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Digging into exploration processes within established firms:

Insights from two entities dedicated to enhancing radical innovation to support existing business

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ABSTRACT

Since the seminal work of J. March (1991), balancing exploration and exploitation activities is an important topic in management research.
Though the literature is abundant on the management of exploitation activities, exploration activities remain a much less studied area. How should be compared and contrasted: exploration activity, R&D, new product development project and advance engineering? This is central to understand the specificities of exploration processes.
In this paper we propose to dig into the exploration process based on the comparison between two case study researches. These longitudinal researches were conducted in two different firms in the automotive industry, one in a first tier supplier company (Ben Mahmoud-Jouini,

Charue-Duboc and Fourcade2007), the second in an OEM company (Lenfle and Midler 2003). These two companies created an entity specifically in charge of exploring novel innovative opportunities in a specified but broad field. The mission of these entities was to identify novel opportunities that could support the existing business in changing or expanding their scope but not in creating an entirely new business.
In order to dig into exploration processes, we propose to delineate more precisely the specificities of these exploratory entities. We stress three dimensions: (i) five characteristics of the "situation" the team of the exploratory entities face (the strategic issues raised, the purpose of the exploration, the type of results expected, the time span, the approach) (ii) five activities undertaken within the entities (creativity processes, external communication, interactions with the customer, formulation of a technological strategy, analysis of acquisition targets) (iii) and the organizational design that supported these activities.
Based on these cases, we highlight an interplay between exploration and exploitation activities. Hence, on the one hand the exploratory entity relies largely on the competences and expertise located in the existing business of the firm on the other hand the entity develops new knowledge either on technology new to the company or on market that are useful for the established divisions of the company and used by them.

We raise the question of the evolution of the boundaries between exploratory entities and the rest of the firm across time, which remains open in the literature. Hence, exploratory entities are not necessarily designed to develop innovative products up to their commercialization. Rather the latest phases of new product development can be transferred to more exploitative entities.

Keywords: Exploration, radical innovation, creativity

Introduction

Various types of innovation have been differentiated in the literature. On the one hand, incremental innovations lead to reinforcing the position of the firm on its market in improving existing products. On the other, non-incremental innovations, that embrace breakthrough, architectural, disruptive and radical innovations, may renew the strategic positioning of the firm. Several research have underlined that established firms face difficulties when trying to develop non-incremental innovation. Various obstacles have been highlighted in the literature: the existing dominant designs, dominant logic of managers, resources allocation processes, the dominance of exploitation learning processes.

Though exploration learning processes seem to play a crucial role in the identification and early development of non-incremental innovation, few research works focus specifically on how to manage exploration. The literature insists on the importance of balancing exploration and exploitation learning processes.

We intend to specify exploration processes aimed at identifying radical innovations in the portfolio of the firm. In order to understand how firms manage such exploratory activities, we developed two in-depth case studies of the implementation of entities in charge of the exploration of a specific field of innovation in two different firms and compared them.

After a review of the literature we present our methodology and research setting. Based on the literature review and the case studies, (i) we characterize the situation of exploration, (ii) characterize the various activities undertaken, (iii) we analyze the organizational setting that appears appropriate considering the characteristics of these exploration situation and the activities to be undertaken. Finally we address the question of the dynamics of the exploratory entity in focusing on two dimensions: the type of transfer of the results of the exploration processes and the lifespan of the exploratory entity.

Literature review and research question

Several studies have highlighted the obstacles established firms face in the development of breakthrough innovations (Dougherty, 1992; Leonard-Barton, 1992; Christensen, 1998; Henderson and Clark, 1990). An initial trend, represented by Dougherty (1992), underlines the existing barriers between functions or product lines, making it difficult to have a shared understanding of the relevance of an innovation and of the problems to be solved in order to develop it. These barriers result from the existence of different schools of thought and organisational routines separating these schools and limiting joint learning processes. A second trend is based on the seminal work of Burns and Stalker (1961) and Abernathy and Utterback (1978), who distinguish production-efficient and innovation-efficient organisations. The former put in place organisational routines to produce and continuously improve the processes and products established, encountering obstacles to the exploration of new technologies and anticipation of breakthrough innovations. Thus, Leonard-Barton (1992) points out that the firm's core competences required to produce and continuously improve products can become core rigidities. Christensen (1998) develops this idea by demonstrating that by being based solely on these competences, corporate development strategies can lead to discrepancies with the market. Henderson and Clark (1990) show that the distribution of knowledge within the organisation can constitute an obstacle to the development of a certain type of breakthrough innovation: architectural innovations. According to these authors, architectural innovations modify the links between the components of a product and therefore require the reconfiguration of knowledge between the organisation units which develop these components. All these authors agree that an established firm is more prone to developing incremental innovations which consist of improving existing product/market combinations.

However, an entire section of the literature has looked into the organisational forms enabling major established firms to develop breakthrough innovations. These studies relate to different approaches.

The first one refers to Romanelli and Tushman's punctuated equilibrium model (1994), according to which the organisations alternate between long stability periods characterised by the deployment of incremental innovations and short periods of radical change characterised by breakthrough innovations which establish the new foundations of the next stability period. The former periods are characterised by stabilised operations within formalised organisations while the latter are characterised by more informal operations with more fluctuating roles and tasks.

A second approach focuses on the simultaneous development of radical and incremental innovations through three different ways. This approach refers to the distinction between exploration and exploitation articulated by March (1991). Exploitation processes correspond to routine functioning, and primarily lead to incremental innovations while exploration processes that refer to activities less finalised and formalised, are more likely to identify breakthrough innovations. The balancing between these processes can be obtained through the structure of the firm (Tushman and O'Reilly 1997) in which an exploratory unit is separate from the rest of the firm and mainly integrated by the top management (Benner and Tushman, 2003; O'Reilly and Tushman, 2004). A second way is to develop a network in which exploration processes are carried out externally by smaller companies (Mc Namara and Baden-Fuller 1999). The result of the exploration is then integrated (equity investments, licence purchases etc.) into the major firms. A third way to balance exploration and exploitation is to nurture a specific context that enables individuals to alternate between exploration and exploitation behaviour according to the situations they are facing (Gibson and Birkinshaw 2004).

These different models underline the necessity to combine exploration processes with exploitation processes that are naturally favoured by established companies. However, the very content of the exploration process is subject to very limited analysis, as opposed to the activities and organisations adapted to exploitation.

A few exceptions should be pointed out. Adler and Obsfeld (2007), who have studied the organisational processes of exploration which they refer to as “creative projects”, equate them with the notion of search: exploration “is the world of creative search”. Other researchers (Katila and Ahuja, 2002; Fleming 2001; Fleming and Sorenson, 2004) have also used the notion of search to model the exploration process. Once again, the search activity itself is rarely analysed; instead, the balance between stability and search is examined (Rivkin and Siggelkow, 2003). Furthermore, studies on the search process as opposed to the search results are few and far between (Knudsen and Levinthal, 2007). Finally, Zirpoli and Becker (2008) have characterised the creation of knowledge which accompanies the search based on three oppositions:

- local vs. distant (incremental search vs. exploring options that are not in close proximity to current behaviour)
- backward (based on past experience and trial & error) vs. forward (based on the modelling of the interactions between actions and results as part of a cognitive approach)
- on-line (in actual situations or experiments) vs. off-line evaluation (based on cognitive models)

Thus, many questions remain on these exploration processes aimed at enhancing non-incremental innovation in established firms: What are the results of an exploration process: is it a new product? the definition of a target enabling the structuring of a development project? the creation of a new business unit? of a new competence which can be used in new products

development projects? Which organisation and links with the rest of the company are best suited to manage the New Product Development projects?

In order to deal with these questions which until now have been subject to limited investigation, we have opted for a fine grained and longitudinal analysis of the activities, organisation and functioning of entities specifically established within companies to manage exploration processes. **Our objective is to characterize these exploration situations, the activities deployed, the expected results, the organisational setting and the management principles.**

Method and research settings

Data collection and analysis

Our results are based on the confrontation and the comparative analysis of two researches carried out in exploratory entities. We have chosen to compare the results of a longitudinal and fine grained analysis of the progressive structuration of two entities specifically created in two separate firms for the purpose of exploring a new innovation field. This qualitative method is appropriate to uncover and understand what lies behind a phenomenon about which little is known (Eisenhardt, 1989) like the exploration process. It is suitable for a theory building approach (Strauss and Corbin 1998), as well. Therefore, the objective is to inductively identify relevant factors associated to the phenomenon studied and the relationships among them. Bibliographic research was done in order to stimulate theoretical sensitivity and questions (Strauss and Corbin, 1998).

In line with the paradigm of grounded research (Glaser and Strauss 1967, Miles and Huberman 1994, Eisenhardt 1989, Corbin and Strauss 1990, Suddaby 2006), the analysis draws on detailed field notes, interview notes, transcripts of meetings, and company documents. Because qualitative analysis is an inherently dynamic, ongoing process, we

conducted multiple readings of our field notes, the meeting minutes, and the documentation to create categories and identify recurring themes. The authors proceeded iteratively, such that the early stages were more open-ended than later stages. In addition, they remained open to both the use of existing theory and looked for evidence that might inform it and any emerging constructs that might complete and enrich it. They examined repeatedly the data to seek robustness and plausibility of the themes and the propositions that emerged from these data (Strauss and Corbin, 1998).

Research setting

The cases studied were selected following a theoretical sampling meaning that they were not chosen for statistical reasons (Eisenhardt 1989).

Below is a brief introduction of the firms in which these two researches were carried. We refer the reader to the associated publications for further details. These two investigations were conducted in the automobile sector within companies situated at different levels in the value chain: one in Domauto, an equipment manufacturer (first-tier supplier) and the other in PlatCar, a car manufacturer. They were conducted separately by the authors who however share the same methodology (fine grained and longitudinal) and interest in exploration processes aimed at identifying and pre-developing novel and innovative opportunities. The confrontation and comparative analysis of these two investigations seemed fruitful and rich in lessons for the authors, who therefore undertook the building of this characterisation of the situation, activities and organizational form.

Domauto exploring the efficient powertrain

Domauto is one of the world's top ten automotive equipment manufacturers: it is a multidivisional firm with autonomous divisions (budget, internal R&D, product portfolio etc.) specialized in functionally homogenous components (alternators, gearboxes, radiators etc.) accounting for the company's turnover.

In order to ensure growth via innovation, a new organisational entity was created in addition to the prevailing divisions, in order to provide car manufacturers with innovative products over a broader scope (the *powertrain)* than that of each division. The task assigned to this exploratory entity named PTE is therefore the exploration of new innovation possibilities, notably architectural innovations, by focusing on the synergies between the divisions (their products, industrial competences and capacity) so as to provide car manufacturers with efficient and value-added powertrains. The *powertrain* covers a range of systems relating to the engine and contributing to its overall performance: electrical starting systems and power production systems from the engine (alternators); other engine-driven accessories such as the pumps and air-conditioning compressor or turbo; wheel torque transmission (clutch systems); the engine cooling system and finally the calculator which controls the engine. Only part of the components of this scope are produced by Domauto divisions (electrical systems division, clutch systems division and engine cooling division), which are involved in the new entity. The other components therefore represent lacking knowledge that Domauto needs to explore in order to suggest innovation possibilities.

After five years in operation, PTE is still active and has effectively identified a large number of innovation possibilities which are currently being developed.

Platcar exploring the communication-driven car

Platcar, one of the top European car manufacturers, decided to explore services using telematics for two reasons:

- in line with innovations such as the air bag, the brake assist system, keyless cars, etc, telematic services will positively differentiate the product providing the drivers with more and more innovations,
- Redefine the customer relationship, a domain relatively free up from the waves of rationalisation which have affected the automobile industry. Indeed, in, the automotive industry, it is very difficult to develop a sustainable relationship with customers due to, on the one hand, low interaction frequency (one doesn't buy a car often) and, on the other, the intervention of an intermediary acting as the interface between the manufacturer and the customers. In this context, the communication-driven car could be a way to develop customer loyalty by offering them services which creates a direct relationship with them, beyond the actual purchase of the vehicle. It would then be possible to improve the understanding of their use of the car and therefore continuously adapt the product and service offer.

In order to explore the telematic services, Platcar decided to create a specific entity named PTel. Its mission is wide: to define specifications for future telematic equipment and services, anticipate the issues related to the integration into the vehicle, identify the suppliers prone to working in this domain, coordinate the first implementation of the services, etc.

The first months were therefore devoted to the exploration of different telematic services and the associated technologies. A broad spectrum was examined (assistance in case of breakdown and accident, remote vehicle maintenance, steering towards points of interest, remote hotel reservation, e-mail consultation etc.), which raised many questions: what are the suitable technical systems? What suppliers? What legal problems? What are the costs incurred? How to finance them? The duality between embedded equipment on the one hand, services and their infrastructure on the other, illustrates the extent of the knowledge required. After four years, this entity was dissolved and the development of telematic services was partly integrated into traditional vehicle project structures. A new entity in charge of navigation and multimedia communication was created.

Thus, as illustrated by the inserts, these two researches relate to the analysis of the progressive structuring of entities in charge of exploring an innovation field within major established firms. They also have other similarities. In both cases, the data collection process covered the operating period of the entity for several years from its creation to its dissolution in one case (two years for Platcar) and continues at distant but regular intervals[1] in the other (Domauto). In both cases, researchers have accompanied the progressive structuring process and participated in the entity's regular meetings, having access to (or being the recipients of) all the documents produced, distributed within the company or for the entity's internal use. The presence of the researchers at the meetings which marked the structuring of the entity, their access to the documents, the large number of interviews and informal conversations made it possible to fully understand the situation examined, the various activities carried out and the major characteristics of the organisation put in place. The investigations also share the fact that the person in charge of the newly created entity decided to include management researchers in this reflection process.

These similarities between two firms situated at different level in the value chain of the automotive sector constituted a source of insight for the authors (Strauss and Corbin, 1998).

[1] The researchers are still in regular contact with Domauto, notably as part of the supervision of the student research carried out. This interaction enables researchers to maintain a relationship with those involved in the exploration process and monitor the evolution of the entity created.

Accompanying these organisational change processes enables the characterisation of the new organisational form, the in-depth analysis of its operating method and relationship with the rest of the company, which are key aspects.

Characteristics of exploration situations

Following our objective to analyse the exploration processes, we shall begin by characterising the situations in which these processes are carried out, referring to them as exploration situations. Different definitions of "exploration" can be found in the literature. March's fundamental definition (1991) highlights the experimentation approach: *"The essence of exploration is the experimentation of new alternatives."* Segrestin (2005) goes further by focusing on the initial conditions of an exploration process: *"exploration relates to a poorly defined problem, a concept for which there is no actual embodiment and the knowledge of which is very limited or not directly usable."* Garel and Rosier (2008) stress the specific nature of the expected results of exploration: *"exploration pushes the potential of technologies and values beyond traditional markets."* By studying the "creative projects" defined as an emerging pattern of interdependent actions undertaken by a group and resulting, among other things, in the introduction of novelties in an existing context, such as new technologies for example, Adler and Obsfeld (2007) underline the links between exploration and corporate strategy: *"Exploration opens up new strategy options and strategy sets the direction of exploration."*

Based on this literature and the exploration situations we have analysed, we propose a definition of the exploration situation through five major characteristics:

(i) the strategic stakes

(ii) the object of the exploration,

(iii) the approach,

(iii) the expected results,

(iv) time span.

These characteristics[2] are selected taking into consideration their impact on the activities carried, the management and the organisational setting. Thus, while detailing each characteristic, we shall highlight the consequences on the management of exploration processes. Table N° 1 summarises these characteristics and their consequences.

Insert Table N°1 here

An intentional and emerging strategy (C1)

An exploration situation occurs when a company contemplates a major renewal of its products, technologies, business model or more generally its value creation model. The idea is to envisage potential growth other than at the fringe of existing products via incremental innovations. A global strategic intent is formulated by the top management, notably reflected in resources dedicated to exploration. Dougherty and Hardy (1996) have pointed out that the acquisition of resources is one of the main difficulties facing breakthrough innovation in major organisations. This is why the literature has focused on the implementation of specific allocation processes (Burgelman, 2003; Christensen and Raynor, 2003; Burgelman and Grove, 2006). However, the initial impulse is insufficient for the accurate definition of the strategy. The orientation of the exploration is developed as studies are carried out and intermediate results achieved. Exploration makes it possible to gradually define the strategy. This emerging strategy can sometimes go against the company's prevailing one (Burgelman, 1994). Initially there is no vocabulary or shared understanding of the phenomena leading to a stable and coherent strategy formulation. The company's knowledge is insufficient to make such a statement. The exploration of a technology, a new usage, a new economic model, or a combination of these, will make it possible to produce the missing knowledge so that the

[2] These characteristics complete the characterisation previously established by Lenfle (2008) in order to highlight the inadequacy of the methods of development project management for exploration situations.

company can develop its strategy. Therefore there is no initial strategic formulation to be deployed, only the willingness to discover new strategic formulations based on an exploration process and support their subsequent implementation. The top management provides the impulse.

In this respect, the exploration of telematic services is typical. This type of service corresponds with at least two strategic designs: the search for product differentiation and a rationalisation of customer relations aimed at reinforcing loyalty. The exploration process will highlight deadlocks and turning points which will specify and reorient the strategic designs.

The exploration of an efficient powertrain corresponds with an intentional strategy planned by the top management who decide to dedicate an entity to the subject. However, the formulation of the strategy stops there. The challenge is to enable the top management to follow the innovation tracks which will emerge from this exploration and to specify the scope and issues at stake.

The management of innovation processes therefore implies the implementation of an organisation sufficiently flexible to seize the opportunities which may emerge throughout the exploration process.

A concept potentially fruitful but not associated with existing knowledge (C2)

The starting point of an exploration is the identification of a potentially fruitful concept not yet associated with company knowledge, be it technical, market, value or usage-related. We shall refer to the concept definition proposed by Hatchuel and Weil (1999), who states that a concept is a “proposition which does not refer to anything that exists and which cannot be deemed true or false at the beginning of the exploration process.” These authors propose the notion of **innovation field** to designate the area that the exploration process will structure. The innovation field is sufficiently different from the products sold by the firm so that the existing knowledge is extremely limited or spread out in different areas of the company. The

firm identifies this innovation field as an area of opportunities which it is unable to explain in detail. One of the objectives of the exploration process is to precisely formulate them and acquire the knowledge required to develop them.

This innovation field may relate to extremely varied formulations such as a range of offers (telematic service) or a system providing a number of varied functionalities to which a specific property is added (a more efficient power train). The similarity between these formulations is that they correspond with new business opportunities for the firm but require the development of new knowledge so that they can be defined. At the beginning of the exploration, the communication-driven car is a concept not yet specified but which, by offering telematic services integrated into the car, should result in the development of new types of usage benefiting from the standardisation of Internet-connected tools. This concept however raises several questions: what telematic service should be proposed? What business model? What are the responsibilities in case of failure? Answering these questions requires the development of knowledge which does not exist within the company, so as to identify the most promising opportunities in this innovation field. Exploration is therefore characterised by a potential of applications and technical indecision: it is the exploration of new applications and usages for unknown users in new and different domains, without being able to prioritise technological choices or decide on architectures.

The management of innovation processes therefore implies the implementation of an organisation making it possible to progressively develop the understanding of this concept, identify and acquire the knowledge required and share it within the firm.

This knowledge can be technical, market, usage or business model related. Potential customers with whom the usage value could be explored must often be identified: what customers might be interested? What do they look for in the offer which would be proposed to them? How to involve them in the process? How to accompany the customer learning process

when the product is extremely innovative? (Ben Mahmoud-Jouini et al. 2007, Ben Mahmoud-Jouini and Charue-Duboc, 2008)

An experimentation and learning approach (C3)

The exploration **process** consists of identifying, carrying out and managing a number of studies aimed at acquiring knowledge via technology prototyping so as to assess the potential and limitations for targeted applications, product concept tests on different markets and usages etc. **Divergence** constitutes an intrinsic characteristic of the **process** (Van de Ven et al. 1999). In the absence of an explicit and specific request from a customer, and in light of the diversity of possible targets, on a specific market or different markets, the idea is to develop generic concepts, semi-finished products (Hatchuel and Weil, 1999), prototypes and propose them to different customers in order to define relevant targets and develop knowledge which can be used as part of different development projects, or in order to formulate new questions for research. Exploring means doing the groundwork in unknown domains, acquiring and developing expertise on issues or fields not previously covered by the company.

Exploring opportunities to create value by the design of an efficient powertrain requires the identification of extremely varied aspects ranging from a compact powertrain to overcome space constraints and open up new design possibilities, to a clean powertrain complying with increasingly stringent regulatory constraints, to name but two examples. The exploration of these two different opportunities requires that numerous studies be carried out on very diverse topics.

The first consequence of this divergence is the necessity to manage the organisation of the learning transfer as the studies are carried out within the exploration process. The importance of these learning phenomena has already been highlighted, notably by Hatchuel and Weil (1999), via the notion of lineage. It was on the basis of the study of an industrial

sector characterised by short development cycles (appliances), in which the exploration process can be based on the marketing of new products, which makes it possible to rapidly acquire knowledge. However, this learning transfer raises specific questions in sectors characterised by long development cycles or sectors which integrate a large number of partners, as is the case of the automotive industry or telematic services for example.

The experimentation approach has notably been highlighted by the researchers who focused on the "search" considered as one of the determinants of innovation (Katila and Ahuja, 2002; Fleming 2001; Fleming and Sorenson, 2004). The notion of search requires the creation and combination of knowledge. Becker and Zirpoli (2008) summed up this research by pointing out that this knowledge can be created by on-line evaluation, i.e. in actual situations as opposed to off-line, i.e. based on cognitive models. It can also be created by trial and error or finally in sectors far removed from the firm's knowledge base.

The learning aspect has also been identified by Pich, Loch and DeMeyer (2002) in their treatment of extremely uncertain ("unk-unk") situations. These authors advocate the implementation of methodologies promoting learning by trial and error and/or pursuing several solutions simultaneously, the best one being selected afterwards (selectionnism). Thus, the learning process consists of recognising that, in light of the uncertainty, the first solution adopted will not lead directly to innovation and can never be an end in itself but will make it possible to develop the knowledge which will progressively define the exploration. The exploration will evolve little by little into an innovation by progressively capitalising on the knowledge. To this end, Sommer, Loch and Dong (2009) focused on start-ups and the creation of new businesses. This learning process combined with exploration situations has different implications for major established firms.

In the end, the knowledge management aspect is particularly significant here. The idea is to explore an innovation field at a lesser cost and as thoroughly as possible. In this respect, the

marketing of a product/service must be considered as an indication for the marking of the initially unknown field in which the innovation will be developed.

Unspecified and multi-form results (C4)

The principal **result** of an exploration is the structuring of the innovation field, notably by producing knowledge relating to different aspects: techniques, market, usage, value etc. The purpose of the exploration process is therefore to develop competences with regard to the technologies, markets, business models and evaluation criteria. The **goal** is not to develop a product with characteristics clearly defined in advance. Limiting the result of an exploration process to the turnover generated by the first newly marketed offer resulting from this process is exceedingly restrictive. Beyond the first product introduced onto the market, the value of the exploration process for the company is the precise identification of a number of opportunities and the development of knowledge based on which development projects can be structured. The ultimate goal is the creation of a range of offers, not just a successful application. The objective is to develop concepts and knowledge likely to rapidly enable the design of one or several lineage of products/services.

The exploration of the efficient power train concept results, via the studies initiated by the exploratory entity, in results as diverse as the development of a functional model to examine the interactions between components as part as architectural innovations; the establishment of a competitive analysis of certain technologies and their differentiated evolution in different areas of the world etc. These studies therefore lead to material as well as immaterial results, all of them unspecified at the beginning of the exploration process.

The idea is not to converge “towards” a goal or work “for” a customer but to achieve intermediate and temporary results (new knowledge, new concepts). According to Lenfle (2008), the results of an exploration process can be explored concepts which will be

developed or suspended due to lack of time and/or resources, and/or new knowledge which will be used later on in the development process or subsequently exploited on other products.

The issue of the evaluation criteria of the results because, without the exploitation of the competences produced which will be reinvested in other projects, the investments made would not be profitable. Hence, management efficiency can be equated with the efficiency of a learning/knowledge creation process[3]. Indeed, studies are characterised by market technical (will the desired functionalities be achieved? what consequences for our process etc.), marketing (what customers? for what requirement(s)?) and economic uncertainties (how much will it cost? what profitability?), which considerably reduces the chances of success. In light of this marked uncertainty, the chances of succeeding are limited and one may hesitate to invest in and commit significant resources to an exploration process. There is a risk that the exploration process may be exceedingly lengthy: it does not immediately take up a lot of resources but is not guaranteed to ever produce anything.

The other issue relates to the adaptation of decision-making criteria to finance these studies. Christensen and Bower (1996) have shown the importance of a well identified customer in the decision to finance a project. Hence, if the customer does not exist, which is the case in the exploration situation, the resources allocation process becomes a key issue.

Multiple time spans and hidden urgency (C5)

We propose that the exploration situation be referred to as "hidden urgency". In light of the breakthroughs desired, one cannot deny that exploration is a long-term process. However, as pointed out above, the exploration process requires the simultaneous initiation of a number of studies. Each study targets a shorter-term time span and has its own deadlines. Furthermore,

[3]Research on new product development recognises the importance of this element but does not consider it a key objective of the project. The issue of the usage/distribution of the knowledge developed in the project is not really dealt with and constitutes a by-product to be subsequently used to improve the running of a process more than a fully-fledged objective (for example Wheelwright & Clark, 1992).

each study develops knowledge which must be eventually used and integrated into a development project. The idea is to determine what product should be supported in the short term in order to introduce the first version of the new offer developed. The window of opportunity available to integrate an innovation into a product development is often limited. Once again, there are a number of deadlines on different timescales (short and medium term) which the exploration must fit into. Multiple time spans must be dealt with and the exploration cannot be deployed over a single time span.

This hidden urgency manifests itself in the presentation of the results of the completed studies to the members of the exploratory entity as well as to the rest of the company.

Activities undertaken by the exploratory entity

In order to propose a complete the characterization of the situation with the activities undertaken during the exploration process, we clustered the one we observed according to the dominant theme.

Creativity and structuration of the innovation field (A1)

One of the first activities is to share a common understanding of the innovation field among the team in charge of the exploration. Following this the purpose is to initiate collective creativity processes aimed at identifying and selecting the exploration patterns which will be investigated. The exploratory entity (EE) will launch (finance and manage) the studies that target the knowledge acquisition. Creativity is deployed within the entity and may combine different competences spread out in the firm including external experts. The creativity approach consists of identifying the value propositions to be pursued and associating them with technical solutions or solution concepts likely to turn these value propositions into reality. At the beginning, this approach leads to numerous debates within the entity regarding

the relevance of the value propositions and the competences needed to conduct the required explorations.

At PTE, this activity led to the identification of ten value propositions (an efficient powertrain is clean, compact, light, safe, etc) followed by the identification of the studies required to assess these value propositions. This identification was also based on the technological roadmaps of the firm and its partners (competitors, customers, subcontractors etc.).

In PTel, the initial months were devoted to the exploration of what "telematic services" means (assistance in case of breakdown and accident, remote vehicle maintenance, steering towards points of interest, remote hotel reservation, e-mail consultation etc.) and of the associated technologies. The purpose of this activity is to specify these different services and identify the studies which would answer the following questions: what technical systems? What suppliers? What legal problems? What are the costs incurred? This activity is undertaken by PTel with the participation of the equipment or content suppliers to explore the different possible infrastructures and the different funding methods possible.

External communication (A2)

The second activity is the company's external communication on the innovation field. By definition, the company is a novice in this field and it may be relevant to communicate on this new positioning to prepare the exploratory studies which will have to be carried out with partners such as customers for example. This external communication helps the firm put together a new identity for the outside world in order to generate new types of interaction with the customers, for example.

The difficulties inherent in this type of communication stem from the large uncertainty which, by nature, characterises these situations. What should the communication focus on and how should failure be managed if this exploration is unsuccessful? The other difficulty is to find the right medium for this communication. As the exploration is ongoing, it is impossible to

communicate on a specific offer because the very purpose of the exploration process is to help define this offer. Finally, this communication would take different forms depending on whether the company's business is BtoB or BtoC.

Domauto issued a communication during the Automobile Worldwide annual exhibition (ten months after the creation of the EE). The EE took charge of the company's communication by presenting a functional mock up introducing the new scope without specifying the company's offers and performance on this new scope, which were being explored. Subsequently, one year later the external communication evolved using a demonstration vehicle in which a new architecture combining innovative components was presented. It should be reminded that PTE focused primarily on architectural innovations designed to generate new values for the customer.

PlatCar also chose the automobile exhibition, approximately one year following the launch of PTel, to communicate on the creation of a joint venture with a mobile telecom partner in charge of implementing a portal. This presentation had a tremendous impact: all European media reported the first alliance between the automobile and Internet.

New interactions with the customer (A3)

As mentioned above, one of the main characteristics of the exploration situation is the need to develop technological knowledge as well as market knowledge on the new innovation field. An objective is to identify the value opportunities associated with this field. Hence, this analysis must be carried out with potential customers who must be identified and with whom interactions must be developed to create usage-related knowledge. One of the main activities is therefore the development of interactions with these potential customers. These customers can be end users or companies, new and different from the company's historic customers. If they are existing customers, notably from the industrial sector, the choice of a new scope requires the development of relationships with new players operating on a broader scope of

intervention or within different timeframes from the product development process. The exploration process requires the creation of relationships with players who have a global and prospective vision of the technologies and requirements. One of the main issues raised by this interaction is the objects that can support them and on the basis of which rich feedbacks can be provided.

PTE developed relationships with car manufacturer's staff in charge of broader perimeters, notably of certain parts of the architecture of the powertrain, because, the purpose was to develop architectural innovations which would alter the components and their interactions. The objective was to interact with people capable of assessing the potential of unspecified value propositions. It was important that this interaction could occur at the very beginning of the exploration process, as soon as value propositions were identified at the start of the creativity activity. However, at this stage, prototypes have yet to be developed. This interaction was therefore based on abstract supports such as presentations or the results of functional analysis or creativity exercises. It was implemented very openly so as to get as much reaction from the customer as possible. The questions asked were, for example, "what are your worst nightmares in terms of vibration?"

Platcar's issue with interaction was different because it involved end users. To improve the assessment of the issues relating to telematic services, PTEL, launched soon after it was created, an experiment whose objective was to identify, in actual conditions, the telematic services requested by the drivers. Thirty vehicles fitted with equipment were put on the roads and connected to a test platform made up of operators connected to the Internet and providing the drivers with all the services they requested. The objective is therefore to inventory the services requested which are not defined at the beginning of the experiment. This experiment makes it possible to identify services but most of all it reveals many information like the one about the delivery of the service "*We thought that a call centre could provide the service but*

we realised that this is impossible. It is not easy to communicate with a vehicle, as the environments of the operator and of the driver are completely different, which necessitates a translation effort." This experiment highlighted the value criteria important to the user such as the precision and variety of the contents, the invoicing, the speed and responsiveness: "*the user must not receive a late response which is not adapted to the situation*," etc. The experiment also enhanced the understanding of the production process and profitability conditions: call centre or not? in which conditions would it be profitable? necessity of an alliance with a service provider, etc.

Formulation of a technological strategy on the innovation field (A4)

Based on the creativity work carried out and the multiple interactions with the customers, the team had to formulate a technological strategy on this innovation field. This activity represents a fully-fledged component of the process. The idea is to select the different studies which will make it possible to create knowledge and structure the field with regard to its market as well as its technologies. This strategy must be supported by the company and, to this end, should be tested by the other company managers who will eventually be concerned by the future results of the exploration process. Certain innovation tracks can sometimes result in shifts in value between the units (risk of cannibalisation etc.).

In Domauto's case, one year after the creation of PTE, the director of the EE issued a strategic document, just like all the other units of the group. Initially, this document was supposed to have the same format as the other units. However, the format was different: it does not include the provisional contribution to the company's turnover due to the uncertainty associated with the exploration. It should be noted that, due to the eventual consequences of the technological strategy for this new scope and the individual strategies of the other units focused on components which are part of this scope, the director of the EE also participates in

the presentation of the units' technological strategies and can challenge them by virtue of the progressively acquired knowledge within the EE.

In Platcar's case, the exploration of the telematic services requires the definition of architectures which can be intrusive in the vehicle and have repercussions on the other elements of the vehicle. The EE had to decide on the combination of a radio/CD unit, a navigation system associated with a GPS, a GSM telephone and an embedded computer capable of processing information received from inside or outside the vehicle. This system could also be integrated into the vehicle and used, for example, to display information on air-conditioning. This type of exploration requires the examination of the technological strategy to be adopted, all the more so as it has consequences for other company businesses and involves external partners such as automotive suppliers who will in turn explore this field.

Recommendation and analysis of acquisition targets (A5)

The required and missing knowledge can only be partially developed by the studies initiated by the EE. The company can therefore envisage the acquisition of external resources to accelerate the process, which involves the necessity to identify and evaluate these potential acquisition targets or strategic partnership targets selected for their product/competences performance; it also involves the necessity to integrate them once the acquisition is completed in order to implement the anticipated synergies. Generally, these acquisition processes are extremely strategic and confidential and therefore require the EE's involvement at top company level.

In Domauto's case, the identification of the studies highlighted the need for a key competence in engine control which accounted for a large part of the possible innovations identified. The company, following a relatively quick process (one and a half years after the initiation of the exploration), acquired a company to complete the EE's teams. The director of the EE played a significant part in the integration of these teams into the company, given that this newly

acquired company was also part, for certain aspects, of Domauto's operating activity because it sold components which were added to the product range. However, it would not have been part of the group's acquisition priorities if the EE had not expressed the need for these competences in order to further explore the innovation field.

In PTel's case, the idea was not to acquire competences by buying a company but to create a strategic partnership in the form of an alliance in order to unite the competences of the manufacturer and of the telecom operator for a possible cooperation on the definition of the future embedded telematic services and the technical infrastructure required to support them. Four working groups bringing together members of both companies and exploring the services & partnerships, infrastructures, business plan and communication plan were constituted and resulted in report summarising the proceedings and outlining the orientations. The proceedings of the working groups were particularly fruitful, allowing the manufacturer to discover the world of service operators, making it possible to specify the partners' objectives and projects, but also highlighting the complexity and difficulties of the subject (both in terms of strategy and practical implementation). In this cooperation, the car manufacturer "*contributes its expertise related to the integration of the equipment into the car and its knowledge of the automobile market and use of the car itself, its customers and reputation,"* while the telecom company "*contributes its Telecom and Internet competences and its experience in terms of mobile portals."* The initial business plans are not fully defined but include the following:

- the operator finances the equipment embedded into the vehicles in order to rapidly achieve significant volumes;
- a payment method inspired by mobile telephone practices, i.e. subscription and "pay as you go".

It should be noted that the exploration process focused fairly rapidly on a formal partnership and the development of a portal without taking the time to explore in depth the different options (techniques, partners etc.). The nature of the product, i.e. a service, and the need to benefit from the internet network to test the value propositions partially explain this rapid focus.

Characterisation of the exploratory entity's organisational form

Now that the exploration situation and the activities to be carried out have been characterised, we wish to consider the organisational forms which would make it possible to undertake these activities and manage the constraints of these situations.

As highlighted when characterising the exploration situation, the knowledge involved in the exploration process is for some part spread throughout the different areas of the organisation and must be developed for the other. Consequently, it is difficult to characterise the exploratory entity's organisation for two reasons: on the one hand, it should encompass the different areas of the organisation such as the business units with useful knowledge, for example, and on the other its boundaries cannot be defined in a stable and totally objective manner as they are likely to shift as the exploration progresses. Finally, the identification of the players involved in these various activities is not easy. The literature on project management (for example Wheelwright & Clark, 1992), which studies the relationships between a project team and a permanent organisation, is useful for characterising the interactions between the EE and the rest of the company. Thus, based on this literature, three criteria were selected to characterize the EE organization:

- the hierarchical reporting
- the time dedicated to exploration activities
- the geographical localisation.

By cross-referencing these three criteria, the organisation of the EE could be characterized according to three levels or circles: the core team, the extended team and the steering committees.

The core team

The core team refers to those belonging specifically to the EE with the explicit task of performing the exploration process. It is made up of people dedicated to the objective and physically located together in a geographical area. Some of them have therefore left the entities they were reporting to before the creation of the exploratory entity, while others have been recruited for this purpose. The **director of the entity** belongs to this core team: he should have a high-profile status within the company due to his seniority and/or experience in the company that should help him in the knowledge mobilisation of the firm. The director of the entity reports to a high level (to the company's executive committee for example). He has a specific budget to finance studies in which people belonging to the extended team are also involved. The existence of a player specifically in charge of the exploration and devoting all or most of his/her time to it will reduce the difficulties in terms of coordination and energy mobilisation. As the exploration processes are structurally lacking of resources and must therefore constantly negotiate with the other entities of the organisation, the absence of a manager acting as a preacher[4] is clearly a problem. Just like a product development project, the assertion of the project identity plays a key role in its implementation. The rest of the core team, generally restricted, is a combination of varied areas of expertise (technology, marketing, product).

In the case of PTE, *the core team* included the director of the EE and a staff of 4. The Director of the EE had over 15 years' experience in the company and had been director of one of the divisions' R&D. He reported to an Executive VP along with the directors of the divisions. He

[4] Metaphor used by Wheelwright & Clark, 1992.

had a specific budget to finance the studies aimed at exploring and testing new solutions, involving the expertise of the company or external firms. The other 4 dedicated staff had over 10 years' experience in the company and elsewhere. They were respectively in charge of the monitoring of the studies identified by the creativity process (A1) carried out by the extended team and aimed at examining technical issues more in depth, and of the monitoring of the marketing actions targeting the customers (A2, A3). This limited team played a crucial coordination and reporting role.

In the case of the PTel exploratory entity, the core team accounted for 18 people. In addition to those in charge of the steering and coordination of the studies, it included "technical" and "services" areas of expertise. This is due to the importance of the development of innovative embedded equipment and the implementation of the infrastructure required to support the different services. These people were young and in the company for a short time. While this characteristic is totally understandable (telecom was a new topic for the automobile sector), it represented a weakness with regard to the group's internal legitimacy and ability to mobilise networks within the company. Commercial and distribution areas of expertise were not represented. This absence had consequences for the adoption of the innovation by the commercial network.

The extended team

A second circle, or extended team, is made up of the people working for a considerable part of their time for the exploration process, i.e. functional managers participating in working or creativity groups or experts occasionally involved in studies while still reporting to their business entities for the internal staff, or to a service provider for the external staff. They are hand-picked and financed for the hours spent working for the EE without being dedicated or reporting to this entity. They can be physically attached to the core team or remain in their entity of origin.

In the case of PTE, the extended team included appointed correspondents within the divisions. As already indicated, the innovation field explored by PTE involves components developed by 4 divisions. For each of these divisions, a person in charge of R&D and one in charge of marketing were appointed to dedicate time to the exploration process. They were chosen for their function in their division, their expertise as well as their career and personal competences: some of them had professional experience with automobile manufacturers. They were generally at a lower hierarchical level than that of the director of PTE. An expert belonging to the research function of the top management also joined this group. They were not dedicated to the exploration process but devoted one day a week to it, thereby cumulating two functions. They acted as a relay: report to the EE the knowledge and the constraints of their divisions and advertise the EE studies in their divisions by recruiting the most competent experts according to the technologies envisaged and by contacting the most adapted customers according to the applications envisaged. They remained the relay of the EE for several years. This extended team was also open to those in charge of the studies initiated such as for example of the construction of a prototype to explore a specific technology/application mix or the customer presentation. These members could devote a sizeable part of their time (over 20%) but their vision of the various possibilities explored by the EE was less extensive. Unlike the first members of the extended team, their function was not so much designed for the long-term as for a time-restricted action. They have varying hierarchical positions (engineers, team leaders etc.) but generally are below the level of the director of the EE. They can also belong to external service providers. These people report the progress of the studies to the core team that finances them.

In the case of the PTel, the extended team includes business correspondents devoting a significant amount of their time but still attached to their function of origin. They play a dual role, just like functional meembers in a cross-functional development project organisation.

They constitute a key link for the EE's attachment to the company. On the one hand, they represent the different businesses in the exploratory entity by providing the competences of the body they represent. They explain the policies and constraints which must be integrated into the studies so that the results can be embraced by the company as a whole. On the other hand, they are the representatives and relay of the exploratory entity within the business. They help enhance its action within their area of expertise. The sense of belonging to this second circle is fuelled and reinforced by coordination processes: monthly or twice-weekly meeting inviting all the members of the first and second circles to assess the different actions undertaken by all, to discuss all current or future topics, whether technical or related to communication, services etc.

The steering committees

Finally, the third level relates to the *steering committees* of the exploratory entity and includes the executive committee which the director of the exploratory entity reports to, as well as other committees, situated at a lower hierarchical level in charge of preparing the executive committee meetings or focused on a specific theme. Although the top managers who make up these committees devote little of their time, they play a crucial role in the organisation of the exploration process and its integration into the company.

In the case of the PTE, different committees helped develop the relationships between the EE and the other divisions. The executive committee to which the director of the EE reported regularly was made up of the executive VP to whom he was attached, the company's R&D director and person in charge of strategy as well as the directors of the divisions involved in the powertrain scope by the exploration field. The different studies were presented and validated in this committee, as were associated budgets. This committee discussed the consequences for the firm and the divisions in terms of technological strategy. This executive committee which brought together the top hierarchical levels of each division was not the

only coordinating body. Other cross-sectional and thematic committees were also created at lower hierarchical levels, among which was the validation committee, made up of the directors of the three divisions involved, their marketing director and R&D director. The same applied to other committees in charge of coordinating the communication to the customers in terms of the innovation field or the technological choice when different offers were proposed to the same customer by the different divisions of the company.

In the case of the PTel, different committees were set up by the company to manage all telematic issues. These committees mobilise staff of a higher hierarchical level than the extended team, most often working part time on the subject. Three types of committee were instituted: the executive committee to which the director of the EE reports, the telematic operational committee and the innovation committee.

Discussion - Conclusion

We have characterised the exploration in three stages: first of all the situation, followed by the activities constituting the exploration process in itself and finally the organisational setting adapted to the implementation of these activities, notably via the characterisation of the exploratory entity. In conclusion, we wish to focus on the combination of these three dimensions. After which we shall discuss the lifecycle of the exploratory entity.

First of all we shall point out the difference between an exploratory entity and an R&D department. The exploratory entity is in charge of managing the development of technical competence, as well as knowledge on the markets, the customers, the specifications, the value etc. As it has already been pointed out in literature, the combination of the development of these competences (techniques, market, value etc.) are decisive for the success of the innovations. The task of the exploratory entity is to ensure this combination, hence the relevance of uniting people with technical profiles and competences but also versed in marketing and competitive surveillance, as underlined in the characterisation of the

organisation. The table N°2 summarises the different dimensions of the characterisation we propose.

Insert table N°2 here

A cross-sectional analysis of the table reveals several connections which combine these different aspects. We shall begin by the strategic aspect, is involved in the intentional and emerging strategy (C1) and the innovation field strategy formulation (A4). This aspect is reflected in the organisation of the EE through the focus on the support given by the top management to this entity as well as the need to integrate the entity into the other structures of the company. The strategic propositions resulting from the exploration processes can go against the current strategy and orientations proposed by the other structures of the company, like the divisions for example. A discussion is then required to confront the information and knowledge making up the foundation of these different visions and consider the consequences, risks and opportunities associated with each of them. Different decisions can emerge from these debates: (i) impose the strategy suggested by the EE, (ii) overrule the strategy proposed by the EE and pursue that proposed by the divisions, (iii) pursue both strategies for a period of time and postpone the decision so that the company can choose once a number of uncertainties have been removed. Multiple integration mechanisms such as the extended team or the various committees are required so that these debates can effectively take place. The multiple integration mechanisms can enable a division to alter its strategy by getting closer to that formulated by the EE.

This integration between the EE and the other structures of the company is also a response to the multiple results generated by the exploration process (C4). An opportunity may arise for example from contact with a customer (A3) to propose an offer based on an innovative combination of the company's existing offers without significant developments. The integration makes it possible to identify and propose this offer fairly rapidly. Similarly,

the competences acquired as part of the exploration process (A1) can be mobilised at intermediate stages for less ambitious product developments to be undertaken by the company's divisions.

Another link is between the composition of the exploratory entity such as the extended team and the creativity activity (A1). This activity reveals the necessity to use experts spread throughout different areas of the company and get them to work as a team on the innovation field to be explored. Focusing on a clearly identified task distinct from their prior function puts members from different company areas in an ideal position to mobilise the competences of these areas. This organisational design is in itself a guarantee of integration.

The experimentation and learning approach (C3) could be linked more specifically with the core team of the EE which, by its involvement in the different exploration studies initiated simultaneously by the entity, can help capitalise on the knowledge developed. However, this capitalisation requires prior technological competences in the domains studied.

This capitalisation and learning characteristic (C3), combined with the simultaneous management of multiple time spans (C5), brings us to the issue of the timeframe associated with the exploratory entity. The EE combines quick wins with the medium-term development of competences which can give access to new strategic positions formulated (as part of A4). This medium-term objective requires an extended timeframe for the entity and guarantees a certain sustainability difficult to assess early on and which shall be subsequently discussed. This sustainability is one of the aspects of the lifecycle of exploratory entities which we shall address to conclude our article.

The exploration, as underlined in our literature review, is first and foremost defined as being opposed to exploitation, radically different yet complementary. The complementarity between exploration and exploitation can be analysed in a synchronic manner, the idea being to ensure that they coexist at a specific time; it can also be analysed in a diachronic manner,

the exploration processes eventually constituting the foundations for exploitation processes. This diachronic perspective raises the issue of the lifecycle of exploratory entities: when are solution concepts, new knowledge or strategic formulations sufficiently "mature" to be developed further within more formalised, structured and routine entities? Hence **the dual issue (i) of the transfer of certain exploration results:** towards what type of entity? When? and (ii) **of the lifespan of the exploratory entity**: is it dissolved at the time of the transfer? Does it survive to capitalise on the knowledge produced and not transferred as well as to continue exploring?

The transfer of the exploration results

The task of the EE is to generate new product positioning opportunities for the company by targeting new technologies, applications or architectures or even new distribution channels. Its purpose is not to develop a new product or product range up to their marketing stage. The studies are restricted to the development of prototypes to test technical feasibility or present an application to customers and end users. Nonetheless, the objective for the company is to eventually sell these radically new products identified by the exploration process. These products can be developed and exploited in different contexts.

When the potential of the innovation is acknowledged by the members of the executive committee, notably by those in charge of the other company divisions, the development can be **deployed within the company,** for example in an existing division. It can also be the case for architectural innovations. Once a new architecture has been stabilised and validated the product is developed by two divisions or more. The development requires more human resources and relates to a more traditional approach for the company. The identification of a potential customer often results in the increasing interest of the divisions, which hold a significant part of the competences for developing these new product ranges.

When the company does not deem the conditions acceptable, the transfer may require the creation of an ad hoc structure, either via the acquisition of external units belonging to other companies or via the creation of a new business unit in charge of developing and exploiting these newly identified products. The transfer can also relate exclusively to knowledge and may lead to the creation of new businesses or new specialties within the firm.

However, regardless of the destination of the transfer, it is often a more progressive process than reflected in the decisions made by an executive committee. The role of the members of the extended team is crucial when preparing this transfer. In the case of an internal transfer, they inform the heads of their divisions of origin of the new solutions and associated business opportunities as well as technological developments. In the case of a transfer to a new creation, the members of the extended team act as a relay and facilitate the transmission of the exploration results.

Before concluding the discussion on the transfer of the exploration results to the units in charge of development, two difficulties generally associated with this transfer should be pointed out:

- Reluctance to integrate these results into the development projects (*"not invented here"* syndrome), especially for internal transfers to existing structures. The exploration process runs the risk of being isolated from the rest of the organisation. This "NIH" pitfall would question its rallying ability, making the switch to development potentially very difficult;
- Absence of certain key competences in the exploration process which will result in the late appearance in the development phase of problems which should have been dealt with during the exploration process. It is difficult to involve personnel from downstream functions (front-office, commercial etc.) in the exploration because the

innovation is traditionally outside their area of expertise although their early involvement is essential to guarantee success, in particular for services (Lenfle and Midler 2009).

The transfer reveals the difficulty for the exploratory entity of finding a balance between the two centres of attraction represented by Research on the one hand and Development on the other, resulting in two possible pitfalls. *The first would be the "Research pitfall"*, whereby the exploratory entity is considered as an upstream surveillance process relatively isolated from the development. We have indicated that the mobilisation of existing company knowledge is crucial and gives the established company a genuine edge over a start-up. However, research shows the difficulty of involving and mobilising all businesses if the solutions developed are not "mature" enough or "validated".

Conversely, the exploration process can switch to development by failing to transfer and trying to ensure the complete development of the services and equipment for a targeted market. This is the *"development pitfall"* In light of the technical uncertainties, the exploratory entity runs the risk of taking charge of development and as a result switching the centre of gravity of the exploration from a "unifying phase lead" position to that of developer of a specific product for a specific market.

Thus, exploratory entities are unstable structures whose task is likely to evolve and who are constantly under threat of turning into more stable entities, recognised in the company and corresponding with more routine operations: research or development.

The lifespan of the exploratory entity

The transfer of exploration results can relate to all or part of these results, which leads us to consider the lifespan of the exploratory entity beyond this transfer. This entity can be dissolved with the transfer, thereby illustrating the temporal characteristic of the projects: we shall refer to these exploratory entities due to be dissolved as "exploration project". It can also

survive the transfer of the exploration results or a part of it and constitute a sustainable exploratory entity which will guarantee the capitalisation of the knowledge acquired by exploration and its renewal. Independently of the type of transfer, the sustainability of an exploratory structure depends on its ability to maintain its multi-faceted characteristic and generate new exploration tracks, notably by focusing on areas outside the innovation field.

The “exploration project” corresponds with a situation where the exploration stops when the dedicated entity is dissolved or continues in one of the company’s existing structures. However, this raises the issue of the organisation’s capacity to explore breakthrough innovations in the absence of the strategic support enjoyed by an exploratory entity. There is a genuine risk that diluting the players of the organisation could result in a loss of the EE impetus, whose exclusive task was to provide this boost and which operated on the fringe of standard procedures.

Based on this analysis, we propose to distinguish four situations. These four situations are differentiated along two dimensions. The first one relates to the transfer of the exploration results within the firm either to one or several existing structures or to a newly created structure in charge of exploiting these results. The second aspect relates to the lifespan of the exploratory entity: is it temporary and destinated to be dissolved or sustainable beyond the transfer?

Typology of exploratory entity dynamics

The combination of (i) the transfer of the exploration results whether it is within the firm toward existing units or it necessitates the creation of specific units with the (ii) lifespan of the exploratory entity whether it is temporary or sustainable leads to the following matrix:

		Lifespan of the exploratory entity	
		Sustainable	**Temporay** **« project exploration »**

Transfer of the exploration results toward	**Existing entities of the firm**	**A** PTE	**B** PTel
	Creation of a specific unit	**C**	**D**

The two cases studied, PTE and PTel correspond respectively to the boxes A and B. The characterization of the situation, the activities undertaken, the organizational setting and the dynamics of the exploratory entity highlights a type of exploration processes dedicated to sustain on the long run the existing business of the firm. Our work enhances the understanding of the exploration process in itself and not in comparison of the exploitation.

Further research on the situations corresponding to the boxes C and D could lead to highlight other dimensions and contingencies.

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Table N°1: Characteristics of the exploration situation and consequences for the management of exploration processes

	Characteristics of the exploration situation	**Consequences for the management of the exploration processes**
the strategic stakes	A strategy both intentional and emerging	Support and protection from the top management Allow great flexibility and responsiveness while integrating into corporate strategy
the object of the exploration,	Initial concept potentially fruitful and not associated with existing knowledge	Organise the divergence resulting from the fruitfulness of the concept Progressive development of a shared understanding of this concept and identification of the knowledge required
the approach	Experimentation and learning approach	Knowledge acquisition and organisation of learning transfers
the expected results	Unspecified and multi-form results	Identify resource allocation and result evaluation criteria
time span	Multiple time spans: from long–term development (technology) to short-term experimentations (applications for clients).	Manage a number of studies on different timescales Reassure the management and achieve credibility towards the rest of the company which provides the funds

Table N°2: Dimensions to characterize exploration

Characteristics of the exploration situation	**Activities undertaken**	**Organizational setting**

The strategic stakes (C1)	Creativity and structuration of the innovation field (A1)	The hierarchical reporting The time dedicated to exploration activities The geographical localisation
The object of the exploration (C2)	External communication (A2)	The core team The extended team The steering committes
The approach (C3)	New interactions with the customer (A3)	
The expected results (C4)	Formulation of a technological strategy on the innovation field (A4)	
Time span (C5)	Recommendation and analysis of acquisition targets (A5)	