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INTEGRATION OF AN EXPLORATION PROGRAM WITH ITS PARENT ORGANIZATION: A LIFECYCLE PERSPECTIVE

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Abstract

Exploration programs are collections of inter-connected exploration projects that are identified, coordinated, and managed in order to pursue a strategic objective of exploring radical innovations for the parent organization to develop.

Based on a longitudinal fine-grained study of a firm that has launched such an initiative, we offer a characterization of an exploration program and we outline the coexistence of its integration with, as well as, its isolation from its parent-organization. This is achieved through mechanisms and boundary activities complementing each others and undertaken by actors involved in the program and located at different levels of the parent-organization. We outline that this integration with the parent-organization evolves between the program initiation and its implementation and that these differences lie in its exploratory nature, i.e. its scope definition scope that is not known at its launch, the potential leveraging of existing resources of the firm to execute exploration projects and then to develop them further, and the capitalization on its outcome and use of knowledge built in excess.

Thus we further bridge the literature on project and program management with the one on innovation management and show how an exploration program can contribute to achieve ambidexterity at the firm level.

Key words : exploration project ; exploration program ; ambidexterity; integration; lifecycle: initiation; implementation

1. Introduction

With the necessity to maintain their competitive advantage and to address big challenges such as sustainability or inclusion, firms experience a rise of projects targeting the exploration of new technologies, new markets or new business models. Therefore, they are increasingly managing multiple exploration projects, i.e. projects for which neither technologies nor markets are known at the start (Lenfle 2008). Considering the scope of these big challenges and the uncertainty that characterizes such

projects, reaching the overall goal of exploring new domains and identifying new opportunities will hardly be achieved by managing such projects independently one from the other (Loch et al. 2006; Midler, 2013).

A stream of research has suggested that program management is particularly adapted to such complex and uncertain endeavors (Pellegrinelli et al. 1997). Indeed, a program is a temporary organization in which a group of projects are managed together to deliver higher order strategic objectives not delivered by any of the projects on their own (Turner and Muller, 2003; Lycett et al. 2014). In an innovation intensive driven competition, firms are increasingly facing the need to develop an organizational capability of managing change programs i.e. multi-projects change in complex contexts (Martinsuo and Hoverfält, 2018).

The literature on program management highlighted the diversity of programs (Pellegrinelli, 1997; Vereecke et al., 2003) and pointed out that program management is contingent (Miterev et al., 2016). We will thus focus in this research on a specific type of program, i.e. exploration program that we define as *a collection of inter-connected exploration projects that are identified, coordinated and managed pursuing a common higher order i.e. identifying new opportunities in technology, market or business models for the parent organization to develop*. Consequently, we will focus on exploration program management in order to nurture and lead a strategic change for the firm. As far as we know, such type of organizational setting has not been studied per se apart from the work of Midler (2013) and Kock and Gemünden (2018) on lineage, i.e. a set of successive exploration projects.

We argue that this type of program deserves such a focus because it should require specific management. We follow the call of Martinsuo and Hoverfält (2018) and the research they have surveyed for studying different program types.

Indeed, even though, the low goal clarity of programs at their outset as well as their uncertainty and ambiguity have been already highlighted (Thiry, 2002; Thiry, 2004), we argue that this is more salient in the case of exploration program for two reasons. Firstly, the goal of an exploration program is broadly defined at its outset as for example in the case of exploring autonomous mobility (Midler et al., 2019), green hydrogen, potential of artificial intelligence or new markets and opportunities in emerging economies. Secondly, exploration program is a group of interconnected exploration projects

characterized themselves by uncertainty and ambiguity (Lenfle, 2008). Furthermore, such program devoted to breakthrough should be protected from short term business operation and priorities.

We investigate the specificity of exploration program integration with the parent-organization. Indeed, literature on program management defined integration as “the process of achieving unity of effort between the projects of a program and ensuring alignment between the program and the needs of the parent organization” (Vuorinen and Martinsuo, 2018, p.583) and emphasized that in order for the programs to fulfill their goals, they must be integrated with the parent-organization (Pellegrinelli, 2002; 2011; Artto et al., 2009).

In the case of programs targeting a change of the organization, Lehtonen and Martinsuo (2008; 2009) have identified several mechanisms and boundary activities that ensure such integration. This literature has highlighted the importance of the context and outlined factors such as uncertainty (Dietrich, 2006) and the nature of the program (Lehtonen and Martinsuo, 2009) in explaining the different configurations of integration. It has also acknowledged the existence of specific lifecycle and dynamics of programs and distinguished an initiation phase or front end (Martinsuo and Lehtonen, 2007; Lehtonen and Martinsuo, 2008) during which the overall goal of the program is refined progressively (Lycett et al., 2004) and an implementation phase (Martinsuo and Kantolahti, 2009) where the projects’ objectives are defined and executed. This literature underlined that program management can evolve over their lifecycle (Pellegrinelli, 1997; Vuorin and Martinsuo, 2018; Miterev et al. 2020).

We argue that exploration programs, for which the goal is broadly defined at the outset and specified further through the identification and management of exploration projects, require a specific investigation of their integration with their parent organizations and the evolution of such integration over their lifecycle. This article is dedicated to this investigation.

Therefore, building on the program management literature and specifically change program on one hand and on exploration projects literature on the other, this article will address the following research questions: What are the integration mechanisms and the boundary activities deployed at the interface of an exploration program that enables achieving the goal envisioned at its inception ? How they evolve over its life cycle ?

For that purpose, we undertook a longitudinal study of an program launched by a firm targeting a strategic renewal through the identification of new opportunities. After checking that such program is an exploration one as we defined it, we show that some mechanisms and boundary activities enabling the integration of the program to the parent-organization identified by Lehtonen and Martinsuo (2008; 2009) in the case of change program are not relevant for an exploration program such as the integration through existing procedures and standards, for example. We show as well, that its exploratory nature acts as a contingency factor to explain the evolution of some mechanisms and activities over the lifecycle of the program between the initiation and the implementation phase such as the reinforcement of the mechanisms related to structures and people and on the opposite, the inefficiency of the goal and content based mechanism in the implementation phase which is offset by the ambassadorial activities undertaken by the exploration program leader. This exploration contingency factor impacting the integration lies in three elements: the scope definition of the program that is not known at its launch, the potential leveraging of existing resources of the firm to first execute exploration projects and then to scale and develop them further, and the capitalization on the outcome of the program and use of knowledge built in excess.

With this research, we thus contribute to the literature on innovation and exploration and to the literature on change program and their integration to the parent -organization.

2.- Theoretical background

We bridge two streams of research: one dedicated to the management of exploration projects targeting breakthrough innovation (Lenfle, 2008; Midler, 2013; Maniak and Midler, 2014; Midler et al. 2019) and one dedicated to the management of change programs defined as a collection of inter-connected projects and actions that are coordinated, managed and controlled in a strategic way to achieve a pre-defined change in the parent organization (Martinsuo and Hoverfält, 2018).

2.1- Exploration projects and the missing link with the parent-organization

Exploration projects are projects for which neither technologies nor customer requirements are known at the start (Lenfle, 2008). They differ from development projects because, (1) they are strategically

ambiguous (do not follow a clear, strategic formulation); (2) they adopt a proactive approach (rather than a demand-pull process); (3) they are not driven by a clearly specified result or objective; (4) they explore new knowledge (instead of integrating and valuing existing one); and (5) their temporality is characterized by hidden urgency and multiple horizons (rather than explicit deadlines and clear time frames) (Lenfle, 2008). They require an ad-hoc project management characterized by the set up of a specific organization that allows a reformulation of the objectives along the way thanks to the knowledge acquired through experimentation and concurrent search and that takes into account the value of the accumulated knowledge as performance measures (Lenfle, 2016).

The integration across exploration projects has been addressed through inter-projects learning and the cumulative use of the knowledge produced within each one (Maniak and Midler, 2014). This connection through knowledge has been designated by lineage (Midler, 2013), either “reactive” securing knowledge from past projects to be actively used in follow-up ones or “proactive” i.e. a planned roadmap of coordinated projects that enables the implementation of a strategic venture (Kock and Gemünden, 2018). Such projects connected through knowledge can be a combination of exploration and implementation/development projects leading to ambidextrous program (Midler et al., 2019).

The integration of projects within the organization or their isolation to protect them from external disturbances as “planned isolation” (Lundin and Söderlund, 1995) is an open debate in the literature on project management. Contingency factors such as the level of innovation have been proposed as a criteria to decide when isolation is valuable over integration (Lakemond and Berggren, 2006). Hence our interest in the integration of exploration projects with program or with the parent-organization.

2.2 – Exploration program: a definition

Programs are specific temporary organizations with unique theoretical foundations and managerial implications and program management is “the organizing framework or structure for shaping and governing the implementation of strategy, simultaneously managing and synchronizing concurrent streams of change realized through projects” (Pellegrinelli et al. 1997, p. 161).

Program configuration and management dynamics differ according to exogenous variables as well as to endogenous ones such as the programs’ contents (the nature of the tasks that the program is set up to

accomplish or the resources involved (Artto et al. 2009; Nieminen and Lehtonen, 2008; Shao and Müller, 2011; Shao et al., 2012; Miterev et al., 2016). Another contingency factor is whether the projects existed or not when the program was created, and whether the intended program outcome represents a major or an incremental change to the organization.

It is the case of change program “a collection of inter-connected projects and actions that are coordinated, managed and controlled in a strategic way to achieve a pre-defined change in the parent organization” (Lehtonen and Martinsuo, 2008), such as growing or evolving the current business or operating it more efficiently. Examples are rationalizing the IT management of an organization including renewing the system architecture, the network infrastructure, organization, and management system, developing a new work methods for risk assessment regarding safety (Lehtonen and Martinsuo, 2008; 2009), digitalizing internal work processes in a municipality and improving digital communication with the inhabitants (Vuorinen and Martinsuo, 2018), etc...

As far as we know, there is no study that has addressed a change program targeting the exploration of opportunities in order to create a new business or to evolve the existing one in a significant manner. Indeed, programs as vehicles for product development (Kratzer et al., 2010; Laine et al., 2016) for example have been marginally considered by Martinsuo and Hoverfält (2018) in their survey.

We intend to focus on exploration programs that we define as *a collection of inter-connected exploration projects that are identified, coordinated and managed in order to pursue a common higher order i.e. identifying new opportunities in technology, market or business models for the parent organization to develop.*

We argue that exploration programs deserve a specific focus considering their characteristics such as uncertainty and ambiguity over their lifecycle. They target a major change in the organization and exist previously to the exploration projects (Vereecke et al., 2003) they contribute to define progressively. They are close to strategic programs targeting significant reorientation (Ferns, 1991), and to goal-oriented-programs defined by Pellegrinelli (1997) as one time initiative outside the organizational standard operating procedures targeting the development of new offers or infrastructures by defining, scoping and managing projects appropriately.

2.3- Program integration with the parent-organization

It has been shown that the pursuit of change program goals requires integration mechanisms at both interfaces: between the projects of a program “project-to-project” (P-to-P) and between the program and the parent organization “program-to-parent organization” (P-to-O) (Vuorinen and Martinsuo, 2018). P-to-P integration mechanisms are formal as well as informal, and impersonal (rules and written policies), personal (liaison and integrator roles) or through groups (teams and committees) (Dietrich, 2006) whereas P-to-O integration happen through impersonal mechanisms (Turkulainen et al., 2015).

Focusing on the initiation phase of the program, Lehtonen and Martinsuo (2008) have identified five boundary spanning activities undertaken by actors to enable P-to-O: (1) defining and shaping the boundary, (2) representing the program and creating legitimacy, (3) information scouting and negotiating, (4) ensuring continuity, and (5) guarding and isolating.

Expanding the scope beyond the initiation of the program, Lehtonen and Martinsuo (2009) highlighted that together with integration, either through boundary management or mechanisms, isolation activities coexist in order to prevent program-related issues from diffusing, and block external influences.

To ensure integration on both interfaces (P-to-P and P-to-O), throughout the lifecycle of the program, five integration tasks undertaken by the program actors have been identified: (i) creating and communicating a change vision, (ii) supervising the program’s progress, (iii) exchanging information in the program-parent organization interface, (iv) coordinating work in a multi-project program and (v) coordinating and supporting the individual projects managers (Vuorinen and Martinsuo, 2018). These integration tasks vary over the lifecycle of the program, especially, the first one plays a central role in the program front end (Vuorinen and Martinsuo, 2018). This resonates with the fact that programs are not stable and evolve during their lifecycle and therefore their management (Pellegrinelli, 1997), hence, the dynamics of P-to-O integration during the program lifecycle (Martinsuo and Kantohlati, 2009).

Beyond integration mechanisms and boundary activities pointed out by previous research (Dietrich, 2006; Lehtonen and Martinsuo, 2008; 2009; Turkulainen et al., 2015), program actors i.e. people taking part in program work regularly (program managers, project managers, team members and steering group members) play a critical role in such integration (Vuorinen and Martinsuo, 2018). Indeed, program actors influence their context (Pellegrinelli, 2002) and undertake purposeful actions to change the

conditions of their activities (Näsänen and Vanharanta, 2016). They use integration mechanisms such as program office meetings, management group meetings and workshops differently whether they were defining or implementing the change and according to the interface considered, i.e. P-to-P or P-to-O (Vuorinen and Martinsuo, 2018). Such actors play a critical role in the autonomy given to the program as well as to its integration with the parent organization, hence, the importance of their selection. Indeed, program managers act as support persons and discussants for the individual project managers, and have a championing or visionary role when creating the vision for the change program and its respective projects (Vuorinen and Martinsuo, 2018). However, the role of players such as the sponsors of the program in the parent organization, the directors and top managers have been less studied than the role of program actors.

As a recap, we intend in this research to address three gaps: (i) studying a specific kind of context, besides organizational change, i.e. exploration program to understand which program management factors stem from the program type, (ii) adopting longitudinal perspective that covers the full program lifecycle in order to study how the different aspects of the program evolve over time and to document the effects of certain program management practices on certain outcome and (iii) complementing the program manager centric studies by addressing the extended program team, and their actions in program management such as the steering committees for example. The relevance of such gaps has been highlighted by Martinsuo and Hoverfält (2018) in their survey on research on change program management.

3. Method

In order to address these questions, we conducted an empirical and longitudinal study (Yin, 2003) of a firm that created an organizational entity dedicated to exploration activities. Six years later, the firm launched products based on novel opportunities identified thanks to these activities. In the following we show that this entity presents the characteristics of an exploration program. We analyze in details how this organizational set-up enabled this company to succeed in identifying opportunities that were scaled up and generated effective business and thus reaching the intended change. Like other researchers

studying the integration of program with the parent firm through qualitative research (Lehtonen and Martinsuo, 2008; 2009; Turkulainen et al., 2015) we argue that a case study is appropriate because it enables developing an in-depth understanding of integration across organizational interfaces. Our unit of analysis is the program. The analysis resulted in a categorization of integration mechanisms and boundary activities between the program and the parent organization that enabled the initiation and the implementation of a strategic renewal for the firm in relation to a domain of innovation.

3.1- The research setting: A first-tier supplier exploring radical innovation

The automotive industry is a highly competitive innovation driven sector with big challenges addressing fuel efficiency, emission reduction, new sources of energy, autonomous cars, etc. To stand this competition, car assemblers have involved first-tier suppliers (FTSs) early in the vehicle projects, to source novel solutions (Zirpoli and Becker, 2011). Therefore, it is critical for FTS to be proactive and explore radical innovation: technological, usage, service, business model, etc.

Domauto (a pseudonym) one of the ten largest FTS in the automotive industry¹: 16 Millions euros sales of which 47% from less than three years products and 13% are dedicated to RandD (2019). The one hundred thousands employees worldwide are distributed in divisions each is dedicated to a functionally consistent product line or component: torque transmission, electrical systems, engine cooling, etc. In order to ensure growth and to stand out from its competitors, Domauto set up an organizational entity, which we will refer to as EP (Exploration Program), with the mission of “anticipating the most stringent requirements of automobile manufacturers in the powertrain efficiency and offering them solutions”. Six years later Domauto has commercialized a portfolio of 20 very innovative solutions new to the roadmaps of the firm and EP was dismantled.

3.2- Data collection

In order to expand our understanding of the organizational setting and how integration was achieved,

¹

we conducted a qualitative, longitudinal research. Qualitative data offer insights into complex social processes (Eisenhardt, 1989). Our research relies on an abductive inquiry that extends existing theories. The literature on case studies stresses the importance of prior theory for guiding data collection and analysis. We rely on the literature on exploration project and on program management. Data were collected during six years in two stages that correspond to two distinct phases of EP lifecycle (Table 1 for more details).

The first stage began with the initiation of EP and lasted two years. During this period, we attended and documented 53 day-long meetings. We were included on the e-mail distribution list of the program team members. We also had access to preparatory documents of the meetings and documents regarding EP more generally. On the sidelines of these meetings, we conducted 25 interviews with EP actors (managers, members, etc.) which lasted one hour on average. Besides, we engaged in many conversations with the aim to collect background information in order to gain a better understanding of the technological issues discussed, and gather additional information about events between meetings. Furthermore, we conducted 16 interviews lasting 90 minutes on average with people indirectly involved in EP: four senior corporate managers (RandD, strategy, two divisions VPs), four senior executives at two divisions (RandD and marketing), and eight experts within the firm. These semi-structured interviews addressed questions such as the main challenges faced, the relationships between EP and the divisions, their expectations concerning EP, how radical innovations were developed prior to EP, etc. In addition to the documents, meetings, and interviews, we met quarterly, i.e. eight times (two hours on average each) with EP leader to share feedback on our understanding of the phenomenon under study, to ensure the plausibility of our explanations and to validate the findings (Miles and Huberman, 1994). With this first round of data, we were able to understand the initiation of EP, its functioning and its relationships with the rest of the firm as well as the activities undertaken.

The subsequent second stage of data collection lasted four years. At that phase, many exploration projects have been identified and launched. Considering the multiplication of observation points, we were joined by 3 successive research assistants with whom we worked very closely and who attended the meetings. On top of the continuation of the previous data collection points mentioned previously,

we conducted interviews with members of the exploration projects launched. With this second round of data, we were able to understand the implementation phase of EP, the specific integration mechanisms and boundary activities undertaken during this phase, the execution of the exploration projects and how this impacts the parent firm.

By selecting numerous and different informants, i.e. actors within EP (core and part-time team members, projects managers and teams) and actors of the firm interacting with EP (steering and validation committee, corporate managers, division vice presidents (VPs) and senior executives, experts, etc) we were able to apprehend the situation from different perspectives (Eisenhardt and Graebner, 2007).

Table 1. Overview of the data sources and collection process

<p>Initiation phase Two years</p>	<ul style="list-style-type: none"> - 53 (day-long) EP weekly meetings (424 hours) - 25 interviews with EP members (core and extended team) - 16 interviews with firm members involved with EP (corporate. VPs, divisions VPs and Senior executives, experts) - 8 (quarterly) interviews with EP leader
<p>Implementation phase Four years</p>	<ul style="list-style-type: none"> - Monthly meetings of EP team - Interviews with exploration projects teams - Interviews with firm members involved with EP (corporate. VPs, divisions VPs and Senior executives, experts) - 16 (quarterly) interviews with EP leader

3.3- Data analysis

Based on these multiple data sources (detailed field notes, transcripts of interviews, meetings minutes, and documents external and internal), we developed case stories or monographs of EP lifecycle as well as of the main exploration projects undertaken.

Considering our research questions, we reread our material, focusing on organizational characteristics of the program (team, budget, leadership, etc..) like Miterev et al. (2020) have done it and on the relationships between the program and the firm. The interviews enlightened some activities, the difficulties the program leader and team as well as the projects teams underlined, etc. Within this smaller set of data, we identified boundary activities and integration mechanisms that had served as enablers in the program integration and grouped those that resembled in categories. Following an abductive

approach, we built on previous research and were inspired by categories previously identified in the literature (Lehtonen and Martinsuo, 2008; 2009; Vuorinen and Martinsuo, 2018) and that helped us in interpreting our results.

However these previous categories were not focused on the differences during the lifecycle of the program. Considering our research design and the way data were collected, it was possible for us to differentiate the information related to the initiation of EP from its implementation and there by track over time how they evolved.

Based on this analysis, we thus classified the integration mechanisms and boundary activities in categories and differentiated them according to the phases of the program lifecycle (Table 3 & Table 4). Like in the case of the qualitative research undertaken by Vuorinen and Martinsuo (2018), the relevance, accuracy and credibility of the results were verified in three ways. First, we compared the results to earlier literature on organizational change program in order to interpret our results. Second, we utilized a consistent interview protocol to ensure the stability of the research process during the research period. And last, we tested preliminary findings through discussions with EP leader as well as with peers in research workshop at international conferences and within our research center.

4. Findings

In this section, we present the EP and outline its integration with the parent organization through mechanisms and boundary activities developed during the initiation and the implementation phases. Then we highlight the exploratory characteristics of EP and how they relate to the integration mechanisms and boundary activities identified and their evolution over the lifecycle.

4.1 - EP: an exploration program

4.1.1- A strategic mandate

As a first tier supplier, Domauto was “anticipating the most stringent requirements of automobile manufacturers in the powertrain efficiency and offering them solutions” (mandate given to EP leader when designated). It is a typical overarching goal that no one project alone can achieve because efficiency can be reached through several ways e.g. fuel consumption and emission reduction, vibration

and noise reduction, and requires complex, multi-components and multi-technologies solutions. With this mandate, the company intend to identify and develop completely novel offerings besides the ones developed by the divisions within their specific scope (e.g. the engine cooling division targets innovation associated with the cooling loop). Therefore, EP mandate was to explore solutions that would represent a strategic renewal for the firm and that potentially leverage the expertise of various divisions and require to develop new knowledge.

EP presents the characteristics of a program: an overarching goal, a bridge between projects that did not exist when the program was launched and outcomes that should represent a major change for the firm (Vereecke et al., 2003). The projects goals were not to launch commercial products but to build demonstrators to learn and gather feedbacks (BenMahmoud-Jouini and Midler, 2020). Neither the technical solutions nor the market positioning were clearly defined at the program launch. In order to illustrate the exploratory mandate of EP, we have selected in Table 2 three exploration projects identified within the program and launched at its implementation phase and we have underlined their exploration characteristics using the framework of Lenfle (2008). We have chosen these projects among the ones launched in the program because they belong to different categories regarding the knowledge explored: leveraging existing knowledge combined differently (FEAD), mixing internal and external knowledge (FHE) and exploring new knowledge (Turbo).

Table 2 : 3 examples of exploration projects identified during the initiation and launched at the implementation phases

Characteristics of an exploration project (Lenfle, 2008)	FHE Electrical machine to complement the fuel engine	FEAD New ways of coupling the accessories to the engine to optimize their size and performance	Turbo A boost to the engine at low rotation speed
(i) emerging and strategically ambiguous	No dominant design existed for the coupling a powerful electric machine to the transmission in parallel to the fuel engine, several architectures could be considered	News ways to couple accessories. System integrating several coupling modes Choice of the accessories to focus on for the consumption optimization. Ambiguity about the division that would produce and	Several technical solutions can fulfill this function (turbo, electrical air pump; energy recovery system)

		commercialize the accessories coupling solution	
(ii) they require a proactive approach in order to (iii) specify progressively the results	Several solutions were designed and compared also to other projects focused on hybridization	Optimization of the overall consumption cycle Selection of an architecture to be further developed	Consider different solutions to be tested and define an approach to measure their performance
(iv) knowledge progressively acquired	Experimentation of these different architectures where undertaken to measure their energy consumption performance. Simulation of the impact on gas consumption of the various architecture was elaborated thanks to the contribution of experts from various divisions	Assessment of the impact on the solution on energy consumption Knowledge about several architectures Simulation tools	Measure of the impact of each solution at the system level (driver experience, energy consumption)
(v) specific temporality (hidden urgency and a multiplicity of time horizons)		Build a prototype to be presented to customers	Present a promising prototype to potential clients to trigger their interest

Over the overall lifecycle of EP, several exploration projects transformed in development projects and resulted in the launch of 20 innovative products. These products complemented the existing portfolio of the firm and a redefinition of the divisions strategies was progressively implemented in order to align them with the novel offerings the company wanted to promote.

4.1.2- The initiation phase

At the creation of EP, the scope was neither identified nor stabilized. Therefore, the first activity was to define a scope that was broader than that of any division. One way to progressively define it was to identify the challenges and pain points encountered by the direct customers (car makers) and final users (drivers).

The initiation of EP lasted two years and was divided in two sub-phases : inspiration (analysis of the customers' expectations and scouting of technology opportunities) then ideation i.e. generation of concepts that would be explored further through projects in the second phase.

The specificity of EP vs. the rest of the initiatives of the firm has been acknowledged and it was therefore organizationally separated from the divisions. However, it shares some resources with the divisions, its own resources being very limited at the start. The program manager, i.e. EP leader, a previously RandD division senior executive, recruited six people from the divisions (R&D, marketing and other experts) who dedicated one day a week in a weekly working group that involved as well external actors (experts, startups, etc). They were individually appointed based on their areas of expertise, past experiences (many were formerly employed by cars makers), inter-personal skills, and positions within their division. They were funded for their part-time work within EP by their divisions. EP leader directed the exploration activities especially the weekly workshop that involved around 20 people and were devoted to (1) share the technical and market challenges and value creation opportunities; (2) generate concepts to address those value opportunities; (3) explore technical solutions in line with these concepts.

EP leader was also involved in cross-division working groups (technological development plans, divisions' portfolio project presentations), in which he brings to the divisions the knowledge progressively acquired during the weekly workshops as well as from the meetings he frequently had with customers and external partners on the new scope.

After 2 years, a list of 35 potential projects resulted from this intense creative and collective process. Another outcome was potential resources to acquire or partner with in order to explore these opportunities.

During that first phase, the objective was to define a scope associated with but not limited to the divisions' ones. Therefore, the inspiration involved the divisions without however adopting their roadmaps. EP was neither completely isolated from nor totally integrated with the firm. This peculiar positioning was reflected in the reporting: EP leader reported the progress directly to the corporate VP R&D and to a steering committee (corporate R&D, strategy and the divisions' VPs) which challenged the strategy explored by EP and its impact on the firm and the divisions.

4.1.3- The implementation phase

After approximately two years, once the scope and the exploration projects have been identified and launched, EP leader built a core team composed of eight fully dedicated people (technical, marketing, and project management) in charge of (i) leveraging external and internal knowledge to explore the innovation tracks identified, (ii) defining, launching and monitoring the exploration projects, (iii) communicating towards the rest of the firm and preparing the report to the top management. The part time team built at the initiation phase was expanded to include the exploration project managers. Unlike the formers, the latter were fully dedicated to their projects funded by EP budget (10% of the overall R&D budget of the firm) and involving resources from the divisions. Exploration projects managers report monthly to EP leader and to the part time team members. This resulted in communicating on the projects within the company so that the divisions provide the required experts and facilitate the collaboration with external partners when needed. Exploration projects managers have not followed the well established development project management process of the firm but rather adopted specific approaches targeting uncertainty reduction. These approaches have been progressively designed with the program core team who acted as PMO.

During that phase, EP launched 12 exploration projects among the list identified during the initiation phase. They aimed at developing knowledge about the potential solutions identified, assessing their performance, their manufacturability, and gain first feedbacks from car manufacturers. During this phase, some projects were stopped, others were retargeted based on the first results of performance measurement, and new projects were launched.

On top of reporting to the corporate R&D VP and the steering committee set up during the first phase, EP leader reported to a validation committee, composed of the divisions' marketing and R&D senior executives headed by the R&D corporate VP, which discusses the exploration projects portfolio and the resources required from the divisions for the execution of these projects.

Besides these committees, EP leader developed repeated, informal individual contacts with the divisions' managers (VP, R&D and marketing senior executives): he shared knowledge acquired through the exploration activities and negotiated resources when needed. As a negotiation lever, he

funded occasionally some divisions' projects to free up critical resources for the exploration projects.

Over the overall period of EP operation, several exploration projects were transformed into development projects hosted by the divisions whose scope or resources overlap the most with the innovative solution.

4.2 - Integration mechanisms and boundary management over the lifecycle of the program

In the following we detail the integration mechanisms and boundary activities developed between EP and the rest of the firm and how they evolve over the two phases: (i) the initiation that starts with the establishment of an exploratory mandate given to a program leader and ends with the identification of exploration projects and (ii) the implementation that starts with the launch of a selection of these projects and ends with their assessment as potential opportunities to be developed further by the firm.

4.2.1 - Integration mechanisms

Table 3 summarizes the integration mechanisms between EP and the parent organization and how they differ between the initiation and the implementation phase.

Overall, for both phases, integration was achieved through (i) organizing structures and formal control mechanisms such as steering and validation committees and reporting procedures, (ii) linkages in the goal and content between the program and the parent organization such as targeting renewal through the exploration of new opportunities, and (iii) the people involved in the program such as its leader and the part-time members involved and the relationships they have with the rest of the firm.

These mechanisms were implemented at three hierarchical levels: the corporate management (R&D and Strategy VPs), the divisions management (Divisions' VPs, R&D and marketing senior executives), and the team (part-time team in the first phase, and the exploration projects members in the second). This multi-level integration design grid played a critical role in the density of the integration with the parent organization beyond punctual levels (top management or idiosyncratic individuals).

The program has not adopted the existing procedures and standards about program and project management. Actually, it was the first time that the firm launched a program to identify radical

innovation and opportunities that are anchored neither in the divisions scopes nor in their roadmaps: launching EP was in itself an organizational innovation for the firm. Therefore, the program had to define its processes and reporting indicators and therefore, the existing procedures and standards did not serve as a lever of integration. The same issue has been encountered once the exploration projects have been launched during the implementation phase. Indeed, the existing established processes of new product development were not suitable to the exploratory character of the projects and therefore the program established its own projects reviews processes. As a matter of fact, such processes played an integration role afterwards in the other way around because they diffused from EP to the divisions when the latter launched their own exploration projects within their scope. Actually, EP was at the origin of building a new management capability as well as new business opportunities.

In the implementation phase, after the launch of the exploration projects, integration based on organization structures and formal control was reinforced thanks to the creation of validation committees that involve more actors from the divisions (Mktg and R&D SE) and to the reviews of exploration projects, leading to the involvement of more hierarchical levels in the integration mechanisms. The integration through people and their relations was reinforced as well thanks to the increase of people contributing to these relationships between the program and the parent organisation such as exploration project members who have a dual role and the network of project managers and core team member dedicated to the program. The integration through goal and content based linkages was challenged during the implementation phase. Though EP leader shared the knowledge acquired in the exploration projects with the division, the alignment between the renewal strategy suggested by the EP and that planned by the division was sometimes problematic. Indeed, some projects such as decoupling the accessories from the engine speed to reduce fuel consumption (FEAD, cf. table 2), for example, were conflicting with the strategy of the divisions and their roadmaps.

Table 3: Integration mechanisms of EP with the firm

	Initiation phase, before the launch of the exploration projects	Implementation phase, exploration projects undergoing

1 - Organizing structures and formal control	<ul style="list-style-type: none"> -EP leader reports to corporate top managers and to a steering committee (corporate managers and divisions top managers) -Part-time team members from the divisions took part to a weekly working group led by EP leader 	<ul style="list-style-type: none"> -EP leader reports to corporate top managers, to a steering committee (corporate managers and divisions top managers) and to a validation committee including RandD and marketing divisions managers -Exploration projects managers report to the part-time team during frequent meetings
2 - Goal and content based linkages	<ul style="list-style-type: none"> -EP pursues a renewal strategy that is aligned with the strategy of the firm (it is shared and discussed during steering committee involving the divisions and corporate managers) - EP leader shares with the top and the divisions management during regular committees the outcomes of the exploration (customers pain points, external technology scouting and mapping of the opportunities identified) 	<ul style="list-style-type: none"> -EP leader shares the results of the exploration projects with the divisions during steering and validation committees -EP leader reacts on the divisions strategies based on the knowledge acquired during the exploration activities
3 - People and relationships	<ul style="list-style-type: none"> - EP leader has a strong internal network in the company and a high status profile - The part-time team members have dual connection (in EP and in their divisions) - The members (senior and high status) of the steering committee 	<ul style="list-style-type: none"> - EP leader has a strong internal network in the company and a high status profile - The members (senior and high status) of the committees (steering & validation) - The part-time team members and the projects teams members having dual role: connections in EP and in their divisions - Other punctual resources negotiated by EP leader from the divisions
4 - Parent organization's procedures and standards	<ul style="list-style-type: none"> - No integration through existing program management procedures and standards because they were not adapted to the uncertainty associated with the program (launching EP was an organizational innovation per se) 	<ul style="list-style-type: none"> - No integration through project management procedures because they were not adapted to the uncertainty associated with the exploration projects - Afterwards, the reviewing procedures established by EP for the exploration projects became standards for the rest of the firm.

As a recap, the integration through structures, formal control, content, people and relationships was reinforced between initiation and implementation phases thanks to the multiplication of the mechanisms, the involvement of more players (exploration projects members, Mktg and R&D SE, punctual resources) and the set up of more opportunities to share knowledge from the program with the divisions.

However, the exploratory program, being itself an organizational innovation, there was no integration through the procedures and standards of the parent organization.

The integration through goals depends on the type of projects that compose the program and that are not known in the initiation phase. In case of conflicts between the goals of some projects identified and launched during the implementation phase and the divisions, it is rather isolation that is favored. Notice that this is likely, considering the exploration mandate of the program.

4.2.2 - Boundary activities

The analysis revealed four boundary activities that enabled integration with, as well as isolation from, the parent organization: (i) information scouting activities that aimed at program content development and identification of opportunities; (ii) ambassadorial activities that aimed at creating legitimacy for the program and connections to ensure its development; (iii) boundary-shaping activities that addressed the perimeter of the program within the firm and, (iv) isolation activities claiming the specificity of EP and protecting it from external disturbance (such as the adoption of the existing project management process or methods). Table 4 describes the boundary activities and their evolution over the two phases.

During the initiation phase, information scouting, undertaken by the EP leader and the part-time team, were focused on content development pursuing the identification and the mapping of potential opportunities to explore. These activities targeted indifferently internal and external sources to collect information. Once the exploration projects launched, the objective became to gather feedback from the divisions on the intermediary outcomes of the projects. Therefore, the content and the objective of these activities evolved.

In both phases, the EP leader engaged extensively in ambassadorial activities. But the motivation and the target of these activities have changed. Whereas in the initiation phase, these activities were mainly targeted towards the top management (corporate and division VPs) to install and build the legitimacy of the program, they progressively shifted during the implementation phase to sharing the progressive outcomes of the projects in order to negotiate critical resources required for the projects. Most and foremost, these activities were targeted as well to prepare the transfer of the projects to a division for its development and industrialization if the opportunities explored are validated. The target of these activities evolved to include the actors responsible for resource allocation (R&D and marketing SE in

the divisions) beyond the divisions' VPs in order to persuade them of the value the program will bring. Considering the duration of the implementation phase, the ambassadorial activities were deployed frequently especially when the staff of the divisions management changes.

Boundary shaping activities consist in highlighting the specificities of the program and what it pursues in comparison to the rest of the firm. Therefore, they evolve with the evolution of the activities undertaken in the program. During the initiation, these activities focus on emphasizing the exploratory mandate of the program and its open scope. During the implementation phase, as opportunities are progressively explored through the execution of the projects, these activities devoted to outline the specificity of these projects compared to development projects and then for the validated opportunities, to investigate if they can potentially fit in the divisions to be developed further or would require a specific set up.

At initiation phase, isolation activities were undertaken to define a scope associated with but not limited to the divisions' ones and to go from a broad goal to a list of exploration projects. Therefore, this phase involved the divisions while keeping a distance from their roadmaps. During, the implementation phase, the objective is to execute the exploration projects which require dedicated resources, sometimes negotiated from the divisions, without however being influenced by the existing development projects undertaken within the divisions.

Table 4 Boundary management activities over the lifecycle of the program

Boundary activities	Initiation phase	Implementation phase
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<p>Information scouting</p>	<ul style="list-style-type: none"> -Gathering information to define and frame the scope of the domain to be explored * internally (part-time team members and their network, experts, roadmaps of the divisions) * externally (customers, technology scouting, etc..) -Gathering feedbacks internally (committees) and externally on the progressive identification of the exploration projects 	<ul style="list-style-type: none"> -Gathering feedbacks on the intermediary outcomes of the exploration projects internally (from the divisions through the committees) and externally. -Identifying potential partners or acquisition targets to further develop the projects once validated
<p>Ambassadorial activities</p>	<ul style="list-style-type: none"> -Communicating the EP goal, and the progress of the opportunities identification to top managers and the divisions' VPs through formal committees and informal meetings. -Being involved in the roadmaps presentation of the divisions -By being involved in both the EP and their divisions, members of the part-time team connect the divisions with EP - 	<ul style="list-style-type: none"> -Negotiating resources for the exploration projects from the divisions -Sharing progressive outcomes of the exploration projects within the validation committees to gain acceptance and support from the divisions which would prepare the landing of the projects in the firm. -Repeated, informal individual contacts with members of the divisions (VP, R&D and marketing senior executives) - Invitation of the divisions staff to events organized by EP involving new customers and technical partners. - Funding some activities for the divisions to free up critical resources required for the exploration projects.
<p>Boundary shaping</p>	<ul style="list-style-type: none"> -Emphasizing on the specificity of the program compared to the divisions - Emphasizing on the open, divergent ambiguous character of the opportunities searched for by the program compared to the planned roadmaps of the divisions -Interacting with new players within existing customers or new customers to gather their pain points and get inspired to better frame the domain to be explored by EP. -Scouting new technologies from unusual players for the firm 	<ul style="list-style-type: none"> -Progressively, a specific expertise on the domain explored (technology, market, etc..) has been developed by EP. Such expertise being new to the firm, it contributes to the reinforcement of EP boundary. -Organization of specific <i>demodays</i> to present the outcomes of the exploration projects to the customers (manufacturers) highlighting the peculiarity of these solutions that solve new problems.

Guarding and protecting	<ul style="list-style-type: none"> -Colocation and isolation of the part-time team from the divisions during the weekly workshop. -Reporting directly to the Rand D and strategy corporate VP 	<ul style="list-style-type: none"> -Having a dedicated core team - Having a budget to launch projects -Dedicated exploration projects managers reporting to EP -Specific project management (reporting, intermediary deliveries, KPI) adapted to their exploratory nature -Specific methods to execute the projects and explore the opportunities
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4.3 – Impact of the exploratory nature of the program on the integration and its evolution

Three characteristics of an exploration program have a strong impact on its integration in the parent firm and its evolution over the program’s lifecycle: the scope, the resources required and the knowledge produced.

The first element regarding an exploration program is that its scope and the projects it coordinates are not defined at the beginning: rather it is emerging and ambiguous. The objective is to design a strategy for the firm on specific domains. Progressively, the activities undertaken enable the refinement of this strategy. First, several opportunities are identified resulting then in a selection of exploration projects that are executed and coordinated. Considering the evolution of the activities undertaken within the program over its lifecycle, the motivation of the program integration with the parent-organization in itself evolves as well as the way this integration is ensured.

One element of this evolution is relative to the connection with the resources required.

Hence, the second issue regarding exploration program undertaken within existing organization is the access to the resources of the firm. Indeed, the projects targeted unexplored opportunities for the divisions therefore one can assume that they require external resources. However, some projects were new and in the same time connected to the firm and thus could leverage resources and expertise mastered in the company but in a new way (FEAD, and to a less extent FHE). The projects involved resources from the firm (from the divisions) as well as external ones (customers, experts, startups, etc..) (XXXX, 2019). By being linked to the rest of the firm through different mechanisms (collectives and individuals) located at different hierarchical levels (corporate, top management, and middle management), ensuring

different boundary activities, EP leveraged internal knowledge and combined it with new one acquired.

The third issue regarding exploration is the exploitation of the exploration projects results, i.e., the assessment of the opportunities identified and their landing in the firm and scaling up if validated. The integration of the program in the organization through the reporting on the progress of these projects prepared the divisions to host and develop the opportunities validated. Indeed, the most promising opportunities were transferred to the divisions in new programs targeting the development and the commercialization of new offerings. On top of that outcome, and independently from the development of the promising opportunities, the exploration program developed new knowledge (technical, marketing, methodological such as design thinking and rapid prototyping, etc ...). Actually, the program has built progressively intermediate results corresponding to multiple time horizon.

Therefore, there are two strong motivations of an exploration program integration regarding knowledge. First, the integration of the program in the parent organization enables the building of new knowledge through the combination of internal and external sources and second it prepares the leveraging and exploitation of such knowledge in other programs or projects of the firm (either exploration or development).

Finally, we would like to highlight the mechanisms as well as the boundary activities that focus on the isolation rather than the integration. Indeed, considering the specificity of the program, i.e. identifying and exploring and new opportunities different from the roadmap of the firm, the boundary and the isolation activities were crucial to preserve the program and prevent its integration through the existing procedures and standards. It was particularly the case, because it was the first time the company launched such a program. We would like as well to discuss the integration through the goal alignment considering that the program is aligned with the strategy of the firm as a whole in pursuing novel opportunities but not with the divisions' strategies.

5 – Discussion

In this research, we outline the notion of exploration program as define as *a collection of inter-connected exploration projects that are identified, coordinated and managed in order to pursue a common higher*

order i.e. identifying new opportunities in technology, market. Through the longitudinal study of such a program targeting the identification of innovation opportunities leading to a strategic renewal of an incumbent, our research analyzes its specificities and its integration with the parent organization over its lifecycle, answering to the call of Martinsuo and Hoverfält (2018) to study types of programs different from the organizational change programs mainly studied so far (Lehtonen and Martinsuo, 2008).

Our analysis shows the coexistence of integration and isolation between the program and the parent organization. It is achieved through mechanisms as well as mundane activities that address the boundaries of the program i.e. shaping and crossing (Lehtonen and Martinsuo, 2009). We highlight the complementarity between the mechanisms and the activities.

Regarding the mechanism enabling the integration through people, we highlight the crucial role played by actors involved in the program (projects managers, members of the committees, etc) over its lifecycle and especially the program leader a heavy weight program manager who has a visionary and a supportive role towards the projects managers (Vuorinen and Martinsuo, 2018).

By differentiating the initiation and the implementation phases of the exploration program studied, we agree with Pellegrinelli (1997) and Miterev et al. (2020) when they emphasize that programs change over their lifecycle. We highlight the differences in the integration between these phases and we stress the limitation of one mechanism during the implementation phase (i.e. goal based linkages) and how it was compensated by boundary activities such as the ambassadorial activities.

We highlight key activities during the initiation phase and thus complement Lehtonen and Martinsuo (2008) and Martinsuo and Kantohlati (2009) who claim the importance of the front end of the program for its lifecycle. Beyond this phase, we outline key mechanisms and activities that evolve during the implementation phase.

In this section, we start by discussing the specificities of an exploration program, then of its integration with the parent-organization over the program lifecycle both regarding the literature on exploration management and change program.

5.1 – Specificities of an exploration program

Beyond the similarities between an exploration program as we have defined it and other types of program in the literature such as *platform program* (targeting the building of new capabilities), *delivery program* or *goal-oriented-program* (targeting revenue-creation through new offerings) (Ferns, 1991; Gray and Bamford, 1999), *strategic program* (targeting strategic reorientation) and *portfolio program* (targeting the investigation of a theme through independent (Pellegrinelli, 1997), we emphasize its first specificity: an exploration program does not implement a strategy previously articulated but progressively and iteratively design it.

Indeed, an exploration program progressively and iteratively defines its goal and formulates a strategy in an emergent way, which has been seldom studied (Pellegrinelli et al., 2015). It thus differs from the two contrasted situations outlined by Vuorinen and Martinsuo (2018): (i) a top down approach where the program team takes the responsibility in transforming the change vision with a high degree of autonomy from the rest of the organization and (ii) a participatory approach where all the key program actors share a similar understanding of the change goals before the program's launch from.

We claim that the ambiguity and uncertainty pointed out in the front end of a program by Thiry (2004) persists in the implementation phase by shifting from the program to the projects level.

We contribute as well to the literature on exploration that we complement. First of all, we extend Lenfle's work by extending the scope from exploration projects to exploration program as a *collection of inter-connected exploration projects*. Furthermore, we highlight that the project development standards of the company are not implemented and that the integration mechanism "adopting the parent's organization standards & procedures" is not appropriate for an exploration program, extending the specificity of exploration project management pointed out by Lenfle (2008) and Lenfle et al. (2019) to the program level. We claim that the program developed its own reporting frameworks and defined appropriate reviewing processes of exploration program and projects that were later on diffused to the rest of the firm. Third, we emphasize that besides the strategic exploration undertaken at the project level (Lenfle 2008), the exploration program leader takes a specific role in negotiating a strategic inflexion of the divisions based on the set of exploration projects coordinated.

We go as well beyond the work of Midler (2013) about exploration projects connection that he has studied mainly through the inter-project learning and the cumulative use of the knowledge produced

within each exploration project emphasized in the notion of lineage. By distinguishing the initiation and the implementation phases, we address the understudied identification of these projects.

Furthermore, this work (Maniak and Midler, 2014; Midler, 2013) stressed the inter-project learning focusing on technical and market knowledge, whereas we highlight the role of the program supporting inter-project learning in another area: the knowledge about managing exploration project. Thus the program builds a capability of managing exploration projects.

5.2 – Boundary and integration management of an exploration program

The analysis of the program organizational design over its life-cycle reveals that several integration mechanisms were established and boundary activities were undertaken in order to connect it with the parent-organization and that some of them have evolved between the phases.

The mechanism “goal and content-based linkages” was effective during the initiation phase but presented limitation during the implementation phase. As the goal of the program is strategic, the divisions and the top management of the company were deeply concerned at its initiation. However, during the implementation phase, this mechanism raised issues and conflicts. Some projects were competing for technical and financial resources with other opportunities the divisions pursued. Tensions gained more importance when the exploration projects came up with results and pilot products that challenged the roadmap of some divisions product lines and their long term technological strategy. The program thus appeared as a threat and source of disturbance for the divisions strategy. Such tensions and paradoxes have been pointed out in the literature on ambidextrous organization between exploration and exploitation units (Andriopoulos and Lewis, 2009), we thus relate them to the exploratory nature of the program studied. We claim that the mechanisms and the boundary activities complement each others. Indeed, the ambassadorial and boundary shaping activities also complement and offset the limitations of the goal and content-based mechanism in the implementation phase.

We show that structures and people related integration mechanisms has developed during the implementation phase by involving more people at different hierarchical levels. We claim that the scope of actors involved is not limited to the top management members and the EP manager but included also executives belonging to the divisions through the validation committees for example. We show that

these actors have a crucial role in the creation and communication of a change vision, the supervision of the program's progress and the knowledge sharing.

We thus claim that in the case of an exploration program, boundary crossing activities between the program and the parent organization remain crucial all along its development and during the implementation phase. Such a result differs from what has been previously outlined in the literature mainly during the initiation phase of change program (Lehtonen and Martinsuo, 2008) suggesting that the parent organization is more active in the front end of the program, and let the program team acts relatively autonomously in the implementation phase,

Our contribution lies also in specifying the isolation activities that ensure the autonomy of the exploration program along the program lifecycle. Indeed, Lehtonen and Martinsuo (2009) highlighted that isolation activities in the case of change program consist in withdrawing information and keeping them confidential within the program. We claim that isolation activities in exploration program pursue different motivations. Exploration program targets the progressive development and transfer of new knowledge notably through exploration projects. However, the program kept this learning activity within the exploration projects and program until the knowledge base had been validated, protecting them from the short term expectations of the divisions.

Lest but not least, we highlight the role of the program leader in developing the boundary activities as for example, convincing the divisions about the specificities of the opportunities explored and their potential. With his role in conflict resolution, as a champion of the opportunities explored in the projects, his boundary spanning abilities and direct contact with customers, he compares to the heavyweight project manager (Clark and Wheelwright, 1991; Midler, 1995) but at the program level.

6- Conclusion

In this research, we study how an exploration program targeting the strategic renewal of a company is integrated with and isolated from its parent-organization in an evolving way over its lifecycle (initiation and implementation). We show that the set-up of an exploration program enabled the firm to pursue

exploration whereas the divisions pursue exploitation resulting in ambidexterity at the company level. Through the study of the mechanisms and the boundary activities and their complementarity as well as evolution, our research provides managerial implications for practitioners in charge of exploration programs. Our results encourage managers to undertake careful analysis of when and how integration is realized over the life cycle of the program and how its different interfaces could be managed in the most efficient and effective way.

Our research has some peculiarities that can be considered as limitations or opportunities for further research. Being based on a single case study, our research has the traditional characteristics linked to this type of method regarding reproducibility and generalizability concerns. Even though, thanks to a fine-grained analysis, we have collected extensive data to address the usual limitations inherent in such research, further research should explore the replicability of such exploration program in various industries and companies. Indeed, we focus on a complex product in a specific industry. We studied a business-to-business context characterized by both strong uncertainties and path dependencies related to the presence of stable players. Other sectors based on a wider ecosystem and a less complex product can be addressed in future research. As exploration programs have been little studied, we preferred an in depth qualitative, longitudinal study of a unique case. Several kinds of integration and isolation mechanisms were outlined and illustrated, as well as phases of exploration programs and their outcomes. Based on this, a survey approach could be designed and correlation analysis undertaken which would complement and enlarge this work.

Furthermore, the exploration program we studied resulted in the identification of many opportunities characterized by new architectures of offerings and of value. The extension to other types of radical innovation can be interesting to study, as well.

Last but not least, we have studied exploration program as an independent temporary organization and its integration within its parent organization. Further research should be developed on the potential integration of program to program, i.e. when a firm launches multiple exploration programs. Or the integration between exploration and development programs extending the work of Midler et al. (2019) when they highlighted the required integration between exploration and implementation projects to

programs. Indeed the competitive context driven by innovation should lead firms to launch simultaneously and successively a multiplicity of programs and to coordinate such efforts.

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