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Innovation, Knowledge Intensive Firms and Creative Environments

Patrick Cohendet

BETA, University of Strasbourg, & HEC Montréal
3000 Côte-Ste-Catherine, Montreal (Qc.) Canada H3T 2A7, patrick.cohendet@hec.ca

Laurent Simon
HEC Montréal

3000 Côte-Ste-Catherine, Montreal (Qc.) Canada H3T 2A7, laurent.simon@hec.ca

The ever growing innovative economic environment invites a reconsideration of the foundations of the theory of the firm. There is a wide recognition that the traditional approaches of the firm, in particular the transactional approach, which has been designed to cope with the problems of allocation of resources by firms, cannot provide a satisfactory understanding of innovation. As emphasized by many authors (e.g. Milgrom and Roberts 1988; Langlois and Foss 1996), the transactional approach, which is the dominant form of representation of the firm, has great difficulties in accounting for the process of creation and diffusion of ‘new’ knowledge. Transactional theory assumes that resource allocation takes place in a context in which productive capabilities are given. The firm is restricted to an institutional device, a “processor of information”, allowing the establishment of incentives that correct informational biases and prevent the unproductive search for opportunistic rents, which can arise thanks to the imperfect nature of the information. This is a theory of the firm based on the problems of exchange, where the aspect of production or creation of resources is either neglected or considered of secondary importance.

These limitations of the traditional approaches to cope with innovation are clearly expressed by Nonaka and Takeuchi (1995, p. 56), when they underline that: “*when organizations innovate, they do not simply process information from outside in, in order to solve existing problems and adapt to a changing environment. They actually create new knowledge and information, from the inside out, in order to redefine both problems and solutions and in the process, to re-create their environment*”.

Following the seminal impulse given by Nelson and Winter (1982), eminent scholars in the field have developed the foundations of an evolutionary approach to the theory of the firm (Teece 1998; Dosi and Marengo 1994; Teece et al. 1997) that in many aspects significantly improve the understanding of innovation. One of their main hypotheses is

that routines hold the key to understanding the organization of firms, their diversity, and their persistence. As stated by Nelson and Winter (1982, 128), *“the behavior of firms can be explained by the routines that they employ. Knowledge of the routines is the heart of understanding behavior. Modeling the firm means modeling the routines and how they change over time”*.

At the same time, building on the resource-based view in strategy (Wernerfelt 1984; Barney 1991; Peteraf 1993), a partly overlapping set of scholars have developed a *knowledge-based* approach to the theory of the firm (Kogut and Zander, 1992, Loasby 1976, 1983; Dosi and Marengo, 1994; Marengo, 1996, 1994; Grant 1996; Spender 1996; Teece et al. 1997; Winter 1987, 1988, 1995). Within this approach, the firm is conceived as ‘a processor of knowledge’, as a locus of setting up, construction, selection, usage and development of knowledge. The governance of the firm is not focused on the resolution of informational asymmetries, but on the co-ordination of distributed pieces of knowledge and distributed learning processes. Cognitive mechanisms are essential in this endeavor, and routines play a major role in keeping the internal coherence of the organization. The focus of the theory thus falls clearly on the process of creation of resources (“from the inside-out”). This perspective on the firm has been taken forward, among others, by Cyert and March (1963/1992); Cohen et al. (1972); Cohen (1991); Drawing on the writings of Chandler (1962, 1992), Alchian (1950), Penrose (1959) and Richardson (1960, 1972), recent works at the forefront of current research, starting with the seminal work of Nelson and Winter (1982) and including contributions by Dosi (1988), Teece (1988), Prahalad and Hamel (1990) and March and Simon (1993), have put forward a common hypothesis: the essential attribute of the firm is grounded in its ‘competences’, which correspond to a set of routines and know-how expressing the efficiency of a firm’s resolution procedures. The firm is thus primarily designed as a locus of arrangement, construction, selection and maintenance of competences, from which its innovative potential is progressively built and shaped.

While much progress in the understanding of the process of innovation has been made in the past 20 years thanks to the evolutionary/knowledge-based approach of the theory of the firm, many open questions still prevail. Among the main ones are the following:

- First, it is difficult to untangle the threads of the discussion between the evolutionary and knowledge-based theories of the firm. This is a source of fuzziness which is heavily pinpointed by opponents such as Williamson in economics (1999) or Porter in strategy (1994). Too many streams, approaches, and concepts weaken the strength and applicability of the theories.
- Second, the theoretical positions of these new theories vis-à-vis the traditional theories are somewhat unclear. Are they complement or substitute? Do firms manage only transactions (according to the traditional vision), or only competences (according to many authors of the knowledge based approach), or do they manage both (Foss and Langlois, 1996; Cohendet and Llerena, 2003).
- Third, the role of the entrepreneur in the evolutionary/knowledge-based vision is unclear. Is there a pilot in the evolutionary theory of the firm (Cohendet, Llerena, Marengo, 1999)? While the entrepreneur is the central actor of the Schumpeterian

- heritage, his role in the modern evolutionary approach of the firm has been somewhat displaced by the attention given to routines.
- Finally, the central concept of routine, and its application to the understanding of innovation still need some major improvements. As Felin and Foss (2004, p.23) write “*While references abound to notions of organizational routines and capabilities, at present in evolutionary economics and strategy we have 1) no theory of their origin, 2) no agreed upon, clear definition, 3) no measurement and 4) no clear understanding of how exactly they relate to competitive advantage... the problem is to a considerable extent with the collectivist roots of routines and capabilities-based work, which sideline the individual, and scarcely allow for individual-level explanation.*”

In the present contribution, we propose to revisit the conceptual approach of the innovative firm by starting from the reconsideration of the last one among the main issues: the concept of *routine* and its unachieved role in the understanding of innovation by the evolutionary/knowledge-based theory of the firm (Part 1). Our view is the following: while the concept of routine has been successful in explaining the heterogeneity between firms (“why firms differ?”) and their different paces of growth, its application to the understanding of the process of innovation is limited by the fact that the concept is still analysed in a too static vision (routine as a “repository of knowledge”) confined in a pre-existing division of work. What is needed is an in-depth exploration of the micro-context of the origin of routines, of the conditions of their emergence, and of their degree of replicability. To understand the dynamics of innovation, one should go behind the scene of the routine, and look at the dynamics of the social groups which are the active units of knowledge from which routines emerge and change. We advocate that the notion of *knowing communities* plays this role of active units of knowledge and captures some fundamental aspects to explain the dynamics of innovation of firms. More precisely, the process of innovation in a firm is heavily dependent on the interaction between formal structures (driven by the hierarchy) and the informal structures activated by the knowing communities.

To illustrate these theoretical insights, we then propose to analyse in depth the case of a specific *knowledge intensive firm* in the domain of videogame (Part 2). We have deliberately chosen this highly innovative firm, because it is not observable through the classical lenses of the theories of the firm, including through the standard evolutionary approach: A remarkable characteristic of this firm is that it has no large R&D departments, nor it has any worldwide subsidiaries to tap into for external creative ideas, nor it accesses creative knowledge through their participation in global networks of diverse partners. Furthermore, this firm does not develop as well the kind of internal organisation with a virtuous knowledge spiral (SECI model) advanced by Nonaka and Takeuchi (1995). None of these classical ways to enhance creativity is present in the firm. Our view is that the creativity of such a firm relies on the existence and interactions of a myriad of *knowing communities* which are the active units of the many projects of the firm. We will show that these communities find their source of inspiration and creativity in their local environment, which, in this precise case, is the creative city of Montréal.

1. Understanding the dynamics of innovation requires “going behind the scene of the routines”.

The theoretical works on routines do insist in understanding “what is a routine”, but devote little attention to the nature of the group of agents “who are involved in the routine”¹. In other words, the members of the organization involved in a routine are generally considered as anonymous. For instance, the well-known definition of routine given by Cohen *et al.* (1996, p. 683) – “*A routine is an executable capability for repeated performance in some context that has been learned by an organization in response to selection pressures*” – does not specify the type of groups of agents related to the routine. In fact the evolutionary theory explicitly refers in many examples that it uses to functional departments or project team as the organisational unit that supports the routine without making any differences between them. The project team is very often referred, since one of the main issues with routine is its replication when the project is over.

We consider that this view, which concerns the very core of the theory, raises two main problems. First, it is only partially true: routines experienced in a functional group, in a project team, in a network of partners, in a community of different kind, may be all different in terms of power of replication, of degree of inertia, of potential of search. The conditions of emergence of the routines drive to a large extent the modes of evolution of routines and the conditions of their replication for the organisation. These considerations should stand at the heart of the functioning of the knowledge-based firm. Second, the classical evolutionary vision, by focusing on the sole organisational arrangements that are shaped by the hierarchy and that are driven by a pre-existing division of work, tends to let aside the contribution of informal groups of the firm to the innovative process.

More precisely, the evolutionary approach is undoubtedly the theoretical approach that best accounts for firms’ resources creation. However, it lets knowledge creation slip because it proceeds as if the firm *possessed* (hence the concept of a ‘repertoire’) the knowledge incorporated into routines and suggests that competence results from the selection of the best routines stored within the repertoire. However, many recent works (see, for example, Cook and Brown 1999) show that most of this knowledge is not accessible through a ‘given’ repertoire, but is instead rooted in the practices of small active groups or ‘communities’ which form the firm. The very nature of a routine (its capacity for replication, degree of inertia and potential for evolution) depends heavily on the group which implements it. Although evolutionary analysis offers a rich context of interpretation of the relations between the individual and collective efforts in the creation of resources through the concept of routine, it still lacks an analysis of the ‘intermediate links’ which are the genuine catalysts of the process of creation in the organization, where the creative ideas emerge or are tested and where the first validation of any innovation is carried out. It is precisely this failure that justifies taking the concept of community seriously into account.

¹ Among the few exceptions, there are Feldman, Rafaeli (2002) and Feldman, Pentland (2005)

We thus propose to carefully examine the organizational context from which the routine emerges. For the sake of simplicity, we will select two different contexts of emergence of routines:

- 1) *Teams*, which is a generic term used to define those hierarchical working groups in the firm (functional groups, project teams, task force, etc.) for which the context of work and coordination of specialized tasks is defined *ex ante* by the hierarchy; and
- 2) *Knowing communities*, which is a generic term that defines different types of autonomous learning groups of individuals (communities of practice, epistemic communities, and other more or less informal learning groups) united by common beliefs and interests who voluntarily share their resources on a long term basis in order to create and diffuse knowledge (Boland and Tenkasi, 1995). These communities consist of frequently interacting agents in a non-hierarchical communication architecture. An important observation emerging from the analysis of such systems of voluntary cooperative exchange is the importance of behavioural norms in guiding the actions of community members and the intensity of the trust relations that underlie them.

Of course there are hybrids forms of learning groups in the organisation, which are partly hierarchical and partly informal (Andriessen and Verburg, 2004; Bogenrieder and Nooteboom, 2004), but in this contribution we will focus on these two extreme forms to show that the process of formation of routines, the nature of the routine, the degree of replication of the routine, the modes of transmission of the routine to new members, the mode of selection of the routine, etc...significantly differ in these two types of contexts of emergence. Our view is consistent with one main result of the theoretical debates on routines: the fact that routines are essentially context-dependent. Execution of a routine can only be conceived in a given context that provides the natural locus of attention for collective action. As Nelson and Winter (1982, p. 105) emphasize “the context of the information possessed by an individual is established by the information possessed by all other members”. Hence the context is generative because the “creation of shared languages and shared meanings stems from the interaction of organizational members. The relationship among organizational members is quintessential for the development and consequential execution of organizational patterned activities that embody the memory of the organization. However most of these approaches consider that the “context” includes physical state of equipment, external memories, and work environment. We clearly suggest focusing on a specific type of context: the organizational context from which the routine emerges. “The organizational context is both prone to active individuals mnemonic processes, and more importantly activate organizational mnemonic processes” (Paoli, Prencipe, 2003, p.153)².

One of the main differences between teams and knowing communities is the *nature* of the collective cognitive process. In the case of teams, most of the learning activity results from a *learning by doing* process. This means that the cognitive construct of the group (the jargon, common grammar and codes, social norms, etc.) is only a *by-product* of the

² See also Cohendet, Llerena (2003), a companion paper of this one.

"main" objectives of the group which are essentially oriented towards coordination mechanisms or incentives (to ensure the task efficiently, to reach the goal of the project on time, etc.). This explains that in the case of teams, specific efforts have to be undertaken by the hierarchy to delineate, capture, reproduce or replicate the routines that result from the learning by doing processes at stake. The cognitive construct that supports the routine is fragile in the sense that it has not been elaborated as the routine has been constructed. Most of the time, the hierarchy tries to absorb and replicate the routine of a given team with the global cognitive tools of the organisation (common language and representations) which are necessarily somewhat "distant" from the actual practice of the team.

In the case of knowing communities, the learning process is *intentional*. It is the *raison d'être* of the community that deliberately engages itself in a cognitive activity in which the cognitive understanding of the routine is inherent to and inseparable from the daily functioning of the group. For instance, members of communities of practice by continuously circulating the best practice between them *simultaneously* work to improve their practiced routines and build the common cognitive framework that holds the community together. The cognitive construct that supports the routine is thus built as the routine is formed. This explains the strong degree of encryption and replication of the routine, which however is supported by jargons and norms which are specific to the community. The replication for the hierarchy may be difficult, but for reasons and mechanisms that radically differ from the case of teams³.

Distinguishing formal and informal structures not only help understanding the process of emergence and growth of routines, it also helps understanding the emergence of innovation within the firm. As underlined by Brown and Duguid (1991, p. 54), the firm can be perceived "*as a collective of communities, not simply of individuals, in which enacting experiments are legitimate, separate community perspectives can be amplified by inter-changes among communities. Out of this friction of competing ideas can come the sort of improvisational sparks necessary for igniting organisational innovation. Thus large organisations, reflectively structured, are perhaps well positioned to be highly innovative and to deal with discontinuities. If their internal communities have a reasonable degree of autonomy and independence from the dominant worldview, large organisations might actually accelerate innovation*"

In such a perspective, the above discussion suggests that an essential part of the process of innovation can be interpreted as resulting from the dynamics of interactions between knowing communities. These interactions can be approached through the principle of 'translation/enrolment' elaborated in particular by Callon and Latour (1991). Interpreting these authors, the innovative diffusion of ideas (for example from the lab to the market) can be seen as a process of progressive contagion of communities, where each

³ In these last two cases, the emergent routines constitute the so-called "dynamic capabilities" As defined by Zollo and Winter (2002), 'a dynamic capability is a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness', Zollo, Winter (ibid., p. 340)

community makes efforts to 'command the attention' of other communities to convince them of the relevant interest of the knowledge it has elaborated.

The idea of the firm as a bundle of interacting communities is in line with the pioneering vision of Kogut and Zander (1992) who view the firm as a social community depending on voluntary co-operative exchange and informal communication as sources of collective beliefs and corporate culture. It is also close to the idea put forward by Crémer (1998, p. 16), arguing for an advanced theoretical analysis of the networks of non-hierarchical communication within the firm: "*A considerable amount of work is yet to be done on non-hierarchical communities in firms. In contrast with the theory of hierarchies, the research in this perspective should aim at a better understanding of the advantages and drawbacks of the different networks of communication. It should also aim at exploring their organizational consequences*". Thus, following Boland and Tenkasi (1995), we can view innovative firms as organisations composed of multiple communities with highly specialised technologies, expertise and knowledge domains: "Organisations are characterised by a process of distributed cognition in which multiple communities of specialised knowledge workers, each dealing with a part of overall organisational problem, interact to create the patterns of sense making and behaviour displayed by the organisation as a whole. Organisations are necessarily characterised by distributed cognition because their critically important processes and the diversity of environments and technologies to be dealt with are too complex for one person to understand in its entirety. Communities develop unique social and cognitive repertoires which guide their interpretation of the world".

The main reason that explains the growing role of communities in the theory of the firm is, in our view, the following: As the knowledge-based economy develops, firms increasingly appear as clusters of interconnected communities interacting within a common cultural framework. Indeed, as the knowledge-base of society expands and progressively becomes more complex, traditional hierarchical structures face difficulties in integrating and consolidating dispersed parcels of knowledge. These parcels are increasingly generated by and consolidated into informal collective contexts or communities that are well suited to dealing with some of the irreversible *sunk costs* associated with the processes of creation and maintenance of knowledge. The ability, in a given firm, to integrate an ever diverse number of specialised bodies of knowledge is not infinite. First, because ever growing absorptive capabilities (which are far from being a free good) are required for understanding external knowledge; second, because the ability to design cognitive platforms of integration is required for shaping the external knowledge in a form suitable for further exploitation by the firm; and third, because in this system the firm is compelled to specialise even further in its domain of specialised knowledge. This requires the building of an infrastructure of knowledge (models, grammar, codes, etc.) that generates ever increasing sunk costs. Thus, communities appear to be genuinely active units of competencies, which are useful to the organisation as a whole since they are involved in a significant part of the processes of production, accumulation and validation of knowledge. These communities can be formed within traditional hierarchical settings (such as functional departments or project teams), but can

also cut across the hierarchical structures of the firm by bringing together members interested in a particular field of knowledge.

However, if communities can take in charge the sunk costs associated with the building of specialised domains of knowledge, there is still the need to integrate the diverse bodies of specialised knowledge in an efficient manner, in an organised and formal structure. This is precisely where the critical role of the hierarchy of the firm comes into play: to organize efficient formal platforms of knowledge (the hard architecture) within the firm in order to facilitate the interaction between knowing communities.

Our vision is that the creation of new knowledge within an innovative firm is the result of a delicate balance between the new ideas that emerges from formal units (such as a research lab, or an artistic department in charge of the conception of new projects) and the new knowledge produced within the different communities. We will in particular emphasise that through the dynamic interaction between communities, new configurations of the knowledge may emerge by creating new meanings or new linguistic routines. The creation of new knowledge in an organisation is often the result of an open system transformation of that organisation's communities of knowing, as they question and revise routines and create new processes and relationships between themselves. Producing knowledge to create innovative products and processes in such firms requires the ability to voice strong opinions within a community, as well as the ability to take the perspective of another into account.

Thus, innovative firms tend to combine a "hard architecture of knowledge" in the form of administrative functional units and hierarchical structures with a "soft architecture of knowledge" that delegates to communities the role of creating, nurturing and enhancing the bodies of specialised knowledge that are needed for their creative business. In an intense-knowledge context, the organisation of firms tends towards a specific structure that articulates on the one side, a hierarchical formal part in charge of the strategy, the definition of competences, the contractual activities, and the formal organisation of a multi-project activity, and on the other side, an informal part composed of diverse knowing communities in charge of the production, accumulation and circulation of competitive knowledge. Given that the production and diffusion of knowledge generally appear to be embedded in informal contexts and structures, one of the major roles of the firm is to give some coherence to the interactions between these various communities, in particular in the processes that lead to innovations.

From this perspective, an important related question is to determine what types of competences the firm should keep internally, and what competences it should place in the external environment along the perspective suggested by Loasby (1991) who distinguishes between the firm's internal and external organisation in differentiating the "knowledge-how" (knowing how to do things for yourself) and the "knowledge that" (knowing how to get things done for you). The firm can thus maintain its direct capabilities internally and place its indirect capabilities in its external environment

(Loasby, 1998, p.9). Some firms may try to keep most of their competences and communities within the internal boundaries and delegate to the external environment basic supplier needs, while some firms may extensively rely on external competences and communities dispersed over an international global network.

Let us sum-up the discussion at this point: we have proposed to deliberately introduce in the foundation of the innovative firm, the active role of knowing communities, viewing the firm as a social entity composed of a myriad of communities. This theoretical construct does not displace the key role played by routines in the evolution of firms, but it aims at complementing it. Observing the communities allow us to understand the micro-foundations of the process of innovation. Referring to one or to the other of these related concepts depends on the context. When dealing with issues such as the reasons of the differences between firms, or of the issues of the building of their core-competencies, the concept of routine is by far the most appropriate one. However, when trying to understand the dynamic of innovation within a given firm, looking behind the scene of the routines and thinking in terms of communities is useful to capture the forces from which the sparks of innovation emerge and diffuse. At this intra-firm level, *knowing communities* are the active units of specialisation of the firm. Situated at the interstices of the hierarchical structures of firms, knowing communities play a unique role in terms of regeneration of the innovative potential of the firm.

If knowing communities in firms could thus be seen as elementary units of specialised knowledge, they also provide another potential advantage to firms: they strongly contribute to equipping firms with *absorptive capabilities*. Knowing communities are never bound within the limits of organisations. They permanently interact in their specialised domains of knowledge with the outside world collecting new ideas and benchmarking the best conditions of practice. They nurture the organisation by continuously bringing new pieces of specialised knowledge which have just been tested and validated in the outside world. The different communities in the organisation could thus be seen as a set of diverse sources of absorptive capabilities that potentially allow firms to benefit from a diversity of knowledge. As Cohen and Levinthal (1990) remarked, “*diversity of knowledge plays an important role: in a setting in which there is uncertainty about the knowledge domains from which potentially useful innovation may emerge, a diverse background provides a more robust basis for learning because it increases the prospect that incoming information will relate to what is already known. In addition to strengthening assimilative power, knowledge diversity also facilitates the innovative process by enabling the individual to make novel associations and linkages*”.

However, as Cohen and Levinthal also emphasised, “*absorptive capabilities refer not only to the acquisition or assimilation of information by the organisation, but also to the organization’s ability to exploit it. Therefore, an organization’s absorptive capacity does not simply depend on the organization’s direct interface with the external environment. It also depends on transfers of knowledge across and within subunits that may be quite removed from the original point of entry. To understand the sources of a firm’s absorptive capacity, we focus on the structure of communication between the external*

environment and the organization as well as among the subunits of the organization, and also the character and distribution of expertise within the organization”.

How useful in practice is such a representation of interacting communities, both of hierarchical and informal types that are the active units of routines, for the understanding of innovation? To illustrate this conceptualisation, we propose to analyse in very precise details an industrial case, of a videogame company which presents the following remarkable properties:

- The company is highly innovative and occupies a leading position in a highly creative sector
- It has no significant research departments
- It did not outsource its research activities to another company or contracted research with a given lab.
- It is not involved in intense cooperative agreements, or technological networks
- It did not rely on intense knowledge based subsidiaries

In short all the traditional variables that are used to explain the process and nature of innovation in firms are absent from this case study. Our view is that the creativity of such a firm relies on the existence and interactions of a myriad of *knowing communities* which are the active units of the many projects of the firm. We will show that these communities find their source of inspiration and creativity in their local environment, which, in this precise case, is the creative city of Montréal. This innovative firm tends to adopt a very specific mode of organisation: it concentrates internally on the governance of multi-project activities which contribute to generate, exploit and develop a “*creative slack*” as a source of growth of the firm, while it tends to place its indirect capabilities, and in particular their absorptive capabilities captured by the knowing communities, in the soil of a creative city.

The key point is the following: the core of the innovative potential of the firm resides at the interaction between the hierarchical structures of the firm (the projects) and the informal structures (the knowing communities that nurture and capture the creative slack of the company). May be one can understand this emergence of innovation as resulting from a complex interactions between different types of routines. We argue that looking at the phenomenon in terms of communities is more understandable.

2. A case study of a creative firm whose innovative performance is based on the interactions of knowing communities.

The case study we have chosen illustrates how a video-game firm, which has no significant research department and does not participate to large international cooperative networks, copes in managing creativity and expression of artistic values, while meeting the constraints of the economics of mass entertainment. The research is based on a case study in one of the largest video game studios in the world located in Montreal, Canada,

where one of the co-authors spent three years during his PhD. The approach considers that the creative units of the firms are the *communities of specialists* (game developers, software programmers, etc.). Each of these communities, which have found a fertile soil in its direct environment (the creative city of Montreal) that nurtures their creative potential, is focused on both exploration and exploitation of a given domain of knowledge (to some extent, it can be said that Montréal plays the role of the research lab of the firm).

In order to benefit from these sources of creativity, the integration forces implemented by the managers of the firm to bind the creative units together for achieving commercial successes reveal a hybrid form of project management which combines decentralized platforms with strict constraints on time, and a specific management of space that favours informal interactions. However, we suggest that the integration forces put forward by the firm are not just for harnessing creative units: they also generate *creative slacks* for further expansion of creativity.

When looking at the organizational structure of the firm, one finds traces of functional traditional departments such as accounting officers, financial staff, human resource employees and diverse administrative units. However, trying to understand the creative potential of this innovative firm from an analysis of these functional departments would be misleading. The functional departments primarily act as administrative support to the organisation of projects which are the main element of the “hard architecture of knowledge” (the formal architecture of knowledge which is shaped and controlled by the hierarchy) in these companies. The innovative firm usually conducts several projects simultaneously (shows, series of videogames, advertising projects), and therefore corresponds to the type of “project based firm” identified in the literature (Gann and Salter 1998, De Fillippi and Arthur 1998). Even if most of those projects are driven by a creative tension (mutual prescriptions) between technological developers and creators of content, they are multidisciplinary in essence and involve the integration of diverse sets of knowledge, skills, and expertise from very different fields.

What is remarkable is that the sources of creativity in this innovative firm are hardly visible on a flow chart. From our observations, the creativity relies on the existence and interactions of diverse informal *communities*. More precisely, the main element of the “soft (or informal) architecture of knowledge” and the source of creativity relies on the functioning of communities, on what we refer to as *communities of “specialists”* (script writers, game-designers, graphic artists, sound designers, software programmers, etc.). We propose to call these groups *communities of specialists* because each of these communities is composed of members with the same background and the same type of assignments who keep on sharing daily information, knowledge, and tricks about their work in and outside the formal framework of projects. However, the very reason why, we refer to *communities* instead of well defined *professions* or *jobs* as in traditional industries, is because these groups of people, essentially composed of young professionals, are bound by emerging and weakly formalised bodies of knowledge. In this case, the ever-evolving nature of technology and the rapidly changing expectations of consumers on a highly competitive market induce a situation where formalisation becomes almost impossible.

Most of the diverse knowing communities are focused both on accumulation and deliberate production of knowledge in the domain of their specialized practice. On a first level, those communities of specialists broadly fit the definition of *communities of practice* as their members use the same technical “jargon”, share practical knowledge, and exchange tricks based on trial-and-error field experiences to increase their competence in a given field of knowledge (thus focusing on *exploitation* activities). On a second level, they clearly also have an epistemic dimension, which means that they are focused on the production of new knowledge (*exploration* activities). As Cowan et al (2000) have shown, epistemic communities are constantly referring to a *procedural authority*. For instance these communities may gather around the appreciation of one “genre” of games or one “style” of graphic design. In programming, they would specialize in a specific coding language or gather around a specific hardware platform. In these formats, those communities would fit the definition of *epistemic communities*.

As a result, most of the communities of specialists in the innovative firm have a dual dimension in the way they process knowledge, aiming both at exploration and exploitation. As the balance varies from one community to the other, the community of game designers probably has the most weight on exploration. However, the coexistence of many diverse communities having both dimensions is one of the distinctive characteristics of cultural industries and explains why these types of organizations finally succeed in matching creativity and efficiency.

In order to better understand the formation of creativity we must explore the various channels through which each of these communities establishes permanent informal interactions with the outside world, in order to confront ideas, to tap creative practices from the other domains of knowledge, and to interact regularly with communities of consumers to check the relevance of their creative endeavours. This reveals a complex maze of creativity, with intense connections to the global world mainly through virtual exchanges of knowledge, but also with deep roots in the local creative city which plays the role of a large and complex forum, home of myriads of knowing communities which promote creativity in very diverse activities and modes.

However, what is remarkable in this innovative firm, by opposition to traditional industries, is that members of a given *community of specialists* - even when they are assigned to a specific project - remain connected to their community on a daily basis. They continue to exchange and interact with the other members of the community and even tend to enrich the knowledge of their community by bringing the experience gained during the project they are assigned to. In this dynamic process, they clearly cope with a dual identity, as members of a given project and as members of a given community.

Such a situation offers many advantages for the organisation. It contributes 1) to facilitate the interactions between communities, 2) to solve the *distance paradox* (coupling or de coupling creative and routine work), and 3) to reinforce the common culture of the company.

First, the dual identity (to have the feeling to belong simultaneously to a project and to a community) favours direct interactions between communities. Members of a community who have participated in a project progressively build cognitive links with colleagues of other communities, and tend to bring this knowledge through the daily interactions within their community. Step by step, the cultural distance (Nooteboom, 1999) between the different communities of specialists is reduced and leads to a reasonable level of mutual understanding, increasing the potential for innovation and creativity. At the same time, new knowledge brought in the project by a specific community fed by members of another project keeps the distance relatively significant so that creative abrasion would still occur. Too great a distance between communities within a firm will not lead to innovative solutions, but if the cognitive distance between communities is too small, the innovative potential of the firm will fade away.

As an example, in a video-game project, game-designer A asks quite naively a programmer to develop an animated piece of rope as an element of decor in a medieval setting, for the next day. The programmer bluntly refuses, and prefers to engage in an open conflict with the now disconcerted game-designer. As the argument unfolds, they both escalate to the programmer's manager and the lead game-designer, manager of A. A technical discussion follows, where the manager explains that programming a rope is not a simple task, that it involves sophisticated calculus of flexibility and elasticity and that this object is not absolutely required unless it plays an important role in the game-play. The game-designer backs off, and acknowledges that he learnt something and finally apologizes to the programmer. Cognitive distance is reduced and would allow for a smoother collaboration in the future. Incidentally, a few months later, the lead game-designer would formally order from the programmers the development of sub-programs of animated ropes to be included in future designs, and used as an element to stimulate the creation of new game-plays.

While the dual identity favours a reduction of the cognitive distance between distant communities, it may in turn have a beneficial opposite effect within a given community by introducing a continuous flow of new ideas from members scattered in dozens of projects running in parallel. Thus, the cognitive distance within members of a given community can be maintained at a level which prevents both too much uniformity and lack of creativity.

Our view is that in the long run, this mutual understanding between communities may drastically modify the way to manage projects in Innovative firms, in particular the way to build modularity. In a theoretical modular scheme, modules (communities) are not supposed to directly interact. Their interactions are mediated by the cognitive platform designed by the hierarchy. However, in the case where mutual understanding between communities becomes very high, we can envisage governance by the community alone, with hierarchy needed only to 'authorize' or 'enact' the organizational forms produced by the interacting autonomous communities. In particular, the cognitive platform itself could

become an emerging by-product of the constant interactions between communities. The organization can operate largely in a self-organized manner. In such a mode of “management by enactment”, the unceasing efflorescence of communities would allow the organization to innovate constantly (Ciborra, 1996).

Second, the dual identity contributes to solve the *distance paradox*. As underlined by De Fillippi et al (2004) organizations attempting to solve the dilemma between creativity and efficiency may physically separate creative work units from more routine work units. “Such de-coupling presumably favours lateral thinking ‘outside the box’ that is free from the practices and conventions of the routine work of the organization (Bilton and Leary 2002)”. However, the implementation of such a solution introduces a major risk of dissonance when creative inputs and creative work practices have to be introduced into the rest of the organization. The *de facto* “dual identity” of project employees in the Innovative firms contributes to eliminate this risk and by-pass the need of decoupling/re-coupling the organization, by providing a specific mode that guarantees the permanent connection between the routine works required in the management of projects, and the creative works done within communities.

One of the advantages of this permanent connection is that it provides opportunities for feedback between the micro creativity that emerges from the daily activities during the project, and the macro-creativity that is the expected output of the creative communities. The creativity of a project should not be confined to the macro-creativity set up at the beginning of the project by the project managers. A creative project should be able to incorporate new ideas and innovative suggestions, and all the micro-creative inputs that emerge from the day to day activities during a project. This micro-creativity compensates one of the main drawbacks of the hierarchical conduct of any project: there is the risk if the hierarchy strictly controls the timing of a project that this constraint excludes any significant feedback in terms of conception, and thus may imply a loss of creativity by killing the micro-creative inputs. The dual identity mitigates this risk, by allowing permanent interactions between micro and macro creativity. In practice, this permanent interaction may lead to two main effects. First, it may happen that if a micro-creative idea that has emerged during a project appears to be relevant, it can quickly circulate within the communities through regular exchanges, be improved and validated through these exchanges, and be introduced directly into the project, *i.e.* be enacted. Second, micro-creative ideas that emerge during a project can be absorbed in the active memory of some communities of specialists, as a *creative slack* that could be used in other projects.

The “creative slack”.

The notion of *creative slack* purposefully refers to the notion of *organizational slack* proposed by Penrose (1959) who suggested that organizations always have some stock of unused, or underused, resources (e.g., knowledge, relationships, reputation, managerial talent, physical assets, etc.) that inevitably accumulate in the course of developing, producing, and marketing any given product or service. In her view, these unexploited or underexploited productive resources are the primary factors determining both the extent

and direction of growth, which is the dominant motivation of firms, limited only by the administrative capacity of the organization.

In innovative firms, our view is that the organisational slack is essentially a creative one which plays the role of an important reservoir of opportunities of innovative knowledge for the organization, and guides to a large extent, the growth of the organisation. In line with Penrose's vision, the firm which has accumulated a creative slack is better prepared than any other organisation to derive benefit from the creative potential of the slack. The creative slack is shaped by the culture of the firm and is essentially understandable through the jargon of the organisation. Because of these idiosyncrasies, it is much cheaper to valorise the slack *within* the firm which holds it than through any other organisation (including through any isolated community). Some may argue that the creative slack appears as a *cushion of redundancy* which is costly to maintain.

We consider that the specific conditions of formation of the creative slack in innovative firms, - which rely on the functioning of autonomous communities which naturally take in charge, at negligible costs, the production and conservation of knowledge in their domain of specialisation - is a guarantee of the efficiency of maintaining the creative slack at low costs. The remarkable point is that the potential of the slack is diffused in the diverse communities of specialists of the firm that have memorised (thanks to the knowledge brought by their members) parts of the learning during projects. Although it is well known that organizations have extreme difficulties in memorizing what has been learnt during a project, the interest of communities with regards to this issue is that they rather easily memorise the routines practiced by their members. As Cohendet and Llerena (2003) suggested, "a routine that has naturally emerged within a community of economic agents sharing strong common social norms will probably have a much stronger power of replication than a routine which results from the functioning of a temporary team project constituted from heterogeneous agents who never met before".

Thus creative slack has an ambivalent characteristic: it constitutes a specific advantage for the firm which is the only entity able to take benefit from it, yet at the same time it is held, nurtured and maintained at rather low cost by the diverse communities of the organisation, sometimes even without an explicit awareness of the managers. This raises the key question of the source of creativity of the communities of specialists. Our view is that the creativity of communities in this innovative firm takes its roots in the soil of the creative city itself. It is as if the innovative firm, while concentrating internally on the formation and exploitation of the creative slack as their key internal core competence, had delegated the building of creative capabilities of the communities to the local milieu of the city, in particular the development of *absorptive capabilities*.

The contribution of the city in the formation, enhancement and development of absorptive capabilities activated by the communities is analyzed in the following section. Before exploring the contribution to the city in terms of creativity, we would like to underline, that not all the absorptive capabilities are "externalised" to the creative city. The innovative firm certainly develops and internally keeps some absorptive capabilities,

in particular in its professional domain. Also we acknowledge that each project of the innovative firm acts as a source of knowledge creation and literally feeds the members of every community involved in the project, indirectly increasing the creative potential of all communities and of the firm itself. However, based on our observations of the innovative firms in Montréal, we consider that the essential driver of creativity is anchored in the soil of the creative city which provides places and events for the fertile intertwining between creative communities.

The creative city: a fertile ground for developing absorptive capabilities

Tracing the sources of creativity starts with those knowledge platforms through which the members of each respective community of specialists interact. Exploring each of these platforms will then lead us to discover their connections to other informal creative places of exchange of knowledge in which these communities of specialists find the sources of their inspiration. Members of the communities of specialists of the Innovative firms permanently communicate with the outside world, through global virtual platforms with specialists of the same focus of knowledge, sometimes even with members of competing firms who share the same interest for a given practice. They also directly interact through informal routes with communities of users. Moreover, they have planted deep local roots in the “creative city”. To better understand the role played by the city as a source of creativity for a myriad of local communities, we start by describing the particular case of Montréal.

Montréal as a creative city.

The socio-political and economic development of Quebec society in the fifties and sixties, coined the “Quiet Revolution” (*La Révolution Tranquille*), allowed Montréal to play an active role on the Canadian scene as a culturally, socially and economically innovative city. Two defining major international events helped in showcasing Montreal as a different, innovative and creative city (Expo 67, Olympic Games 76). The city and its people developed a culture of large projects requiring a shared vision and popular involvement. The urge to innovate and create became part of the culture of the city and creativity became one defining element of the local and international image of Montreal.

Stolarick and Florida recent empirical study of Montreal stresses a few basic facts that could play a positive role in the “capacity for creative connectivity” of the city (2005, 2006). Their conclusions go as follows: Montreal is geographically well positioned, bilingual, and multicultural, with a historically grounded “creative spirit”; knowledge industries are well-represented and diverse, with research activities well-connected to four international universities; and finally the city developed a specific connection between the arts, culture and technology.

Table 1 sums up the argument:

<i>Art-Culture</i> ↔ <i>Technology</i>	<ul style="list-style-type: none"> - Techno-creative firms (<i>Cirque du Soleil</i>, video-games, <i>Mega Brands...</i>) - Techno-creative climate - Festivals
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	- “Laboratories” for techno-creative creation
Language: <i>French ↔ English</i>	- 53 % of Mtl population speaks both languages - 18 % with another “mother tongue” speaks also French, English, or both.
Geography: <i>Montreal ↔ U.S. and Europe</i>	- “Mtl is closer to Europe than any other major North-American city” - “Mtl has a culture that is both European and American” - “Mtl is not simply bilingual – it is bicultural, even multicultural”

The facts and data compiled by Stolarick and al. and their analysis give an interesting account of the potential of the city to foster creative endeavours. Comments and critics of this analysis would stress that it didn’t acknowledge Montréal’s mixed economic results, lagging behind Toronto, Vancouver or even Calgary. They would also emphasize that “a potential for connectivity” would not directly provide for economic performance or social development. We acknowledge the need to further study those issues and to balance rather optimistic views of Stolarick and al. Yet, in the following part, we would like to consider the so-called “creative city” approach from another angle to develop a better understanding of the inner functioning of knowledge flows and sources of creativity. From this perspective, we intend to provide a conceptual analysis of the dynamics at stake behind the alleged potential for creativity.

Our argument is the following: the interplay of multiple creative communities happens through a conjunction of interrelated elements that allow for the development of an absorptive capacity at the city level. As Cohen and Levinthal (1990) emphasise, “absorptive capabilities refer not only to the acquisition or assimilation of information by the organisation, but also on the organization’s ability to exploit it. Therefore, an organization’s absorptive capacity does not simply depend on the organization’s direct interface with the external environment. It also depends on transfers of knowledge across and within subunits that may be quite removed from the original point of entry. To understand the sources of a firm’s absorptive capacity, we focus on the structure of communication between the external environment and the organization as well as among the subunits of the organization, and also the character and distribution of expertise within the organization”. This remark leads to the crucial issue of both the interactions between a community and the hierarchical structures of the firm, and the interactions between knowing communities.

In line with the views of Cohen and Levinthal, we suggest that the creative city plays the role of an “organization”, and that the creative communities are the “subunits of the organization” as the active units of absorptive capabilities. What the creative city provides is a local platform of “spaces and places” and a centrality of “projects and events” that favour not only the diversity of creative communities but also continuous and ever renewed opportunities to intertwine communities, transfer knowledge across and within communities, and accelerate the translation of ideas and practices. As Allen (2000: 28) emphasises: “the translation of ideas and practice as opposed to their transmission, are likely to involve people moving to and through ‘local’ contexts, to which they bring their own blend of tacit and codified knowledge, ways of doing and ways of judging things. There is no one spatial template through which associational understanding or active comprehension takes place. Rather, knowledge translation

involves mobile, distanced forms of information as much as it does proximate relationships “.

In the following part, we are going to discuss the issues of “diversity and proximity” of local Innovative firms, that allow for the emergence of a significant amount of diverse yet relatively overlapping communities, “spaces and places” as areas where communities can meet and share knowledge creating “local buzzes”, and “projects and events” as opportunities to translate and hybridize knowledge through the pressure of enactment and performance, opening on “global pipelines”.

To sum-up the argument, as artists and creators, people would belong at the same time to some communities of specialists in Innovative firms, and to a community of interest, for instance sharing a passion for experimental electronic music, short movies or the video-games mod scene. Shared interest is enacted in common projects in “small worlds”. Small projects, like a music band or the filming of a short movie, would get people involved with several objectives: actualizing some creative intentions through performance, learning from the partners, and gaining social capital and eventually, in the best case scenario, economic capital. “Places” settled in open “spaces” would allow the performance of those projects and the development of new creative conversations with other communities from the audience that would lead to new – inter-community – projects. The ensuing buzz would reinforce this dynamic, make new projects possible with wider scope and open global pipelines. This whole system fosters the development of absorptive capacities at the city underground and “over ground” level; that would nurture communities of specialists hired by local Innovative firms.

The articulation between community from the Innovative firm and creative communities from the city is clearly initiated and supported by individuals’ actions. Multiple citizenships allow for boundary-spanning and knowledge-brokering activities. Individuals involved in communities in the Innovative firm would participate in different, more or less active ways in the creative life of the city. (See [tab. 2](#)). It can be argued that even a simple spectator can infer some inspiration from a show and then increase the absorptive capacity of the firm.

It must be emphasized though, that the interplay between the “creative city” and the Innovative firms, doesn’t only rely on the exploitation of the absorptive “capacities” through the development of the “creative slack” fed by communities. The creative city is also fuelled by the presence of those large Innovative firms on several grounds. Those firms are at the same time attractors for talents, stepping stones to start a career and come out of the underground, and finally they act as iconic references to differ from. In terms of cluster development, firms like Cirque du soleil for the performing arts, Ubisoft for the video games, or Cossette for advertising and communication play the role of pillar firms, around which the clusters are revolving and evolving.

For innovative firms, the promotion of the creativity of their internal communities is a subtle issue. As they would develop internal processes to harness creativity, they would also have to promote participation in external activities without generating too much “leakage”. In the case of a too tight institutionalization of internal processes, employees would be pushed to express their creativity elsewhere, either through underground activities⁴ or “over ground” through entrepreneurial activities. In the last case, the entrepreneurs would at the same time benefit from the presence of the “anchor tenant” and compete with it, based on a creativity-based differentiating strategy. As an example, an emerging circus act like “*Les 7 doigts de la main*” (literally: the seven fingers of the hand) was founded by former employees from Le Cirque du soleil. Their show would appeal to an audience looking for something different from Le Cirque. It would take place in La Tohu, the circus theatre mostly founded and funded by Le Cirque, and it would most likely provide some renewed inspiration for employees from Le Cirque.

To a large extent these flagship companies can be viewed as “anchor tenants” (Feldman, 2003). Their presence enhances the local creative milieu such that local creativity is more likely to be absorbed by and to stimulate local industrial creativity. The local labour market is thickened: a manager that is considering leaving the anchor tenant in order to join a smaller firm developing a new technology is more likely to move to the local firm. More and more, efficient activity by this fringe of smaller firms increases the impact of vertical knowledge spillovers in the local economy, above and beyond the direct consumption of local academic creative workforces by the anchor tenant.

Conclusion:

To sum-up, Montreal plays the role of a large scale forum consisting of a myriad of creative communities which is a fertile soil for igniting sparks of creativity. Through this constant opening to the external world and the permanent search for the best practices from outside the organization, communities of specialists in Innovative firms are unique devices tapping into the external world to bring permanently useful knowledge and creative ideas to the firm. Thus, tracing the sources of creativity in Innovative firms reveals a maze of creative communities of different sizes and scopes, a “hidden architecture of creativity” which starts from the different elementary communities of specialists of the firm that are also participating in the dynamic socio-cultural life of the city.

More precisely, what our ethnographic analysis suggests is that the sources of creativity for the members of a given community of specialists at Ubisoft are manifold:

- Part of the creativity results from activities of knowledge *within* the community of specialists itself. Members of a given community of specialists, such as game

⁴ In the video game industry, expert game-designers or programmers would produce “mods”, small “add-ons” pieces of software – a new map, new characters – usually downloadable on the Internet; that would add some functionality to an official product.

designers or graphic analysts, remain connected to their community on a daily basis. They exchange and interact about their current practice with the other members of their community, whether local colleagues (*geographical proximity*), or external colleagues of the same domain of knowledge (since they also maintain intense connections to the global world mainly through virtual exchanges of knowledge: *relational proximity* according to Gertler, chapter 8)

- Part of the creativity results from interactions and frictions *with other communities of specialists through the making of projects* for the innovative firm. In that case, the activities of knowledge are shaped by the formal organisational structures that could enable, support, and stimulate to a large extent the interactions between the communities of specialists.
- Part of the creativity is also the results of informal and random interactions *with other communities in the fertile soil* of Montréal. What the creative city provides is a local platform of “spaces and places” and a centrality of “projects and events” that favour not only the diversity of creative communities but also continuous and ever renewed opportunities to intertwine communities, transfer knowledge across and within communities, and accelerate the translation of ideas and practices.

What is remarkable is that the above three sources of creativity refer to three different activities of knowledge creation:

- Within each community of specialists, members communicate regularly with each other about their practice through a cognitive space that allows for specialists of the same domain to confront ideas, to build daring assumptions, and to validate new creative forms. As a result, step by step, the “codebook” of the community of specialists is progressively built from these various activities of knowledge. This work space is not fully monitored through the formal corporate process, and is not necessarily aligned with corporate goals and strategy. It is also somewhat disconnected from the daily pressure of producing an efficient output designed for a specific market purpose.
- Between communities of specialists of a given Innovative firms, members of a given community of specialists who have participated in a project progressively build cognitive links with colleagues of other communities of specialists, and tend to bring this knowledge through the daily interactions within their community. Step by step, the *cultural distance* between the different communities of specialists is reduced and leads to a reasonable level of mutual understanding, increasing the potential for innovation and creativity. This workspace is essentially monitored through the formal corporate processes, and is mostly codified.
- With the multitude of diverse communities that can be met on the places and spaces of Montréal, members of a given community of specialists have the ability

to tap in external sources of knowledge to find new creative ideas or to confront a newly produced piece of knowledge with local experts or local consumers.

Thus, Innovative firms can grow, and develop innovative projects based on the dynamics of their creative slack by using the creative potential of local communities that we have assimilated to the units of absorptive capabilities. Through its unique intertwining of spaces and places, events and projects, we have emphasised that the creative city offers an efficient platform to enhance and nurture these absorptive capabilities.

However, this “virtuous” cycle of creativity between Innovative firms and the creative cities mediated by the communities has strong limitations. First, it supposes the existence and the maintenance of a sufficient number of attractive Innovative firms to activate and enhance the creative potential of the city. Such conditions are never guaranteed since the competition between different cities to attract Innovative firms is intense and destabilising. Second, it supposes that in turn, the cognitive communities stay in the creative cities and invest in knowledge activities and exchange on a long term basis. Again, the competition between creative cities may induce drastic movements of communities from one city to the other (as an example, mostly for regulation reasons, communities in the video-game industry have tended to expatriate from Paris and emigrate to Montréal).

To sum-up, this chapter has analysed the particular spatial ontology of the creative city of Montréal, in which the local and global are interwoven in specific ways, where creativities of various kinds channelled by active communities of specialists nurture and enhance the performance of Innovative firms, and where and in turn the main Innovative firms nourish the creative soil of the city through a flagship or anchor role. Beyond the specific example of Montréal, we are convinced that explicit introduction of the role of communities (here as instruments of mediation between the creative city and the Innovative firm) helps in opening novel lines of thinking on the interpretation of the creative city, and of its growing role in the knowledge based economy.

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