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HOW INTERNATIONAL KNOWLEDGE ASSETS SUPPORT CAPABILITY-BUILDING IN HIGH-TECH BORN GLOBALS?

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Abstract: While the sales perspective has remained predominant in prior studies on born globals and was in fact the outcome of their orientation toward international markets, this study advocates a growth perspective useful in the assessment of the benefits derived by high-tech born globals (HTBGs) from international knowledge assets. This perspective is based on the development of new capabilities in foreign markets. All things considered, a qualitative survey was carried out on 20 HTBGs having performed R&D in the province of Quebec (Canada) and elsewhere. The examination of collected data has led us to formulate the “growth scale” which assumes that HTBGs are supposed to increase their value in terms of new capabilities, as they undertake more resource-intensive entry modes. In this regard, HTBGs require the accumulation of significant international market experience so they can expand their capabilities. As a matter of fact, this international experience would help them in sustaining and strengthening their “capability-building pattern.”

Keywords: *Born globals, knowledge, capability building, internationalization, high-tech sectors.*

Introduction

Born global companies, or born globals, are small entrepreneurial companies that internationalize upon or soon after their inception (Bell, McNaughton and Young, 2001). A born global realizes at least 20% of its revenues in foreign markets during the first five years after its foundation (Kim, Basu, Naidu and Cavusgil, 2010). This phenomenon of born globals has drawn greater attention from academicians, who have made several studies examining why entrepreneurial firms go global upon their creation (Oviatt and McDougall, 1997, Brush, 1992). In this respect, literature reports that the rapid expansion

of born globals in foreign markets is underpinned by specific models of knowledge and capabilities (Knight and Cavusgil, 2004). In fact, born globals build their competitive advantages upon a strong knowledge base allowing them to take advantage of interdependencies of markets worldwide (Bell, et al. 2001). Although numerous studies discussed the ability of born globals to harness knowledge assets in foreign markets to increase their international sales, no study has explored in depth how these knowledge assets deliver growth outcomes for these companies in terms of capability-building.

In view of this and in light of the findings generated through a field survey carried out in the Province of Quebec (Canada), this essay proposes to introduce a growth perspective in the study of the born global phenomenon. The purpose is to explain how the possession of knowledge assets worldwide produces growth for high-tech born globals (HTBGs). Growth is referred to by the development of new capabilities. In this regard, the development of new capabilities cannot be achieved in an accelerated manner, and that international experience is needed to foster growth among HTBGs.

The paper has been organized as follows. The first section presents the theoretical background that discusses the knowledge leverage in born globals. In the next section, research questions are discussed. Method and results are presented afterwards, and finally findings are discussed along with future avenues for research.

Literature Review

Born globals use knowledge assets available in international markets in order to internationalize rapidly (Cohen and Levinthal, 1990). The definitions provided to born globals highlight the key role of knowledge assets in the international expansion of these companies. Knight and Cavusgil (2004) define Born globals as “business organizations that, from or near their foundation, seek superior international business performance from the application of knowledge-based resources to the sale of outputs in multiple countries” (Knight and Cavusgil, 2004: 124). Thus, knowledge explains the emergence of these companies (Brennan and Garvey, 2009). More particularly, born globals rely on tacit knowledge as the most valuable intangible resource on international markets (Freeman, Hutchings and Schroder, 2010).

The predominance of knowledge as a core leverage to the international expansion of born globals is explained by their innovativeness. The latter enables born globals to develop different types of knowledge that enhance their organizational capabilities, which in turn act as drivers of early internationalization and performance in foreign markets (Knight and Cavusgil, 2004). In a born global setting, Kim, et al. (2010) define innovativeness as “a firm’s openness to new ideas and new ways of meeting customers’ needs” (Kim et al., 2010: 3).

Furthermore, several authors (Compagno, Pittino and Visintin, 2005; Coviello and Munro, 1997; Crick and Spence, 2005) acknowledge that born globals' reliance on knowledge assets is widely associated with international networking capability. Born globals demonstrate an ability to create knowledge more effectively in foreign markets, predominantly through partnerships and networks (Freeman, et al., 2010). Networking underlies born globals in their search for market opportunities and helps them develop knowledge-intensive products by providing them market as well as technical knowledge (Mort and Weerawardena, 2006). The entrepreneurial owners/managers play a critical role in the international expansion of born globals thanks to their networking capabilities. Born globals have fundamental and secondary networks. Fundamental networks refer to networks in which the entrepreneurial owners/managers had been involved prior to the company's creation, while secondary networks are formed by the entrepreneurial owners/managers during firm's growth and pursuit of opportunities and competitiveness (Mort and Weerawardena, 2006). Due to competitive pressures, high-tech born globals in particular are able to create knowledge quickly and proactively from existing as well as newly formed collaborations. These firms are able to integrate and rapidly transfer tacit knowledge throughout their supply chains (Freeman, et al., 2010).

Conceptual Framework

The literature review carried on the knowledge leverage in born global reveals some noteworthy facts which relate to the role of innovativeness as an origin of this orientation and international networking as a means to gather knowledge resources worldwide. However, no studies examine how the possession of valuable knowledge assets is likely to fulfill growth to born globals, despite the assumed linkage between knowledge assets detained by a firm and growth (Nonaka and von Krogh, 2009; Penrose, 1959; Popadiuk and Choo, 2006). Accessing those knowledge assets enables global firms to develop new specific advantages (Miesing, Kriger and Slough, 2007). In previous studies (e.g. Autio, Sapienza and Almeida, 2000; Oviatt and McDougall, 1994; 1995), growth outcomes attributed to the geographical diversification of knowledge assets in born globals relate predominantly to sales increase. Little attention has been devoted then to explore thoroughly growth in terms of capability-building. Nevertheless, the OLI paradigm considers that the current globalizing and alliance-based business environment allows companies not only to pursue market and cost-savings objectives, but also to access strategic assets worldwide and to strengthen their capabilities (Dunning, 2000).

In this regard, innovativeness and networking alone could not inform us on how knowledge is applied and transformed into new capabilities in born globals. Accordingly, an in-depth investigation of this issue is needed to unravel how international knowledge assets are used

to deliver growth for High-tech born globals (HTBGs). Growth in this paper refers to capability-building.

Capability-building asserts that firms create economic rent by being more effective than their rivals at *deploying* resources (Makadok, 2001). A ‘capability’ is defined as “a special type of resource—specifically, an organizationally embedded nontransferable firm-specific resource whose purpose is to improve the productivity of the *other* resources possessed by the firm” (Makadok, 2001: 389). Contrary to other resources, Makadok (2001) notices that capability should be built not bought. In this regard, while the resource is the knowledge asset in a foreign location; the intent of this manuscript is to explore how HTBGs deploy this resource in order to build new capabilities.

The rationale behind the choice of high-tech sectors to study the growth issue among born globals lies in the fact that innovativeness, reported in related theory as the origin of motivation for knowledge acquisition, is dependent on the R&D intensity of the born-global (Dib and Da Rocha, 2010). In order to refine the scope of this study, it would be more beneficial to study the issue of born global growth in the high-tech sectors due to their increased R&D intensity.

As aforementioned, prior studies emphasize networking as a prominent means allowing born globals to spread their hold over knowledge assets in host locations. However, international business literature (Brennan and Garvey, 2009; Dunning, 2000) advocates foreign direct investment (FDI) as a means of accessing strategic assets in foreign locations. Firms operating within a globalization setting use FDI to take advantage of human capital differentials together with production cost gaps (Buckley and Ghauri, 2004). Entrepreneurial firms increasingly make use of this entry mode (Kuo and Li, 2003), especially those positioned in high-tech sectors (Fujita, 1995; Keeble, Lawson, Smith, Moore and Wilkinson, 1998). Consistent with this line of thought, R&D partnerships and FDI are retained as a means of accessing knowledge assets abroad for HTBGs. Two FDI strategies are considered in this essay, i.e. acquisition and Greenfield entry. As such, there will be a focus on R&D internationalization – carried through three entry modes – as a platform allowing HTBGs to tap into knowledge assets in other locations. R&D internationalization is considered in this manuscript due to the relative predominance of R&D activity in value-creation among knowledge-intensive small- and medium-sized multinationals, compared to marketing and production activities (Almor and Ashai, 2004). As a result, the internationalization of R&D would be motivated to a certain extent by accessing knowledge assets worldwide to serve value-creation purpose.

In addition, studies conducted on large multinationals (e.g. Bartlett and Ghoshal, 1989; 2000) used the knowledge-based perspective to discuss the growth pattern of these companies. As an outcome of this knowledge-based perspective found in

internationalization studies, exploitation and exploration processes are considered in cross-border capability-building. Knowledge resources are transferred to the organization and then applied in exploration and exploitation activities. Whereas exploration deals with generating new products and technologies, exploitation attempts to improve existing products and processes (Bierly III, Damanpour and Santoro, 2009). “Exploration implies firm behaviors characterized by search, discovery, experimentation, risk taking and innovation, while exploitation implies firm behaviors characterized by refinement, implementation, efficiency, production and selection” (He and Wong, 2004: 481). For this purpose, exploitation is centered on refining and elaborating the firm’s experience, while exploration addresses the diversification of the experience through experimentation and free associations (Holmqvist, 2004). The extent of exploration can be captured through technological and market novelty for the firm, not for the industry as a whole (Greve, 2007).

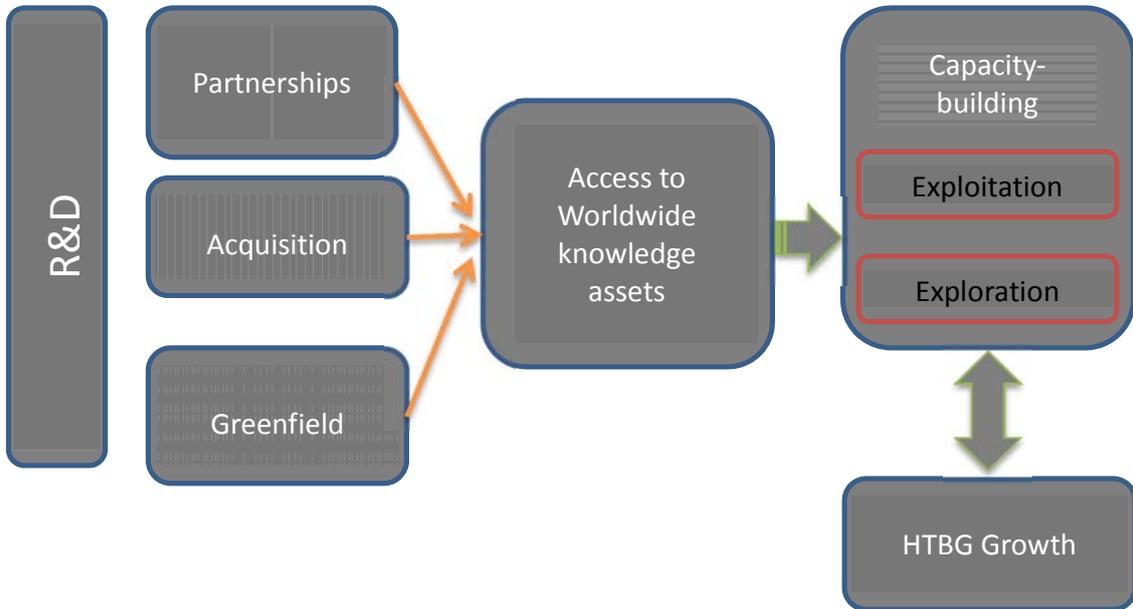
Therefore, exploitation and exploration activities are used to unravel capability-building leading to growth. Several authors acknowledge the growing presence of both types of processes in internationalization studies, i.e., existing specific-advantages exploitation and new specific-advantages exploration (Gassmann and Keupp, 2007; Li and Yue, 2005; Macpherson and Holt, 2007; Nobel and Birkinshaw, 1998). Exploitation and exploration assignments are intended to upgrade the global firm’s pool of capabilities, and new global firm interpretations suggest that any local embedment should lead to the creation of new knowledge for the entire organization (Stonehouse, Campbell, Hamill and Purdie, 2007). In this regard, it is expected that this double focus will be demonstrated by HTBGs. As guidance to this research, it has been assumed that HTBGs use knowledge resources in foreign locations to supply exploitation and exploration activities which deliver new capabilities but at different extents.

Figure 1: spreading R&D activities across multiple host countries through the utilization of partnerships, acquisitions and Greenfield entry modes can support firms’ access to valuable knowledge assets that can enable capability-building at two paces: exploitation and exploration.

In order to frame data collection and analysis procedures, the following research questions have been formulated:

1. Determining to what extent HTBGs using partnerships and FDI strategies are motivated by growth outcomes when going abroad
2. Identify the nature of the knowledge assets leveraged by HTBGs
3. Fathoming how knowledge assets are transformed into new specific advantages through exploitation and exploration activities (referred to as capability-building pattern)
4. Identifying the growth trend of HTBGs

Fig 1: Conceptual Model



Methodology

To validate research propositions, a qualitative survey was applied based on multiple case studies. Four data collection methods were used, i.e. semi-structured individual and group interviews, non-participant observation and secondary data (archives, firm documentation, newspapers, websites, etc.)

As a matter of fact, most research dealing with small firm internationalization used exploratory protocols, based on semi-structured face-to-face and phone interviews (Bell, et al. 2001). Case studies represent a convenient way to cope with exploratory topics related to internationalization of entrepreneurial firms (Dimitratos, Plakoyiannaki, Pitsoulaki and Tuselmann, 2010).

Data collection targeted born global high-tech companies performing R&D in the province of Quebec (Canada), and as a result, the research sample contains companies that originated in Quebec and worldwide. For this purpose, convenience and snowball sample selection procedures have been applied. Almost all the companies are small and medium sized firms (fewer than 500 employees according to Statistics Canada), except for one case which had 1,200 employees. Even though this born global company falls outside SME category breed, it was found relevant to be included in the sample. This Quebecer firm is most dependent on the international market. Furthermore during data analysis, capability-building capacity in this company could definitely be characterized as the most developed.

In light of research assumptions aforementioned in the conceptual framework, born globals were selected using partnerships and FDI as means of carrying out R&D activities abroad. Two FDI strategies are considered in this essay, i.e. acquisition and greenfield entry mode.

The final sample is composed of 20 High-Tech Born Globals (HTBG), evolving in four different sectors, i.e. Multimedia, Aeronautics, Electronics/Software development and Biotechnology. Seven representatives of from these firms accepted to participate in the focus group session and another participant used Skype to join the panel. The focus group was held at Laval University, and was administrated by the researcher. People were interviewed in French and/or English. All interviews were recorded and transcribed. A data analysis procedure was conducted following a coding process, with the latter being divided into three steps: initial coding, axial coding and selective coding. In this regard, a software dedicated to qualitative research was used, i.e. NVIVO 8. Several scholars recommend the use of specialized software to handle the considerable volume of data.

Results

Table 1: Composition of the sample by Sector. Larger proportions of companies have been picked from Biotechnology and Electronics/Software Development sectors.

Table 1: Sample composition

Number of HTBGs per sector
Aeronautics <i>1 HTBG</i>
Biotechnology <i>7 HTBGs</i>
Electronics/software development <i>11 HTBGs</i>
Multimedia <i>1 HTBG</i>

Table 2: detailed Composition of the sample by Sector. Extensive information is provided on on the profile of all companies in regards to home country, year of foundation, size, international markets and globalization modes.

Table 2: Detailed description of the sample

Sector	Case	Home Country	Year of foundation	Internationalization starting year	Number of employees	International markets	Ratio of international sales/total sales	Globalization modes
Aeronautics	A	Italy	1995	1995	500	Worldwide	100%	Partnerships Acquisitions Greenfield
Biotechnology	B	Canada	1997	2000	50	North America, Europe, Asia	60%	Partnerships Greenfield
	C	Canada	1991	1991	120	Worldwide	100%	Partnerships Acquisitions Greenfield
	D	Canada	2000	2000	40	North America, Europe	95%	Partnerships Greenfield
	E	Canada	2000	2002	12	North America, Europe, Asia	80%	Partnerships Acquisitions
	F	Canada	1999	1999	25	North America, Europe	93%	Partnerships Greenfield
	G	Canada	2007	2008	5	North America, Europe, Turkey	42%	Partnerships
	H	Canada	1994	1994	117	North America, Europe	97%	Partnerships Greenfield
	Electronics/ Software Development	I	France	1990	1992	180	North America, Europe, Asia	88%
J		Canada	2003	2003	18	North America, Asia	55%	Partnerships
K		USA	1993	1993	184	North America, Europe, Asia	77%	Partnerships Acquisitions
L		Canada	2009	2010	22	North America, Asia	30%	Partnerships
M		Canada	1989	1989	120	Worldwide	100%	Greenfield
N		USA	1997	1999	25	North America	100%	Partnerships Acquisitions
O		Canada	1985	1986	1200	Worldwide	100%	Acquisitions Greenfield
P		Canada	2004	2004	75	North America	55%	Partnerships
Q		Canada	1994	1997	220	North America, Asia	62%	Partnerships
R		Canada	2000	2002	105	North America	48%	Partnerships
S		USA	1998	1998	70	North America, Europe, Asia	91%	Greenfield
Multimedia	T	Canada	2003	2003	95	Worldwide	100%	Partnerships

The HTBGs in the research sample are all oriented to the global market, yet the home country market does not represent any predominant interest for them. They do not seem to make any distinction between local and foreign markets:

“If we have products with market potential, we would see these markets as global. The two most important for us are North America and Europe. The international market is therefore a priority when we develop certain products.” (HTBG C)

The limited scope of home-country market is likely to drive international expansion of HTBGs. Therefore some respondents highlighted the critical nature of international market for their survival. As a matter of fact, these firms commit considerable amounts of financial resources to carry their R&D experimentation. Thus, they are looking for larger markets to offset their investments:

“The intention of introducing the international market is not a simple objective. It’s a condition to our survival and our development. The population of the province of Quebec is only 7,5 million. It’s very small. We can hardly rely on Quebec to develop knowledge-intensive industries which become important on the long-run.” (*HTBG R*)

“Quebec is a small market. Even Canada is a small market. The European and the American markets are the most interesting in the present. I would say Asia also, but we are not at this stage yet.” (*HTBG B*)

Under the pressure exerted by larger competitors and celerity of technological innovations, HTBGs need to reinforce their capabilities. By means of knowledge assets located worldwide, HTBGs are able to deal more proactively with unpredictable change. As such, they enter locations not necessarily to get access to local markets, but to tap into knowledge assets that could deliver value to them. The most targeted knowledge assets are qualified and specialized workers. Given that they operate in focused technological fields, HTBGs have to cope with the problem of skilled workforce shortages. By spreading their activities worldwide, they increase the likelihood of enlarging their competitive scope. The goal pursued by HTBGs consists of broadening their R&D capacity and in this regard, participants recognize that emerging countries such as India are endowed with larger pools of well-trained people who studied in specialized technical programs at universities. Therefore, it was conceded that HTBGs are looking for the human capital of specialized and skilled workers as the primary knowledge asset when they go abroad. For example, acquired firms embed specific competencies that might have been trained and cumulating expertise over a sustained period of time. Accordingly, several HTBGs are concerned with spreading their hold over those specific assets worldwide to trigger beneficial synergies and enhance their core capabilities:

“Our major competitors are 5 times larger than us. They are Americans. They have research sites in France and Germany. These are consortiums, representing companies which merged over the time.” (*HTBG L*)

“We are evolving in a domain where technologic innovations are going fast. If we look at their pace, it’s very quick. So, we invite and encourage people to debate their ideas and look farther than what is done.” (*HTBG I*)

The goal we pursue through our plants has nothing to deal with market access. We implement them because we are looking for competencies, the craft.” (*HTBG I*)

“The primary objective is to add capacity to R&D.” (*HTBG O*)

“It’s a very specialized knowledge. We can find some of it in the US but it’s still pretty focused. This acquisition was an opportunity which helped to derive higher benefits.” (*HTBG N*)

The HTBGs motivation in undertaking cross-border capability-building noticeably stems from the presence of strong innovativeness. All the HTBGs in the sample are oriented towards the ongoing acquisition of knowledge sources for this purpose. Two respondents in fact mentioned that capability-building eagerness is more salient among technical workers, and hence for these HTBGs, R&D is acknowledged as the most value-adding activity. For example, case M retains an R&D staff representing more than 60% of the total workforce.

“It is part of our daily routines: making refinements and developing new product generations” (*HTBG S*)

Discussion

Capability-building in HTBGs is based on the leverage of different enablers likely to reinforce the productivity of knowledge assets harnessed worldwide, namely the human capital of local skilled workforce. HTBGs tend to diversify those enablers as they use more resource-intensive ‘globalization modes.’ Globalization modes refer to entry modes that provide access to valuable knowledge assets, i.e. partnerships, acquisition and Greenfield entry mode. After observing the presence of different combinations between three globalization modes, a ‘growth scale’ was developed to specify the extent of growth that HTBGs can achieve (Figure 2). Increased resource-intensiveness is likely to convey more consistent knowledge assets to HTBGs, thus enhancing their capability-building process which underlies growth. As revealed in data, knowledge assets are mainly represented by the skills and expertise of local workforce. In this regard, when a HTBG engages more resources locally through Greenfield entry in particular, they should expect to rely on people who are more committed toward growth goals of their organization. Partnering strategy for instance implies that the partner’s workers show less commitment to serve the long term growth perspectives of the HTBG. Therefore, a HTBG would be more encouraged to diversify capability-building enablers.

Figure 2: HTBGs in our sample show different degrees of globalization. Stage number 7 represents the highest degree of international involvement. They are expected to commit more resource as they move forward on this scale.

Fig 2: Growth scale

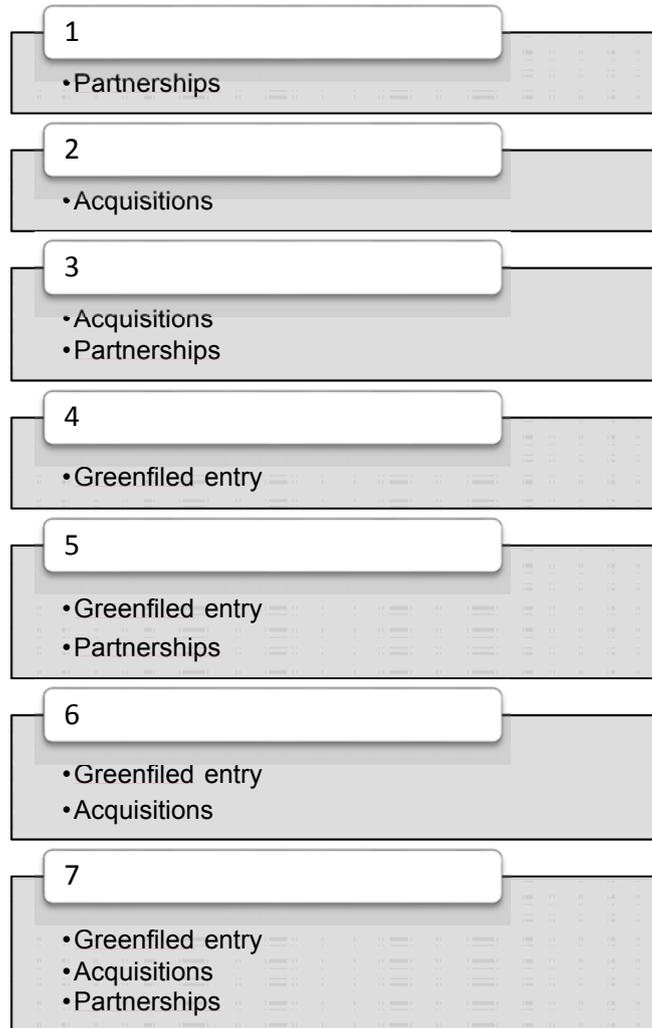


Table 3 below indicates that more experienced HTBGs of research sample engage more resources in foreign locations. Therefore to improve their capability-building HTBGs need to gain more international experience. In other words, focusing on growth perspective will lead to stress that HTBGs could not make any breakthrough on the growth scale unless they accumulated significant market experience. The only reminder to highlight in this regard is related to the non-linear growth of these HTBGs.

Table 3: Most companies achieving high levels of globalization in our sample are experienced as shown by their age range.

Table 3: Various groups of HTBG located on growth scale

Involvement in globalization	Related levels of growth	Number of HTBGs	Age range	Average age
Limited	1	7	[1-16]	7.14
Average	2 – 3	3	[10-17]	13.33
High	4 à 7	10	[10-25]	16.9

HTBGs can improve their capability-building by (1) evolving through more resource-intensive combinations of globalization modes; and (2) cumulating more international experience. To grasp this scheme, data nodes referring to capability-building enablers were picked up. By means of categories representing various levels of involvement in globalization (Table 3), a cross-table identifying those HTBG categories associated with the highest use of capability-building enablers was generated as shown in Table 4 below.

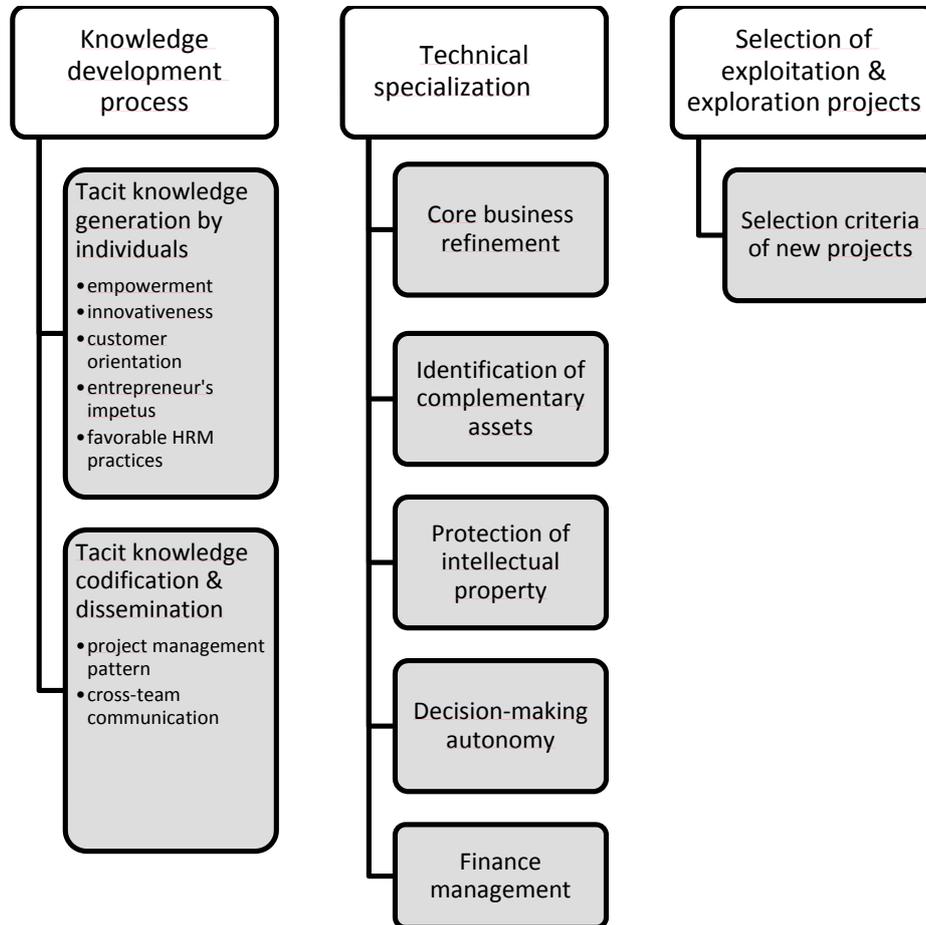
Table 4: The table scores the number of capability-building enablers applied by all companies listed in each of the three groups referring to low, average and high degrees of involvement in globalization. A mean score is generated afterwards for each group of firms.

After compiling the mean number of capability-building enablers for each group (Table 4), it was observed that as HTBGs move up on the growth scale, they tend to diversify these enablers. In other words, HTBGs located on the upper levels of the growth scale are likely to demonstrate stronger capability-building pattern. After mapping the growth scale and arguing for the role of international experience, a model that provides a comprehensive overview of the HTBG capability-building pattern is proposed in Figure 4. To this end, capability-building enablers were listed and sorted. After several iterations intended to bundle data nodes, a constellation of various concepts was created (Figure 3). Figure 3: Three major groups of capability-building enablers have been identified.

Table 4: Cross analysis of HTBG groups relative to employment of capability-building enablers

Involvement in globalization	Cases	Capability-building enablers												Totals	
		Empowerment	Innovativeness	Customer orientation	Entrepreneur's impetus	Favorable HRM practices	Project management	Cross-team communication	Core business refinement	Identification of complementary	Protection of intellectual	Decision-making autonomy	Finance management		Selection procedure for
Limited	G		X	X						X					3
	J	X	X	X			X	X	X	X					7
	L	X	X		X			X							4
	P		X	X											2
	Q		X	X	X						X				4
	R	X	X			X					X				4
	T	X	X							X	X				4
Mean number of capability-building enabler occurrences per case														4	
Average	E		X					X	X	X	X				5
	K	X	X	X		X	X	X	X	X			X		9
	N	X	X	X			X	X			X				6
Mean number of capability-building enabler occurrences per case														6,66	
High	A	X	X	X	X	X	X	X	X	X				X	10
	B	X	X	X		X	X	X	X	X	X		X	X	11
	C	X	X	X		X	X	X	X	X	X	X	X	X	12
	D	X	X			X	X		X	X	X			X	8
	F		X		X	X	X	X	X	X	X	X	X	X	11
	H	X	X	X		X	X	X	X		X	X			9
	I	X	X	X		X	X	X	X	X		X		X	10
	M	X	X	X	X	X	X	X	X			X		X	10
	O	X	X	X	X	X	X	X	X	X	X	X	X	X	13
S	X	X	X			X	X							5	
Mean number of capability-building enabler occurrences per case														9,9	

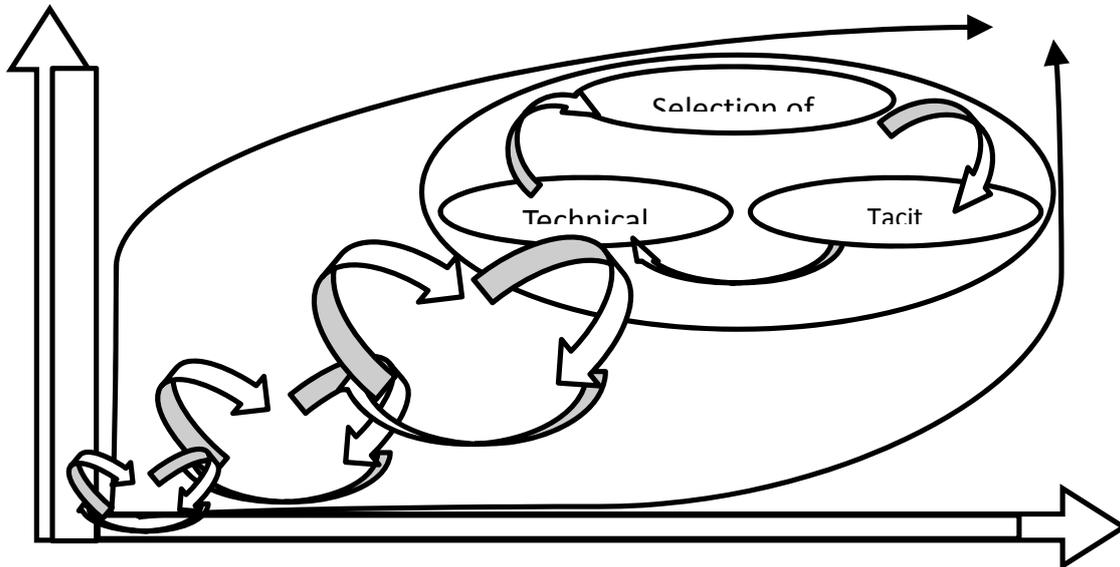
Fig 3: Hierarchical assortment of capability-building enablers



HTBGs positioned at higher levels on the growth scale tend to have a robust capability-building pattern characterized by three interactive key components: technical specialization; selection of exploitation and exploration projects; and knowledge development process (tacit knowledge generation, codification and dissemination).

Figure 4: The expanding spiral that moves from the lower left corner of the graph to the upper right corner shows the self-reinforcing process of HTBGs' Capability-building when going abroad. Committing more resources in foreign markets and cumulating international experience are supplying this process with knowledge assets.

Fig 4: HTBG capability-building pattern



A review of the different capability-building enablers led us to some noteworthy facts. In HTBGs, the individual is seen as a core element in capability-building. A considerable number of participants reported that organizational members are empowered to act as prominent suppliers of new ideas and novelties for the firm, and to appropriate the project.

“There are people who are our force and who carry new ideas for the society. There are other persons involved, in marketing, in sales or in development. It’s a cooperative way of thinking...one of our rules of governance is to trigger contradictory debates on whatever subject: are we able to sell what it’s gonna be done in this line of business? Is there any market for this?” (HTBG I)

“R&D members are in charge of innovation. We don’t ask sales people to do this. These people tell us that this customer asked us to do this thing. We ask them to question the client further. I want that my R&D staff focus on R&D because they would be distracted with discussions with customer about their feedbacks and how they perceive the things going on” (HTBG M)

“I have rather a philosophy of belonging. The projects owes to everybody. It’s a philosophy of belonging and pride also. It we come to our goal, then, it means that we achieved those objectives.” (HTBG H)

The observation of numerous individual empowering conditions throughout these enablers support the focal role of individuals in HTBG’s capability-building, i.e. firm innovativeness, favorable HRM practices, customer orientation and entrepreneur impetus.

Table 5: more facts about empowering conditions for HTBGs organizational members are presented.

Table 5: Individual empowering conditions

Empowering conditions	Impact on individual empowerment in HTBGs	Related evidence
Innovativeness	<p>Innovativeness denotes sustainable willingness to come up with new ideas and thus, we depict it as a learning culture noticeably shared in almost all the HTBGs in our sample. For these companies, commitment toward capability-building is a crucial orientation, given that it represents a medium of anticipation and adaptation to changes driven especially by technological evolution in high-tech sectors. Therefore, innovativeness has been identified in our data as a sustained cultural setting encouraging contributions from all organizational members, especially from technical and marketing staff. In some HTBGs, there is sustained investment in cutting-edge equipment, to help those people offering their utmost regarding innovation. These are also stimulated by bonus programs linked to productivity and created patents.</p>	<p>“It is probably one of the most important things we do: acquiring new knowledge in research.” (HTBG K)</p> <p>“We are in a domain where technological innovations go very fast. If we look at the pace, we would notice that it’s very quick. Therefore, we invite and we do encourage people to confront their ideas and their arguments, to go farther than what is done.” (HTBG I)</p> <p>“I think that people in the business side believe that our biggest asset is knowledge. I think that this is very engrained in the overall culture of the company.” (HTBG K)</p>
Customer-orientation	<p>All the HTBGs in our sample engage significant effort in pursuit of a better understanding of their customers’ needs. Customer orientation secures the position of these firms as avant-gardist in their niches. According to one participant, customer-orientation should not lead to a customer-driven approach. HTBGs are attentive to general trends, not to sole orders expressed by customers. In this regard, all workers regardless of their professional background, i.e. R&D, marketing and sales, should work closely to effectively intercept those market trends.</p>	<p>“Our products are mainly addressing presently people who are in computer-assisted training classes. There is a heavy tendency to help people learning languages with increased easiness. What we do at the moment helps those people to connect only locally. Thus, in order to meet this need, we tried to develop a Web-based technology while maintaining the same capacity and stability as usual.” (HTBG J)</p> <p>“The majority of our products are generic. If one client tells us that he needs 2 million units, it would take something special for 2 millions, and therefore we will do improvements for them. But our core model of generic products addresses a market need. We don’t have a customer-focused approach. When we were too small, we were customer-focused, but customer-focused is customer-driven.” (HTBG O)</p> <p>“The first contact that was conveyed to us by our sales people or technical staff. They give us feedback also. We are not in a direct contact yet.” (HTBG S)</p>

<p>Entrepreneur's impetus</p>	<p>The manager/entrepreneur is the key actor in several HTBGs surveyed in our sample, giving vision and direction to learning inside the firm, and also displaying the charisma and personal traits needed to stimulate people by promoting values of excellence and organizational commitment. Although in some HTBGs control procedures are based on commitment rather than formal bureaucratic rules, managers/entrepreneurs need to deal with cultural differences whereby people are less used to cordial links with their superiors.</p>	<p>“The European model is more hierarchical. It's a bit different in Quebec. Here, we are a small firm where all people know each other very well. It's not because I'm the president and sited in this office without going on the floor. We would see this less frequently in Europe. The managers are standing out. It's not very fluent as a management approach. This will not unload us of our duties as managers though. However, it represents a more interesting relationship of work. Interacting with people and measuring the objectives are very different. I can measure things accurately while being either friendly or directive at the same time.” (HTBG A)</p>
<p>Favourable HRM practices</p>	<p>To support the development of novelties, several HTBGs apply adapted HRM practices:</p> <ul style="list-style-type: none"> - Hiring young and talented people who are more open to change and more familiar with new technologies. This is likely to ensure commonality and sharing among workers. - Offering flexible working hours because they are favorable to initiative and creativity. In general, young people enjoy working in casual and less-constraining atmospheres (e.g. extending time-offs to employees, accommodating religious considerations). - Preserving the unity of interests (unpoliticized working places), thus improving decision-making processes and steering them to upgrade organizational performance. - Encouraging social activities and disseminating rituals and artifacts in order to enhance knowledge-sharing between pairs (e.g. celebrations, training provided by pairs, presentations, symposiums, consultations, multidisciplinary teams). - Privileging trust-based control modes. 	<p>“Our workforce is young like all companies which are R&D-centered. What motivates people to innovate pertains to flexibility of working hours. The software editors enjoy coming late and working till late. We have small teams with team leaders. These team leaders are very technical, and monitor other people. We offer also training on subjects of interest. For example, if Microsoft proposed a given product then, this is what we should learn. It's a kind of lunch and learn. We offer pizza. We do three lunches per month. And even the new employees who are knowledgeable in some domains, they train other people. We get them books and computer-based training. This is what relates to training. We give them the possibility to finish their courses. We have a cool atmosphere like barbecues on summer Fridays. We have a hockey team...we gave also three days off above what it is guaranteed, for religious considerations. We do make accommodations. We are really a united nation.” (HTBG M)</p> <p>“I think that in order to have creative people, we shouldn't delimit their action and control them continuously. We should adapt the relationship to the nature of the assignment. People who are working on research and software must be given more leeway to think.” (HTBG N)</p> <p>“Our relation with our workers is based on trust. We do not exert a very strict control.” (HTBG N)</p>

The existence of empowering conditions can be intended to stimulate individual participation in brainstorming efforts in HTBGs. Product development process in these companies usually starts with ideas being generated by diversified R&D and marketing teams. Generally, an overview of the overlapping individual empowering conditions compels us to regard HTBG members as sources of tacit knowledge. Actually, knowledge

formulated by individuals is unarticulated, incompletely defined knowledge that needs to be shared and refined within teams:

“We do encourage particularly our technical leaders. Through our managers we tell them: If you see something that can be done better, speak up! Table your ideas! Discuss them internally first to see if it makes sense. Talk with your teammates. Maybe you missed something.” (*HTBG P*)

The knowledge-based perspective regards employees as differentiated and perceives them as actors possessing specific knowledge because true beliefs differ according to personal values and surrounding context (Nonaka and Toyama 2005). To the extent stated, the premises of a capability-building pattern were identified, starting with individuals developing tacit knowledge. For this purpose, HTBG members, recognized as the principal knowledge assets, benefit from leeway and empowering conditions. Evidence demonstrates that once aroused by individuals, tacit knowledge is shared with teammates, supervisors, peer-teams, and executives. When the usefulness of this knowledge is established, it becomes a codified know-how likely to be disseminated across the organization. Tacit knowledge codification and dissemination in HTBGs is based on the application of a project management structure coupled with intensified cross-team communication:

“I do use much brainstorming with my subordinates.” (*HTBG H*)

“Innovation management is applied as a process in our company. It’s described and documented. On the one hand, sales people who are in contact with the customers, come up with lots of ideas from the market. We don’t choose our innovation based on this, because the customers may be standing out what is really gonna be, or show a need which is not representative. We cannot start from this to carry an innovation. In face of this, we have the developers’ layer, who tells us where we need to go in terms of innovation. Then, we confront them both. There are many debates. In bottom line, we have a synthesis which serves us as a road map. Decisions are made with regards to each product line. We balance our priorities very much so that we stay on the edge. This is what summarizes the best how innovation management is performed here.” (*HTBG I*)

“Before engaging in a project, we need to have ideas about products. Therefore, it encourages us. However, there are people who are paid to do this. They are the project line managers. Everybody is encouraged on this level, but always within the project management framework.” (*HTBG O*)

“We work within projects. An approved project serves to develop a product X. This project would last 9 to 10 months. Afterwards, the same team will swing to another project which consists of developing a product Y. Then, it’s the product Z, W...we will work eventually on refining the product X that we did 3 or 4 years ago.” (*HTBG O*)

The aforementioned evidence thus serves to illustrate how individual tacit knowledge, seized through R&D internationalization, is transformed into codified knowledge and shared afterward through communication within and across HTBG projects.

In the HTBG capability-building pattern, this tacit knowledge processing is embedded within interactive relationships along with two other core dimensions, i.e. technical specialization and selection of exploitation and exploration projects. The strength of interrelations between these elements is likely to influence the growth of HTBGs. The capacity of HTBG project team members to come up with new knowledge is a prerequisite to fostering corporate technical specialization. Otherwise stated, newly codified and disseminated knowledge helps HTBGs in refining their core business. HTBGs are commonly concerned with the construction of an idiosyncratic identity in the market. Furthermore, scholars have mentioned that high-tech entrepreneurial firms are more successful when they stick to their core business, because the limited R&D budgets in these companies make expansion to unfamiliar domains an irrational choice (Winch and Bianchi, 2006). As a result, data highlights the fact that HTBGs need to choose projects that could possibly reinforce the firm's capabilities. Growth is effectively achieved when a HTBG adds a new capability that upgrades and secures existing core business. Such growth could be enhanced if HTBGs undertake more complex combinations of globalization modes to tap into more knowledge assets. Following this logic, data content is outlined in Table 6

Table 6: Companies listed in the sample are committed to strengthening their core capabilities. A review of these facts led us to assume that HTBGs are struggling to keep their members committed to specific knowledge frameworks:

Being aware of the importance of sustaining their core business; some HTBGs strive to keep individual experimenting within related technical realms through a rational selection of future projects.

“We analyze these projects to guarantee a return on our investment in time, money and energy. This will guide us to dominate the market niches where we deliver our services. It is unlikely that we invest massively in an orphan business line with no further applications. It's important for us to keep close to our core business and our strategy.” (HTBG B)

Table 6: Evidence highlighting eagerness for technical specialization within HTBGs

Specialization-centered constructs	Characteristics	Related evidence
Core business refinement	<p>Most HTBGs in our sample tend to thoroughly delimit their distinctive technical skills. The definition of their core business obviously represents a lengthy process. The goal pursued by HTBGs consists of securing their core business by standing out of domains which are exploited by competitors. Accordingly, focusing on core business allows HTBGs to leverage their market know-how and more properly exploit their existing resources, thus ensuring profitability and survival.</p>	<p>“We are aware that not everything is required to our success. We don’t need to develop everything in fact. We will keep and protect our resources. Our people inside the organization will focus only on our core business, which is critical and strategic for us...our progression is made step-by-step.” (HTBG O)</p> <p>“We focused on gastroenteritis. We concentrated on fewer lead markets and countries. We had have not been profitable if we proceeded otherwise. And obviously, the company would be at stake if we don’t make profits.” (HTBG B)</p>
Identification of complementary assets	<p>To consolidate their core business, several HTBGs developed strong capacities in complementary knowledge identification. Entrepreneur’s social capital and vision are key factors in this regard. Strategies applied to get access to these assets are either acquisitions or partnerships. Before choosing the proper source, HTBGs are attentive to the related perspectives of technological and market synergies along with compatibility to business models.</p>	<p>“Usually, when we study a target, an acquisition or a partnership, we look at the company as well as its assets. We have an idea already if we will use it to do something. We don’t make it only to expand, expand and expand. We try to obtain assets which are in line with our development and future objectives. We do it, and thanks to a correct managerial vision, we have an idea about what we need to acquire and what we’re gonna do with it. I think that the best way to proceed is to foresee correctly, to plan properly according to the corporate strategy, and not to engage in adventurous choices without a clear rationale. We need to find out applications for what we do.” (HTBG B)</p> <p>“There must be always linkages with our core business. We know that there will be potential synergies once we integrate the company. We judge that there is still money to make in our core business for the moment. It is easier then. You already have the base, credibility and a good market share.” (HTBG C)</p>
Protection of intellectual property	<p>HTBGs are concerned with the protection of their intellectual property, especially regarding core assets. Intellectual property protection helps HTBGs in offsetting R&D costs and deriving benefits useful for later</p>	<p>“We cannot rely only of the patent protection to secure the market and the benefits of this product. We really need to safeguard our assets on different levels: you need a patent, know-how...it’s important to protect your assets to get payoffs on your investment. Then, with profits, you’re gonna invest again</p>

	<p>exploration. Patent consolidation is a grant for survival for HTBGs. However, HTBGs should register patents neither too early nor too late. If done too early, the firm would not be the sole actor exploiting the patent. When the patent is registered too late, it is more likely that competitors copy it. Although the patent needs to be written properly to convey better protection in the long run, one participant mentioned that firms should be attentive to making it neither too precise nor too vague.</p>	<p>in R&D, new molecules, new processes, new projects.” (HTBG B) “The patent should be made neither too early because you’ll not have enough time, nor too late because you undergo the risk that other competitors copy your technology. It’s important because it costs hundreds of millions to be developed.” (HTBG C) “Today, people are aware that there is a good manner to write a patent. There are other manners not good enough. When you have a patent, this doesn’t mean that you are protected. We need to enhance education in our universities in this regard, even in our SMEs so they convey protection on the long-term.” (HTBG R) “The secret with a patent is that it should be too loose and too accurate at the same time. If it’s not precise, it cannot be made a patent. If it’s too precise, people will copy it easily. Someone who will get our patent must be an expert, because he needs to be able to reproduce what we wrote. Even though, it will take him 2 to 3 years of development so that he levels us out.” (HTBG Q)</p>
<p>Autonomy of decision-making</p>	<p>For a number of HTBGs, it is necessary to freely formulate their strategic goals in a manner allowing them to be linked to core business. One of the surveyed HTBGs dropped partnerships from potential strategic options. As a matter of fact, large firms appeal to HTBGs for collaboration because they need their specialized know-how that would be costly and non-core if developed on their own. Autonomy concerns with respect to major clients and institutional investors are also expressed. It is noteworthy to mention that HTBGs do in fact face a dilemma in this regard: on the one hand, they need funds from different actors to finance R&D and continue expanding. Clients, partners, investors are likely to put their autonomy at stake. On the other hand, if they leverage their own benefits to finance future R&D activities, some explorations could fail (e.g. three clinical essays are required to obtain validation</p>	<p>“[Name of partner hidden] is a large company. They are looking for something very very precise. And this doesn’t respect exactly the properties of our extract. For example, they want a molecule which closes a wound like ulcer for diabetic persons. We notice that even though it doesn’t close the wound quickly, it helps to makes it less visible. For them, this is interesting, but it doesn’t meet their objectives. So, they steer everything to the closure of the wound. However, it’s not the best application of our extract. So, we are in a kind of conflict. Then, our investors are awaiting a result for this partner given that we announced that we did an agreement with him. As a result, we need to push in order to satisfy our partner, which frustrates me! I would have liked to get better results in another domain. This is frustrating as a relationship. They don’t have necessarily the means to engage in research like us. They don’t invest in research like us. For example, [Name of partner hidden] wants to find out how to make a better dressing, and how to improve their existing products. They never look for new compounds. They are not able to do this. They are heavy! They are looking for close-to-market products. They don’t have funds for R&D. Even for large</p>

	for new treatments in biotechnology sector).	pharmaceuticals, they are investing less in R&D like we do it. They will invest when they get to the second clinical study.” (HTBG E) “The most challenging issue for biotech companies everywhere is funding. I think that the workforce is easy to find. We have the knowledge; we have support from university labs and large hospital centers. But funding is critical because we expend money without having many payoffs. Therefore, for the large part of the companies, there is an ongoing funding renewal.” (HTBG C)
Finance management	HTBGs make use of two principal options to overcome financial burdens and further expand their core business without putting their autonomy at risk, i.e. patent royalties and vending of non-core-business-related divisions.	“We sold a product which was already in the Montreal market. We sold out the right of royalties on a product of <i>in vitro fecundation</i> which was already in market. We convert into cash assets which no longer count as core assets. This action generated 70,000 million CAD that helped us to finance our activities. So, we concentrated our activities.” (HTBG C)

HTBG exploitation and exploration projects are thoroughly selected in a manner allowing steady knowledge development processes to continue refining core business. Each selected project is intended to provide the HTBGs’ core business with leverage. Accordingly, a refined technical specialization would head an HTBG into further growth stages, and as a matter of fact, HTBGs cannot address multiple knowledge purposes simultaneously. In a highly competitive international environment, time and money are scarce resources that need to be spent carefully on value-adding activities. Consequently, HTBGs may be concerned with maintaining stronger linkages between knowledge development processes and core business, thus ensuring that any selection of future projects would confirm well-defined strategic orientations. Overall, specialized HTBGs – as mapped in the research model – tend to select projects aligning with their existing core capabilities. Exploration projects are however more crucial to HTBGs:

“R&D had been refined a lot to become more effective. You make 10 to 15% of margin on your cost price. But when you come up with a product which is unique in the world, you triple and you quadruple your expected outcomes. Thus, the innovation machine is more rewarding than the efficacy and development machine.” (HTBG O)

This argument is supported in Ravasi and Turati (2005), who found that entrepreneurial ventures depend on self-reinforcing learning cycles, leading them to devote increasing resources to the exploration of certain opportunities at the expense of others, following a sense-making process affected by their previous knowledge. Not paying such attention to

the selection of exploration projects would lower self-confidence and assurance among workers, because they may feel they are exerting less control over the expected outcomes of the project (Ravasi and Turati, 2005). Capability-building pattern would be enhanced if selected projects corresponded to what HTBG members are used to doing. If they keep working on projects that allow the use of existing knowledge, HTBG teams will have the opportunity to continue challenging existing organizational codified knowledge, thus preventing them from abrupt discontinuities in their knowledge development process:

“We are open, but we don’t want to offer all services from A to Z. We are still in a sharp domain and if we wanna be experts in our niches, we need to be the best. Otherwise, we cannot go international.

...we are specialized in certain aspects for the three last years, regarding the bio-manufacturing in particular, which is the production of bigger and more biologic molecules. We started working on proteins from bacteria. So, this year and in the last weeks, we increase our capacity to do not only the fabrication from bacteria, but also from mammalian cells. We enlarged our pharmaceutical capabilities from this type of service because it’s interesting, there is a market, and we have the know-how to do it.

...and given that we work on cutting-edge research technologies, target very well the projects that we intend to serve. We cannot learn on each project, because the customer would not be happy. We want to have an expert. If we learn, we will do it in partnership with them. This will give us an impetus. But the research of new services is done according to a reasoned and strategic rationale so that our company remains profitable as well as our services.” (*HTBG B*)

Taken as a whole, the research model asserts that the growth of HTBGs is based to a large extent on the effectiveness of their capability-building pattern, which regroups three key interdependent elements, i.e. knowledge development process (tacit knowledge generation, codification and dissemination), technical specialization, and selection of exploitation and exploration projects. As these elements gain in effectiveness, HTBGs are likely to climb up the growth ladder. The model also proposes that from their inception, HTBGs may have an effective capability-building pattern. Start-up founders who are internationally experienced bring along a valuable stock of technical and internationalization knowledge (Brennan and Garvey, 2009), thus contributing a set of primary capability-building enablers to their companies, and this is what is explained by the born global phenomenon characterized by early expansion to foreign markets.

The model stresses that the accumulation of significant international experience is a prerequisite to diversifying capability-building enablers. Collected data provided us numerous elements pointing out that experienced HTBGs tended to be more effective in tacit knowledge conversion, more technically specialized, and more careful in their selection of new projects. Besides, less experienced HTBGs – positioned at lower stages of growth – need to gain more experience so as to improve the effectiveness of their capability-building pattern, and subsequently propel themselves up to superior growth

stages. As a matter of fact, they may still find it hard to overcome certain newness restraints such as the lack of social capital and resources.

Conclusion

In this paper, a seamless theoretical model was derived to address HTBGs phenomenon according to the growth perspective. More specifically, capability-building pattern was advocated as a primary driver of HTBG growth in the international market. This conceptualization is an attempt to unravel the mechanisms through which access to knowledge assets in foreign locations enhances the development of capabilities in HTBGs. The effectiveness as well as the fluency of their capability-building pattern is likely to influence the trajectory of growth among HTBGs. Indeed, there are certain limitations in this paper that could be addressed in future inquiries. First, the research sample did not cover HTBGs originating from emerging countries. Although entrepreneurial firms in these countries do face numerous impediments to internationalization such as weak infrastructure and support to innovation, local inter-firm collaboration conveys key benefits that would be useful in the pursuit of foreign markets (Audretsch, et al., 2010). Additionally, there is a need to refine the assessment of growth through empirical studies based on statistically-sound measures.

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