Journal of Business Research 66 (2013) 2071–2078

Contents lists available at SciVerse ScienceDirect

Journal of Business Research

Too close to collaborate? How geographic proximity could impede entrepreneurship and innovation ☆

Soumaya Ben Letaifa [a,*], Yves Rabeau [a,b]

[a] University of Quebec at Montreal, Canada
[b] Department of Strategy, University of Quebec At Montreal, Montreal, Canada

ARTICLE INFO

Article history:
Received 1 July 2012
Received in revised form 1 December 2012
Accepted 1 January 2013
Available online 6 March 2013

Keywords:
Cluster
Innovation
Collaboration
Social proximity
Geographic proximity
Cognitive proximity

ABSTRACT

Numerous studies focus on successful clusters to demonstrate that geographic proximity enables collaboration and innovation. Yet, practitioners still need to understand why some clusters fail to collaborate despite their geographic proximity. This longitudinal study investigates an ICT public–private innovation cluster that fails to collaborate and explores how geographic, institutional, organizational, cognitive and social proximities interplay. The findings show that: (1) social proximity is the most important proximity to achieving collaboration; (2) close geographic proximity can be a barrier to social proximity; and (3) geographic distance is seen as an accelerator of entrepreneurship and innovation. These findings contribute to the literature on clusters and innovation by arguing that contexts of high cognitive, organizational, institutional and geographic proximities do not facilitate communication and collaboration. Specifically, geographic proximity can have a negative impact on social proximity. Finally the paper illustrates that clusters created by economic policies are less prone to innovation compared to spontaneous ecosystems emerging from private entrepreneurial initiatives.

1. Introduction

Mainstream literature on clusters and networks considers geographic proximity to be a driver of innovation. Indeed, geographical proximity promotes and makes cooperation easier between local players and therefore enhances individual and regional capacity to innovate, which explains the widespread development of clusters. Clusters are defined as geographic concentrations of interrelated companies and institutions in a particular sector that foster entrepreneurship and innovation (Porter, 1998), particularly in knowledge industries (Asheim & Cooke, 1999; Cooke & Morgan, 1998; Longhi, 1999; Niosi, 1999). Spatial concentrations of businesses are usually presented as contexts that bolster social proximity, collaboration and innovation (Alecke, Alsleben, Untiedt, & Scharr, 2006). Indeed, geographic proximity facilitates four important proximities, namely social (trust), organizational (organizations' interdependence), institutional (norms) and cognitive (knowledge) proximities (Boschma, 2005; Harrison, 1994; Howells, 2002). Multidimensional proximity explains how networks and clusters emerge, collaborate and innovate, with a traditional and strong focus on the role of geographic proximity. Even in virtual and delocalized networks, where cognitive, organizational and social proximities are the main drivers of collaboration and innovation, geographic proximity plays a positive role (Hausmann, 1996; Howells, 2002). For example, the Silicon Valley cluster succeeds in generating angels and serial entrepreneurs and a regenerative collaborative venture capital market, particularly in the ICT industry (Eisenhardt and Forbes, 1984, cited in Thornton, 1999; Silva da Rosa, Ensslin, Ensslin, & Lunkes, 2012).

Yet, certain North American clusters trying to replicate Silicon Valley's successful conditions of proximity, fail to generate collaboration. Indeed, the study of some North American ICT landscapes reveals that entrepreneurs and firms are unwilling to collaborate and to co-innovate, specifically because of local geographic proximity (Ben Letaifa & Rabeau, 2012). Although the ICT industry remains a key factor for economic development in Canada and Quebec, many reports (ADRIQ, 2010; CRSNG, 2009; SECOR Inc., 2011) suggest that because of a lack of collaboration and coordination, some ICT clusters suffer from a gap between structural inputs and entrepreneurial and innovation outputs. This idea is reminiscent of Thornton's (1999: 31) statement:

> "*While the regional-factors work predicts the context in which certain forms of new enterprise are likely to be founded, it is not the regions that start new businesses.*"

This article addresses the gap in understanding cluster failures by considering two key questions. First, why do some heterogeneous

☆ The authors appreciate the financial support from the Social Sciences and Humanities Research Council (Canada) for developing the paper. The anonymous reviewers provided helpful and constructive comments.

* Corresponding author at: Department of Strategy, University of Quebec at Montreal, ESG, UQÀM, CP 8888 succursale Centre-ville, Montréal H3C3P8, Québec, Canada. Tel.: +1 514 746 1420; fax: +1 514 987 0422.
E-mail addresses: ben_letaifa.soumaya@uqam.ca (S. Ben Letaifa), yrabeau@uqam.ca (Y. Rabeau).

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http://dx.doi.org/10.1016/j.jbusres.2013.02.033

public–private innovation clusters fail despite the geographic, institutional, organizational and cognitive proximities? The focus is novel since traditional literature investigates collaborative and successful geographic clusters. Second, how could geographic proximity have a negative impact on collaboration? Traditional literature explains how too much closeness impedes creativity (Boschma, 2005), but never suggests that closeness would obstruct communication and collaboration. Studies need to address these questions as they present new theoretical assumptions on: 1) the specific role of different proximities; 2) how the different proximities relate to each other; and 3) clusters' conditions of success and failure. These questions also aim to shed further light on the relevance of differentiating between spontaneous and institutionalized clusters of innovation and on the need to better understand the role of social, geographic, institutional, organizational and cognitive proximities in fostering collaboration and innovation.

The results of the study have implications both for theory and practice. On the one hand, contrary to many other studies' conclusions, the findings reveal that strong geographic proximity does not necessarily facilitate social proximity, business networking and collaboration. Worse, proximity appears in some cases to be an obstacle to business networking and communication. The propensity to collaborate even grows with higher geographic distance between firms. The study reveals that in competitive contexts entrepreneurs could reject the "*local clustering*" and prefer "*global and foreign networking*" for the same category of service providers. Thus, geographic proximity needs to be complemented with social proximity to generate innovation. On the other hand, the findings suggest that public–private clusters are less prone to collaboration and to innovation. In fact, they rely more on exogenous proximities (geographic, organizational, cognitive and institutional) and less on the endogenous social proximity, while private spontaneous networks require social proximity from the beginning.

After this introduction, the following section presents a literature review on collaboration and innovation in geographic contexts. Section 3 explains the methodology used to explore the Canadian ICT cluster. The fourth section presents the main results. The final section integrates the most important conclusions and contributions of the study followed by the limitations and future research directions.

2. Collaboration and innovation in geographic contexts

Much of the recent work on clusters, networks and ecosystems has emphasized how spatial proximity enhances collaboration and innovation (Lagendijk & Oinas, 2005). Porter and his associates (Furman, Porter, & Stern, 2002; Porter & Stern, 2001) argue that the choice of a geographic location for the establishment of R&D facilities remains important despite the dissemination of and global access to knowledge through the Internet. Highly innovative regions such as Silicon Valley are dynamic because of the quality of the industrial clusters located in the area and the presence of basic and applied research institutions. Furthermore, the wealth of local communications in terms of both knowledge and ideas is a very important comparative advantage. Hence, leading firms agree to invest in these clusters because they anticipate success in terms of innovation.

Location also matters in more traditional networks. Italian industrial regions (Harrison, 1994) based on networked and specialized organizations promote collaboration. These regional industrial networks are harbingers of clusters (Ebers & Jarillo, 1998). Privileged access to government regional economic policies and measures, access to natural resources, local market and to other firms' complementary skills as well as a competent labor supply are among proximity advantages. Other advantages include a shared local business culture that favors cooperation behavior (Storper, 1999). Indeed, geographic proximity of firms fosters social interaction, trust building and hence knowledge spillover and innovation (Boschma, 2005). As Kauffeld-Monz (2009) suggests, an innovation network follows an inverted-U shaped relation between proximity and information and knowledge acquisition over time. Organizations are more likely to interact when they belong to the same spatial area (Balland, 2012). The literature suggests a multidimensional approach to the notion of proximity. Boschma (2005) defines five types of proximity: cognitive, organizational, social, institutional and geographic.

Cognitive proximity tends to consider the similarities in the way actors perceive, interpret and evaluate the world (Nooteboom, 2000). Cognitive proximity facilitates effective communication as people share the same knowledge base and expertise (Boschma, 2005). However, a high cognitive proximity may lead to a status quo as people share the same paradigms and are less able to explore or exploit new knowledge. At the same time, too much cognitive distance leads to problems of communication (Nooteboom, 2000).

Organizational proximity is defined as the nature of relations between the actors, ranging from weak ties (autonomy) to a joint venture or a well-coordinated and interdependent ecosystem of innovation (control and interdependence) (Moore, 2006). Some authors refer to the same space of relations (Torré & Gilly, 2000). Organizational proximity fosters cooperation and knowledge spill over, as firms are highly connected to each other. While too much bureaucracy and hierarchy could lead to a lack of intra- and inter-organizational learning (Saxenian, 1994), low control and coordination could impede collaboration and innovation (Boschma, 2005). Organizational proximity is often leveraged with social ties, or social proximity.

Social proximity has its roots in the social embeddedness literature (Granovetter, 1985). This component refers to the individuals' levels of relationships and includes trust based on friendship, kinship and experience (Boschma, 2005). Social proximity facilitates communication, knowledge transfer and collaboration as individuals develop social relationships based on trust and mutual commitment. While distance proximity is an obstacle to collaboration, too much social proximity could lead to a locked or closed community of people and could be the source of deception. Sharing of key information presents opportunistic risks. However, opportunism depends also on the macro or institutional context.

Institutional proximity refers to the social and cultural norms that regulate the business and non-business relationships in a specific context. Social and organizational forms of proximity are thus linked to institutional proximity (Boschma, 2005). Indeed, institutional proximity creates effective communication and collaboration and enhances the social and organizational proximities. However, too much institutional proximity does not stimulate innovation.

Geographic proximity finally represents the physical distance between the players (Howells, 2002). While short distances favor interaction, networking, collaboration and innovation, long distances require more complementary proximities to achieve closeness (Boschma, 2005). Recent works on ecosystems of innovation (Iyer & Davenport, 2008; Moore, 1996; Siegel & Renko, 2012) highlight the role of interdependence rather than geographic proximity to explain collaboration and innovation. However, the geographic proximity still plays a positive role and location still matters.

All these proximities are interrelated. For instance, geographic proximity positively affects cognitive proximity (Parra-Requena, Molina-Morales, & García-Villaverde, 2010). A high social and cognitive proximity can reduce knowledge distance between business partners (Boschma, 2005), broadening their common knowledge base and expertise. Some authors introduce relational proximity, which refers to both social and cognitive inter-organizational proximity (Nooteboom, Vanhaverbeke, Duijsters, Gilsing, & Oord, 2006). Therefore, relational proximity facilitates knowledge acquisition, particularly of the tacit type, since involved agents act in a very similar way (Storper, 1999). The knowledge industries and ICT in particular gather in collaboration advantages when customers, partners, competitors and all stakeholders cooperate to co-innovate (Chesbrough & Appleyard, 2007).

Both knowledge management (Ashworth, 2012; Messeni Petruzzelli, Albino, & Carbonara, 2007) and economic geography (Boschma, 2005) present cognitive proximity and geographic proximity as facilitators of learning, knowledge creation and collaboration (Hautala, 2011). However, some authors argue that, as yet, no rigorous empirical work validates these assumptions (Huber, 2012; Maskell & Malmberg, 1995, p. 434). The limits of spatial proximity need to be further investigated (Belussi, Sammarra, & Sedina, 2010). The observation of some innovative clusters such as the Southern California electronics industry (Scott, 1993), the Emilia-Romagna region of Italy and the science-based industrial cluster in Cambridge (Castells & Hall, 1994; Huber, 2012), questions the positive relationship between innovation and geographic proximity (Gordon & McCann, 2005). The literature starts to recognize the need to identify the conditions under which clusters collaborate. Too little closeness would harm collaboration, and too much closeness would facilitate collaboration but at the same time would reduce the potential of newness and innovation (Boschma, 2005). Thus, geographic proximity combined with product differentiation among local players (Nachum & Wymbs, 2005) nurtures the other proximities and explains why some clusters flourish. Recently, some authors shed light on collaborative entrepreneurship, which requires the development of social relationships in both local and the global contexts (Ribeiro-Soriano & Urbano, 2009; Tuan, 2012) and could determine the success or failure of clusters (Castells & Hall, 1994). Thus the social proximity (Boschma & Frenken, 2009) based on local and global collaboration is more important than cognitive and geographic proximity. Social, organizational, cognitive, institutional and geographical proximities facilitate interaction, collaboration and knowledge spill over. First, geographic proximity does not matter for some ICT clusters, whose networks appear to be more global than local and whose workers do not engage nor believe in local clustering (Huber, 2012). Second, social proximity overcomes geographic distance and creates collaboration and innovation in a context of global networks.

2.1. Local versus global collaboration

Studies (Lagendijk & Oinas, 2005) with little distinction between global and local collaboration examine collaboration issues in clusters to unravel success stories. Within the context of geographical proximity, only a few studies have explored the importance of local or global collaboration for innovation (Oinas & Malecki, 2002). The general belief is that local collaboration advantages would surpass non-local collaboration (Amin & Cohendet, 1999). However geographical clusters are not always welcomed by local entrepreneurs who would prefer international networking and collaboration. Some entrepreneurs rather see local players as their competitors and have little confidence or interest in their local network (Ben Letaifa & Rabeau, 2012; Lagendijk & Oinas, 2005; Puffer & McCarthy, 2011). Whereas some studies pinpoint cognitive proximity (Autant-Bernard, 2006) or geographic proximity (Audretsch & Feldman, 1999; Balland, 2012) or both (Hautala, 2011) as determinants of collaboration and innovation, they could be in some cases source of mistrust (Ribeiro-Soriano & Urbano, 2009). This case study illustrates how these proximities could be tricky. Despite the current literature on open innovation (Chesbrough & Appleyard, 2007), on coopetition (Padula & Dagnino, 2007) and on cooperation in innovation ecosystems (Adner & Kapoor, 2010; Datta, 2012; Iyer & Davenport, 2008; Turner, Ledwith, & Kelly, 2012), the state of current knowledge on local collaboration, particularly for knowledge industries, is still embryonic. One commonly accepted hypothesis is that "*knowledge transverses corridors and streets more easily than continents and oceans*", (Feldman, 1994:4, cited by Rallet & Torre, 1999) could be challenged specifically with a critical case study.

3. Research methodology

High-knowledge-intense industries, such as ICT, form a privileged territory for understanding collaboration and innovation processes. This research studies innovation and entrepreneurship within a geographical cluster. In a single-site longitudinal study (Eisenhardt, 1989), the authors use narrative analysis (Pentland, 1999), and time-bracketing (Langley, 1999).

3.1. Case overview and selection

The study first proceed with a judgment sampling with several practitioners, experts, and leaders in the ICT cluster to gather their perspectives on a longitudinal multi-level study on innovation processes. The sampling of the cluster (called ecosystem instead of cluster by the founders) is critical, emergent and opportunistic (Patton, 2002, p. 239).

Montreal is the third-ranked city in North America in terms of employment in the ICT sector (Innovation Montréal, 2008). The city offers 120,000 jobs across 5000 companies and organizations at the core of the global ICT ecosystem. Seven sub-sectors define the ICT ecosystem: production and software development, information technology and telecommunication services, interactive digital media, media integrating sounds and digital artistic development (Innovation Montréal, 2008). In addition, Montreal is the host of four high-caliber universities with research capacities to support and/or execute ICT firms R&D project.

The Canadian ICT ecosystem analyzed has the reputation of not being prone to collaboration. This case is particularly relevant since the ecosystem studied was intentionally created in 1999, under a public–private initiative, to generate open innovation and entrepreneurship. Despite this formal mission, the leaders of the ecosystem deliberately kept the set-up in a standby or status quo situation until it was dissolved in 2009. Putting in place industry quality standards, developing technological partnerships to expand networks and find new wireless applications, and undertaking research and development on projects related to the healthcare sector were among the projects involving innovation in the ecosystem. Governments contributed to a series of public investments starting in 1999 to provide the ecosystem with the technical infrastructure necessary for open innovation projects. For example, the government funded state of the art R&D labs to nurture open innovation between local players in a private–public ecosystem, called International Institute of Telecommunications (IIT). In 2007, the Montreal Metropolitan Community (MMC) and Montreal International launched an experimental committee (called TechnoMontreal) including decision-makers from the different organizations and companies belonging to the ICT cluster. The purpose was to promote and develop the cluster and to nurture links between institutional and political organizations with industry firms in order to specifically develop small businesses and large companies to collaborate. The Silicon Valley, as the leading incubator region is the inspiration of the cluster initiative in the province of Quebec. Provincial and federal governments put in place all the infrastructures and inputs required to bolster innovation and knowledge sharing in the region. Industrial clusters are the strategic development policy of the Quebec government since 1991. However, the Quebec cluster challenges the common view in geographical proximity and collaboration.

The overall ICT cluster encompasses more than 1000 member firms and in this study, the selection is of a hundred members belonging to this ecosystem (the most important players and specific type of actors for the sake of representativeness). The study either interviewed them (40 different organizations interviewed) or they are part of the committees observed (60 organizations participated at the five ecosystem committee observations). Triangulation between different sources helped to validate the information collected (see Table 1). The criterion of data saturation and redundancy determined the number of interviews and observations.

3.2. Multi-level case

The analysis first level is ecosystemic. This level is actually multi-level because the organizations involved belong to three levels of the

Table 1
The ecosystem's respondent's profiles.

Type of organization	Number of organizations	Respondents' positions	Number of interviews
Carriers	4	Vice-president	4
		Associate director	4
Network equipment manufacturers	3	Vice-president	2
		Director	4
Content providers	10	Vice-president	10
Niche suppliers	5	CEO	5
Public institutes	5	President	2
		Innovation Senior Advisor	5
		Senior Economist	2
Financial Angels	2	CEO	2
Associations	2	CEO	2
Consultants	5	Senior consultant	5
Universities	4	Partnership Chairman	2
		Professor	10
Total	*40*		*61*

ecosystem (Moore, 1996) (core level: operators and their suppliers; larger enterprise: customers; and ecosystemic level: governments, associations, universities, public institutes, financial angels, and other stakeholders). The organizations observed the presence of various socio-demographic profiles in terms of status (public, private, or public/private), size (SME or large firm), nationality (North American or European), core business (equipment, operator, content provider, institute, association, research chair), and geographic coverage (local, national or international).

The second level of analysis is individual. The respondents belong to three hierarchical levels (CEO, VP, associate director), allowing for the triangulation of information sources (40 public and private-sector decision makers). The vast majority of respondents are men (mainly engineers); they occupy decision-making positions in the ICT sector or are economists and financiers in risk-capital firms, economic development institutes and other peripheral organizations actively involved in the promotion of innovation in ecosystems.

3.3. Data collection

The longitudinal study began in 2007, and ended in 2009, during the dissolution phase (see Fig. 1). The study uses four data-collection methods: in-depth interviews (+60), observation of innovation committees (5), analysis of internal documents (35), and the expert method (10 researchers specializing in clusters, information technologies, collaboration, and innovation). Different sources permit data triangulation and enhance results' validity. The longitudinal study captures real-time and retrospective data back to 1999.

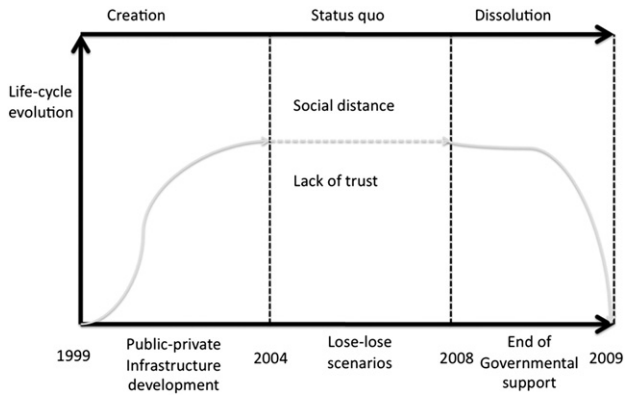

Fig. 1. The ecosystem's evolution.

The interviews deal with the past, present, and future of the cluster: how the ecosystem emerged, what specific projects are targeted, how leaders collaborate, and why collaboration does not take place. The questions posed are open ended without suggesting responses. The interviewer questions respondents about the facts (impartial objective information: who, doing what, when, where), schemas (norms, rules, perceptions); and social relationships (individuals and organizations in these relationships). The data supplied included causality links, descriptions, interpretations, intuitions, truth in the field, and stories (resulting from story-telling about experiences, sequences of pivotal events, and so on).

The data analysis follows Miles and Huberman's (1994) methodology. Indeed, the data is condensed, structured into a first then a second level of analysis and finally transformed into intelligible in terms of the issues being addressed (role of proximities). The use of tables and figures to organize the data helps the logical presentation of the data.

4. Results

The results reveal how geographic proximity does not always facilitate collaboration in local contexts, despite cognitive, institutional, and organizational proximities. However, the results also reveal the lack of social proximity. Surprisingly enough, respondents perceive geographic proximity as an obstacle to true win–win relationships, and to the development of social proximity. Contrary to previous studies, the findings highlight how the cluster fails because of a lack of social proximity in a context of four complementary proximities. This suggests that social proximity is critical to collaboration and to innovation and that artificial clusters cannot force collaboration through exogenous and rational proximities.

In fact, the analysis of the evolution of the ecosystem clearly describes how geographic proximity is more an obstacle than a determinant of collaboration especially in close and competitive contexts. This section presents the phases of creation, status quo and dissolution of the ecosystem studied and analyzes how geographic proximity impacts these phases. Certain major events provide crucial milestones for defining the transition from one step to the next in the innovation process. The temporal decomposition follows four key moments: 1999, creation of the ecosystem; 2004, beginning of mandates; 2008, resignation of a large number of members; 2009, dissolution of the ecosystem.

These four temporal milestones delimit three main phases of evolution of this innovation ecosystem: 1) public creation of the cluster because of geographic proximity, 2) status quo due to social distance, and 3) dissolution due to the lack of entrepreneurial and innovative initiatives (see Fig. 1).

4.1. Geographic proximity as the raison d'être: the Creation Phase (1999–2004)

Local public leaders rely on geographic, organizational, cognitive and institutional proximities to leverage this public–private ecosystem in Montreal, with the hypothesis that geographic clustering would enhance collaboration and innovation. The formal ecosystem creation arises through a public–private initiative in 1999. This initiative is somehow the enthusiastic phase, as different stakeholders devote energy and concrete actions to favor a climate of innovation. Through public sector incentives, socio-cultural events, networking activities, technological installations, time and money provide the investments to create the conditions necessary for cooperation.

During this phase, all actors are more or less proactive with regard to the initiatives set up to encourage the emergence of alliances and coopetitive partnerships. The actors most involved in this phase are: complementary companies such as equipment manufacturers and public actors (governments, institutions, research laboratories, associations, and so on). They all share the same language, the same

innovation objectives, the same norms and the same network. Participants know each other well since they are the most important entrepreneurs and decision leaders in Quebec.

The cooperative practices of different levels of government involved political, financial, and technical leadership during this phase of creating an environment propitious to co-innovation. Through direct involvement of various political representatives, granting of direct and indirect financing (grants and fiscal measures), creation of specific economic development programs, and supervision of different public and private initiatives, governments (federal and provincial) play a key role. The peripheral actors (risk-capital firms, institutions, associations, universities) are very cooperative during this phase. Some entities have the mission of contributing to the creation and implementation of industrial open innovation sub-clusters and, thus, have the mandate of encouraging, supervising, and supporting all innovation approaches. Others devote themselves to research and development, taking on the role of initiator of various co-innovation projects. Equipment manufacturers are the second most important actors during this phase. Because of their core business, they are very proactive and motivated to establish collaboration agreements that would enable them to create network and scale economies for their projects and existing technological infrastructure. Also, these players envision the creation of new higher value-added innovation poles, particularly in multimedia. As suppliers to operators, they benefit directly from any co-innovation project with the latter or between the latter. Finally, local SMEs as suppliers of applications and content tend to graft themselves incrementally onto the ecosystem and are therefore open and proactive during the emergence phase.

Operators are the least enterprising players during this phase. They have representatives at different events, programs, and collaborative projects, but their participation is more pro forma than substantive. For instance, they attend various local events organized to promote co-innovation, but they participate as polite guests, knowing that abstaining from responding to the general invitation would be poorly regarded.

This first phase materializes with various cooperation practices: governmental leadership, financial incentives for the ecosystem, meetings, committees, and resource-sharing. The peripheral actors, namely equipment manufacturers and SMEs, devote effort and active participation in the construction of an environment propitious to innovation. All players agree to create structures, programs, and pro-innovation initiatives in the region. Therefore, various funding structures by financial angels are set up thanks to collaboration between governments and entrepreneurs. In addition, joint public–private memoranda are submitted to government departments and other organizations with a view to modifying the economic, regulatory, competitive or technological framework in order to assist the innovation ecosystem. Peripheral actors and equipment manufacturers play the role of facilitating pillars whereas SMEs act as niche players on the lookout for new market opportunities. Operators (telecom, cable and other infrastructure companies), on the other hand, were passive opportunistic players.

During the creation phase, collaboration is embryonic and appears by relatively convergent cooperative efforts in a highly competitive local environment. The next phase highlights how the geographic proximity does not work out.

4.2. How social distance perpetuates the status quo: (2004–08)

From 2004 to 2008, the expectation is to see an engagement from all the actors, but this phase ends up being a status quo phase. Data analysis shows how local leaders purposefully slow down various innovation projects despite their cognitive and geographic proximities.

The year 2004 marks the end of the euphoric phase of speeches and purely symbolic actions. The ecosystem should now crystallize its official engagement through specific projects. As Fig. 1 illustrates, the ecosystem trajectory begins with cooperative practices because of geographic proximity (meetings about innovation projects in 2004) and ends with competition practices (cheating, refusal to share resources, interpersonal conflicts, use of the veto right and absence of governmental commitment) due to social distance.

The criteria that measure the actors' engagement are three: inputs or resources invested on the emotional or communicational level, duration and the consistency with which actors offer resources (Dwyer, Schurr, & Oh, 1987). The study shows that this phase does not mobilize all of the inputs and emotional or communicational resources required. These inputs and resources fluctuate over time and are inconsistently motivated.

Analysis of the verbatim record is very revealing on the actors' individualistic behaviors and unwillingness to cooperate. A number of members say that they are disappointed and frustrated at other members' incapacity to cooperate. However, curiously, no actor takes responsibility for these failures. Certain projects deal neither with research nor marketing of solutions, but concern professional training and standardization protocols.

Consider these quotations from the verbatim transcript:

"*That's the naïveté, they were enthusiastic to work together, like a science experiment but it's not a great business.*"

"*One on one we can cooperate and go to market but formal, global cooperation highly impossible.*"

"*The operators are the blockage in the ecosystem: keeping people from passing through the pipeline, aren't capable of being content players.*"

"*What disappointed me a little was not to see some enthusiasm among the operators.*"

"*There's not even a place to bring experienced people together.*"

"*The idea of sitting down with others isn't popular.*"

"*The existing players and the old monopolies are kind of arrogant, they say, I'm not going to take the risk of taking up with the young ones.*"

As these statements illustrate, geographic proximity does not play a facilitator role. Even if the respondents have to see each other on a regular basis because of the public institutionalized ecosystem, their social proximity does not develop. The geographic proximity combined with the duty to work with each other is not enough to foster trust, engagement and social ties. All of the ecosystem leaders agree that collaboration in local innovation projects would be a win–win scenario. Yet, they are not ready to build such close relationships. Their readiness is not a matter of time or space. In addition, they know each other and belong to the same French Quebecer community. Local players share high organizational, cognitive and institutional proximities. Among operators, competition wins out over cooperation. War and ego are two central themes that defined behaviors and inspired individuals (see Fig. 2). The vocabulary is explicit: "trench warfare"; "approach what you do with your arsenal"; "we will fight and we will win"; "it's killing us"; "Win the battle"; "They have invaded our territory."

Opportunistic, competitive logic blocked cooperative logic, even though cooperation could generate more individual and collective profit than competition. During this phase, some even engage in conveying false information and misleading competitors. These following are examples from the verbatim transcript:

"*The strategy in these meetings is get the others to make mistakes.*"

"*Make them believe in fake R&D projects.*"

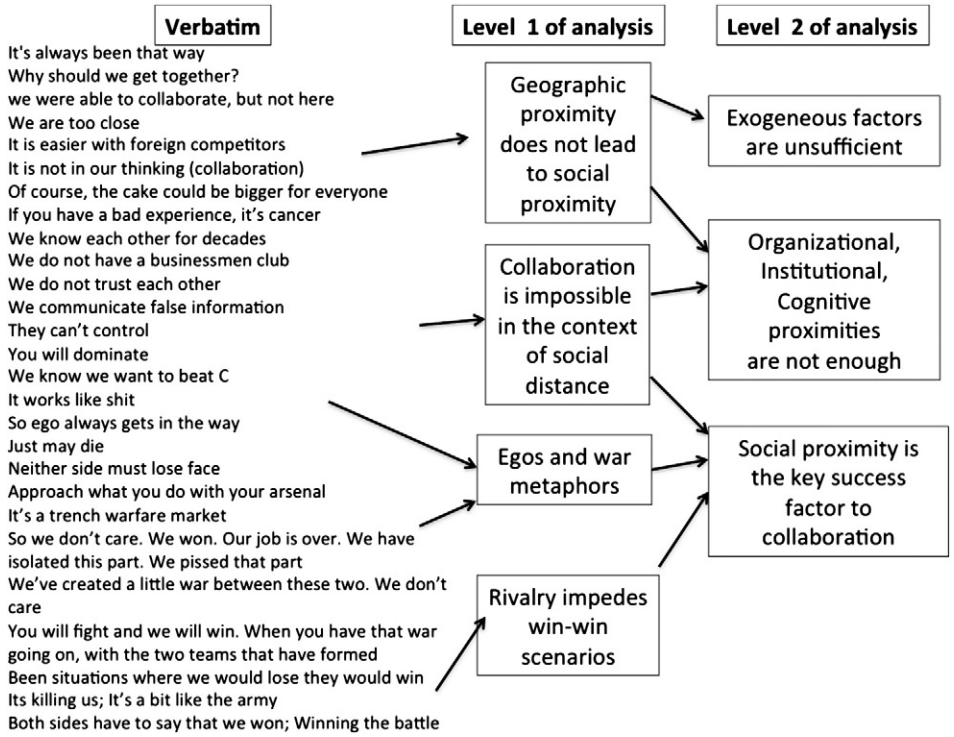

Fig. 2. High-rivalry context.

"*There is stiff competition, if I only have scarce resources in the corporation why would I expend them working with my competitor?*"

"*I doubt we would ever partner with C. If the customer had enough power to demand that and there was enough business there, you might see some form of cooperation between ourselves and our competitors, it does happen.*"

"*When the overlap is 90% like C we're highly unlikely to cooperate, unless this guy has so much control or X has so much control that they make us do.*"

"*We have to be a very very large opportunity with a very very large payout and even then we would cooperate to the minimum amount possible.*"

"*Eventually you'll get your money back if the solution you're creating is successful if it is unsuccessful you get fired so not many people won't risk their career they won't do it unless one tells them they're going to need it.*"

"*Rarely those things work to that level, the more opponents you have conflicting agendas, the overlap is so tiny, the way the industry works, personal opinion hence, most solutions don't get widely deployed.*"

"*They realize that every one of those techniques are cooperation, could actually hurt you in the business model if you give away your secrets.*"

In the end, this phase clearly explains that geographic proximity does not always lead to social proximity, even over many years. Many of the leaders interviewed demonstrate a modicum of interest in open innovation. The only cooperative practices during this phase consist of having representatives at various socio-cultural events and showing a sense of belonging to the community in the various activities linked to firms' social and economic responsibilities (involvement with universities, conferences, innovation days, innovation meetings and so on). During the first five years, steering parties (governments, donor agencies) submit ideas for open innovation projects. In 2008, the ecosystem begins to disengage.

The federal government in 2008, for one, starts to depart from its roles of funding and support for innovation and entrepreneurship and announces in its budget a gradual withdrawal over the next few years. This decision has a negative snowball effect. Certain local actors supporting co-innovation have to review a number of projects and certain donor agencies, given the shrinking government participation envelope, become more hesitant and prudent in funding participants. A number of programs are threatened to be stopped due to a lack of political will and funding. In fact, according to a number of respondents, initially the public budgetary envelope for investment strongly encouraged stakeholders to get involved and to believe in the potential of these investments. The pullback therefore affects the level of confidence in the ICT sector.

4.3. The dissolution phase due to the lack of entrepreneurial and innovative initiatives (2008–09)

Finally, the dissolution phase (2008–2009) shows how all the socioeconomic actors decide to abandon their ecosystem. In 2008, the status quo is broken. The members begin to leave officially and the different stakeholders end their active role. Although nominally the ecosystem existed until 2009, the actors no longer participated in any activities and stopped contributing financially to ecosystem fixed costs. In less than a year, the ecosystem was dissolved without having generated the anticipated potential of open innovation.

The federal government is to some extent wrongly blamed for the failure of the ecosystem, which had been a public–private initiative whose operation had depended on a mixture of funding sources. The ecosystem therefore finds itself facing two challenges: an endogenous challenge related to problems of social proximity among members and an exogenous challenge related to the public funding that

the government had promised and which had not been forthcoming in the last few years, thus limiting its development. By the end of this process, the ecosystem had become an empty shell.

5. Conclusions and contributions

This paper contributes new evidence toward understanding the process of collaboration for innovation in high-knowledge industries. In fact, this work highlights how ICT ecosystems are not blindly innovation driven. Hence, open innovation is a social phenomenon that requires a social proximity between firms and entrepreneurs. This article contributes to existing theory on innovation and entrepreneurship in knowledge industries by showing that, contrary to the dominant thinking, geographic proximity neither explains social proximity nor fosters collaboration for innovation. Even in close contexts of cognitive, organizational and institutional proximities, social distance can be an impediment to collaboration.

This multi-level study evolves from a macro perspective (ICT ecosystem evolution) to a micro perspective (individual practices in a context of geographic proximity). After identifying and describing the evolution of the geographic ecosystem, the paper focuses on why leaders have not engaged into innovation projects. Despite their formal mission and their geographic proximity, the leaders chose a lose–lose innovation scenario. Success depends less on geographical proximity and more on the social innovation mechanism (Gordon & McCann, 2005). As an addition to the existing body of literature, this case study leads to three propositions.

Proposition 1. *Geographic proximity does not lead to social proximity, especially in high-rivalry contexts.*

The dissolution of the public private ICT ecosystem is the result of the lack of trust due to the social distance between local players. Thus, despite close geographic proximity, local leaders do not engage in social relationships. This case study challenges traditional literature on geographic proximity. Indeed, geographic proximity is generally considered to be an enabler of trust, social relationships and collaboration. This study shows that geographical proximity is not a sufficient condition to sustain regional cooperation and innovation. Precisely because of geographical proximity, many entrepreneurs did not want to cooperate. Interpersonal and inter-firm rivalries are major impediments to allowing the network to function. Despite government and institutional incentives, firms abandon different projects. The lack of social, informal and spontaneous relationships can also prevent cluster members from acting as interdependent and cooperative players. Hence high-knowledge industries do not always benefit from geographic proximity to run open innovation projects.

This case critically reveals the difference between spontaneous and institutionalized geographic clusters (Rallet & Torre, 1999).

Proposition 2. *Formal institutionalized clusters impede spontaneous social proximity.*

Clusters created by economic policies may be less prone to innovation compared to clusters emerging from private initiatives. Natural clusters that entrepreneurs create, like Silicon Valley or the German Mittlestand are models often cited as success stories but their imitation in other geographical regions supported by government policies is no guarantee of success. In successful geographical clusters, firms connect on a voluntary basis driven by knowledge spillover and innovation. Public initiatives artificially create institutionalized geographic clusters that do not develop as endogenously as spontaneous networks. In fact, artificial clusters rely more on exogenous proximities (geographic, organizational, cognitive and institutional) and less on the endogenous social one; while private spontaneous networks require social proximity from the beginning. The case study explicitly describes how individuals act very passively in their ecosystem. Some leaders even engage in conveying false information and misleading local competitors. Yet they are able to see the benefits of collaboration with foreign players.

Proposition 3. *Geographic distance is seen as an accelerator of entrepreneurship and innovation.*

This case study highlights how individuals not engaged in their local innovation ecosystem regularly partner with global competitors (particularly with French and American partners). The geographic distance seems to favor a win–win mindset among Quebecer leaders. Trust is easier to build with foreigners, as partners do not feel threatened in their local markets.

To understand entrepreneurs' willingness to cooperate within a regional cluster, the study points out the need to go beyond firms or interfirm analysis. Several authors suggest that individual decisions and actions are embedded in the institutions and social systems to which individuals and managers belong (Aldrich & Zimmer, 1986; Granovetter, 1985). Both over-socialized and under-socialized perspectives of behaviors need to be complemented (Aldrich, 1992; Thornton, 1999).

From a practical point of view, the findings have directly relevant implications. First, public policies for clusters should take into account the socioeconomic local context. They should particularly target the enhancement of social proximity between local entrepreneurs instead of relying on geographic and cognitive proximities. Institutionalized ecosystems should enhance existing spontaneous initiatives.

The sample studied suggests that conducting a multilevel analysis is necessary, but only few such studies exist. This work highlights that the relationship between the ecosystem and the individuals is dialectical. Thus, the social and geographical context is a key piece of the puzzle, but an integrative framework of entrepreneurship and innovation needs to include psychology, economics and sociology (Thornton, 1999).

5.1. Limitations

This research has limitations that require further attention. In fact, the study is based on a longitudinal analysis of a single ICT cluster. Though critical single case sampling is encouraged to reveal fine-grained data (Langley, 1999; Yin, 1994), the conclusions are limited by the single-case data. For greater external validity, future quantitative research need to test the propositions that would involve different public–private high knowledge clusters. Because of this concern, this paper acts as an exploratory study that helps to pinpoint new research directions.

5.2. Future research directions

A number of methodological and theoretical insights emerge from the research. First, the longitudinal analysis allows seeing the innovation as a process involving firms and individuals. This process reveals the evolution of the collaboration dynamic in the cluster instead of having a descriptive snapshot of the cluster failure. The research emphasizes that contextual factors are important and that in-depth qualitative analysis allows analytical generalizability (Yin, 1994).

This work contributes to the cluster literature by suggesting new relationships between collaboration and geographic, cognitive, organizational, institutional and social proximities. While cognitive, organizational and institutional proximities do not help to create a climate of collaboration, social proximity is the most important dimension. Future research should establish more precisely the role of social proximity in fostering collaboration in contexts of geographic distance. To build on the propositions of this paper, a multiple case study could compare the evolution of different ecosystems

(spontaneous and institutionalized). Finally, this paper builds an argument for the importance of studying both successful and unsuccessful clusters. The paper's findings highlight the importance of understanding failures to grasp new insights on open innovation as a social phenomenon.

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