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## Post-investment migration of Quebec venture-capital-backed new technology-based firms

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Numerous innovative Canadian new technology-based firms migrate abroad when local venture capitalists exit. This article aims to determine how common this type of exit is, and to understand the motivations behind and the consequences of these migrations. We find that nearly half of successful venture capital exits from Canadian firms result in migration. Using a pattern matching approach with 14 cases selected in Quebec, we show that these migrations are motivated mainly by strategic considerations in the context of a small region with few strategic partners and a small market for innovative products. Acquired firms become truncated companies with declining activities. Only a small proportion of bought-out entrepreneurs reinvest in the local economy. This phenomenon probably has strong negative effects on the creation of new large technological firms and clusters.

Worldwide, an increasing number of new technology-based firms (NTBFs) are acquired by foreign firms based mainly in the US. These NTBFs relocate their activities out of their original region (Foreman-Peck & Nicholls 2013) or country (Doyle, McDougall, & Doyle 2004; Davenport 2009). Such a situation can be considered a migration (Pellenbarg, Van Wissen, & Van Dijk 2002; Anokhin 2013). Indeed, 'migration' has multiple dimensions: it may refer to a change of country of ownership, change of a function such as R&D, or of the entire business. In this paper, we consider migration of ownership that invariably results in the migration of the entire business. Consequently, local appropriation of the benefits of knowledge investments is becoming a central question (Freeman & Soete 2009, 588). This problem is crucial for small economies like Israel (Rosenberg 2002; Teubal & Avnimelech 2003), New Zealand (Daven-

port 2009; Enderwick & Scott-Kennel 2009), Latin American emerging markets (Gonzalo *et al.* 2013) and even the US (Reynolds, Samel, & Lawrence 2014). It is pivotal for a province like Quebec, where the number of large firms is decreasing and where economic growth lags behind several other provinces (Migué & Bélanger 2010). Venture capital (VC) internationalization is prompting NTBF migration because cross-border VC investment augments the set of exit opportunities and eases the migration of NTBFs to foreign locations. However, cross-border VC investments are not the sole source of NTBF migration. It also results from the increasing propensity of venture capitalists (VCs) to exit through trade sales (Ritter, Gao, & Zhu 2013), and from the appetite of large technology-based firms for young innovative companies.

This article examines migration induced by local VCs in the province of Quebec. The phenomenon is particularly important in a small open economy like that of Quebec. This province invests heavily in the innovation system and in financing tools for NTBF (Migué & Bélanger 2010) but exhibits poor performance in innovation and productivity gains (Doyle, McDougall, & Doyle 2004). Canada's lagging productivity growth is largely due to weak business innovation (Expert Panel 2009). Fagerberg & Srholec (2008) give the Canadian innovation system a score similar to that of Greece for 2000-2004; only one of 22 developed countries has a lower score. Canadian underperformance in innovation has not been clearly explained, but the Expert Panel (2009, 102) suggests "Canada's failure to develop a greater number of innovative Canadian-based multinationals has been a key contributor to the country's overall R&D weakness." Several journal articles have mentioned the Canadian "hollowing out" spectra.<sup>1</sup> If the most promising VC-backed NTBFs migrate, this can partially explain the observation of the Expert Panel and justifies the present research. This is particularly true in Quebec, a province that faces the migration of head offices to Ontario and a very low rate of initial public offerings (IPOs). The average annual number of IPOs of Quebec-based firms is estimated at five from 2002 to 2011 (Carpentier & Suret 2012).

Firm migration is an important research topic, largely ignored by scholars (Mason & Harrison 2006; Anokhin 2013). Knowledge of the reasons, extent and economic impact of the acquisition of locally owned NTBFs by remote large firms is limited. We analyze the extent, reasons and consequences of foreign exits among NTBFs financed mainly by Canadian VCs. We quantitatively assess the extent of the phenomenon at the Canadian level and we qualitatively analyze the motivations and consequences of the migration of Quebec-based NTBFs.

The remainder of this article is structured as follows. Part one presents the methodology. Part two summarizes the literature, and states

our propositions and expected patterns. We discuss the data in Part three and our results in Part four. The article concludes with a discussion.

### Methodology

Firm migration and the effect of foreign VCs on exits have been investigated using case studies and quantitative methods (Mäkelä & Maula 2005; Mason & Harrison 2006). Experts have written reports to explain the Canadian paradox and the problem of the commercialization of innovation in this country.<sup>2</sup> Although several propositions have been put forth regarding the motivations and consequences of migration, this phenomenon has not been quantified precisely. Molina-Azorin *et al.* (2011) assert that the mixed approach is well suited to analysis of the outcome and process in the same study, and to capture several facets of a phenomenon. Accordingly, we use quantitative data to determine the extent of the foreign trade sale (FTS) phenomenon and a qualitative approach based on the pattern matching method for rival explanations (Dul & Hak 2008; Yin 2014). This pattern matching method facilitates comparison of empirically based patterns emerging from the qualitative data with predicted patterns. Specifically, we perform visual inspection of patterns to determine whether they match or not (Dul & Hak 2008). This approach is considered as one of the most desirable for case study analysis (Yin 2014, 143). Starting from competing propositions based on previous research and theory, we specified an expected pattern composed of independent outcomes that are predicted according to each of the propositions. Multiple cases let us determine how well each case fits the explanations or assertions. We associate three outcomes with each of our three propositions related to migration explanations and consequences. We then estimate the number of cases that fit each outcome. We study 14 cases, because both the reasons for and effects of acquisitions usually differ widely, depending notably on the type of acquired company, acquirer and acquisition.

### Previous literature, propositions, and expected pattern

Overall, evidence of the post-exit trajectory of VC-backed firms is very scarce. Generally, the literature does not investigate beyond how the exit occurs. Post-exit analyses are generally restricted to the case of IPO exits, because market data are available for this type of liquidity event. However, IPOs constitute only a small proportion of exits.

Several studies analyze VC exits, but generally neglect to consider the country where the NTBF develops after the exit, and focus on differences between IPOs, trade sales and liquidation. Schwienbacher (2005) reports the frequency of the different exit routes for US VCs and presents a proportion of IPOs of 29.9%. In Canada, Brander, Egan, & Hellmann (2010) evidence a proportion of exit by IPO on a senior (junior) exchange of 1.8% (1.3%). The trade sale is becoming, by far, the most common exit mode from successful VC investments. Further, trade sales become FTS with potentially negative crowding-out effects. However, this phenomenon remains largely unexplored. The first important question is thus how often successful VC-backed NTBFs are sold to foreign firms or investors.

Migration is not an entirely new topic, although most previous works focus on within-border changes of localization. Two propositions emerge from the research and from Canadian reports: 1) firms can move abroad because of managers' strategic decisions; and 2) some firms are obliged to move abroad.

The institutional approach suggests that firm location behaviour is "the result of firm's investment strategies" (Brouwer, Mariotti, & van Omeren 2004, 337). External or institutional factors including expansion, merger, acquisition and take-over, and co-operation play a central role in explaining the relocation decision. For instance, migration helps high-tech firms develop networks and R&D collaboration, and establish close links with specialized research centres. In addition, innovative firms are likely to

move to large markets, where specialized innovative products or services can be profitably launched (Rosenberg 2002; Jones, Coviello, & Tang 2011). The FTS can be a manager's strategic choice to reduce the liability of foreignness and the other risks and costs following international expansion. Third, due to an ongoing change in the economy, small firms are worth more as part of a larger organization (Ritter, Gao, & Zhu 2013). Established firms can rapidly commercialize high-tech products and services and realize economies of scope and scale. Small firm shareholders find it more convenient and profitable to get big fast by selling out in a trade sale rather than going public and remaining independent (Achleitner *et al.* 2014; Carpentier & Suret 2014). In Canada, Doyle, McDougall, & Doyle (2004) and the Expert Panel (2009) contend that emerging high-tech firms are often sold to foreign strategic acquirers because of the scarcity of large domestic technology firms. The first proposition to explain the FTS is:

P1 FTSs result from strategic considerations.

If this proposition is true, we should evidence the following pattern and corresponding outcomes:

- O1.1 The buyer is a firm in the same sector as the acquired firm.
- O1.2 The reasons for the transactions are mainly market or network related.
- O1.3 The transaction is motivated by complementarity or synergy effects.

The alternative proposition rests on the premise that Canadian emerging firms migrate because they face a financing gap. This gap could result from several weaknesses of the Canadian VC market (Expert Panel 2009; Jenkins 2011; Hurwitz & Marett 2012). The inability of Canadian operating companies to obtain sufficient capital to expand, which implies that they must be sold before they attain market leadership, often to large US companies, is affirmed by the OECD (2010, 63). In other countries, scant local VC also explains why NTBFs turn to for-

foreign VCs, who are more likely to organize a foreign exit (Mäkelä & Maula 2005; Gonzalo *et al.* 2013). If FTSs result from a local financing gap, we should observe that local VCs have not funded the firm recently. Foreign VCs are likely to be involved in the latest rounds of financing, and the quest for finance should be cited by managers and the main shareholders to explain their decisions. The second proposition to explain FTS is:

P2 Local financing gaps explain FTS.

If this proposition is true, we should see the following pattern and corresponding outcomes:

- O2.1 Acquired firms have not been financed locally during the two years before the acquisition.
- O2.2 Foreign VCs are involved in the latest financing round.
- O2.3 The managers of the acquired firm mention the financial limitation on growth.

The overall impact of cross-border acquisitions has been largely debated, although no consensus has been reached. We consider three dimensions: i) consequences on R&D, production and innovation, ii) the loss of firms and potential leaders and iii) the recycling effect.

Technology transfer and spillover productivity effects could be observed when the NTBF's R&D activities expand following the acquisition. This expansion depends on the acquirer's willingness to tap into the innovative resources of a region. Regions experiencing rapid technological development may contain considerable tacit knowledge that can attract large foreign firms. In such cases, the acquisition can let acquirers anchor their activities in the region (Dahlstrand 2000). Delocalization of R&D activities also depends on the NTBF research team's embeddedness in the local network of tacit knowledge, a critical component of the development process (Reynolds, Samel, & Lawrence 2014). Tacit knowledge requires proximity and face-to-face interactions, is context-specific and is thus a key determinant of the geography of innovation (Gertler 2003). This knowledge is

“sticky” and thus less mobile and harder to communicate over distances. Stickiness has historically protected work from being offshored easily (Reynolds, Samel, & Lawrence 2014). Most of our studied firms operate in the information technology sector. Clusters of this type of technology exist in Canada (Lucas, Sands, & Wolfe 2009). However, only one of our cases can be considered as coming from one of these clusters. Accordingly, the technology spillover effect is likely to be weak and the crowding-out effect significant following the acquisition, consistent with the strategy of large US firms that have a relatively low proportion of R&D and patenting activities abroad (Narula & Zanfei 2005).

Even if we do not expect large R&D spillover, the acquisition could have positive effects if the acquired firm develops as a stand-alone entity. In Sweden, foreign acquisitions have positive effects, probably because large firms let acquired SME retain their autonomy (Dahlstrand 2000). In Canada, Doyle, McDougall, & Doyle (2004) find that acquirers usually maintain only a small part of the bought-out firms' activities in the original country as a truncated company or simply move the activities abroad. Truncated entities are left with only an R&D function, and lack the head offices, production, sales and finance functions that potentially generate significant economic activity. Moreover, the Canadian and US markets are closely integrated and US firms can easily reach Canadian customers. Accordingly, based on previous observations, we expect to observe that acquired NTBFs became truncated companies.

After analyzing the acquisition of NTBFs by larger firms located in central areas, Mason & Harrison (2006) conclude that the entrepreneurial recycling benefits are likely to offset the crowding-out effect. Recycling occurs if bought-out owners of SMEs become serial entrepreneurs or business angels and recycle the outcome of the acquisition in new ventures. We expect to observe a different situation in our sample for two main reasons. Mason & Harrison (2006) looked at the sale of large and well-established firms

with local facilities. Such sales provide entrepreneurs with significant amounts of cash. We study the acquisition of emerging high-tech ventures by foreign firms. Some entrepreneurs are hired by foreign firms and have to leave the country if the buyer transfers the NTBF's activities. Moreover, the amounts of money involved in the transaction are generally lower than those described by Mason & Harrison. Hence our proposition concerning migration effects:

P3 Overall effects of FTSs in Canada are negative.

If this proposition is valid, we should see the following pattern and corresponding outcomes:

- O3.1 R&D activities of acquired NTBFs do not increase following the acquisition.
- O3.2 Acquired Canadian NTBFs become truncated companies.
- O3.3 There is little evidence of local recycling activities.

#### Data

We used Thomson Reuter's Private Equity and Venture Capital service to get information on VC deals and exits. This source is generally used to summarize VC activity in Canada, including the quarterly and annual reports published by the CVCA. The information comes mainly from VCs, who tend to report only successful exits. We thus compiled a list of 712 VC exits from Canadian firms between 2001 and 2012. We determined the nationality of the buyer in each trade sale, and the stock exchange in each IPO.

We selected the 14 firms that migrate from Quebec following an FTS from the lists constructed for the quantitative analysis. All firms satisfy the following conditions: i) be associated with high technology activities, ii) be financed initially by local VCs, for a minimal amount of CAN\$1 million, iii) have been sold to a foreign interest after at least two years of existence, and iv) have been followed by the media and have provided enough information to be analyzed. Studying the economic impact of VC exits is particularly relevant in the Province of Que-



**Table 1.** Distribution of VC Exits from Canadian Firms Reported by Thomson Reuter, 2001-2012, According to Exit Type and Exit Location.

	2001-2012		2001-2006		2007-2012	
	#	%	#	%	#	%
<b>Initial public offering</b>						
Canadian	74	10%	54	15%	20	6%
TSX	57	8%	41	11%	16	5%
TSXV	17	2%	13	4%	4	1%
Non-Canadian	10	1%	4	1%	6	2%
Cross-listing	7	1%	4	1%	3	1%
Total	91	13%	62	17%	29	8%
<b>Trade sale</b>						
Canadian	240	34%	117	33%	123	35%
Non-Canadian	314	44%	152	42%	162	46%
US	240	34%	118	33%	122	34%
Non-US	74	10%	34	9%	40	11%
Total	554	78%	269	75%	285	81%
<b>Other</b>						
Canadian	18	3%	3	1%	15	4%
Non-Canadian	11	2%	3	1%	8	2%
US	9	1%	3	1%	6	2%
Non-US	2	0%	0	0%	2	1%
Total	29	4%	6	2%	23	6%
Write Off	38	5%	21	6%	17	5%
Total	712	100%	358	100%	354	100%

Note: # means number of exits, % means percent of the total exit number.

bec, where both the federal and provincial governments implemented several actions to increase the supply of VC, purportedly to foster local economic development. As a result, more than half of Canadian VC was managed by Quebec funds in the early 2000s; government, quasi-government and tax incentivized labour-sponsored VCs predominated in this province.

To extract qualitative data, we first collected all information available since the inception of the firms, including each financing round announcement, and press releases and newspaper articles on NTBFs and entrepreneurs, along with their statements surrounding the event. We also obtained the filings of public buyers. We devoted special attention to information on trade sales, and we noted the managers' announcements at the transaction time. We followed each case until mid-2013, to track the outcome of each target firm, and the activities of the bought-out entrepreneurs following the transaction. For firms surviving locally, we determined the level of revenues at FTS time and in 2012. We used Factiva and specialized websites (including Manta.com

and Industry Canada), and releases issued by Canada's Venture Capital & Private Equity Association (CVCA). We also summarized the information related to the products, for both the target and the acquirer, and determined the NAICS codes of both firms involved in the transaction. We wanted to supplement our analysis with direct interviews with the principals of the firms involved, but could not do so for two main reasons. First, the selected acquisitions begin in 2000, and reaching the managers in place before the transaction was not feasible. Moreover, the quality of their potential answers after such a long time could be questionable. Second, several key members of the team before the migration had left the firms and could not be easily interviewed. We used press releases, LinkedIn and Factiva to determine the entrepreneurs' activities following the transaction. We contacted the remaining Canadian entities by phone to determine the current number of employees and the fate of the acquired entities.

In the second step, we searched for financing rounds and the information related to each of the private

equity investors involved in the financing, distinguishing between private and government-sponsored funds. We analyzed each target's evolution, financing and innovation in detail. Third, we gathered all discourse related to the migration reasons mentioned by the entrepreneurs, the acquirers or the VCs. Each sentence was situated in a grid based on the outcome defined above. This was done independently by the authors and a skilled professional. Cases of divergences in coding and interpretation were very few, and were solved by discussion. During the last step of the process, we determined whether each case satisfied the expected patterns associated with the propositions.

## Results

In Table 1, we report the numbers and proportions of domestic trade sales, FTS, domestic IPOs, and foreign and cross-listed IPOs. In Canada, trade sales and IPOs constitute 78% and 13% of reported successful VC exits respectively. Other types of exits include backdoor listings (reverse mergers) and secondary sales, accounting for 4% of the exits. Because the foreign exits reported in this group comprise 1.5% of the total sample, we do not analyze this type of exit in detail. Write-offs account for a meagre 5% of the exits because most are not reported.

IPOs are mainly launched on the domestic market (10%), and foreign and cross-listed IPOs account for 2% of the exits over the whole period; they can be considered a marginal source of migration. Trade sales predominate among successful exits. Because most involve foreign buyers (314 vs. 240 Canadian buyers), FTSs are clearly the major source of migration. When foreign IPOs are accounted for, the proportion of VC-backed firms that migrate reached 45% between 2001 and 2012. The proportion of FTSs increased from 42% to 46% between 2001-2006 and 2007-2012 and, overall, the proportion of foreign exits including IPOs was 48%. Nearly half of the successful VC exits from Canadian firms resulted in migration. Trade sales constituted 75% of exits during the first sub-period

**TABLE 2** Characteristics of the NTBFS Studied.

<i>Company name</i>	<i>Product or service</i>	<i>Age and location</i>	<i>Financing rounds</i>	<i>US acquirer and acquisition date</i>
Pyderion Contact Technologies Inc.	Software managing e-commerce call centres	13 years, Montréal	round 1: \$M2, round 2: \$M2.2, 1 gov. and 2 priv.	Intecom (NA), subsidiary of EADS (Euronext), Dec 29, 2000
Movibox Corp.	Voice over internet protocol (VoIP) calls for mobile phones	2 years, Montréal	round 1: \$M3, round 2: \$M11, 4 priv.	Sabse Tech. (NA, founded in 2008), Sept 29, 2009
Goal Semiconductor Inc.	Fabless semiconductor company supplying integrated circuits for sensor signal conditioning	13 years, Montréal	1 round, 3 gov.: \$M4.1	Ramtron Int. (Nasdaq), \$M9 (US\$M34), Aug 29, 2005
Haptic Technologies Inc.	Developer of haptic computer peripherals and software technologies	4 years, Montréal	1 round: \$M1.2, 2 gov.	Immersion Corp. (Nasdaq), \$M10 (US\$M58), Feb 26, 2000
Mycota Biosciences Inc.	Identification of antifungal essential drug targets and antimicrobial functional genomics	9 years, Montréal	round 1: \$M2.5, round 2: \$M1.64, 1 gov. and 3 priv.	Elitra, \$M30 (US\$M23). Elitra reinvests \$M10, Dec 7, 2000.
Tomoye Corp.	Editor of social networking site based on Microsoft Sharepoint	10 years, Gatineau	1 round: \$M1.1, 4 gov.	Newgator Tech. (NA, created in 2004), Jan 20, 2010
Traf-Park Inc.	Automated parking systems	14 years, Boucherville	1 round: \$Mo.96, 1 gov. et priv.	Subsidiary of Cubic Corp. (Amex), \$M4 (US\$M543), Sept 2, 2004
Micro Thermo Inc.	Energy management and environmental control systems for supermarkets	15 years, Laval	1 round: \$M3.5, 1 gov.	Carrier Corp., subsidiary of UTC (NYSE), Aug 10, 2001
GEOCOMtms Inc.	Fleet management software for local and short-haul pickup and delivery operations	8 years, Québec	7 rounds: \$M20.29, 3 gov. et 3 priv. including 1 US	Redprairie (Rev. US\$M253), Feb 22, 2007
Polyplan Tech. Inc.	Software linking manufacturing process management and product development	5 years, Montréal	3 rounds: \$M8.95, 2 gov., 2 priv. and others not identified	Parametric Tech. (NASDAQ, PTC) (US\$M676), June 5, 2005
Colubris Network Inc.	Wireless local area network solutions for enterprises and service providers	9 years, Laval	5 rounds: \$M66, 1 gov., 5 priv. US and others not identified.	Subsidiary of HP (NYSE), Aug 25, 2008
Gilys Inc.	Wireless optimization solution for packet-switched wireless networks	5 years, Trois Rivières	3 rounds: \$M7.6, 5 gov. and priv.	Openwave (NASDAQ), \$M12 (US\$M477), Jan 31, 2005
Terrascale Technologies Inc.	Software dedicated to storage solutions for enterprise cluster and grid applications.	4 years, Montréal	1 round, \$M2.7, 2 gov.	Rackable Systems Inc., US\$M38 (US\$M176), Aug 29, 2006
Timespring Software Corp.	Continuous data protection software	13 years, Montréal	2 rounds, \$M19.75, 2 gov., 2 priv. and others not identified	Double-Take software (NASDAQ), US\$M8.3 (US\$M77), Dec 24, 2007

Note. \$M (US\$M) means millions of Canadian (US) dollars. Gov. (priv.) means government-sponsored (private) venture capitalist. IC means Industry Canada. The age (location) is that of the company (head office) at the acquisition time. In the column labelled "financing rounds," amounts are those of raised financings. The amount in the column entitled "US acquirer and acquisition date" is the acquisition price, if available, and the values between brackets are acquirers' total assets before the transaction, revenues (rev.) or creation date if total assets were not available. NA means not available

and 81% thereafter. Exit through trade sale is becoming, by far, VCs' preferred exit mode.

The evolution of the 14 firms is summarized in Table 2.<sup>3</sup> Six firms are more than nine years old, and only one is less than four years old. This is an expected result, because we select situations of exit by VCs, an operation that generally occurs after four to seven years of participation. With few exceptions, the studied firms operate

in the information and communications technologies (ICT) sector, in line with the strong participation of Canadian VCs in this sector, which accounts for 49% of VC investment in 2008 and 53% in 2009.

We have listed the financing rounds and the funds involved in each of these rounds. Because a firm may receive equity from several sources at each financing round, the total number of financings is 32. Six firms re-

ceived only one round of VC funds, and four firms received two successive rounds. The median length between the initial financing and the exit is three years. Two subsets of VCs are involved in the financing of the studied firms. Government-sponsored VC funds provided financing in 28 cases, while private VCs, including US firms, invested in 23 cases. This situation reflects the strong government involvement in the Quebec VC industry.

**TABLE 3.** ‘Foreign trade sales’ motivation analysis

Name	Same sector (O <sub>1,1</sub> )	Explicit market consideration (O <sub>1,2</sub> )	Complementarity and synergy effects (O <sub>1,3</sub> )	No Recent local VC (O <sub>2,1</sub> )	For- eign VC (O <sub>2,2</sub> )	Financial con- straints (O <sub>2,3</sub> )
Pyderion Contact Techno.	Yes	To access a larger market	To enhance Intecom’s offerings to the contact centre market	No (10 months)	No	No
Movibox Corp.	Yes	To access a large market	Complementary technologies	No (2 years)	No	No
Goal Semiconductor	Yes	No	Products are highly complementary, to accelerate product development and delivery	No (1.5 year)	No	No
Haptic Techno.	Yes	No	Large synergies of R&D efforts, and complementary technologies	No (7 months)	No	No
Mycota Biosciences	Yes	No	Very complementary expertise, gene discovery and drug screening technologies	No (6 months)	No	No
Tomoye Corp.	Yes	No	Products and customers are very complementary	Yes (5 years)	No	No
Traf-Park Inc.	Yes	To access new markets and services	Complementary products, to adapt Cubic’s smart-card to automated parking systems	Yes (4 years)	No	No
Micro-Thermo Techno.	Yes	To access a worldwide market	Complementary products; to provide a full range of products and services	No (1.8 years)	No	No
Geocomtms	Yes	No	The acquirer already distributed the products of Geocomtms and is rapidly growing through acquisitions	No (1.8 years)	Yes	No
Polyplan techno.	Yes	To access the market	PTC wants to completely integrate Polyplan’s solution that PTC is already distributing	Yes (2.2 years)	No	No
Colubris Network	Yes	To access to market using HP’s channel network.	HP completely integrated Colubris’s line into its portfolio.	No (1.9 years)	Yes	No
Cilys	Yes	Access to market	Products are complementary	No (1 month)	No	No
Terrascale Techno.	Yes	No	Product are complementary: Rackable sells servers while Terrascale sells storage to rapidly feed servers with data	Yes (2.4 years)	No	No
Timespring software Corp.	Yes	No	Products and expertise are complementary	Yes (3 years)	No	No

Table 2 briefly describes the buyers. All are US-based high tech firms, including three subsidiaries of large firms: EADS, UTC and HP. The other buyers are small- and medium-sized firms according to the US terminology.

Using the comprehensive list of citations and the characteristics of the deal, we determine the extent that the expected patterns associated with our propositions could be affirmed. Table 3 summarizes our results related to FTS motivations.

In each of the 14 cases, we compare the industrial codes and find that the acquirer operates in the same industry as the target. Moreover, the services or products of both firms are generally very close. For example, Haptic Technologies was acquired by Immersion Corp, a Californian direct competitor. Tomoye Corp. was acquired by Newsgator. Both firms have developed editors that improve the use of Microsoft Sharepoint by embedding social media functionalities. O1.1 is thus satisfied in each case.

In 7 of the 14 cases, we find explicit mention of market consideration (O1.2) in the entrepreneur’s or acquirer’s declaration. We report excerpts from these references in Table 3, Column 3. For example, one CEO mentioned: “I am excited about the combined capabilities of Carrier and Micro Thermo. With Carrier’s heritage, brand image and global presence, they provide the perfect platform to expand and improve our customer service in North America and abroad.” The Movibox founder says: “We’re very

**TABLE 4** Consequences of the Acquisition.

Name	Fate of the company	Local impact?	Fate of the founders	Little evidence of recycling effect?
Pyderion Contact Techno.	Intecom bought by Aastra (Ontario). No longer active in Canada.	O <sub>3,1</sub> yes O <sub>3,2</sub> yes	The CEO became CEO of a start-up in Ottawa until sold to Los Angeles-based company and then became managing partner of a venture capital firm in Montréal.	O <sub>3,3</sub> yes
Movibox Corp.	No longer active in Canada.	O <sub>3,1</sub> yes O <sub>3,2</sub> yes	The founder and CTO stayed 9 months with Movibox's acquirer and then became the CEO of a small high tech company near Montreal.	O <sub>3,3</sub> yes
Goal Semiconductor	No longer active at the initial location. Acquirer still active in Canada.	O <sub>3,1</sub> yes O <sub>3,2</sub> yes	The founder and CEO founded another high tech company in Ottawa, then became CTO of a small high tech company in Ontario and is now director of a local development centre in Sherbrooke.	O <sub>3,3</sub> yes
Haptic Techno.	Still operates in Montréal (16 employees) in R&D activities, rev. \$M1.5	O <sub>3,1</sub> no O <sub>3,2</sub> yes	The co-founder and CTO became the CTO of the Haptic's acquirer, and is now President and CEO at a San-Francisco-based high tech company founded in 2006. The co-founder and CEO stayed three years with the acquirer, became CEO or VP in four Montréal-based ITC start-ups.	O <sub>3,3</sub> yes
Mycota Biosciences	Acquired by Merck Frost Canada. No longer active in Canada.	O <sub>3,1</sub> yes O <sub>3,2</sub> yes	One co-founder is a professor. The other one has been VP or CEO in five small biotech companies, and is portfolio manager of a local VC firm.	O <sub>3,3</sub> yes
Tomoye Corp.	Still at initial location (Québec, 25 employees), R&D activities, rev. \$M2.4	O <sub>3,1</sub> no O <sub>3,2</sub> yes	The co-founder and CEO stayed three years with the acquirer. He then co-founded and became CEO of a start-up in Ottawa. The co-founder and CTO became an executive director of a non-profit environmental organization in Ottawa.	O <sub>3,3</sub> yes
Traf-Park Inc.	No longer active at initial location. Buyer operates a sales office (10 employees).	O <sub>3,1</sub> yes O <sub>3,2</sub> yes	The founder runs the company's sales office in Montréal.	O <sub>3,3</sub> yes
Micro-Thermo Techno.	Still in Laval as an R&D division, 57 employees, rev. \$M5 to 10 (IC).	O <sub>3,1</sub> no O <sub>3,2</sub> yes	The founder and president is still a business unit manager at Microthermo (a division of Parker Hannifin Canada).	O <sub>3,3</sub> yes
Geocomtms	No longer active at initial location. The buyer operates an office (Montréal), 25 employees.	O <sub>3,1</sub> yes O <sub>3,2</sub> yes	The founder and CEO (serial entrepreneur) became the president of a two-year-old high tech Québec company. He is also behind the creation and investment of Berclain Group (sold to German IT Baan in 1996) and Taleo (sold to Oracle in 2012).	O <sub>3,3</sub> no
Polyplan techno.	A small office still open in Montréal (13 employees)	O <sub>3,1</sub> yes O <sub>3,2</sub> yes	Founder is professor and CEO of a non-profit organization.	O <sub>3,3</sub> yes
Colubris Network	Staff integrated to HP, still in Montréal, R&D centre.	O <sub>3,1</sub> no O <sub>3,2</sub> yes	Founder became a consultant in the Montréal area and is President of a Californian telecom high tech company founded in 1970.	O <sub>3,3</sub> yes
Cilys	No longer active in Canada.	O <sub>3,1</sub> yes O <sub>3,2</sub> yes	The first co-founder (serial entrepreneur) is CEO of a company founded in 1999 in Montréal. In 2007, with the second Cilys co-founder and CFO, he co-founded another Montréal-based start-up, then sold it to a US company. The third Cilys co-founder is CTO in a New York firm.	O <sub>3,3</sub> no
Terrascale Techno.	No longer active in Canada. Integration failed. Sold 2 years later to another US firm.	O <sub>3,1</sub> yes O <sub>3,2</sub> yes	The founder (a seasoned technology entrepreneur and investor) became the CEO of a small Floridian technology company founded in 2008.	O <sub>3,3</sub> yes
Timespring software Corp.	Buyer acquired by Vision Solutions (2010). Small office in Montréal (10 employees).	O <sub>3,1</sub> yes O <sub>3,2</sub> yes	The CTO and CEO became the executive chairman and CTO of an employee-owned start-up in California.	O <sub>3,3</sub> yes

Note. O<sub>3,1</sub> means the R&D activity of acquired NTBFs does not increase following the acquisition, O<sub>3,2</sub> means the acquired Canadian NTBFs become truncated companies, O<sub>3,3</sub> means there is little evidence of recycling activities. IC (rev.) means Industry Canada (revenues).

proud that Sabse Technologies values so highly the voice-services-development environment we've carefully nurtured. We look forward to

working closely with Yogesh and his team to bring voice-activated services to carriers and their customers around the world."

The comment that the acquired firms will benefit from the acquirer's infrastructure to access the market is less common (7 cases) than explicit

references to product or service complementarities (14 cases). Complementarities were notably mentioned by Mycota Bioscience's CEO: "Elitra's expertise in bioinformatics and high throughput screening provides the ideal platform for furthering the development of Mycota's scientific accomplishments. Additionally, we believe that our gene discovery and drug screening technologies are very complementary, and together we can leverage the knowledge gained from *Candida Albicans* to advance programs on other major human and agrochemical fungal pathogens." When Ramtron International acquired Goal semiconductor, its CEO announced: "We expect that this acquisition, which is highly complementary to our current product strategy, will give us a five-year jump on our roadmap for integrated and application-specific product launches. As a result, we hope to accelerate the development and delivery of high-margin products targeted at the markets that we serve." The Carrier's Vice-President mentions: "This acquisition enables Carrier to offer a complete range of controls products and software to satisfy the needs of food retailers with an intuitive, easy-to-use system to manage operations and develop strategies to lower costs, particularly in light of rising energy prices. Carrier, through its various subsidiaries, already provides a broad array of refrigeration and HVAC equipment to supermarkets; Micro Thermo complements our current businesses and enables our company to provide a full range of products and services to individual stores and chains." At the time of the acquisition of Colubris network, the Senior Vice-president of HP ProCurve says: "The acquisition of Colubris Networks will strengthen ProCurve's hardware, management platform and services, significantly improving the overall performance capabilities of both wired and wireless networks, and will deliver even more best-in-class choices for our customers worldwide." Similar declarations can be found in each studied case (Table 3). O1.3 is thus satisfied in all cases.

Overall, our studied cases fit the expected pattern associated with P1. The expected outcomes according to this pattern are observed in 35 of 42 possibilities. The studied FTSs seem to be linked to strategic considerations.

The three rightmost columns of Table 3 report our observations on the outcomes of the expected pattern linked to proposition 2. O2.1 states that acquired firms have not been financed locally during the two years before the FTS. Only five cases satisfy this outcome, but this number is reduced to three if we expand the time frame up to 2.5 years. Most of the firms that do not get VC financing during the two years before the FTS report revenues at this time. This can explain why they did not attempt to obtain a new round of external equity.

Foreign VCs are involved in two firms, but play a significant role in only one case (Colubris). In the other case, the foreign investor co-invests with five local funds, for a total amount of CAN\$20 million. Foreign VCs invest jointly with local investors, and do not seem to supersede local VCs. Their involvement can be traced to the large amounts requested by the firms, which received a total of CAN\$66 million and CAN\$20 million respectively. Accordingly, O2.2 is not supported in nearly all of the studied cases. However, we observe evidence of recourse to US VCs when the requested amounts rise. We consider that O2.2 is generally not satisfied.

We do not find any explicit mention of shortage of funds. O2.3 is thus not affirmed. Overall, the 42 expected outcomes are observed in 7 cases only, for a proportion of 17%. The proposition that firms migrate because they face a shortage of equity financing is thus inconsistent with the cases analyzed. Our observations support the strategic explanation for migration. Canadian high tech firms studied joined larger firms producing complementary or similar goods or services in the same sectors. They primarily sought synergistic effects and aimed to reach a large market more easily than they could as a stand-alone enti-

ty. The acquirers aspired to offer their customers more services or products.

Table 4 summarizes our observations on the outcomes associated with the expected pattern, i.e. that FTS have negative effects. We analyze the fate of the bought-out entities. Nonetheless, comprehensive information is generally out of reach because the acquired firms are mainly subsidiaries of private entities.

In ten cases, the acquired company no longer operated at the initial location, although in four of these cases, the acquirer had an office in Canada. In one case, the R&D team was integrated with the buyer's team in the same city. In three cases, the acquired firm continued R&D activities, albeit on a small scale. In each case, we estimated the revenues in 2012 and those reported at the FTS time. The latter are similar to or lower than the former, at between \$1 million and \$10 million. The growth rate of R&D activities, which are the sole source of revenues for these entities, is approximately zero. Accordingly, we consider that none of the acquired firms exhibits significant growth in R&D activities, which could generate spillover effects. O3.1 is thus observed in all the studied cases.

Overall, 10 of 14 (71%) NTBFs acquired by foreign firms disappeared. We observe that the four surviving entities resulting from acquisitions fit the definition of truncated company proposed by Doyle, McDougall, & Doyle (2004, 9). None reported activities other than R&D. The truncated company was left with only an R&D function, whereas the acquirer had its own sales, marketing and production department, and a head office. These NTBFs failed to develop as stand-alone entities. Accordingly, O3.2 is systematically affirmed. The studied FTSs appear to have systematic negative effects on local economic development.

The right part of Table 4 summarizes our observations about a possible recycling effect of FTSs that could offset the negative consequences evidenced above. Only 2 of 14 cases could generate this effect, specifically when



the entrepreneurs, both of whom fit the definition of serial entrepreneurs, subsequently founded new NTBFs. Four entrepreneurs have recycled their experience, becoming a consultant, CEO or involved in VC, but they did not create new ventures. The other entrepreneurs created new ventures in other provinces or countries, were still employed by the acquirer, or had left the business world. These results differ from those observed in another context by Mason & Harrison (2006) in Scotland. They can be traced to heavy involvement of VC before the FTS. Notably, VC could have captured much of the sale proceeds. A full analysis should consider the recycling of these funds, but we think that the economic effect of capital recycling may be weak because local VC abound: the Quebec Venture Capital Association<sup>4</sup> reported that in 2000 the total pool of VC under management was \$8.6 billion, a proportion of GDP far higher than in the US, and the liquidity of Quebec-based VCs was estimated at \$2 billion. Consequently, the amounts collected through FTS are unlikely to change the investment propensity of local VC funds.

### Conclusion and implications

Our analysis points to three important conclusions. First, the VC industry in Canada, including government-sponsored funds, is a significant source of migration of promising NTBFs to the US, and does not seem to fully play the positive role described by Kenney (2011) in other countries. Second, NTBF migration is motivated largely by strategic considerations, in the context of a small country where the number of strategic partners is limited and the market for innovative products is also considered small. Like their counterparts in other countries, Canadian VCs prefer to exit through trade sales but cannot find a local acquirer easily. VC-backed IPOs, which are often prerequisites to the construction of large public firms, have become exceptional events. This situation is particularly worrying in Quebec, where the number of large technological companies is small and decreasing. This reduces the likelihood of the

emergence of new technological leaders, clusters and networks that can ease local exits. We observe less positive effects of acquisitions than do previous studies. The acquired firms became truncated companies, and often simply disappeared. Third, only a small proportion of the bought-out entrepreneurs were involved in creating new local NTBFs. The recycling effect described by Mason & Harrison (2006) apparently does not occur in Quebec. Our results pertain to a Canadian province where the governments have implemented several major actions to stimulate the VC industry, with a clear objective of promoting local economic development. The original objective of the labour-sponsored venture capital corporation, the most significant policy action to foster venture capital in Quebec, was to help the province create a locally controlled, healthy and sustainable economy. Clearly, selling the most successful ventures to foreign firms hardly fits this objective, and a revision of this program created in 1982 is needed. An avenue to explore can be to link the advantages of government-sponsored funds to objectives regarding creation of local firms. Because of their reduced cost of equity due to subsidies, these funds can accept a lower rate of return or wait longer for harvesting. In summary, we suggest a change in focus from the number of start-ups financed to the number and quality of large firms created at the end of the process.

The role and responsibility of the VC industry in a small open economy deserves attention and should be analyzed in other contexts. As Niosi underlined (2000, 9), financial institutions that provide funding for innovation are a major component of the national innovation system. Their role in this context has not been examined, especially in small countries where, despite great effort, VCs are still not a significant component of the national innovation system (Kenney 2011, 1679). The reasons why high growth firms move abroad, the consequences of such migrations, and the policy tools that can prevent their systematic migration are important research top-

ics. Our study deals with a particular context, and cannot be extrapolated to other regions. However, we provide evidence supporting several claims by expert panels and academics in Canada.

Another implication of our study is that the globalization process is likely to influence the design and implementation of innovation policies (Edquist 2011, 1726). Quebec has devoted significant resources to structuring and helping the VC industry; more than half of the industry receives government funds or tax advantages. To our knowledge, the overall performance of this industry in terms of the creation of local industrial and R&D leaders has not been examined. We evidence that most of the exits, including the most profitable ones, generally involve foreign buyers. This can be explained by the paucity of large Canadian high tech firms. The VC industry does not seem to be increasing the number of such companies.

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<sup>2</sup> Conference Board of Canada, available at: <http://www.conferenceboard.ca/hcp/details/innovation.aspx>. In Sweden, a similar phenomenon is known as the Swedish Paradox (Ejermo & Kander 2006).

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<sup>3</sup> The detailed analysis (31 pages) is available upon request, but it cannot be included in the article owing to the Journal's size requirements.

<sup>4</sup> Réseau Capital, The Venture Capital Industry in Québec in 2000: An Overview, Available at: [http://www.reseaucapital.com/docs/communications\\_2000.pdf](http://www.reseaucapital.com/docs/communications_2000.pdf), accessed online April 10 2014.