem. Based on five criteria, Montreal is in the same category as Silicon Valley, because of its cultural diversity and high quality of life. Canada's big agglomerations such as Montreal, Toronto and Vancouver have some similar elements. They can attract international tech talents, they have high quality universities and their communities are very tolerant and open.

According to Philippe Telio of Montreal StartupFest, (Credo, 2016) startups are different from other types of firms in the sense that they innovate faster, they focus on one business idea and on knowledge, they accept failures and they rely more on informal networks. They innovate faster, because they have nothing to lose for being first in the market and by continuously improving their products and services. By contrast, larger firms must often manage projects through formal budget planning and approval processes. In an uncertain environment, startups rely on a business model that they regularly test, and eventually change, rather than developing a very detailed business plan.

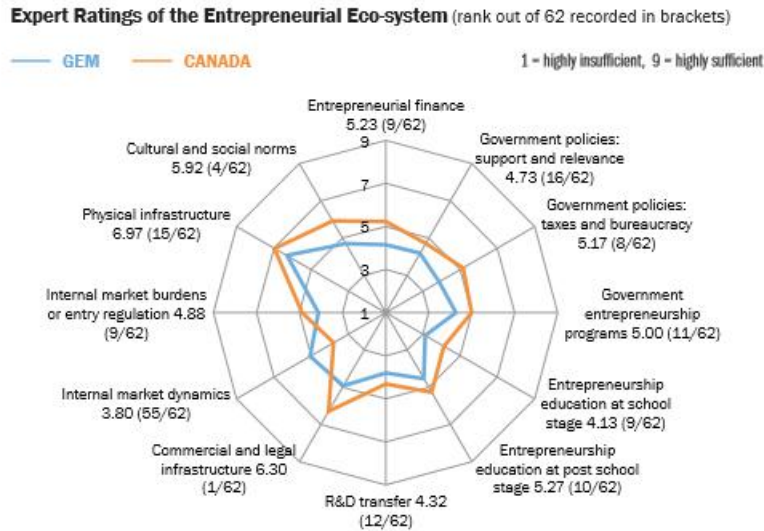
They focus on knowledge in order to develop a viable and sustainable economic business model. Often, they will focus on a niche that larger firms are neglecting. Startups accept failures which can lead to learning and ultimately to add value. From one perspective, larger firms tend to target risk reduction and are often more risk averse. Startups tend to find funding, partnerships and

networking through informal events such as StartupFest. According to Telio: “Startups are innovation accelerators. They are essential for innovation, education, a better level of quality of life, and the competitiveness of our cities.”

According to an OECD report (2016), the actual level of competency of Montreal’s population is insufficient in regard of the potential of the city in terms of education and training; it appears that the stock of competencies in the local economy is limited in comparison with other cities. The overall production activities are limited because: “there are too many little firms with few innovations which are targeting only the local market.” (OECD, 2016: p. 67). The OECD also pinpoints the lack of coordination in the public policies and the local initiatives for the issues of job creation, economic development, education, training and immigration.

A recent report by the Global Entrepreneurship Monitor (2016) suggests that Québec’s emerging entrepreneurs are very dynamic: from 2013 to 2015, they are considered the most innovative and the most ambitious in Canada, in terms of growth. However, they are less exposed to medium and high technology than the businesses from the rest of Canada. In comparison with the rest of the countries analyzed, Québec entrepreneurs choose more often to launch a startup because they identify an opportunity rather than by necessity. This can be viewed as a strength in the economy (GEM, 2016). When we combine the emerging entrepreneurial activity and the intrapreneurship activity, Québec occupies the second place in the OECD world ranking.

Evaluating the competitiveness of Québec’s entrepreneurship, experts have a positive opinion on physical infrastructure, commercial infrastructure and funding (GEM, 2016), which are considered as the main strengths of the Québec entrepreneurship ecosystem. However, experts interrogated by GEM have more a negative opinion on tech transfers, R&D activities, the openness of markets, social and cultural norms, governmental programs, public policies and education & training in entrepreneurship. According to experts from the GEM report (2016), in their tech programs, Québec universities don’t incorporate enough courses on skills necessary for the creation of startups, such as communications, sales and funding. The GEM report (2016) indicates that Canada is third on the World Bank’s ‘starting a business’ ranking (189 countries). Canada is in an innovation-driven economic development phase and is in 35th position in the World Economic Forum Global Competitiveness Rating (140 countries). According to those statistics, Canada’s and Québec’s startup competitiveness are among the best in the world.



Many subsectors of Québec’s MM-IT are deeply linked. For instance, big data, Internet of Objects, online security, advanced manufacturing and 3D printing are all benefiting from digital innovations. The growth of the MM-IT sector will have a great impact on other tech subsectors and vice-versa (Credo, 2016).

According to the Credo report (2016), based on a survey on Montreal digital startups, 41% of the employees are immigrants, 38% of startups have some of their teams that are working also from other countries and 13% of product teams are producing from other countries. Québec’s MM-IT economy is thus becoming more global.

As mentioned above, Québec counts many SMEs, especially in the multimedia-IT sector. However, several successful SMEs in Québec with 25-150 employees have been sold to foreign firms and this is a major issue for many businesses and government officials.

Industry Canada’s Science Technology and Innovation Council (ICSTIC) took a more pessimistic view, suggesting Canada is ‘treading water’ with major concerns for business performance of Research and Development (BPRD) as a share of GDP and business investment in Information and Communications Technologies. The Council also suggests that: “One of the most powerful drivers of innovation is the ”spillover” of knowledge not used in the core business of mature

firms to support the founding of new firms to exploit the knowledge in support of a new direction.” (ICSTIC, 2016a, p. 23) For example, IBM received US\$1 billion in royalties from sold patents in 2001 alone. They sold their non-used patents to organizations with better business models to exploit those patents.

“We’ve entered a new era of growth (in Québec), never seen before in Canada, both in terms of revenue and financing sizes,” said Mr. Chris Arsenault of iNovia Capital. “With it comes new challenges in attracting experienced talent to cope with growth issues still unknown to most emerging entrepreneurs (Czikk, 2017: p.2).”

Klyver *et al.* (2012) argue that knowing someone who has started a business within the last two years (entrepreneurial ties) has a significant impact on the intended level of innovativeness during the startup process. Specifically, entrepreneurial ties have a positive impact on the expected level of competition, intended newness to customers, newness of technology and the intended level of exports and growth. Simpson *et al.* (2006) propose in their qualitative study that innovation-oriented firms outperformed less innovation-oriented firms through market advantages, employee advantages, operational excellence and other innovation-related positive outputs.

Based upon a sample of 18 innovative startup firms, all of them located in the Bay Area of San Francisco, a study by March-Choda (2002) did a SWOT analysis common to the innovative startup firms, gathered in five areas: funding, management, focus, personal profile and goals and growth strategy. It appears that managerial and organizational hurdles prevail during the first stages of development, whereas most strengths fall into the funding, focus and personal profile categories. An update of the 18 firms under study in 2002 indicates that the innovation startups usually manage to grow faster than the conventional SMEs.

Pereira *et al.* (2015) found a positive and significant effect of R&D intensity and in-licensing on startups’ growth. These conclusions are also confirmed when controlling for the activity sector, which has a major effect in sectors such as high-tech manufacturing industries and high-tech knowledge intensive services (such as multimedia and IT).

Lee and Osteryoung (2002) developed a Startup Business Index by analyzing USA and Korean firms. As concerns the relative weight of the determinants for startup business, managerial ability was considered to be the most important factor in the USA, followed by marketing factors and economic/financial factors. On the other hand, marketing issues constituted the most important factor in Korea, followed by technological factors and economic/ financial factors. This difference, they believe, is due to government support for businesses.

Table 1 Determinants of startup businesses

(Adapted from Lee and Osteryoung, 2002)

(A)Marketing factors	Definition
(A1)Marketability (A2)Expected market share (A3)Distribution channel (A4)Pricing concerns	The item’s ability to attract demand at market when it is available to the customer The share of your item in the market against total market size Availability of distribution or collection channel Competitiveness of the item in terms of price at market
(B)Technological factors	
(B1)Availability of core technology (B2)Availability of technical manpower (B3)Technology intensity (B4)Availability of production technology	The extent to which you have attained your core technology Availability of technicians for production The extent to which your core technology creates value-added Capability of attaining and operating technology required for production

<p>(C)Economic/financial factors</p> <p>(C1)Availability of factory/building site</p> <p>(C2)Availability of machine and facilities</p> <p>(C3)Working funds/capital</p> <p>(C4)Profitability</p>	<p>The extent to which the factory sites are already attained</p> <p>Capability of securing machines and facilities</p> <p>Availability of funds to acquire raw materials, labor, manufacturing expenses, etc.</p> <p>Expected profitability of the business</p>
<p>(D)Governmental/regulatory factors</p> <p>(D1)Government support</p> <p>(D2)Financial support from government</p> <p>(D3)Environmental issues</p>	<p>Whether the business is entitled to regulatory support from state or federal government</p> <p>Range of government financial support for startups (interest rate, period of repayment, etc.)</p> <p>Whether the business needs to consider judicial and/or social regulations with respect to environmental issues</p>
<p>(D4)Tax support</p>	<p>Whether the business is entitled to support in terms of subsidies</p>

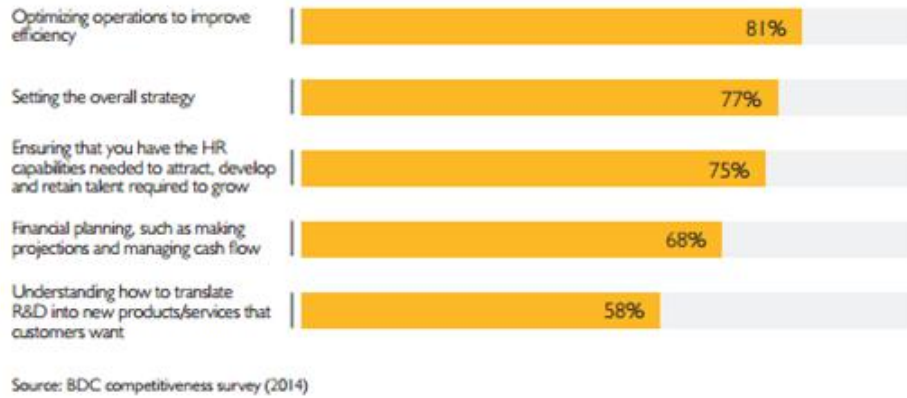
<p>(E)Managerial issues</p> <p>(E1)Fund-raising</p> <p>(E2)Marketing/service management</p> <p>(E3)Organization management</p>	<p>Ability to raise operating funds</p> <p>Ability to conduct various marketing activities and provide appropriate services to customers</p> <p>Ability to manage the organization and human resources</p>
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2.1 High-Growth Firms and Gazelles Literature review

One of most important indicators of the entrepreneurial activity associated with Canadian firms is how many of them are high-growth firms or "gazelles." By definition, high-growth and gazelle firms consistently outperform other businesses in the economy in terms of growth in sales and/or growth in employment. Gazelles are the subset of high-growth firms that are very young (they are less than five years old at the end of the observation period) (Industry Canada, 2016a).

Industry Canada (2016a) considers rapidly growing firms to be truly entrepreneurial because there is something significantly novel about their products, their processes, or their markets that allow them to expand rapidly. In other words, high-growth rates reflect innovativeness, a cornerstone of entrepreneurship. Furthermore, high-growth firms are economically important to the Canadian economy because they contribute disproportionately to the job creation. About 4 per cent of Canadian firms classify as high growth in terms of employment and nearly double that number qualify as high growth in terms of sales, in the years for which data are available (2011-2013). Moreover, about 0.5 per cent of Canadian firms classify as gazelles in terms of employment, and over 1 per cent qualified as gazelles in terms of sales. While the percentages of high-growth and gazelle firms are not large, the fact that there are a significant number of established and young businesses operating at this growth level is a good sign, according to Industry Canada (2016b). The following figure reports the main management challenges among high-impact Canadians firms.

Figure 2 Management challenges among high-impact firms



3-Methodology

In order to answer our research questions, 30 semi-directed interviews were conducted. Appendix I shows the breakdown. Many entrepreneurs were interviewed, some very successful, some less successful, and many managers from the multimedia-IT sector in business and non-business organizations, i.e. support organizations. All the interviews were recorded using an application on the iPhone7. The interview period lasted over one year from September 2015 to January 2017. A thematic analysis was conducted followed by a synthesis of the results, with the most important quotes on each theme and research questions. The results were then compared with the different themes in the literature.

Through our research interviews, we got a better understanding of the key components that differentiate startup failure and startup success and how a better SME growth management facilitates the emergence of middle-size leaders.

4- Results & Discussion

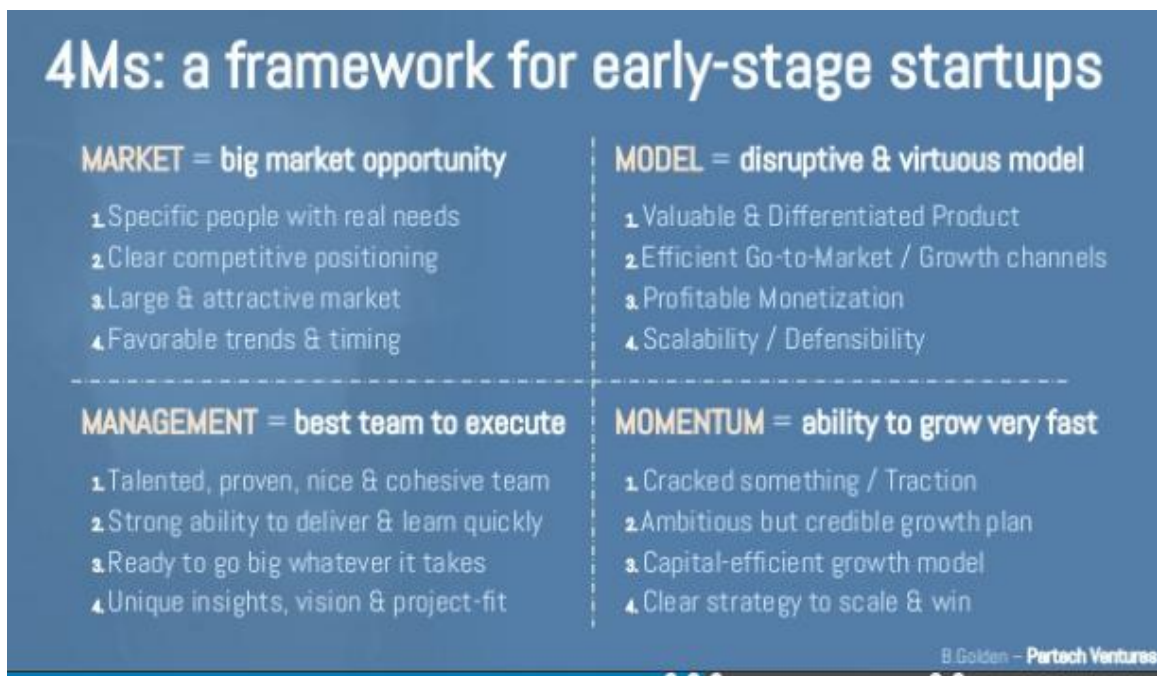
In this section we report our main results and provide a discussion in order to answer our research questions. Let us recall that our main research questions were the following: how is it possible to facilitate growth and develop more middle-size firms in Québec's MM-IT sector? And can the competitiveness of Québec's startup MM-IT sector be improved? The following sections provide a SWOT analysis summary of the measures to improve the competitiveness of Québec's MM-IT

sector in order to grow larger firms. We wanted a global perspective of Québec's startup multimedia-IT ecosystem, thus we also interviewed large firms, support organization, governmental officials and professional organizations.

Before we go into the results, we want to mention that we used the 4M model to categorize the growth model of startups in our sample. This classification enables us to better understand the dynamics of the startups in their growth path to become middle –sized firms.

The 4M model was proposed by Golden from Partech Ventures. It represents a strategic framework to analyze a startup's market, business model, management and momentum. It is widely used by venture capitalists. This model helps startups to determine the key issues to be addressed before asking for VC funding. The startups or SMEs must have a certain level of development and product traction in order to use this model.

Figure 3 4 M model



4.1 Strengths

In this section we will present the strengths of Québec's MM-IT sector according to our interviewees.

(Accelerator)⁵: “We offer coaches and mentors to entrepreneurs. Mentors are more personal and the coach is someone on the battlefield that provides answers to real technology or management problems.”

Several interviewees have mentioned that the Québec entrepreneurship and startup community is tightly knit.

(Emergent leader): “I am in multimedia but in informal meetings I regularly meet managers or entrepreneurs in other sectors facing similar issues and they sometimes give me great advice.”

(Support organization): “One of the best assets of Montreal is the quality of life. But how do you measure it? It is not easy if you want to try quantitatively”. The quality of life, cheap housing and great universities are the main top reasons to attract foreign investments, foreign workers and international students.

The CAN/US exchange rate favors Canadian firms and the Montreal agglomeration has many positive factors that influence the competitiveness of the Québec tech ecosystem (XXX and YYY, 2016).

One of our interviewees created the first Québec crowdfunding marketplace for startups.

2. Weaknesses

Our respondents also mentioned weaknesses and we present them here.

(Emergent leader): “Like Duplessis (former Québec Prime Minister) did in the 50's by giving away iron to Americans, the multimedia tax credits program gives away our human resources to French and Americans. The video game sector is dependent of this tax credit... and is a colossus with feet of clay.”

(Large IT firm): “Some sectors (i.e. aerospace) benefit more of collaboration research from the federal government. In some sectors like IT, there are few incentives programs.”

⁵ We mention at the start, in parenthesis, the origin of the quote.

(SME): “We created an Internet hub digital NY to find information (formal and informal) of the NY IT community: VC, startups, jobs, etc. We did the same for Boston. Unfortunately there is nothing like this for Montreal. I barely know what is going on in my Montreal sector.”

(SME): “There are not enough angel investors. These angels act like real venture capitalist firms and it should not be the case. The process to become an angel investor should be easier in order to finance startups and SMEs.”

(Accelerator): “Government and organizations are not at the same pace as startup launches. It can take 7 months to wait for a grant while it takes 7 months to create a prototype, which is inconsistent. Government agents often lack some key competencies in their analysis of subsectors.”

“The entrepreneurs have good access in general to mentors but there is a lack of business coaches (i.e. with technical expertise in commercialization or financing)”. Often they have to find them informally in their own network.

4.3 Opportunities

There are also opportunities identified by our respondents and we synthesize them here.

(Emerging leader): “I have few customers in Québec: I mostly grow via exports. I sell in over 100 countries.”

It is a trend observed in our interviews, that many emergent leaders in Québec’s MM-IT sector started with few local customers, and are growing aggressively via exports with few foreign offices by optimally scaling their Québec operations.

(Accelerator): “I think the most competitive sectors in our areas are not sexy: they are online security and online database management. Mostly it is objects that interact with applications.” “Dull” sectors often attract less competition. The value creation potential can be greater for entrepreneurs.

(Professional organization): “*The fast pace and evolution of the IT sector is its greatest strength but also its main weakness.* Organizations must know what to do with emerging technologies, how to create value and how to develop a product, service or process.” Competition is fierce in MM-IT because of the fast pace of the technologies, the obsolescence and the easiness to launch a startup.

The Québec IT-multimedia sector that we have analyzed with our interviews and the reports is famous for its exports and a much better level of innovation. The Québec video game sub-sector is thriving in terms of startups and the distribution of their games are international through digital platforms such as iOS, Android, Windows or downloads for game consoles.

One CEO of a fast-growing SME argues: “Some successful firms are using a technology of a tool differently than the first use. The originality could be because of the different dynamics the customers are dealing with in this sub-sector. In Montreal we have a melting pot with a unique blend of strong French and English cultures and many ethnicities, with strong immigration. For instance, we have worldwide music artists such as Arcade Fire or Patrick Watson that leverage both dominant cultures. In Québec we can be the real bridge between Europe and North America.”

A consultant indicates that many spillovers of the video game sectors have nurtured new innovations in new subsectors such as maritime logistics, aeronautics simulations or virtual reality. One Research Director from a large firm suggests that video games have spillover effects in education, training and serious games.

4. Threats

To conclude the SWOT analysis, we present the threats that confront the sector.

(Support organization): “The MM-IT sector is a world market, there are few barriers, it is easy to shift a computer from a location to another. Collaborations between locations are easier. In a knowledge economy brains can also move easily. Talent attraction and retention are key challenges.”

(Support organization): “In the research cycle, often a firm needs \$1 of Research, \$3 of Development and \$7 of commercialization. Too often firms stop before completing the necessary phase of commercialization.”

(Professional organization): “In Québec we are known for great inventors but we have few good inventors who have also good resources for commercialization and export in their team.” Among

the SMEs experiencing significant growth in our sample, many are growing via exports in the USA.

(Emergent leader): Technological obsolescence puts pressure on management.

- Often digital firms in Québec that exist for more than 10 years faced several disruptive forces in technologies and the modification of their business models. One firm changed their name and business models 3 times in 22 years. Another firm is at their fourth business model in thirteen years. The advertising agencies were their major customers and now it is less than 2% of their total revenues. The change in revenues had a major shift in the market structures, technologies used and the types of employees hired.

- Obsolescence of training:

- “Few years ago, a flash programmer was the best-paid employee in our firm. Now this expertise is worthless. Ongoing training is not a luxury, it is the norm... In some web projects the technology has a lifespan of just 6-8 months.”

One VC interviewee suggests: “in Québec our entrepreneurs are definitely less ambitious than in the US, they are asking for \$1M in financing while they should ask for \$10M!” Some reasons are that the local VCs have less cash and also that the entrepreneurs are less aggressive than in the USA. However, we found some Québec emergent middle-size leaders in multimedia-IT that are thriving and don’t need VC money to expand so far. Among the reasons are targeting several international markets and making most of their production in Montreal in Canadian dollars.

4.5 Ecosystem’s Status

An ecosystem can be defined as any system or network interconnecting and interacting parts, as in a business: i.e., the success of Apple’s ecosystem depends on hardware/ software integration; or in a territory: Silicon Valley’s technology and entrepreneurship ecosystem (Dictionary.com, 2016). On this issue, our respondents also identified various competitive challenges.

(Accelerator): “In order to become more competitive Québec’s MM-IT ecosystem must leave place for a lot of experimentation (trials and errors) rather than focus on short-term return on investment. We are still not in the phase to quantify easily our success.”

(Accelerator and Consultants): “The success to firm creation and success stories is to have an ecosystem that favors the emancipation of firms. To have this ecosystem, it requires the collaboration between all participants. Starting a new business is an extreme sport: competition is fierce. If the local ecosystem doesn’t support your firm, you are dedicated to failure.”

(Support organization): “The new professional association of video games producers is another proof of this vitality and of the level of maturity of the ecosystem”.

4.6 SMEs’ Strategies

The SME’s strategies were also analyzed to determine how they adapt their competitive strategies in the context of the SWOT analysis.

(Emerging leader): “I am “lazy” entrepreneur: I sell to the world, while scaling by extreme my operations in Montreal. It is a SAAS business model adapted to a desktop tool. With an innovation project entrepreneurs should try to build the minimum viable product: by offering the least possible solution to one business needs; often you have to cut in half your product in order to make it simple and satisfy one real business problem.”

(Large multimedia firm): “We are a large firm but we want to change the perceptions of startups towards us: we want to collaborate on innovation projects and subcontracting.”

Small firms often use agile management modes with lower hierarchies and they have bright growing innovation projects in the pipeline. It is a distinctive strategy over large firms, small firms or startups. From the interview analysis, several of those emergent Québec firms produce locally, but sell their products and services around the world (without the need for several international offices). It enables access to local human resources and to scale operations more optimally.

(Emergent leaders and SMEs): adaptation, evolution and adoption of key best practices, such as agile management, lean startups have become very popular.

In order to take the lead in the strategic trajectory of its subsectors:

➤ (Emergent leader): It pinpoints the importance to be at the forefront of business and market changes.

✓ One CEO told us: “I am often referred to as the Wayne Gretzky (Famous hockey player) of my sector. Gretzky was skating where the puck would be, not where it actually is. Similarly we start innovation projects for where the market would be in 2-5 years.”

✓ Another CEO said: “We can’t do what we did 3-4 years ago, or we would become obsolete and disappear.”

✓ It is very easy to launch a startup compared to 20 years ago. Software can be on the market even before getting funding.

4.7 Areas of Improvement based on entrepreneurial learning

Following our SWOT analysis, we tried to determine the possible areas for improvement of the competitive strategy of SMEs. For this, we applied the 4 M model to our sample. One limit of the model is that the startup should have a minimum of product traction and growth. We could identify 11 startups and middle-size firms: 1 market (big market opportunity), 1 management (best team to execute), 4 momentum (ability to grow fast) and 5 model (disruptive & virtuous model). Many SMEs and middle-size firms in our sample have the momentum and use a capital-efficient growth model. Some even don’t need VC capital so far. However, some have used VC capital and networks and it accelerated their growth. *There is no one size fits all model but many ways to develop a startup towards becoming a successful middle-size firm.*

(Professional organization): “*a strong economy should have a good mix of startups, SMEs and also a large number of middle and large firms.*” It enables the whole tech ecosystem to better innovate and to create better new products and services.

4.7.1 Improving University Research Collaborations

(SME): “It would be good if SMEs with their limited resources could better participate in university research centers.”

(Support organization): “In order to become more competitive Québec’s MM-IT sector must embrace more university-industry partnerships. It is more natural in the health sector, it is starting in multimedia.”

4.7.2 Develop Local Intellectual Properties

The importance to develop local intellectual properties in subsectors such as: video games, multimedia, education, media software and IT is a popular issue among interviewees.

(Emergent leader): “with a low Canadian dollar and tax credit many subsectors will feel pressure in few years. If we develop local intellectual properties, we could have a better competitiveness. To promote intellectual protection the private sector should better collaborate with universities to ensure there is a transfer or at least IP facilitates it. It is not an easy task, academia processes are too long, me, I want to deliver the innovation project in 3 months.”

4.7.3 Public Policies

According to our results, public policies should be targeted toward better interventions with new innovations and local development by giving more space to network dynamics and collaboration between the startup ecosystem, and also by focusing not only on linear value chains and traditional sectoral borders. New strategic visions must be implemented such a real governmental digital strategy in order to put the Québec economy in a better equilibrium with productivity and competencies (OECD, 2016). Several interviewees complain about the “silo development mentality” of many public ministries. A well craft digital strategy could coordinate the efforts between the Québec government, the ministries, the non-business associations and the corporations. However, some interviewees suggest they are waiting for governmental leaderships for at least five years without any real actions and results.

Some of our interviewees proposed a training work visa or improving the startup visa for foreign students.

The new videogame association (the “*Guilde des développeurs de jeux vidéo*”) is an interesting new initiative to represent the interests of the new independent Québec video game producers. Rather than only compete with one another, they want to cooperate in order to get new contracts together. Coopetition could become a key strategic asset to Québec’s multimedia-IT sector compared to other Canadian and international agglomerations. It could also enable a better development of local intellectual property. Some middle-size firms such as *Behaviour Interactive* has just got some recent success by developing their own game after doing a lot of sub-contracting.

4.7.4 Improving Commercialization

For many experts, the main problem is commercialization. For one consultant: “You can have the best product in the world, you have to sell it.” *Commercialization and human resource management are actually the critical growth issues in Québec’s MM-IT sector, according to many interviewees and reports.*

One expert reports that if entrepreneurs need \$1 in research, they often need \$3 for development and \$7 for commercialization. Too often SMEs don’t reach the commercialization phase. Some successful SMEs are sold very quickly to foreign firms in order to improve the commercialization. Another expert reports that in order to have an optimal growing economy, it is necessary to have a great mix of small and larger firms in order to also favor better innovation. Actually, the Québec IT-multimedia sector is relatively new. We have larger firms in IT than multimedia since the multimedia sector is younger and has a different dynamic in terms of production and business models. In our interviews we found that some successful emergent SMEs have just turned out to become recently middle-size firms. However, there are still few of these players in the Québec IT-multimedia sector.

4.7.5 Improving Exports

Successful growing SMEs and middle-size firms are almost all oriented towards exports and they often make successful alliances with local and international organizations. One CEO mentioned that it is easier for him to sell multimedia in Los Angeles than in Québec. In the USA, they often have more budgets, but they are also at the forefront of the evolution of the sector. They are more open towards news solutions and suppliers to improve their own competitiveness.

The new InnovExport fund (\$30M from provincial government and VC) will help 50 SMEs and gazelles toward their new initiatives in exports and innovation. Several interviewees suggest that it could be more available to the whole MM-IT ecosystem (excepted for large firms).

4.7.6 Improving Coordination Among Actors

With our 30 interviews and by reading the latest reports on Québec tech startups, entrepreneurship and innovation, we found that Québec's multimedia-IT sector requires a better coordination between the different actors.

Among the areas of improvements for the better competitiveness of startups, we found in our interviews that there is a lack of coordination in the fast-evolving multimedia-IT sector. This is particularly the case for the startups' support between incubators, accelerators, innovation district, mentors, coaches, governmental organizations and consultants. The startup community is growing quickly in Québec. One hurdle to the dynamics of startup entrepreneurs is to identify where they can get a precise resource, whether it is business advice, human resources, financial resources or commercialization/marketing support. In the latest years, the startup ecosystem and the tech sector have created a large number of new actors. The community must better cooperate in order to become more complementary than competitors.

The largest firms have few relations with the Montreal startup community. New initiatives such as Innobahn (innovation projects between startups and large firms) could be more implemented. A better coordination among the different actors and organisms should be favored instead of creating several new support initiatives. The mentors and coaches structure could be improved and simplified. Finally, a formal government official could be specialized for the startup community.

The Montreal Chamber of Commerce also made relevant key recommendations. The community should help more the gazelles, the fastest growing SMEs and medium-size firms. The incubators and accelerators could be more accountable (i.e. with their data) in order to better analyze their performance. Another recommendation is to improve mentorship by enabling more links between the gazelles and successful tech business leaders (mainly Canadians & Americans). The community should also improve the startup access to foreign markets. It should explore new models to increase the implication of investors into startups.

More cooperation by creating new cooperative professional associations to improve the competitiveness of the Québec-tech sector is a real solution to the problems of firms' smallness, lack of innovation and lack of commercialization of products and services among Québec startups. An OECD report argues that few Québec startups are innovative and are targeting international markets. But it is less the case for multimedia-IT firms since the local market is relatively small.

Concretely, the videogame association can have a big impact on the path of video game startups towards becoming middle-size firms by providing various types of member services in order to accelerate revenue growth. They are offering networking events between developers, students and other players in the video game industry; preferential rates for many professional services, notably in accounting, economic development, insurance, legal services, quality assurance, recruitment, tax credits and web sites. They are organizing an online board with freelancers and interns' profiles. They promote group participation to festivals. They also provide preferential advantages during many local events, group health insurances, and in the future they want to offer a rebate program with specific shops for the members and their employees, mentoring between studios, knowledge database with templates and tips about different areas, notably in administration, communications, human resources, legal services, marketing, public relations.

4.7.7 Improving Diversity in Ethnicity and Gender

The authors of the Credo report (2016) argue that Québec should try to bring more foreign students into the world of startups. Moreover, Credo proposes to facilitate the attraction and retention of international talents. The Montreal unemployment rate has fallen quickly by 2% in the past year to reach 6.7% in February 2016. Montreal could create more university entrepreneurship centers. It could also promote more women in the startup community. On this last issue, there appear to be particular difficulties for women in IT and MM according to a recent publication (The Atlantic Daily, 2017).

4.7.8 Better Information Sharing

The information should circulate more on the sources and natures of venture capital available to startups. One interviewee told us that his company built a New York and Boston hub of information for startups and VC. This doesn't exist in Montreal and the CEO also said we barely know what is actually going on in my tech sector in Montreal. For Credo (2016) funding is the major success factor for startups (74%) and the Montreal ecosystem. Some of their interviewees and also our interviewees had divergent (not enough vs enough venture capital) and some convergent opinions (not enough capital in the early stage and development phase) on this topic.

4.7.9 Improve Business Models

One key component of the success and growth of startups is to strengthen the sustainability and the evolution of their business models. It can be improved with better access to mentors and coaches.

5- Conclusion

Our main research questions were the following: How to support growth and develop more middle-size firms in Québec's MM-IT sector? How to ensure the survival of Québec startups and SMEs? How to improve the competitiveness of the startups and SMEs in Québec's MM-IT sector?

We observed that some SMEs in Québec's IT-multimedia sector changed their business model completely 3 times in less than 13 or 23 years. As an expert from a professional association we interviewed argues, the biggest strength of the IT-multimedia sector is the fast pace of its evolution. It enables many business opportunities, but it also represents its main weakness: coping with change is the daily challenge of many firms in the sector. Business models, human resource management and commercialization require regular monitoring, and the leadership of the management team is the key to address those issues, according to most of our interviewees.

One of the other main strengths of the Québec IT-multimedia sector is the fact that many entrepreneurs and managers are supporting each other in the business community. Many new support organizations (professional, consultant, incubators, accelerators, technology district, governmental) really improved the competitiveness of Québec's IT-multimedia sector. However, some experts report a weak coordination among the different types of organizations (i.e. between

all the new incubators and accelerators and the innovation district for example) towards the goal of improving the Québec IT-multimedia competitiveness.

A fast-growing sector has a positive impact on many indirect subsectors. For instance, the boom of oil in Alberta or Texas created an important economic growth in other related subsectors. IT-multimedia is transversal in the economy: almost all industries use partially or intensively the technology. Facilitating the adoption of technology enables Québec firms to develop locally and internationally and ensures the growth of the IT-multimedia suppliers.

One key lesson from our interviews is the support toward exports which is improving in Québec and Canada. Commercialization is a big weakness in the sector. In our interviews we found that some successful emergent SMEs have just turned out to become recently middle-size firms. However, there are still few of these players in Québec's IT-multimedia sector. Successful growing SMEs and middle-size firms are almost all deeply built towards exports and often made successful alliances with local and international organizations.

Our research has highlighted nine main implications for policy and practice in order to improve the competitiveness of Québec's multimedia-IT sector and accelerate the growth of the startups and SMEs. Based on a literary review of academic and professional studies combined with our interviews with 30 actors it appears important to develop more university research collaborations, to develop more local intellectual properties, to design better public policies related to the dynamic of the sector, to improve commercialization of products and services, to improve exports, to improve the coordination among the main actors in the ecosystem, to also improve the diversity in the ethnicity and genders of the workers and the entrepreneurs, to improve information sharing across the sector and finally to strengthen the measures in order to improve the business models of startups and SMEs.

However, as in all research, there are limits to this research: it is based on a limited number of interviews (30) which gives a good indication but is not totally representative of the sector.

In future research, we would like to pursue the interviews, to increase the diversity and number of interviewees, and also to compare to other technological sectors as well as other countries. This would make it possible to identify how local ecosystems are thriving, what are their strengths and weaknesses and what are the key solutions to help startups to survive and grow into larger successful firms.

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Appendix I

Table 2 Summary of the interviews

Type of organization	Number	4M Model
Startup	4	Market: 1 Model: 3
SME	2	Model: 2
Middle size (Emergent leader)	5	Momentum: 4
Large	4	Management: 3 Momentum: 1
Support	5	n/a
Professional	2	n/a
Economic Development	5	n/a
Government	1	n/a
Consultant	1	n/a
Venture Capital	1	n/a
Total	30	14