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Open Innovation For Systemic Innovation: Insights From Three Projects

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Abstract

The ever increasing connection of objects calls for ever increasingly systemic innovation management project, involving more and more players in ambitious innovative initiatives. Project management and open innovation provide useful frames to tackle this challenge but remain quite decoupled fields of research. We still lack of knowledge about how OI projects should be managed.

We investigated three cases of OI projects, involving an heterogeneous set of partners, embarked three years together to develop an ambitious value proposition (interoperable EV charging network, automotive data marketplace, autonomous car-based urban mobility system), highlighting the management, coordination and management issues.

Results show project mode provides great incentives for all partners to overcome internal limitations and provoke final results which wouldn't have been possible without it. We point the need to keep OI projects under strict project management methodologies, but enlarging their scope and time-scale to allow teams building and using knowledge together at a multi-project scale.

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1. Introduction

Systemic innovation challenges companies since their in-house R&D efforts are not sufficient to end with an integrated innovation (Teece, 1986). In this case, innovation requires that several players align their product and services to build offers which make sense together (Cusumano et Gawer, 2002b; Pechmann et al., 2015). For example, 3G/4G/5G communication network require compatible phones and tablets in order to find a customer value. Electric vehicle have only value in the eye of the customer if they can find charging stations, public incentives, charging stations cartography, specific maintenance network, adapted home charge, etc. Autonomous cars will require adapted infrastructure (V2I: vehicle to infrastructure), maybe specifically designed roads, specific driver licenses, adapted communication networks and backbones. A microprocessor requires having a computer which is compatible both in term of interfaces and in term of CPU clockspeed, and software which use these capacities.

Surprisingly, innovation management literature has made only limited contributions to solve this specific issue. A noticeable exception is the work from Gawer and Cusumano who did introduced the term of platform leadership (Cusumano et Gawer, 2002a; Gawer, 2009; Gawer et Cusumano, 2008; Gawer et Cusumano, 2014). They claim that a firm can take the lead upon a group of complementors, differentiating internally a business unit in charge of synchronizing and coordinating these actors towards the same technical interfaces, and the same pace of innovation. Whereas this literature provided great insight to understand the co-evolution of firms within common platforms, it gives only limited guidance about how to manage such projects at an early stage, when technology and common purposes are not yet settled.

The paper tries to contribute to this lack of understanding relying on both project management and open innovation literature. Bridging these two bodies of literature appears as a promising analytical avenue to explore how firms can use projects both to develop common offers and to nurture their own knowledge basis.

Open innovation has been developing as a “market of ideas” more than an integration process. *“Open Innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas ... as they look to advance their technology.”* (Chesbrough, 2006, p.1). The focus has been placed on how external sources of knowledge (ideas) could be captured by a company and how they can feed the internal pipe of new product development; or how internal ideas or patents can be used and valorized outside the

parent firm. It progressively expanded its scope to understand how firm can effectively absorb external knowledge (Cohen et Levinthal, 1990). One critical problem to apply this paradigm to specific innovation management challenges is that it widely remained a holistic firm-centric framework (Chesbrough, 2004; Chesbrough, 2006). Thus, several others have been trying to adapt project management processes to open innovation (Grönlund et al., 2010) and identify contingency factors (Brunswick et Chesbrough, 2018; Du et al., 2014a; Kim et al., 2015; Lakemond et al., 2016).

Project management provides stabilized tools and methods to conduct new product development projects (PMI, 2013). Initially defined within the context of new product development (Brown et Eisenhardt, 1995; Clark et Fujimoto, 1991; Wheelwright et Clark, 1992a) and Stage Gate processes (Cooper et al., 1999), and progressively spread as a firm-wide approach (Gemünden et al., 2018; Midler, 1995), showing diverse management settings depending on the number and levels of maturity of projects (Maniak et Midler, 2014; Maylor et al., 2006; Pellegrinelli et al., 2015).

However, these bodies of literature remained widely disconnected and we are still far from having a good understanding of how to conduct systemic open innovation projects, which present a high degree of uncertainty, information asymmetry, lack of precise specifications, lack of initial player alignment, need for cross-investment.

This paper takes the automotive industry as example. Automobiles have always been regarded as self-standing objects, until now. For a couple of year, the domain of connected and autonomous cars has led to numerous press articles, consultant reports and forecasts, public funded plans, and considerable private investments from carmakers and pure digital players (Uber, Google). The smart city domain also integrates connected, robotized and green cars as key drivers for city sustainability.

We build on a longitudinal in-depth analysis of three cases. Each case is constituted with a joint R&D project involving more than 3 major industrial players, IT providers, start-ups and public authorities. Two have been conducted in the frame of the H2020 European projects and one emerged from a company's initiative. Each of the three projects aims at developing a systemic innovation (electric mobility connected service, shared data marketplace, urban autonomous driving service). Authors participated to the three projects, assisting to all meetings and committees, and consigning emails and memos. We have also conducted 23 interviews of participants.

The next section positions the research into the relevant literature in OI and project management. We then describe the cases and discuss their implications. The final section concludes and bridges results with literature.

2. Literature review

Wondering how to conduct innovation projects which involve various heterogeneous players requires questioning the ability of participating organizations to integrate their knowledge into a coherent value proposition which fits with their internal roadmaps. Both project management (PM) and open innovation (OI) literatures have been focusing on such knowledge integration mechanisms, at an in-house or multi-firm level. The following section investigates these bodies of literature to refine our research question.

2.1. Project management

Even if we can talk about Egyptian pyramids construction epics, project management as a discipline dates back to the early 1960s. Several elements aligned at the same time. First, organizations faced complex projects like missiles, space missions, mega-constructions, etc. (Lenfle, 2012). Second, system engineering – and system thinking - developed trying to master complexity and decompose it into solvable sub-problems (Bertalanffy, 1968). Third, given the importance of such mega projects, governance structures heavily called for control about the efficiency of the cash invested in such megaprojects (Sapolsky, 1972). These elements concurred to found project management as a system engineering discipline (Cleland et King, 1968). At that time was invented methods such as PERT (Sapolsky, 1972).

A second round of rationalization happened in the early 1990s. The challenge at that time was to cope with a weakening demand, and thus to launch new products within controlled cost – quality- lead time constraints. Pioneer research revealed that incumbents were not as prepared as one could have expected to deal with this challenge (Clark et Fujimoto, 1991; Midler, 1993; Wheelwright et Clark, 1992b). The problem essentially lied in the matrix battle between functions and projects, projects trying to orient functional resources towards their own objectives over the functional routines. Best practices such as concurrent engineering (Carter et Baker, 1992) first emerged then rapidly spread over industries, and finally stabilized into recognized capabilities (PMI, 2013).

Once the challenge of developing a new product was settled – theoretically – arose the challenge of making

several projects make sense together. Project portfolio management emerged as a way to rationalize a population of projects. A first way to do it is to map the population and dispatch the global R&D budget according to the profile of each project (risk / expected return on investment) (Cooper et al., 1998; Teller et al., 2012). Another way is to think in term of global cost reduction, maximizing the commonality of parts among projects (Cusumano et Nobeoka, 1998). Other authors pointed the necessity to coordinate projects upfront in order to synchronize their respective contributions towards a more global program (Maylor et al., 2006) even if projects have different level of maturity and time horizons (Pellegrinelli et al., 2015).

Another critical issue in PM concerns the interplay between projects and knowledge dynamics. Whereas the general frame of PM focuses on how to use existing knowledge to converge towards a specific goal, projects have also been recognized to be part of knowledge creation within a general learning cycle (Maidique et Zirger, 1985; Nonaka, 1991). This raises the question of the ability to link research activities with development activities, and how to integrate potentially disruptive new knowledge in stabilized product architectures (Iansiti, 1998). In this perspective, projects have to be managed in a specific way in order to give them sufficient degrees of freedom to explore new knowledge and continuously refine strategic goals (Lenfle, 2008; Lenfle, 2016; Lenfle et Loch, 2010). At a multi-project scale, PM requires to draw a sequence of knowledge creation / knowledge application, following a lineage logic (Maniak et Midler, 2014; Marsh et Stock, 2003).

Surprisingly, whereas external organizations became increasingly important in new product development, PM literature essentially focused on in-house coordination mechanisms. A noticeable exception is the cooperation between the focal firm and its suppliers, which attracted much attention in the 1990s. Given the importance of suppliers' R&D capabilities, the ability to integrate suppliers' effort in the new product development process, in the place and the right time, and relying on the right incentives, became a key success factor for PM (Clark, 1989; Handfield et al., 1999; Lamming, 1993).

PM literature widely described knowledge and teams integration mechanisms and governance which point towards an objective, mostly the launch of new products. Researches progressively expanded the scope of analysis and management to include multi-projects rationalization and knowledge dynamics. However, PM mostly remained a firm-centric literature stream, disregarding the knowledge flows between in-house projects and external players. This is precisely what the Open Innovation literature focused on.

2.2. Open innovation

Open Innovation (OI) progressively became a dominant paradigm to explain knowledge flows between the product pipe of a focal firm and the external innovation processes. The term “open innovation” returns more than 100’000 results on Google Scholar, and the term infused not only in the academics circles but also in most of the companies (Brunswick et Chesbrough, 2018). This all began with the recognition that R&D could be more efficient if it leverages external opportunities instead of focusing on in-house dynamics (assets, ideas, people, etc.). Pioneer example like Lucent and Cisco (Chesbrough, 2003), Xerox, P&G (Dodgson et al., 2006) constituted the empirical foundations for such a proposition. In this perspective, a company could rely on external ideas and knowledge sources, nurturing its own innovation pipe by combining various sources into a coherent offer.

This hypothesis appears quite counter-intuitive. Many scholars have underlined the advantages of investing in proprietary R&D. Having its own strong R&D, close to the production activities, allows to answer quickly and specifically to their requirements and pain-points (Chandler, 1990). In the same line, R&D roadmaps need to be oriented towards firm specific strategic objectives, which strive for an integrated R&D model (Roussel et al., 1991). Thus, investing in R&D provides economies of scale and scope which act as entry barriers towards competitors (Teece, 1986). It also appears that the cost associated with technology scouting and integration can exceed the value created through the open innovation process (Faems et al., 2010).

Of course the best practices are to be found between these two extremes (Rothaermel et Alexandre, 2009). One of the main reasons is that companies need to have a strong in-house R&D in order to be able to recognize and absorb external knowledge. The absorptive capacity approach helps understanding such mechanisms, where open innovation performance heavily relies on the previous experience of the company in the field of external knowledge sources (Cohen et Levinthal, 1990). Past research clearly showed that superior absorptive capacity led to superior firm performance (Rothaermel et Alexandre, 2009) and quicker development cycles (Fabrizio, 2009).

However, scholars both claim that such a strong experience can incite to open to external contributions (De Faria et al., 2010) or allow to do without others (Barge-Gil, 2010).

Most of the literature about OI has been carried out at a firm level. However, this unit of analysis has several limits. First because there is an obvious diversity of practices within a single firm, especially big companies,

which prevents from talking about OI global practices as a homogenous firm behavior. Second because it is hard to measure the performance of such practices at a firm level, because of the number of variable to control. Third, because practical implications at a firm level are difficult to implement since R&D activities are most often led at a project or portfolio level.

So there is a need to open the black box and see concrete mechanism of knowledge integration and management.

2.3. Project management and open innovation

Several authors explored how to adapt in-house innovation processes and organisation to face the open innovation challenges.

Kim and his colleagues found that the size – “not too big” - of the team in charge of the inbound process was a key success factor of project performance (Kim et al., 2015). Other researches described how to adapt the Stage Gate process, and open windows between gates to favor outside in and inside out flows (Grönlund et al., 2010). Bogers et Lhuillery unpacked the knowledge flows into market, supplier and public research knowledge, each being mostly captured by different business units – namely R&D, manufacturing and marketing (Bogers et Lhuillery, 2011). Other authors highlighted the mediating role of knowledge inflow governance on open innovation performance (Lakemond et al., 2016). For instance, project management settings have been described as moderating factors of open innovation project financial performance, market-oriented project being more performing with strict project management processes, and science-oriented project with looser project management settings (Du et al., 2014b).

Heterogeneity and knowledge distance among partners impact the coordination and motivation challenges. Systemic innovation management requires to have both a strict project management framing, but also to anticipate within the project work breakdown and timeline a specific slack to solve the “knowledge distance” among partners and system explorations (Du et al., 2014a). The heterogeneity of partners’ knowledge basis both open opportunities of recombination and raises collaboration challenges because of the knowledge distance between partners (Bertrand et Mol, 2013). On the top of that, when these actors play at the creativity stage, this increases the uncertainty and information asymmetry, and requires strong coordination and motivation mechanisms in order to align behaviors and incentives. Project management has been proved to be a relevant vehicle to make this alignment happen (Lakemond et al., 2016).

Given this short literature review about project management, open innovation, and project management related to open innovation, we can highlight some missing linkages in our understanding of these phenomena.

The first limitation is that both PM and OI literatures regard the innovation process from a focal firm perspective. Even if the literature about open innovation at a project level begins to grow, most of the stream of research is still dominated by a holistic view of open innovation practices. Second, joint R&D projects have rarely been considered symmetrically, taking into consideration the other parties' perspectives. Project members do have their own interests in joining such initiatives, and do have their own R&D roadmaps, absorptive capacities, etc. High performing open innovation projects can, at first glance, be projects which provide value to all the members of the initiative, not only a focal firm. Finally, if project management has been recognized as a good way to align partners' behaviors at a creativity stage, PM literature pointed various form of project management (exploration, development, portfolio, lineage, etc.) and we can wonder about which kind would be suitable for open innovation projects.

2.4. Research question

Surprisingly, whereas the management of systemic innovation projects appears as a growing challenge namely given the increasing importance of the Internet of Things and digital industries, literature gives only partial answers.

Project management provides useful guidance to coordinate and motivate people in various configurations of projects (development or exploratory) at various scale (project vs portfolio) with various attention paid to assets' associated dynamics (program vs lineage). But it gives limited elements to manage projects which involve heterogeneous partners and how knowledge is created, absorbed and reused in such configurations.

This is precisely the goal of the open innovation literature. OI described mechanisms to open in-house R&D both to inside-out and outside-in the classical innovation funnel. It paid a close attention to the way such knowledge flows are captured by the focal firm. However, it's mostly a firm perspective which gives little insight to project management implications.

In this article, we want to contribute to the emerging literature about the relationship between project management practices and open innovation. If literature pointed that project management was a key factor

for open innovation at a creativity stage (Lakemond et al., 2016) and for market-oriented projects (Du et al., 2014b), how to manage open innovation projects? What are the consequences of given governance and project management methodologies on project performance?

3. Methodology

3.1. Choice of the industry

To investigate this issue, we chose to analyze an industry which is quite experienced in term of project management. System integrators – such like the automotive industry - have been pioneering industries in term of new product development practices (Clark et Fujimoto, 1991; Wheelwright et Clark, 1992a), most often in closed innovation paradigm. This tendency to close the innovation process should be linked with the integrity – non modularity - of the final product, which favors integrated companies instead of a distributed design process (Baldwin et Clark, 2000; Jacobides et al., 2007; MacDuffie, 2006). On the top of that, the performance of such project based organizations (PBO) relies on the stability of specifications across products rather than the ability to launch breakthrough new products lines, based on external ideas or unusual knowledge (Cusumano et Nobeoka, 1998).

However, such industries are compelled to open their innovation process namely because of the digitization of products and services. Objects are more and more connected with their environment, with other objects, with energy sources, with data centers, with customers, etc. Designing robust objects is therefore not sufficient. Providing complete seamless offers implies to coordinate with various players coming from various worlds.

Carmakers are engaged in providing integrated mobility solutions, involving the cooperation with players coming from the data industry, local public authorities, car-sharing or taxi operators, legislator, competitors, etc. Public authorities wonder about how to help traditional industries shifting to this new digital world, saving / creating jobs, creating economic growth, and triggering positive environmental and network externalities.

3.2. Choice of the cases

We selected the inductive multiple case study (Eisenhardt, 1989; Yin, 1994), and we chose to investigate three projects in order to add validity to the results on strategies adopted by one single firm or consortium.

Projects focus on the creation of new infrastructures, new user experiences and revenue from car data, and the relationship between territories and vehicles. The projects play a role in smart mobility ecosystem creation at different moments and at different levels of output concreteness.

The first case, developed by a consortium formed by four automotive manufacturers (OEMs), one energy supplier, a service operator and one academic institution (the authors were part of it), aims to deploy 200 EV charging stations in two years along a national highways network. The project was part of the EC global initiative to develop an interoperable charging network towards EV adoption scaling.

The second one, developed by a consortium formed by three carmakers, two service providers, two private IT and cloud operators and three management and academic institutions (the authors were part of one), aims to create the prototype for a marketplace allowing OEMs and service providers to extract data and create services from the data treasure collected by cars around Europe.

The third case was developed under the supervision of one OEM which associated the Paris municipality, several automotive suppliers, design studios and simulation companies. It aimed at exploring what could be the autonomous mobility in a big city, involving to define specific cars and infrastructures.

	Goal	Dates	Partners
“Corridor”	Deploy 200 EV charging stations	Early 2014-Dec 2015	Private+Public: Four OEMs, one utility provider, one service provider, one academic institution
“Automat”	Create a prototype of marketplace for car-derived data.	April 2015-April 2018	Private: Three OEMs, two service providers, two privacy IT and cloud operators, three management and academic institutions
“Square”	Explore the autonomous mobility in a dense city	April 2016 – April 2018	Private+Public: OEM, city municipality, automotive suppliers, design studios and simulation companies

Table 1 - Case description

3.3. Case analysis

For each of the projects, authors have both participated to the key meetings all along the projects, and interviewed the key actors of the projects in each participating organization. Interviews and data collection were focused on (1) the governance of the project (2) how players learn through and from the project (3) how this new knowledge impact their parent organization and processes.

	Interviews	Meetings	Second-hand data
“Corridor”	11	3 operational committees, 7 steering committees, 1 workshop.	Strategic notes, minute-meetings, emails.
“Automat”	12	6 consortia meetings, 2 workshops, 1 review meeting.	Emails, minute-meetings, EU Commission roadmaps.

“Square”	10	17 weekly meetings, 4 top-management seminars.	Emails, minute-meetings, technology roadmaps.
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Table 2 - Data sources

All the data collected have been consigned formally in a database structured following the different dimension under analysis (governance, learning, absorption).

4. Case studies

4.1. Electric vehicle: the “Corridor” case

4.1.1. The initial setting

The electrification of transportation is linked to the technology of energy storage and energy charging, being these two elements key success factors toward the EV use experience definition and therefore adoption. Actors initially involved where OEMs, pushing for EV performances improvement on their own or with alliances, while waiting for the public institutions to provide the infrastructure for charging. Historically automotive and electricity generation and delivery industries didn’t need to cooperate to deliver value proposition and to insure each other profitability. But, being the cost of an EV extremely high and infrastructure on the public soil not available, the adoption of EV was low and the electrification of transportation a struggling object. Public and private actors keep trying partial solutions, while private actors and public-private initiatives push the adoption their way (i.e. Tesla, Autolib’). The imperative of environment protection pushes international institutions and national governments to fund projects for moving the object forward, toward a trajectory of successful scaling adoption and widespread economic and social benefit. And EC funded consortium-based projects arises.

The observed consortium was composed by four automotive manufacturers, one utility provider, one service provider and one academic institution. These organizations jointly applied one year before to the EC, answering to a call for projects in the context of EV infrastructure development. They finally got the funding. The goal set by the consortium was to implement a network of EV fast charging stations covering the highways in France and commercial areas in the vicinity of highway exits, for a total of 200 stations.

The consortium contract started in early 2014 and ended in December 2016. The project had to demonstrate that the consortium can develop a profitable private business on “charging stations” by the end of the project. This was also a condition for application.

4.1.2. From project funding approval to contract agreement: Early 2014 -February 2015

Since the project funding approval in early 2014, all partners formally agreed that the common goal was to move electric mobility forward, which was a fit for every partner’s internal commercial and technology roadmap. Beyond this common global objective, going into the detail led to several debates. Contract signature was the first focus of partners’ discussions. Differences arose between contract negotiation and partners’ internal processes, which impact project development. The disagreement on contract ignited debates on service providers’ responsibilities clauses, service price and technical progression of station definition.

Besides every partner needed to reach agreement internally on moving the boundaries of contract engagement acceptability. Escalation of internal hierarchy revealed to be more time-consuming than forecasted. Every partner declared different priorities in term of internal budget completion and related position on agreement signature: from urgency to immediate budget allocation, and therefore immediate signature, to reproach of previously unconsidered effort and engagement and therefore no pressure to action toward higher level of hierarchy for signature completion in short term. Once in front of un-recoverable delays of the project, some partners were able to obtain flexibility in internal procedure application.

Every partner defended its initial interest setting, focusing on timeline completion for return on investment target achievement, although there was no interaction among partners on direct-sale business plan parameters and hypothesis definition. Preliminary awareness of not viability of this frame and of the impact of public institution on project timeline completion emerged. The need of moving forward operations on infrastructure definition pushed the partners to agree on clauses. Besides every partners needed to reach agreement internally on moving the boundaries of contract engagement acceptability.

Differences arose between contract negotiation and partners’ internal processes, which impact project development. The disagreement on contract clauses ignited debates on vote procedure, service providers’

responsibilities definition, service price and technical progression of station definition. At the beginning, partners didn't agree on the responsibility assignment in case of infrastructure failure.

4.1.3. Resistance tempering by contract signature and regulation constraint: March 2015-August 2015

Since contract agreement, few operational activities were kicked off at consortium level, while a certain progress was performed on service infrastructure technical definition. The sudden appearance of a technical feature the infrastructure needed to comply with under a specific regulation, resulted in a forecasted heavy impact on project milestone completion. More resources had to be allocated to solve the technical issue in order to minimize the impact on overall target achievement and on partners' internal roadmaps, clearly perceived by all partners. Along with the operational contingency, the simultaneous accomplishment of partners' internal process for contract signature resulted in an increased degree of flexibility of partners toward each other, allowing sharing on project status and site negotiation process, alignment on project performances expectations starting, and cooperation in collaborative attitude in charging station testing.

Partners realized negotiation for getting the adequate conditions for each charging station site requested a learning process. Besides it, the process of building a relationship with location managers paved the way for a more extended dialogue between service provider and OEMs with previous experience in such a relationship and negotiations (e.g. grocery stores).

Deadlines approaching, OEMs became aware of the relevance of internal information on technical solutions for charging and communication standards between cars and stations to be shared with other OEMs, not seen as pure competitors, but as participants of a community acting for EV adoption scaling up. Partners became more aware that profitability of the project relies on the ability to collaboratively involve partners beyond the consortium.

On the top of that, partners discovered a major legal issue: each project went through a phase of legal compliance of new infrastructure features by a negotiation process to reach shared definition of new concepts and new territories of agreement with external stakeholders. As stated by one of the partners: *"The introduction of new arrangement of places for RPM is object of negotiations, and we are working with highway operators for ...lowering of the arrangement costs...The law in France is not clear on this topic,*

and this is putting some sites at risk.” Project Manager, Utility Provider. This conducted to a delay of time and increase of costs, but it was also part of an iterative process of learning for partners and stakeholders confronted for the first time to such issues. All the main features of the infrastructure deployment, such as stations characteristics, station locations and interoperability performances were all repeatedly redefined and updated during the project. First level of interoperability of the station with different OEMs and telecom operators through digital platform was reached at mid-term.

Besides, the opportunity of participating to a future European funded project on another geographical area arose and partners expressed their interest in participating. During the project development, the consortium interacted with European Commission, which main requests on project report concerned the time plan and expense report. The feed-back from and the interaction with other European similar projects was shared among consortium partners, as information source on which factors to consider for a successful project completion.

4.1.4. The epiphany of first users' feedback: September 2015- end of project

Joint actions on customers' awareness and service experience were taken, while EC confirmed the priority of profitability target. First feedback from users had the effect of urging partners to introduce modifications in price scheme and operational flow had to implement in order to comply with EC expectation. Information on modifications to be taken was informally and partially discussed, while partners discovered a learning-by-doing process and started to share consideration of other revenue stream collectable from the infrastructure.

Consortium officially declared to EC the project had an estimated delay of one year, and that it would have committed to the completion even with no further funding from EU for the extra-time.

Although OEMs and service provider partners never found a business model vision full alignment during the project, a certain degree of cooperation was achieved. Some of the partners became openly aware and open to the acceptance of a new role and partner dynamics in such projects, such as co-innovator partnership.

As far as value from the project, OEMs initial vision of the project as EV sales booster evolved toward a more collaborative vision on how to reach the desired adoption effect, with arising awareness on the

current impact of the project in their strategic roadmap. We noted an evolution also on the utility provider side, from whom the project at the end was seen as “a marketing site to work on together” (utility provider).

As far as technical and commercial knowledge, the complexity of activities flow, from first visit for technical assessment to charging station commercialization, resulted into internal processes creation by some participants. As stated by the Utility Provider: *« We introduced two internal processes to accelerate the certificate achievement from 3 weeks to 1 week delay. We have just been able to identify this knowledge improvement now, during the deployment process.»*

Project ended with the one year delay, with all the 300 charging stations installed. Today there are not quite used by people since their location and customer experience are not that relevant. The same players did enter a new European-funded project called Ten-T to deploy the same type of common electric infrastructure in another country.

4.2. Autonomous vehicle: the CityPod project

4.2.1. AV Le Square- the vision of autonomous driving for ready-to-test use cases

Digital technology impact in mobility industry reaches its highest level with the autonomous driving. Hardware manufacturers, software manufacturers, public institutions have to act more like musicians of an orchestra, than solo, but public/private sectors, hardware/software development processes all is driven by different parameters and operational logics. Projects are launched, but with a very large scope and therefore hard to achieve.

As all its competitors, one major OEM player is seeking at headquarter level for the adequate strategy to dominate such debate and to set a path for a profitable position in the next years. The complexity of the challenge is translated into responsibility spread across the organization, and the autonomous driving topic is on the agenda of different divisions, with no clear intersection points or coordinated resources use toward a common goal. One initiative laterally located compared to headquarter set the ambition to find the way through the urgency, the speed and the uncertainty through open collaboration.

On the other side, a Tier 1 supplier is seeking its path toward the most profitable positioning into the

autonomous mobility value chain, aware that the attitude of waiting for the OEM to propose components solutions is not the best strategy to settle into a dominant position for a future ecosystem based on services and experience structuring. The work on experience prototyping developed in recent years by a very small proactive team is not considered by the headquarter as a core product to be developed in the future in the context of smart cities and the team is frustrated about the limitation of use cases the software application will have if it stays linked to the giant company and the sell-it-to-OEMs approach. They would like to have the opportunity to apply it to a smart city real use case with a broader range of partners, but the headquarter is not giving the green light to search for it, as not a company priority.

As a foreground of these private actors-driven scenarios, the race of competition of municipalities worldwide is getting harsher to being the smartest and greenest, to attract investments, tourists, inhabitants. Life quality and wellbeing become relevant factors in such rankings. How to increase such intangible assets through the development of new mobility services driven by digital technology and speed is a difficult question to answer with current tools, procedures, partners, and parameters. In such a scenario, Paris is no exception and roles as the urbanism and attractivity developer are seeking for initiatives able to provide answers. Paris manager is expressing urgent need of initiatives to be co-developed with them.

As the conditions for creating space and time for an exploratory collaborative project emerges at the OEM's side, a collaborative initiative is set as complementary option to projects developed at the headquarters, and is conceived as fueled by the shared intent of some stakeholders, who are willing to take action in a non-traditional way.

The set of players is composed by one automotive manufacturer, one Tier1 supplier, one academic partner, one public authority and progressively involved external contributors as autonomous driving urban stakeholders (graphic designers, architects, urbanists, service designers, potential users, software developers, collaborative service platform managers etc.). These actors unite effort in order to explore and converge towards a shared vision of autonomous mobility leading to future services.

The project started in January 2017 and it should have last 3 months. The evolution of project

deliverable definition and impact on partners resulted in an extend duration, and currently the project is ongoing and will last until December 2018.

4.2.2. *The relevance of the perspective and the team composition: January 2017-February 2017*

From kick off meeting, project description and performance differ from a standard project, as per the lack of performance criteria in term of quantitative evaluation, and the focus in term of vision originality within feasibility. As no players got a clear idea of the form of the target to be achieved, all agreed in applying a creative process to define both the offer and the demand of new mobility services. The lack on initial specification setting was openly declared and accepted: *"The specs description of the concept will be done during the project and by all the participants, it must be collectively desirable"* (OEM).

However, players did have an initial clear idea about their own expectations toward to projects, most of them in term of open innovation development, and in term of marketing for others (*"This project is for us advanced marketing to know better our customer and to take power before competitors"* Tier 1 Supplier).

The exploration preliminary results have been discussed with a representative of the public local institution. It was the occasion to confirm shared interest in the exploration. The creative process could be pursued with the aim of iteratively reconsideration of the target perimeter and the width of the team to be involved. The relevance of the direct dialogue among players in confirming shared intentions and target was declared and the regular and purposeful involvement of players defined as key success factor.

Once the internal rhythm and setting were set, the need of external knowledge already emerged. The first input was requested in term of municipality priorities, therefore in term of city pain-points and parameters. The input on such subject impacted the consideration of which product portfolio should be defined for which impact, from economic and social perspective. As stated by the representative of the local municipality, *"the vision could be a deliverable to break traditional reflections, and to pave the way for experiments....It could improve dialogue among municipalities, which is problematic and it lacks coordination"*.

Describing the “vision” became then a shared innovation field to be developed jointly by the project team with the municipality support. Project deadline was declared obsolete and extended of one month.

4.2.3. *Discovering the augmented target: March- April 2017*

From the initial concept defined in the first months of project development, some partners expressed interest in the project from a new approach, as communication tool toward internal hierarchy.

As the creative exploration was kept open, and external players as municipality representatives started to react to the intermediate results, partners realized that pain-points of users, citizens, were not correctly defined, and a deep work on semantic questioning on key definitions was performed. It allowed to clearly define the pain-points and to move forward for solution proposals, and a broader understanding of the relevance of certain definition (e.g. public space). The re-definition of the initial concept generated the emergence of tensions not previously considered.

As the players circle keeps enlarging, pure creative sessions are alternated (or interrupted by...) with sessions on which external knowledge is provided to the team, but in a non-structured or rhythmmed format. Interest in the project evolved for some partners, as stated by one player: *“engagement is such a project comes from individual but shared enthusiasm and by the target vision toward a big ambition”* Tier 1 Supplier.

While project deadline was approaching, team realized that the definition of target of the project was knowledge building and structuring, and consequently the structuring of a “multi proof of concept” (POC) strategy, based on a vision larger than a single POC. The sense making of the project evolved toward a lineage of a multiple results instead of a single output.

The creative process integrated a challenge of the state-of-the-art of creative output with an information graphic designer. This generated an open debate on which another level of scope widening was reached: the project is able to generate two main strategic results, one external and one internal to participants’ organization. The external one is the ignition of interactions among stakeholders of an emerging ecosystem, the second one is to define the experimental process as an effective one for innovation ignition and for knowledge structuring among heterogeneous actors.

This awareness acted as knowledge-box opening for each team member, who shared experiences and useful feedback from previous projects. Project goal was openly understood and assumed as vision toward actionable objects, and pilot concepts have been challenged for further development.

At the end of March, when national municipalities' leaders were launching the white book on mobility for 2030, project deadline was postponed of another month.

4.2.4. The development of the two deliverables for a vision May 2017- Sept 2017

Since early May, the project team acknowledged a paradox of interests between the municipality and the OEM in term of attitude toward vehicles presence in the city. The paradox became evident in the elucidation of the meaning associated to several words used by the team and received by the municipality with a different meaning and therefore implications in potential further decision making. What was considered value generator by the team has an ambiguous meaning for the municipality, potentially leading to public manipulation. In order to solve this paradox, the team needed to reformulate mobility problems using the language of local municipality. New external knowledge has been searched as far as law implications, use cases and maker participation. The need of making the vision tangible emerged and two concrete objects have been identified as means to convey the vision message:

- An infographics elaborated by the graphic designer included in the team in the previous month
- A simulation of a real situation in an urban area, with potential evolution to an augmented model.

Artifacts, physical and digital, impact the path of partners' dialogue: *"Infographics should work as tangible tool of discussion, practical and effective"* (OEM).

Partners started to apprehend the project as an arena in which tools are created and tested, and two more partners have been called on-board. New partners demonstrated enthusiasm for the initiative, matching with their wish to overcome internal innovation roadmap frustrations: *"Our objective for being here is to show internally that there are new forms of merging innovation challenged through collective projects, and that new tools can be created through them"* (New partner).

The project was then divided into four working packages with relevant team members associated to

each package. For the first time in the project, each team member got a defined assignment, with sub-team to act in parallel, while before everyone contributed to an all-shared activity. Time schedule changed accordingly and the weekly meeting, previously working session for the whole team, became moments of result sharing on each working package.

2.1.9 Project sense-making through internal and external communities October 2017-December 2017

At this stage, the project team decided to focus on local impact of the project for defining later a more global impact, and decided to include even more participants from the open lab community. A workshop on smart city was organized at the open lab and more people got involved in the reflections of the relevance of autonomous driving based services in urban areas.

OEM refined the internal use of the project intermediate deliverable, as *"the work on this project at headquarter level, is useful to make people reasoning on subjects such as AI and messages on innovative services can be transferred without being blocked by the headquarter rigidity of reasoning and approach. There are off the radar for political wars."* (OEM)

The link with other internal divisions progressively appeared to make sense in term of industrial feasibility and to be vital to the project chances to be deployed. In order to include all the relevant knowledge on technical standards and use cases from design and sociology point of view, the team decided to explore the industrial and business model link with an existing and already publicly known OEM project and to challenge the project so-far developed vision and concept through a service design workshop, an check and ignition of new perspectives.

Two separate events were prepared, a meeting with the OEM team responsible for the development and deployment of the first production vehicle initially considered as the basis for the City Pod project, and a service-design workshop on mobility use cases, workshop open to external contributors.

During the meeting with the OEM team responsible of the parallel project of innovative autonomous vehicle, it appeared clear that technical and business goals of the two projects are set to merge to make business and industrial sense. The two teams shared industrial and project management issues on both sides, discovering that most difficulties they faced were similar and that the solution path was a

converging one. The two teams started to pave the way to explore how the two research projects could get synchronized to support an existing production object experiencing sales volumes concerns. While discussing on how to perform the synchronization, teams were confronted with the obstacles of being located into separate units (R&D and Open Lab) of the same company organization chart, and with the actions authorization and coherence issues deriving from it. In both projects, the business model design is an ongoing process during the project development, but: *"it is not isolated. Some work on the CityPod business model is reusable for the XX" (OEM).*

The quest for project complementarity was then open, internally and externally.

Simultaneously, a first presentation of the modular object part of the deliverable was performed by some team members to potential customers in another municipality than the one partner of the project. The result was encouraging, as the municipality expressed vivid interest in the presented modular concept, but a lack of knowledge of the object in term of feature and performances emerged. *"Potential partners are interested in the concept, but not ready to make an offer bid. They do not know how to compile the specification of such an object."* (Tier one supplier)

The multiple aspects of deliverable value composition is finally entirely revealed: through the progressive alignment of partners, their knowledge background and the newly created knowledge, the deliverable becomes an object of convergence of technological solutions to match users' needs and an object of business intentions convergence for several actors.

Team discussed of more intangible elements to be included as project performance indicators, but no decision was made in term of formalization of a performance format yet.

The project gets internal and external momentum and the deadline is continuously extended as project deliverable expands. The working packages are set to be all delivered by the end of the current year.

4.3.Connected vehicle: the "Automat" project

4.3.1. Early moments of the project

Cars generate a considerable volume of data. Internal and external sensors capture nearly in real time many signals and information about the environment, car, driver, road, weather, traffic, urban

contexts, etc. Carmakers have been trying for two decades to build profitable businesses upon these data, mainly by selling premium services to car owners. Results have always been disappointing.

That was the starting point of the structuration of a consortium composed by three automotive manufacturers, one utility provider, two service providers, two privacy IT and cloud operators, three management and academic institutions. The goal set by the consortium was to develop a prototype of profitable marketplace for the exploitation of data collected from cars, for new services creation in automotive-related field and in cross-sectorial applications.

The consortium applied to a European Horizon 2020 financed project in March 2014, and the proposal was accepted in October 2014. The project started in April 2015 and will end in April 2018.

4.3.2. April 2015- October 2015: first setting

Data format and packages initially proposed by OEMs were debated during months among partners in the aim of format coherence consensus reaching and use cases applicability. Several workshops of partners' sub-groups were introduced as effort of alignment on vision toward key features of the marketplace, including standardization, data privacy and cybersecurity. It finally appeared that OEM had different data formats as input for the platform (histograms, etc.), different levels of aggregation, and different lists of data to share. The project was not strong enough to incent them to change their all data policy. As a consequence, the marketplace remained quite weak compared to the initial ambition.

Service providers started expressing initial hypothesis of use and declared which data would have been of their interest "*We will be interest only in the data that generate benefic effect in the magnitude of the service purposes, otherwise data should stay with the OEMs, because there is no shared business case*" (Service provider) .

Some partners realized that the challenge of the project on this subject could have been beyond the compliance with existing regulation, up to the influence in the future legislation definition for other highly systemic and disruptive projects (i.e. the autonomous driving). That was a clear expectation of the European governance entity.

The overall approach to the project business model was based on business plan definition for the

direct sale of data from the marketplace, without discussion on value proposition for users. From analysis of preliminary features of the marketplace, this frame appeared not to be viable, unless assigning a “safe” high price to the service, endangering the early-adoption dynamics.

4.3.3. *Defining-by-doing acceptance: November 2015-August 2016*

As far as offer side, first results on external potential users investigation and the on-going dialogue among partners on data package definition led to the general consensus on the fact that *“the world cannot be defined at the beginning of the project”* (OEM). On data package format and use cases, partners embraced the iterative process of definition between offer and demand. Some OEMs started to provide some data to service providers to start exploring use of them, but there is still no requirement definition from service providers.

The business plan exercise was slowed by the pricing building mechanisms. Partners were divided between a commercial performance of the project, searching the commercial viability of the marketplace, and a more exploratory performance. The role of the project was perceived as a mean to become a supplier of a dominant platform dedicated to a bunch of data from different sectors to a specific market target (*“the goal of the packages resulting from the brainstorming is to feed Californian developers”* OEM). Besides, service providers shared with the consortium an evolved vision of certain marketplace features for inciting interactions of platform participants. Data collection requirements were defined by service providers, which allowed the test demonstration activity to be developed.

A wide exploration process revealed that the panel of potential users and complementors was wider than the current partners’ focus. Partners realized that the business model viability and the strategic positioning of the marketplace relies on the ability to collaboratively involve in the dynamic such users and complementors beyond the consortium.

Sessions on business model design were performed in order to incite shared understanding of main concepts and impact of each other decisions on platform performance, aiming at jointly defining among the partners the value proposition. Partners temporarily agreed on shared understanding, but internal culture and processes reduced the impact of such agreement. All the above considerations drove the project to a delay in deliverables completion compared to time-plan.

4.3.4. Service provider partner replacement as a project performance enhancer: September 2016-March 2017

At mid-term, the open issues are still several, in term of offer and demand, marketplace business model and user incentives definition, but collaborative initiatives on data package collection and tests are ongoing between OEMs and service providers. As far as technical knowledge, partners expressed their improvement on both sides knowledge (offer-demand sides).

As far as value perception, the project is still perceived as commercial-viability-oriented and exploratory project at the same time. Some partners realized that part of the value of the marketplace resides in indirect value sources. The question on the business model is at the core of the discussion and the need of a “risk mentality” appears key to the partners in order to make business sense of the project. Some partners (OEMs) declared the gap between this approach and their traditional logic of business plan. Some others (service provider) declared re-consideration of automotive as business focus for the future and modify heavily their interest toward the project, with final decision of leaving the Consortium. A new partner is found by another Consortium partner and rapidly introduced to the others for approval. The replacement of one service provider partner ignited a new vision on collaborative results achievable by the partners. Joint use cases of data packages are investigated and partners declared the potentiality of internal use of project results, as a project performance beyond already set ones.

The pertinence of a more flexible strategy for project development is pointed out by some partners.

4.3.5. First data availability and end of the project April 2017- September 2017

The dialogue between Service Providers improved radically toward a better definition of package need and toward the aim of optimizing the demand of marketplace functionalities; it also allowed to discover functionalities to be implemented in the future which were unknown at project kick-off. Application use cases are better defined, and frequency requests became more coherent with real upload possibilities on OEMs’ side. Dialogue on use cases highlighted the relevance of applications for autonomous vehicle scenarios, but such projections raised the opposition of some partner: “But Automat is not designed for that!” Telemetry Service Manager, OEM.

In September, first data are finally available from one of the OEMs partners to be used as a sand-box for service providers to check the correspondence with their needs in term of quantity, quality and characterization.

The availability of first data from one OEM was the first jet of a data flow from all OEMs partners progressively contributing in the following two months.

First feedback from the service provider is quite deceiving as far as the usability of data is concerned. The amount of useable data was roughly 10% of the data uploaded into the platform.

Then partners engaged in a collaborative work on how to form packages at platform level in order to be used by service providers. Service providers started to formulate feedback and OEMs started to learn about quality characteristics of their own data, and where the value of them is.

The European sponsor was only partially happy with the final deliverable. He expected to have a real data platform at the end of the project. Players envisaged this scenario a couple of time during the project but progressively abandoned the idea because of the various misunderstandings and misalignment which arose during the project.

5. Case analysis and discussion

5.1. Project in-between other coordination patterns

We briefly described the course of three open innovation projects. Each of these initiatives was clearly settled and lived as projects, with a given objective, initial specifications, a given timeline and workforce partitioning. Each project was an open innovation project, involving more a pool of heterogeneous players aiming both at launching a common offer and at learning from the project for its own business future success. Each project is engaged because players feel their limitation, and that they won't make it alone, deploying the EV mass market, building an attractive data platform, or defining new autonomous urban mobility.

The cases are in-between various types of inter-organizational open innovation settings. In one sense, they are just like alliances, since players join their forces and complementary assets. The project acts as an alliance since the common objective and strict delivery constraints every partner to engage sufficient resource in the project, building trust and reducing opportunism (Das et Teng, 2001). We also find similarities with R&D consortia mechanisms, since firms trade off private interests against collective benefits (Ring et al., 2005), and given the high heterogeneity of interest, influence and expectations, one key issue is to create and maintain the alignment of interests (Olk et Young, 1997).

Even if we can find some common mechanisms between these forms of inter-organizational settings and our three projects, major differences appear because of the capacity of projects to provide incentives and coordination specific paths.

5.2. Project as an enabler for OI

The main difference between the static view of open innovation settings and projects is that players evolve in a dynamic process. Both the Automat and the Corridor project show that the initial project proposal was made as a hypothetical project, proposed by a small team within the R&D departments. When the project is launched, the project theme rises in the hierarchy and becomes progressively active in the agenda of decision makers. Companies discover that their play "for real" on the projects, with real partners (cities, competitors, IT providers...), with real targets, and that they engage their brand in the project.

This in-house activation mechanism allows granting resources to the project, since senior management has

the power to orient resources to strategic projects. We should highlight the fact that the three open innovation projects became strategic when partners joined - not before – and that the partners joined because they was a clear project with a clear target together.

Complying with the in-house governance and decision making processes appeared as a critical dimension. One central element which arose from the cases is the fact that each initiative has to provide convincing arguments to prove profitability. Rough profitability assessment was made at an aggregated level in order to convince the decision maker (here the European Union) to launch the common initiative, but individual profitability assessment happened after the kick off, after the project took some consistence and recognition within every participating organization.

5.3. The dark sides of OI projects

If the project setting provides levers to activate workforces and put the theme at the strategic agenda of players, it also has several dark sides which relates to the “project” unit of management.

The project implies a beginning and an end, with a global profitability, quality and lead time optimization. On the projects, players had to demonstrate that the profitability of the project was under control, meaning that it will lead to the commercialization of products or services with sufficient margin to cover the costs. So each project worked hard to make such a demonstration, even with very high uncertainty about market and technology. Even with the greatest efforts, such projects were very hard to prove their profitability. Automat and Square projects were too far from the market to have sufficiently strong hypothesis.

Beyond this classical problem, a more structural one is that the profitability of the common project relied on the costs calculated by each firm regarding its position on the value chain. For example, the profitability of the data marketplace relies on the expected cost of the sensors in the car, the costs of the IT, of the server, development, front and back office, etc. However these costs depend on the expected volume of transactions, which is low at the beginning since there is no market. Since every player keeps costs high because of the uncertainty and low volume, the customer price is fixed high to save the profitability equation, which reduces the volume of customers, etc.

The analysis of the three projects shows that the initial phase of trust building lasts a couple of month if not a year. Then, when players realize that this is “for real”, lawyers and experts in each organization step in the

project (Automat and Corridor) and protect the interests of the company sometimes against the interest of the project. Let's add on the top of that the opacity of costs since no one in each of the three projects accepted to share its real costs, even if the European Commission strongly incited them to do so in order to maximize profitability.

To sum up, if profitability is key both the common project and for each participant, OI projects are unlikely to find a satisfying economical equation without a strong cost killing heavyweight project management.

5.4. OI projects as learning arenas

However, such projects also imply knowledge exploration, surprises, and unforeseeable events. Literature invites to anticipate these events and program some slack in the timeline to face knowledge distance among partners (Du et al., 2014a). Observations confirm this guidance.

One central learning arena regards terms. At first glance, players are aligned towards a common objective: deploying a charging network, build a data marketplace, define autonomous driving city services. The vocabulary used during the initial phase is very inclusive and use general terms ("big data", "smart cities", "marketplace", "interoperability" etc.) in order to pass the initial stagegate. After the kick-off, organizations realize that they do not have the same understanding of these terms, because of the difference of organizational culture and technical paths. They progressively align their understanding, discussing definitions - *"this project is eventually not about big data"* - and specifying new terms specific for the project like "risk mentality" or "city pixel". This takes time and energy.

Another arena of learning and flexibility regards the project management and reporting itself.

Apparently the project is defined with clear "deliverables" and "milestones", structured in "workpackages", "demonstrators", "prototypes" etc. Entering into the project shows that these words inherited from the in-house development processes in quite misleading in the context of OI projects management. Given the diversity of interpretation regarding the same terms, organizations realize that "delivering a prototype" can be very differently seen in term of technical realism, user-friendly HMI, maturity, etc.

On the three projects, organizations hardly debate what is "in the project" and not, what is the project "made for". Has the platform to be able to sell real data at the end of the project? Do the charging stations have to be really customer appealing or is it just a research project? Even with an apparently very structured way of

framing the project, it appears that such fuzziness triggers misunderstanding, but also gives to the project enough flexibility to navigate the uncertainties and surprises. Since the reporting structures are used to stabilized projects' terms ("prototype", "demonstrator", "validation", etc.), the project team can report nearly what it wants pretending it sticks to the plan since these terms are not well defined.

5.5.From OI projects to OI exploration program management

The project allows mobilizing resources towards a given objective defined ex ante, which provides both an incentive and constraining frame. The reporting processes of Automat and Corridor focused on showing that the project sticks to the initial planning, sequence of deliverables, and quality. However the structural lack of flexibility of this model tends to neglect critical learning and opportunities which arise during the project, which invite to modify the scope, planning and sequence of deliverable. For example on the Automat project, the fixed perimeter of partners does not allow including potential B2B customers (service providers), or organize an "open innovation contest" promoted by the partners, in order to scale up the platform. On the Corridor projects, municipalities and highway operators appeared during the project as key partners to include, which was impossible because of the initially defined project setting. On the contrary, the flexibility of the Square project reporting process let the players continuously redefine the outputs of the project, shifting from a demonstrator to a collective design methodology, to a graphical inclusive representation of the future of urban mobility. We find here again the need to construct boundaries design artefacts and meanings in order to keep everyone onboard (Carlile, 2002). However, the project keeps delaying something concrete to deliver since the project continuously stays out of the spotlights. It appears that such collective and uncertain project should be strictly managed, but not in a "sticking to the plan" way. Modern theories about exploration project management could here be useful to apply to such context in order to be able to revise objectives and scope regarding surprises and learning, and at the same time deliver (Lenfle, 2008; Lenfle, 2016).

Apart this strict vs. flexible debate, the time-frame of the project is also questionable. On the top of the above described necessary slack, projects show that partners want to pursue their cooperation after the projects. On the European projects, it meant applying together to another project call. On the Square project, it meant continuously delaying the project endpoint and including more and more partners. This invites to enlarge the scope of the collective action from one project to a sequence of cumulative projects conducted together. As

literature pointed, an innovation project approach tends to produce knowledge which is only reused afterwards in a lineage program approach, allowing to over-invest on initial project (Maniak et Midler, 2014; Maylor et al., 2006).

5.6. Conclusion

Systemic innovation (Teece, 1986) is to become a major innovation management challenge because of the connection and autonomisation of objects which will have to be developed within their digital and physical context. This implies to have both a rationalized project management practice in order to keep things converge to a final value proposition, and an open innovation philosophy to be able to include various players. Project management and open innovation are streams of research which connected only recently. Project management literature progressively expands to include more than one firm and manage increasingly exploratory issues. OI literature progressively shifts its lenses from a holistic firm-centric approach to a project unit of analysis. However we still lack of knowledge about how OI project should be managed.

We investigated three cases of OI projects, involving an heterogeneous set of partners, embarking to develop an ambitious value proposition (interoperable EV charging network, automotive data marketplace, autonomous car-based urban mobility system), highlighting the management, coordination and management issues. We thus feed a vein of authors who invite to unpack the black box and look at how the OI process bridges with in-house innovation processes (Grönlund et al., 2010) , OI teams characteristics (Kim et al., 2015) or impacted business units (Bogers et Lhuillery, 2011).

Results show that project structured OI processes should be carefully fine-tuned. On the one hand, we confirm that project allows a certain form of alignment (Lakemond et al., 2016). The project mode provides great incentives for all partners to overcome internal limitations. The projection towards a concrete and close common goal, tangible intermediary deliverables, and expected profitability progressively allows gaining legitimacy and budgets in each participating organization. The final results wouldn't have been possible without OI. On the other hand, the project timeframe is both not flexible and not broad enough to fully support OI processes. Not flexible enough since the focalization on "sticking to the initial plan" neglects critical learnings which can lead to re-streamline the work-package structure, revise the planning or the partner's perimeter. It also feed a collective fiction where the project is profitable for itself and for every partner, whereas profitability lies both in a longer timescale and in a broader organizational set. These results

invite us to consider OI in a *program* perspective more than in a *project* perspective, so that partner can use the common knowledge spillover in a multi-project scale (Maniak et Midler, 2014; Maylor et al., 2006).

We also contribute to the debate about strict vs. loose OI project management (Du et al., 2014b). We found that a strict project was required in order to achieve the above cited advantages. We confirm that the heterogeneity of partners requires to anticipate an important slack in the project, according on the wording and aligning on precise work contents representing an important part of the projects observed (Bertrand et Mol, 2013). We highlighted the fact that teams can deal with this need of slack and also comply with strict project management milestones since they can play with the meaning of fuzzy reporting terms like “demonstrator”, “validation” or “prototype” inherited from the development contexts.

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