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UMR 7522

Documents de travail

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Document de Travail n° 2012 - 05

Juin 2012

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**THE ROUTINIZATION OF CREATIVITY:
Lessons from the Case of
a video-game Creative Powerhouse**

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March 3d , 2012

Abstract:

The aim of this contribution is to proceed to an in-depth exploration of the micro-context of the origin of routines and of their intimate link with organizational creativity. Our view is that organizational creativity orchestrates continuous interactions between different types of routines, operating at different levels of the organization. More precisely we propose distinguishing three types of routines:

- *First*, the routines issued from formal structures or 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 of the firm;
- *Second*, the routines emerging from informal structures, the “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”
- *Third*, the routines that are inherently related to the organizational creativity of the firm, which are essentially corporate routines as expression of patterns of thinking, feeling and acting in the corporate culture. In essence they are the genes of collective identity, and take the shape of project management staging and gating principles and practices, framing collective divergent exploration and convergent production toward a creative goal.

The contribution is based on an in-depth analysis of the organizational creativity in the world- leading videogame company, Ubisoft, with a special focus on the studio located in Montréal. To some extent, Ubisoft is one of the flagships of the “creative industries”, in which the clear imperative is to sustain creativity on a permanent basis. These reasons explain the choice we made to test our approach of organizational creativity and routines in this firm

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Introduction.

In everyday language, the “routinization of creativity” may sound as an oxymoron. Most *clichés* about creativity refer to some form of free, unbounded exploration and expression. Routines, on the contrary, would rest on stability, regularity, systematization, and standardization of actions and behaviors. For the last 30 years or so, research in economics, strategy and management addressed these two concepts in depth and suggested a completely different and stimulating view on routines and creativity.

One important hurdle to consider, though, is that the interest generated by these two concepts produced a wide range of different, often divergent, and sometimes conflicting definitions (Becker 2004, 2005; Felin and Foss, 2004). Furthermore, as these definitions are mostly inspired by the background discipline of the researchers, they tend to be one-dimensional, to address one level of unit of analysis, and to delude concrete and operational concerns.

To refer to two generic metaphors, the scientific status of these two concepts evolved from “black box” to “mirror ball”. Inspired by classic information theory, the black box metaphor refers to a system the inner working (and origins) of which remains unknown, but that can be studied and analyzed through its inputs and outputs¹.

With regards to routines, the black box refers to the fact that if routines were known to be an essential element of the functioning of organizations, they were mostly taken for granted or briefly defined as «programs for action» (Simon, 1981) or «genes of the organization» (Nelson and Winter, 1982). The recent literature on routines which literally flourished in the past decade, as emphasized by Becker (2004), suggested multiple, sometimes conflicting definitions, up to the point of a certain academic confusion about the very nature of the phenomenon (see for instance: Cohen et al., 1996). Even if we settle on a definition of routines as “patterns of interaction”, as suggested by Becker, the discussion remains open about the way micro-routines originate and the roles they play as “the basic elements” (Lippman and Rumelt, 2003) that drive differences in learning and capability development between organizations. 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*

¹ The origin of the metaphor is usually attributed to von Neumann (1951) and goes back to a lecture delivered in 1948.

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".

To reflect this situation, we introduce the complementary metaphor of the "mirror ball", where the concept being addressed and analyzed by academics from different fields mostly eludes an integrated understanding yet offers interesting reflections about those fields, in terms of theoretical issues, epistemological discussions and empirical methods. As emphasized by some researchers, empirical studies could allow for a more realistic understanding of the nature and evolution of routines (Becker and Lazaric, 2009). With this "research program" on the way, empirical studies provided mixed results, mainly due to the inability to settle on an operational definition of routines, as a phenomenon to be observed and assessed in action.

With regard to "organizational creativity", the concept parallels the situation of routines as a concept evolving from the status of "black box" to "mirror ball". Following a few defining papers in the 90's (Woodman et al, 1993; Drazin et al., 1999), it seems that the concept of organizational creativity is ubiquitous in the literature, covering different realities considering the standpoints of contributors from the fields of psychology, organizational behavior, management, economics or strategy. The concept was also recently enriched by new perspectives and fields of study such as knowledge management (Nonaka, 1994; Fleming et al., 2007), the design field (Hargadon and Sutton, 1997; Hargadon, 2002; Martin, 2009; Brown, 2009), economic geography and urban economics (Grabher, 2001; Florida, 2002; Florida et al. 2008; Scott, 2005; Asheim and Gertler, 2005, Pratt, 2010), engineering (Hatchuel and Weil, 2009) as well as computer science (Sosa and Gero, 2003; Wierzbicki and Nakamori, 2006), for instance. Yet still today, the definition of organizational creativity introduced by Woodman et al. has not been fully questioned. If it remains largely elusive, it still offers an interesting starting point: "Organizational creativity is the creation of a valuable, useful new product, service, idea, procedure, or process by individuals working together in a complex social system" (Woodman et al, 1993, p. 293).

As emphasized by Styhre A. : "Although organization creativity literature has made some fruitful contributions to organization theory, the literature is still, in comparison to research on for instance knowledge management or organization learning, too disjointed and dispersed to make a broader impact on the field" (2006, p. 146). In the end, in both cases, "routines" and "organizational creativity", knowledge appears either too generic or broadly idiosyncratic. Furthermore, operational or implementation issues are left to the experimentation and more or less enlightened improvisation of practitioners.

However, an emerging literature in management has pinpointed the key interest of considering routines and organizational creativity as intrinsically complementary. As an example, the literature in business has applied recurrently the example of jazz, and more specifically the art of improvisation with which it is associated, to put forward the organizational mechanisms of creativity occurring within and beyond a highly constrained structure of routines (Hatch, 1999, Zack, 2000, Kamoche and Cunha, 2001). The locus of emergence of routines supporting creative processes becomes particularly interesting. On the one hand, the literature on routines is relatively silent on the emergence of the process of routines, particularly concerning routines related to dynamic processes such as innovative ones. On the other hand, organizational creativity offers an interesting hypothesis: the loci of emergence of such routines is to be found at the intermediary level between individuals and organizational processes, namely in knowing communities (Drazin et al., 1999; Cohendet and Llerena, 2003).

We aim in this contribution to add to this stream of literature through an in-depth exploration of the micro-context of the origin of routines, as well as of the conditions of their emergence, and of their intimate link with organizational creativity. Our view is that organizational creativity orchestrates continuous interactions between different types of routines, operating at different levels of the organization. More precisely we propose to distinguish three types of routines:

- *First*, the routines issued from formal structures or 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 of the firm;
- *Second*, the routines emerging from informal structures, the “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” (Cohendet, Llerena and Simon, 2010);
- *Third*, the routines that are inherently related to the organizational creativity of the firm, which are essentially corporate routines as expression of patterns of thinking, feeling and acting in the corporate culture. In essence they are the genes of collective identity, and take the shape of project management staging and gating principles and practices, framing collective divergent exploration and convergent production toward a creative goal.

To a large extent our analysis of the emergence and formation of novelty in organization echoes Ulrich Witt's vision (2009), when he argued that the creation

of new cognitive concepts (ideas, imaginings) involves three operations. "One is a generative operation that produces new (re-)combinations elements. The other is an interpretative operation by which the new (re-)combination is integrated into a newly emerging or a more general already existing concept. Yet another operation can often be observed to accompany the interpretative operation, namely an evaluative one. However, where the interpretative operation answers the question of what it is that emerges, the evaluative operation is concerned with what the utility, advantage, benefit of this is" (Witt, 2009, p.113). We suggest that the generative and interpretative operation results from constant interactions between the routines issued from the formal and informal structures, while the evaluative one is orchestrated by the corporate routines.

Our contribution is based on an in-depth analysis of the organizational creativity in the world- leading videogame company, Ubisoft, with a special focus on the studio located in Montréal. As of fall 2011, Ubisoft Montreal studio is the largest videogame development studio in the world. This French-owned video game developer and editor established a studio in Montréal, in 1997 to benefit from substantial grants and tax credits offered by the provincial government , but also from the growing experience of the local creative workforce, well-trained in computer-science, cinema, fine arts, literature, theatre, management and marketing (Cohendet and Simon, 2007). The Montreal Studio hires employees mainly from Montreal (around 80 %), most of whom have been trained in the Montreal arts and computer schools, and in various university business programs. Ubisoft Montreal now employs over 1800 people, all scattered in the 250 000 square feet of open space offered by the red-brick building situated in the heart of the Mile-End neighborhood considered as one of the hippest and most creative urban areas in the city. Throughout the years, the home environment has offered a fertile ground for individuals to build informal contacts, as well as provided the formal institutional settings supporting the development of cultural life, therefore creating a link between the firm and the local milieu.

All these features contribute to creating a strong and positive corporate image. Any new employee at Ubisoft exposed to friendly open office spaces, to a real creative atmosphere, and to permanent story-telling about the recent successes of the company, will quickly adopt the organizational culture of the company, through experiencing what can be called the "corporate routines", that provide common patterns of thinking, feeling and acting, and contribute to shaping the strategies, visions, and norms of all the employees. To some extent, Ubisoft is one of the flagships of the "creative industries", in which the clear imperative is to sustain creativity on a permanent basis. These reasons explain the choice we made to test our approach of organizational creativity in this firm.

The paper proceeds as follows. Section 1 addresses issues of methodological consideration, which is based on organizational ethnography and research-action. Section 2 introduces the analysis of the ways creative processes are managed at Ubisoft, and particularly analyzes the balance between creative formal and informal forces in the firm. Section 3 proposes an extended discussion on the relationships between routines and organizational creativity. Section 4 offers the conclusions.

1) **Methodological considerations**

This study started as the reinterpretation of empirical data originating from the organizational ethnography of a creative powerhouse: Ubisoft development studio in Montreal. In the case of Ubisoft, L. Simon was literally embedded in the firm for fourteen months, in line with traditional approaches of organizational ethnography (Van Maanen, 1979; Schwartzman, 1993). This fieldwork led to more than 200 pages of ethnography, which are at the basis of this particular study (Simon, 2002). The researcher followed up on this work and conducted regular research-action projects with the firm on a yearly basis from 2003 to 2009, mostly focusing on production and creativity issues (analyzes of productive processes and team dynamics), and subsequently developed an ongoing training program on the management of processes and creativity for the firm's middle and top managers. On average, the researcher has been spending 2 to 3 days per month with managers and employees of the firm for the last 10 years.

Consistent with the definition of organizational ethnography proposed by Rosen (1991), this piece of work revealed the importance of connections between the different projects of the firms, between different modules within a specific project, and between the firm and external social groups and organizations. Drawing on the "emergence" of this topic (Glaser and Strauss, 1967; Glaser, 1978, 1992), specific attention was given to the stories that came out of the interactions with the informants. These narratives regularly stressed:

- 1) The roles of individuals' behaviors and knowledge in the creative process;
- 2) The importance of multiple sources for learning-in-action inside the firm (mainly specialized modules from different projects);
- 3) The role of social groups, in and outside the firm, and the role of organizations external to the firm, feeding the internal creative processes;
- 4) The role of organizational design, structure, and processes to orient, channel, and harness individual and collective creativity

For this case study, the researcher clearly remained an outside observer (Watson, 1999). A constant concern therefore was to faithfully render the observations

and to allow the informants to fully express their understandings of their own activities, without introducing the researcher's personal opinions or biases (Geertz, 1973, 1983).

A second research allowed the researchers to engage in a continuous (and ongoing) set of research activities and research-action projects with firm from 2003 to this day. These activities mainly focused on the in-depth analysis of the integration of new content ideas through the implementation of formalized stage-gate process and Agile activities. The fine-grained sets of primary data were completed with further direct observations, sets of secondary data on existing and interacting communities in the organizations, as mentioned by the informants (public and corporate sources), as well as interviews with employees, managers and external partners of the firm. The data and information were finally gathered and compiled into a synthetic case study (as suggested by Eisenhardt, 1989; Yin, 1994; and discussed by Eisenhardt and Graebner, 2007).

The sets of data were analyzed through an induction/abduction process aiming at reconstructing knowledge flows and transformations inside the firm, and between firms and intermediary communities based on the narratives of the informants and secondary sources, on the one hand, and classifying those groups and organizations based on the literature on knowledge groups and situated creativity, on the other hand. In turn, some expected entities like diverse forms of knowing communities, including associative professional groups, and also less known elements like creative collectives were identified.

2) The formal management of the creative projects at Ubisoft

On organizational grounds, as for other cultural industries (DeFillippi and Arthur, 1998; Lampel, Lant and Shamsie, 2000), the management of complex video games projects is the result of a delicate balance. On the one side, a videogame project can be viewed as a complex multimedia artifact, relying on flexible and decentralized expertise, with significant artistic dimensions. It integrates contents from different origins quite parallel to the occupational roles described by Crosby (2000) mainly: game-design, programming, 2D and 3D arts, characters' animation, voices, with sound effects, soundtracks, non-interactive parts, and integration/localization. On the other side, the videogame project requires strict managerial attitude looking for the advantages of tight integration of these activities within time, cost and market constraints. The need to fine-tune the level of integration in such an industry is high: too strong an integration could lead to a permanent reduction in diversity and creativity; too loose an integration could lead to divergence, chaos, and inefficiency.

To cope with these constraints, Ubisoft, as most of the videogame firms, has adopted a modular form of management of projects. The project is decomposed into relatively small autonomous organizational units (modules) to reduce complexity. Modularization leads to a structure, in which the modules integrate strongly interdependent tasks, while the interdependencies between the modules are weak (Sanchez and Mahoney, 1996). The management of a given game is the result of an actualization process – from the idea/concept to the product – accomplished through the progressive divergent/convergent integration of pieces developed in the specialized modules². If modularization within a given project leads to some disaggregation of the traditional form of hierarchical management, it remains on a theoretical basis under the control of the hierarchy of the firm. The modules are managed by specific departments or functions (coined as “métier” at Ubisoft, the French equivalent of specialized craft). In one project, modules are coordinated by the action of a project manager, hereafter “the producer”, in charge of this mitigation and integration process.

In strategic terms, the video-games industry operates in a very dynamic and globalized market, with an accelerated evolution of technologies and under strong competitive pressure. As with the movie industry, predicting a blockbuster and establishing the internal capabilities for success is not an exact science. To meet to those strategic conditions, large video-games producers are manage a significant portfolio of projects, sometimes more than 20 projects in parallel, where a project can mobilize up to 100 creative employees plus up to 200 quality testers. The dominant organizational form ranges from a balanced matrix structure to a pure project-based organization, with a dynamic equilibrium gravitating toward project-led design (for definitions, see Hobday, 2000).

The historical account of the evolution of organizational design at Ubisoft’s Montréal studio gives an interesting overview of the challenges to be overcome to define and harness creative processes through organizational design, and especially of the difficulties in diffusing and replicating the best creative practices.

Ubisoft’s Montreal studio went through three structural designs in its 10 years of existence. From its origins in 1997 to 1999, the studio followed a formal balanced matrix structure, slightly dominated by specialized functions, with game-design and programming in tension as the two dominant “core” functions. During this

² As the product is not exactly the same, the development of an animated movie follows the same inner logic, where creativity would be expressed at the level of the story (the theme and game-play in case of a game) and through daily problem-solving and technical incremental innovations. If Pixar’s success is driven by unique stories, “a movie” insists Ted Catmull, Pixar’s CEO, “contains literally tens of thousands of ideas” of artistic, technical, and managerial origins (2008).

period, the modules were under the responsibilities of the functions listed earlier. At this point in time, the studio managed a portfolio of less than 10 projects, including 4 major projects. Three “executive producers”, with significant previous experience in the video-game, movie or media industry, were responsible for more or less 3 projects. Each project was operationally supervised by a “producer”. New to the industry, most producers were recent graduates from business or technical/arts schools with only a few months or years of work experience.

As the first round of projects got completed, in 1999, it appeared that the balance of power between producers and executive producers was shifting. Executive producers were busy dealing with the French headquarters or with licensing partners, mostly in the U.S., and spent most of their time outside of the company. Producers were the closest to the action. They would develop personal contacts with most of the employees, and also with their peers. The experience gained through the first round of projects helped them become more efficient and more autonomous. This new state of things received some validation with the arrival of a new CEO. At the end of 1999, the new CEO led a restructuring of the organization and moved towards a purely project-based structure. The rationale was to accelerate the games development process and to instill some competition between the different project teams. In the background was the idea that functions could not play a useful role as repositories of knowledge anymore, since knowledge would be essentially developed on a day to day *ad-hoc* basis by individuals and teams and, due to market characteristics, would become obsolete almost on the spot. The underlying principle was that, projects being somewhat independent entities with no real incentives for knowledge transfers or complementarities between them, pure competition between the teams would assure speed and efficiency. The existence of a cumulative process in learning was denied or at least significantly underestimated.

At the same time, in 1999, the introduction of a Project Office was aimed at standardizing project management practices along the different projects in the organization. It then proved challenging to get the producers and specialists to endorse the recommendations, mostly inspired by a technocratic paradigm, and perceived as «invasive» by most producers. This initiative, viewed as a controlling and constraining stance driven by the hierarchy, generated significant resistance to the point where the hierarchy decided to concede. If the hierarchy recognized the poor performance of the office and dissolved it after a few years of experimentation, it still noticed the importance of formalizing the project management process in order to be able to follow up on the portfolio. One of the internal consultants working with the project office and

former consultant in product development for the local aeronautic industry exposed higher management to a more systematic phasing and gating approach, and to the necessity of thinking about it as a learning process rather than a pure controlling and validating one.

In fact, the hierarchy recognized the importance of cumulative knowledge and learning; and moreover the importance of the managers in supporting those learning processes.

In this learning process, the role of the managers as for any project is twofold:

First, to make sure that the "routinized corporate procedures" of projects are respected (stage gate procedures, respect of deadlines and cost considerations, as well as, when a project comes to an end, trying to capitalize and codify as much as possible the knowledge gained during the project, etc.). Again, after having tried to impose strict staging and gating procedures, the hierarchy adopted a quite distant stance towards production, and settled on a broad project management "script" left to the interpretation of the producers. The manager makes use of the ambivalence of the rules, exploiting the cognitive dimension of any rule which leaves room to interpretation (Reynaud, 1996; Avadikyan et al., 2001). The expected stages were the following: a pre-conception stage to establish a unique "breakthrough" (the element of story and game-play that will make the game stand out from the competition); a conception phase to specify the storyline, the design of the characters, and the "look-and-feel" of the game; a prototyping phase to produce a playable demonstration "map"; and finally, the production phase, mainly re-interpreting the prototype with different specifications to follow up on the storyline. Even if this approach proved efficient in terms of the respect of deadlines, it is criticized for its own virtues: it aims at concentrating "thematic" creativity at the early stages of the process and discourages significant creativity at the later stages. Yet, in these later stages, incremental creativity occurs intensively in "problem-solving" modes in every module.

Second, the manager has to undertake specific efforts to delineate, capture, reproduce or replicate the routines that result from the learning by doing processes achieved by the teams involved in a given project. As Winter and Szulaski underlined (2000, p.3) "replication of routine is one important process by which organization re-utilize knowledge that is already in use". In the case of hierarchical 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 "main" objectives of the group which are essentially oriented towards coordination mechanisms or incentives determined by the hierarchy (to ensure

the task is carried out efficiently, to reach the goal of the project on time, etc.). The cognitive construct that supports these routines is fragile in the sense that it has not been elaborated through the construction of the routine themselves. 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 (Cohendet, Llerena and Simon, 2010). Though considered as essential for sustaining the creativity of the firm in the long run, the actual replication of knowledge accumulated in the routines and practices of the project teams is rather weak and unsatisfactory. This result is not specific to Ubisoft, but is rather generally shared by most firms (Winter and Szulanski, 2000).

So, only a small part of the knowledge acquired and gained from these formal groups is recuperated by the hierarchy. In fact, the gains of knowledge resulting from the projects can be divided into two main categories. First, most of the knowledge recuperated by the hierarchy is constituted of new ideas about managing projects that could improve the corporate routines. Such a category of knowledge contributes to fuelling the *organizational slack* of the organization. The organizational slack refers to Penrose (1959), who suggests that organizations always have some stock of unused, or underused resources (e.g., knowledge, relationships, reputation, managerial talent, 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; growth being the dominant motivation of firms, limited only by the administrative capacity of the organization. Second, another category of knowledge addresses actual creative issues and insights. As we will see further, this category of knowledge is essentially held by informal communities and fuels another type of slack that we call *creative slack*. Before exploring this new dimension, we turn to the conclusions derived by Ubisoft on the possibility of replication of the routines from the projects.

For Ubisoft, the possibility to replicate the routines that result from the learning by doing processes achieved by the teams involved in the videogames projects appeared as unsatisfactory. A historical evolution took place with the hiring of a new CEO for the Montreal Studio in 2005. A former producer, involved in one of the most successful blockbusters of the company, the new CEO was very sensitive to the “suboptimal” exploitation of knowledge. One major irritant that he expressed was the fact that a good idea would generally not circulate from a module to the other projects. He emphasized the existence of a strong tendency to “reinvent the wheel” all around the organization. A study

conducted at this point would show this position as slightly exaggerated, as specific active units would already intensely foster knowledge circulation and exploration: the “communities of specialists” (Cohendet and Simon, 2007).

For the hierarchy, the recognition of the role of those communities as active units of knowledge creation and diffusion occurred through some research-action projects undertaken from 2003 to 2008. A few internal initiatives also revealed the intensity of the cognitive activities of those communities: some virtual forums, experimentally implemented in 2006, showed how some experts from different modules in different projects could build common knowledge bases through sharing and discussing. As the hierarchy, in fear of knowledge “leaks” toward the outside of the organization, decided to strictly moderate these forums in order to steer and focus the discussions, with the aim of developing formal, codified knowledge repositories, the attendance at these forums diminished significantly. Then when the hierarchy decided to stop these forums, employees almost started a revolution and asked for their return. This experiment led the hierarchy not to intervene too invasively in those processes and prompted another restructuring.

As Ubisoft Montreal’s hierarchy was experimenting in learning how to learn about routines, the next step was the implementation of “knowledge-through-people” managers, the “directeurs métier”. From late 2008 to today, the hierarchy set up a new position of “directeur métier” (literally: craft director), with the mandate to “facilitate knowledge circulation, exploration and discussion, in order to optimize the implementation of best practices” (field interview). A “directeur métier” position would be created for each specialty, and one for project management, mostly concerned with middle managers in charge of specialized modules (struggling with a dual identity of technical specialist and people manager). Each “directeur métier” had previous experience at Ubisoft Montreal in his/her field of expertise.

As the first tendency of the newly hired “directeurs métier” was to try and identify the «best practices», it rapidly appeared disappointing. First, it proved difficult if not impossible to actually reduce an apparent, yet specific success to a formalized and minimal set of rules, due to knowledge tacitness and situatedness. Second, the transmission of a formalized routine from one team to another would generally be costly and counter-productive, as it would detract the team from an already implemented or soon-to-be implemented routine.

The option retained, then, appeared to refocus on the possibility of a micro-(re)-structuring of routines, betting heavily on inter-individual knowledge transfers, supported by the cognitive work of communities of specialists. Not only did the “directeurs-métier” strongly support the diverse training programs as

opportunities for people to “meet and share stories”, they also essentially promoted the recombination of knowledge in several ways.

First, they would organize formal sharing sessions on a regular basis. Those sessions would provide the opportunity to meet and share knowledge around a well-identified issue or challenge. During those sessions, the “directeur métier” would only play a coordinating role to make sure that everybody would have a chance to voice their concerns and ideas, and would refocus the discussions from time to time if necessary. Such a simple organizational learning device was widely appreciated by the participants, as formal opportunities to share actually were very scarce. At first, most producers were quite reluctant to let their employees attend these sessions. This changed dramatically when the producers came to realize the invaluable role these sessions played in increasing the capability of their respective teams. Employees were therefore strongly encouraged to participate in the sessions.

Second, they would play an essential role in combining and recombining specialized teams for new projects, in order to fine-tune the combination of specific individuals in a module to support knowledge creation and creativity. In collaboration with the human resource department (HR) and the producers, the «directeurs métiers» would recommend specific individuals for specific modules of the project at hand. They would focus on previous experience, autonomy, «soft» skills (ability to establish efficient and respectful working relationships with close peers, other modules, and supervisors) and the ability to share knowledge. The focus would aim at a rich mix of previous experiences and “hard skills” to ensure diversity (or require variety) and of so-called “soft skills” to support the integration of knowledge through social convergence toward a shared goal/vision. The guiding philosophy would be to make sure that in every module, at least one person would adopt a questioning, reflective stance towards the established routines, and would challenge work practices, while keeping a strong operational focus to avoid overly disturbing the pace and orientations of the modules. The choice of individuals would be negotiated, and sometimes harshly debated by these three actors: «directeur métier», HR representative and producer.

Third, most of them would play a very active role as informal knowledge-brokers. Most “directeurs métier” would consistently “wander around” on the shop floor (according to Peters and Waterman’s expression, 1982). They would observe more or less formally the work of employees, discuss with them, adopting a listening and coaching stance. They would also informally channel contact between one employee faced with some technical challenge and another employee that may have some parts of the answer. At the time of this study, this

organizational reform was still under way and not fully evaluated yet. The different “directeurs métier” have up to this point met with mixed success: as some of them are still trying to gain access to local knowledge through trust building activities, some others are already considered as very efficient “knowledge coaches” (field interview) and respected either as solution providers and/or as connection providers with other, more knowledgeable employees. Some very respected “directeurs métier” (game-design, 2D graphic arts, management) have been coined as “fair community players and knowledge-enhancers”, stressing the importance of their connections with their respective communities of specialists (field interview).

3) The communities of specialists at Ubisoft as active units of diffusion and creation of routines.

In the following part, we introduce communities of specialists and discuss their role in the exploration activities. As mentioned earlier, along the projects, in each module, a small group of specialized employees is in charge of specific elements of the project. Each of these groups should not be seen as an administrative or functional unit, but rather as a part of a community of specialists where members communicate regularly with each other about their practice and trade knowledge through informal cognitive spaces with more or less open boundaries, in a not-so-organized fashion. If indeed a part of their work is determined by the technology they are using (hardware and software), and is also defined by the mandate they received from their hierarchy, a major part is the result of their previous knowledge, experience and shared interpretation of their tasks with the other members of the community. Members of a given community share knowledge on an informal basis. They work in the same building, have lunch and go out together or they just chat online with peers in search of advice or technical solutions. They respect the social norms of their community that drive their behaviours and beliefs. Within a given community, knowledge is continuously exchanged and can circulate through the existence of a local language understandable only by the members. To a large extent, these workspaces are not fully monitored through the formal corporate process. They are not necessarily aligned with corporate goals and strategy. They are also somewhat disconnected from the daily pressure of producing an efficient output designed for a specific market purpose. These informal socio-cognitive spaces offer areas where people can meet, wander, confront ideas, build daring assumptions, and validate new creative forms.

Members of each of the communities of specialists who are employees of Ubisoft also 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, and have planted deep local roots in the 'creative city' of Montreal. Through this constant opening to the external world and the permanent search both for the best practices from outside the organization (exploitation activities) and for the new trends and styles in their domains (exploration activities), communities of specialists at Ubisoft are unique devices tapping into the external world to permanently bring useful knowledge and creative ideas to the firm.

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) (Lave and Wenger, 1990; Brown and Duguid, 1991). 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) (Cowan *et al.*, 2000). As a result, most of the communities of specialists at Ubisoft have a dual dimension in the way they process knowledge, aiming both at exploration and exploitation.

As such, by their mixed nature (internal / external; exploration/exploitation, communities of practices/epistemic communities), the communities of specialists are one essential intermediary level, allowing the passage from individually determined creative processes to the macro-dynamics of the firm.

The managers at Ubisoft Montreal are fully aware that they cannot directly control or "possess" the creative works of the communities of specialists. Learning by "intrusion" and trying to control the cognitive functioning of the diverse communities would be doomed to failure. What the managers have implemented are integration forces in order to bind the creative units together for achieving effective production, timely delivery and ultimately commercial successes: the staging and gating process. It appears that the nature of the relationships and ties that bind the scattered communities together is generally not a unique platform (such as a given production line or a given modular structure). These communities exchange knowledge through different cognitive platforms (almost in line with the notion of 'ba' in the sense of Nonaka and Konno, 1998) which are shaped or enacted by the hierarchy and which have some plasticity and flexibility to take different forms of coordination and may reconfigure through time. From the managers' point of view, this flexibility, partly framed by the generic "script" of the staging and gating process, is the key to the success of the alchemy of combining heterogeneous communities to reach

a creative collective video-game product. To go further in this direction of research, we will then develop the idea 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. Thus, creativity in this video-game firm seems to unfold through an attenuated, balanced organizational form which combines informal cognitive platforms disseminated in and outside an overarching hierarchical structure built around an organizational culture and formal processes

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 "dual" nature of the communities of specialists at Ubisoft (dual in the sense that they have both an exploration and an exploitation mode of activity) contributes to eliminate this risk and by-passes the need of decoupling/re-coupling the organization by providing a specific mode that guarantees the permanent connection between the routine work required in the management of projects, and the creative work done within communities. On the one side, members of a given community of specialists, as any employee of Ubisoft, have fully adopted the cultural global norms of the corporation that shape values and behaviours. They also have accumulated significant competences with regards to the respect of the managerial routinized procedures of achieving projects (or macro routines). To some extent in their current daily practice, these "corporate and projects" routines guide the way they achieve their creative cognitive interactions within their community of specialists. On the other side, the creative construct made by each community through their constant interactions, inside and outside the firm, greatly contributes to bring novelty on a daily basis into the Ubisoft Montreal projects, in the form of new ideas, new trends, new practices or new codebooks.

We argue here that two specific modes of exploration can be identified. A first mode is framed in a top-down way by the hierarchy, and mostly managed through project parameters, and sequential controlling and validation activities (the "gates"). It provides a vision of the output of the project which is only weakly defined and the details of which are left to the interpretation of the project team, actively working on its actualization. This can be defined as macro-routines of exploration. This macro-exploration is completed by multiple micro-

exploration activities, essentially managed by members of communities of specialists involved in the modules of different projects. This micro-exploration occurs in a very autonomous, bottom-up and transversal manner, under the radar of top-down control. It plays an essential role in generating new routines and challenging existing ones. Through accretion and breakthrough, micro-creativity can challenge and partly reshape the macro-routines.

This permanent connection provides opportunities for feedbacks between the micro creativity that emerged from the daily activities during the project, and the macro-creativity that is the expected output of the interplay of creative communities (and channelled by the hierarchy of the firm). The creativity of a project should not be confined to the macro-creativity designed by the hierarchy once and for all at the beginning of the project. A creative project should be able to incorporate new ideas, innovative suggestions, and all these micro-creative inputs that emerge. According to the managers of Ubisoft, one of the main drawbacks of the *Stage-Gate* process put forward to strictly control the timing of a project is precisely that this constraint - which excludes any significant feedback in terms of conception - 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 as 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. The managers of Ubisoft thus agree that there are cases when the *Stage Gate* rule should not fully apply. Second, micro-creative ideas that emerge during a project can be absorbed in the active memory of some communities of specialists, constituting a *creative slack* that will and/or can be used in further projects.

The *creative slack* resulting from the cognitive work of the communities plays the role of an important reservoir of opportunities of innovative knowledge for the organization, and has guided to a large extent the innovativeness of the organisation. In line with Penrose's vision of a slack, the firm which has accumulated a creative slack is better prepared than any other organisation to derive a 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 communities). 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 at Ubisoft, which rely on the functioning of quasi 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. The slack is not "possessed by the firm". At best, if the firm correctly harnesses the creative work of communities, it can access it at low costs.

Although it is well known that organizations have extreme difficulties in memorizing what was learnt during a project, the interest of communities with regard 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 resulted from the functioning of a temporary team project constituted from heterogeneous agents who never met before". Thus a creative slack has an ambivalent characteristic: it is a specific advantage for the firm, that is the only entity able to derive benefit from it, but at the same time it is held, nurtured and maintained at rather low cost by the diverse communities of the organisation, sometimes even without explicit awareness of the managers. This creative slack may also be positively influenced by the existence of multiple projects, where each project acts as a source of knowledge creation and literally feeds the members of every knowing community involved in the project, indirectly increasing the creative potential of all communities and of the firm.

The key question that follows logically is whether the organization will benefit in the future from this creative slack which is dispersed between the diverse communities and needs an integrative effort to be reassembled and put into collective creative practice? Our view is that the answer depends to a large extent on the culture of the organization. In the case of Ubisoft, the strength of the "corporate routines" acts as a real guarantee that the answer is a positive one.

This rich empirical case offers a complex, yet readable picture of the roots/sources of organizational routines, and of their interplay in the creative process, especially when adopting a multilevel analysis leaving a significant place to meso-level activities (i.e. module teams, communities of practice, communities of specialists). In such a perspective, it appears that the

"repertoire" of routines of the firm is a complex one, with three main components.

A first component is the set of "corporate routines" shared by all the employees of the company which, to a large extent encompasses the organizational cultural traits that shape the common vision and general behaviors within the firm. These routines are particularly useful to assure the efficient functioning of the "exploitation activities" of the firm.

A second component is the set of routines activated through the projects. These routines emerged through activities that can be considered as "guided exploration", with a rather constant control of the hierarchy that has the responsibility to guarantee the respect of project procedures of all sorts, but also to mitigate the risk of losing at the end of a given project, the knowledge and good practices gained and learned during the project. It is at this level that the organizational slack appears and allows for dynamic adjustments and growth in terms of size and number of simultaneous projects.

A third component is the set of routines activated by the communities of specialists. These routines emerged through cognitive interactions that can be considered as "open exploration" achieved by community members. It is there that the *creative slack* appears and is elaborated. It allows the innovativeness of the firm, its dynamic capabilities and de facto the routinization of creativity to be improved. The key point here is that this domain of the repertoire is not "possessed" by the firm, it can just be harnessed. 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. 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. This question echoes the idea suggested by Loasby (1991, p.9) 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). In the case of Ubisoft, it appears that the firm has delegated its open exploration capabilities to the diverse communities of specialists. Of course the "bet" of the company is that the conditions of being able to harness the cognitive work of these communities will constantly remain. Those routines which are largely learned outside of the boundaries of the firm will

be channeled and exploited by the firm inside its boundaries. As suggested, for instance, by Kogut and Zander, (1992), the role of the firm would then be to provide communities of specialists with “identity” (strategic orientations, corporate culture, and a sense of shared purpose), coordination through a generic script, and opportunities to learn through interactions in multiple platforms. In this regard, in line with Cunha (2005), managers should develop their capacity for “bricolage”, ensuring the ongoing interplay of the communities of specialists of the firm.

4) Conclusion: beyond the black box and the mirror ball, a multilevel perspective on routines and organizational creativity.

To sum up, this in-depth analysis of the case of Ubisoft suggests that the organizational creativity results from continuous interactions between different types of routines, operating at different levels of the organization. (cf Table 1):

1) The routines issued from the projects carried out by the firm for which the context of work and coordination of specialized tasks is defined *ex ante* by the hierarchy of the firm. As we have seen, the power of replication of these routines is limited. As Winter and Szulaski (2000, p.23) noted, “leveraging knowledge by replication of routines necessarily involves an investment in communication infrastructure, at least in the form of training in the organization’s specialized language. Adequate command of language requires, however, substantial knowledge of organizational context: the link of information to action typically depends on the knowledge-based interpretive powers of individual human beings. Hence, the organizational use of symbolic information depends on the stocks of knowledge held by the participants: much of this is tacit and/or context dependent and it reflects the accumulation of local expertise. Under these circumstances, the creation of the requisite knowledge stocks at a new outlet can be accomplished only through a variety of costly processes that are substantially less straightforward than a standard notion of transmission of information would suggest”. Though constrained and limited in scope the replication of knowledge from the projects contributes to fuel the organizational slack through new managerial ideas for managing projects recuperated by the hierarchy

2) The routines emerging from informal structures, the communities of specialists. They are at the origin of a wide range (ecology) of local, «situated» routines, partly determined by technology, partly constrained by the hierarchical script, partly socially constructed and interpreted, and tightly or loosely coupled to the

very specific local milieu. The “open exploration” is achieved by the members inside the firm but also and sometime mainly outside, in a broader environment. The quality and the richness of the firm’s environment become then crucial dimensions for the innovativeness of the firm.

3) The routines that are inherently related to the organizational specificities of the firm, which are essentially corporate routines as expression of patterns of thinking, feeling and acting in the corporate culture. They contribute at the organizational level to the broader organizational slack, and to the building of larger «script» of project management. The “script” is partly imposed by the inner logic of the industry, which defines a specific project-based structure with a phasing-and-gating process. The process is however regularly interpreted and reconfigured by the hierarchy. In essence they are the genes of collective identity, and take the shape of project management staging and gating principles and practices, framing collective divergent exploration and convergent production toward a creative goal. This set of routines permanently organizes a constant friction, abrasion, interactions between the routines issued from the formal and informal structures. It is from this platform that the “improvisational sparks necessary for igniting organizational innovation” (Brown and Duguid, 1991, p. 54) come.

Table 1: Ecology of routines at Ubisoft Montreal

Corporate routines	Routines from projects' structure and design	Routines generated by communities of specialists
Genes of the corporate culture « What we are » Collective identity and purpose Patterns of thinking; feeling and acting	New (mostly managerial) routines, that enrich the « gene pool » of the organization Guided, focused exploration	Routines allowing for some radical exploration (in one specific field, technical or managerial) Open-ended, autonomous exploration
Resulting from historical accretion Those routines are transmitted to newcomers in priority	Acquired through learning by doing processes, by teams designed by the hierarchy	Acquired through a deliberate cognitive process of the communities' members, to capitalize on specialized knowledge or to create new specialized knowledge
Shape strategies, visions,	Drive new managerial	Genuine sources of

norms, focus and convergence	practices	novelty
« Owned » by the organization	Supposedly « owned » by the organization, yet difficult to effectively codify, master, and replicate at the end of a project	The organization does not « own » them, but can get access to them, facilitate their expression and transmission, and enact them
Allowing or not the creation and/or exploitation of the slacks	Sources of and location of organizational slacks	Sources of and location of creative slacks

Following the exploration of this case, in this contribution our aim was to try and address some main issues about the origin of routines in the organisation, including innovation-related routines. The theoretical works on routines do insist on understanding “what is a routine”, but devote little attention to the nature of the group of agents “who are involved in the routine”³. 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 support the routine, without making any differences between them. The project team is very often referred to, 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 relevant. Routines experienced in a functional group, in a project team, in a network of partners, in a community of a 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 leave aside the contribution of informal groups of the firm to the innovative

³ Among the few exceptions, there are Feldman and Rafaeli (2002) and Feldman and Pentland (2005)

process. Our contribution is to locate at the level of communities of specialists the emergence of routines and practices allowing for a creative slack.

As a theoretical approach, the evolutionary perspective allows for a fair and faithful account for the resources creation of firms. 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, some literature (see, for example, Cook and Brown 1999) shows 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 levels' which are the genuine catalysts of creativity in the organization. The creative ideas emerge or are tested at an intermediate level, which also carries out the validation, consolidation, and combination activities necessary to feed innovative processes. Further research is thus necessary to develop a better understanding of the role of knowing communities in the generation and integration of routines in organizational learning and innovating activities.

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