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## ***VALUE CREATION IN EMERGENT MOBILITY ECOSYSTEM EVIDENCES OF ORGANIZATIONS' STRUCTURE ROLE***

### **Résumé**

It has been widely described that industries have been disrupted by the platformization enabled by digital technologies, and that sectors boundaries are becoming more blurred due to the ecosystem-based dynamic of resource flow (energy, data...). The automotive industry has been widely impacted by the servitization and platformization of their offer (Sumatran *et al.* 2017), and value capturing involves the consideration of roles to be played in future ecosystems. In the case of nascent ecosystems, different strategies have been identified to navigate such situations and the path to bottleneck position is described as the one enabling the creation and capturing of value (Hannah and Eisenhardt, 2016)

But few elements are provided on the relationship between value creation and value proposition definition, and individual characteristics of incumbent firms participating and positioning in nascent ecosystems. The influence of organizations structure on how partners perform during the phase of emergence of an ecosystem has not been investigated.

Based on three case studies on mobility infrastructure and service development, the communication investigates how incumbents react to emerging requirements of a nascent ecosystem, and consequently how they progressively contribute to steer their future positioning in such ecosystem. The research highlights that organizational evolutions might take place, but that value creation and ecosystem positioning are influenced by actors' initial organizational characteristics and its ability to modify them, while being involved in a portfolio of similar innovation projects.

**Key words:** ecosystem, platform, systemic innovation, organization

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## 1. INTRODUCTION

Current strategy dilemmas in innovation topics challenge management literature. Even if the “open innovation”, “ecosystem” and “platform” thinking dramatically improved in the past decade, organizations still need concrete guidance on which strategy will be the most performant in the quest of value creation and capture in the digitally enabled ecosystem, such as “smart mobilities”, “integrated healthcare” or smart cities. These challenges require that several and heterogeneous players co-invest upfront in a common project to build a seamless customer experience, hybridize and connect products & services which are not only the addition of improved ones from each partner, and short-term and long-term business viability for all contributors who join the initiative.

Building such systemic (Teece, 1996) and disruptive (Bower and Christensen, 1995) innovation requires strong alignment of players during the project. The vertical integration stands as an apparently efficient model to provide such alignment (Teece, 1986). Companies like Tesla managed to develop in parallel highly innovative offers, including products, services, infrastructure, etc. Even if the vertical offer is not owned by a single entity, literature points towards strong “platform leadership” actions to incent complementors to invest upfront, building together a growing disruptive market (Gawer and Cusumano, 2014, 2002). But vertical integration is not the only strategy to activate and manage complementarities toward effective structuring of an ecosystem (Jacobides et al., 2018).

Furthermore, Tesla strategic path is investment intensive, and not all companies can afford such financial support for initiatives with no ROI in a timeframe coherent with firms’ financial goals. But all private and public players are aware that they have to be proactive in co-define such future integrated services; exploration initiatives and partnerships are undertaken in order to prefigure future integrated services and future dominating platforms. However, of course, all of them won’t lead to a direct profitable integrated offer, or a sustainable robust ecosystem, although public and private players intensively invest in such projects.

The central question of this article is “Is there an influence of organizations structure on how partners perform in value creation during the phase of emergence of an ecosystem?”

In order to answer this question, we investigate existing literature related to managing digital platform and resulting ecosystems. Platform leadership (Gawer and Cusumano, 2002; Gawer

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and Henderson, 2007), ecosystem management (Adner, 2017, 2012), value chain dynamics (Fine, 1998; Jacobides et al., 2007), partnerships and complementary assets (Teece, 1986) provided extensive and critical guidelines in value creation and capturing, going the “firm centric” and “product centric” approach. The emergence of ecosystem and the factors driving it have recently been addressed (Autio and Levie, 2017; Hannah and Eisenhardt, 2016; Jacobides et al., 2018). However, bridging these streams of literature with the innovation management literature (Clark and Fujimoto, 1991; Lenfle and Loch, 2010; Loch et al., 2006; Midler, 2013; Thomke and Fujimoto, 2000) points a blind zone. The ecosystem / platform literature only consider that collaborative projects aim at delivering a profitable systemic offer and strategy from the ecosystem point of view, with few considerations of organizational characteristics impacting such collaborative path. Innovation management literature points towards key aspects of the exploration process in order to give strategic guidance, such as the analysis of performance of exploration projects (Lenfle, 2008), on considerations on the benefit of ambidexterity through alliances (McNamara and Baden-Fuller, 1999), or firms and performances in accumulation and exchange of resources (Lin et al., 2007). As the ecosystem literature focused on ecosystem’s structure and alignment, without considering the link with organizations’ internal dynamics and their impact on ecosystem structuring, value creation and capturing, innovation management focused symmetrically on internal organization of innovation processes and structure, without analyzing the links between such dynamics and partnership dynamics within ambitious systemic projects. The research aims at bridging this gap.

The chosen focus is on the mobility sector as this stands as key momentum of the automotive industry, which had been able for more than a century to protect its value chain compared to other industries (Jacobides et al., 2007), giving power to the integrator (Jacobides and MacDuffie, 2013; MacDuffie, 2006). However with the digitalization of the increasing connection among the vehicles, their users and the environment, the automotive industry pillars shake. Innovation projects effort progressively shift from embedded technologies to electro-mobility and autonomous mobility systems. Every carmaker engaged in providing integrated mobility solutions, not only products, involving to team up with players coming from the data industry, local public authorities, car-sharing or taxi operators, legislator, competitors, etc.

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Simultaneously, we observe the rising of awareness of inadequacy of current organizational setting, which becomes an issue for incumbents: “*The way we’re organized now is not sufficient* » Carlos Ghosn, (Bloomberg interview at CES 2018). Innovation, creativity of startups and support from outside partners have been identified as missing elements of current organizations.

We participated to three projects, all aiming at contributing to building the ecosystem of the autonomous connected vehicle. Projects are focused on charging infrastructure for Electric Vehicle (EV), data marketplace creation for car collected data, and on AV based services in urban areas. We will describe on each case how players align or not during the project, how they operate changes on their organizations in order to achieve the alignment and the co-construction of a value proposition, and which internal conditions made such actions possible.

The first section provides a summary of the relevant literature about innovation management, ecosystems and platforms. The second section describes the cases and the methodology. In the following section, we provide a narrative of the three cases. In the last section, we discuss the findings based on the case study analysis, and link them with existing literature.

## **2. LITTERATURE REVIEW**

Is there a link between value creation and organizational structure in emerging ecosystems? We decided to explore insights from two bodies of literatures investigating the management of innovation management.

- The analysis of innovation management, with the consideration of the current challenge of new product development evolution and the integration of external contributors.
- The analysis of ecosystem dynamics, with the consideration of how several players can align and build suitable value propositions,

### **2.1. FROM TOP-DOWN NEW PRODUCT DEVELOPMENT TO COLLABORATIVE INNOVATION MANAGEMENT**

Groundwork on innovation management focused on new product development. In order to build competitive advantages in defined markets, academics and firms have been investigating on how to improve quality, cost and lead times of development projects (Clark and Fujimoto, 1991; Clark and Wheelwright, 1993; Midler, 1995).

This contributed to dramatically improve theories and methods, theorizing and implementing concurrent engineering, multi-project rationalization through platform strategies (Cusumano and Nobeoka, 1998), frontloading approaches (Thomke and Fujimoto, 2000), fuzzy-front-end and advanced engineering management (Khurana and Rosenthal, 1997; Maniak et al., 2014). The diffusion of these theories allowed increasing the pace of new product launches maintaining R&D costs under control. But in the last decade, the pace increasing of digital technology and market demand evolution challenged dominant design-driven products derived from streamlined product development processes (Abernathy and Utterback, 1978; Leonard-Barton, 1992). Open innovation kicked in, involving the commercialization of innovations from other firms and the deployment of pathways outside their current businesses to bring new concepts to market (Chesbrough, 2003), and formal engagements as technology alliances among firms to support individual innovation initiatives by technological resources' combination (Deeds and Rothaermel, 2003; Dittrich and Duysters, 2007; Hagedoorn, 2002; Poot et al., 2009) to increasingly consider external players not only as classical "suppliers" or "partners", but rather as "complementors" (Yoffie and Kwak, 2006) which have to co-invest upfront with the focal innovating firm. Each has to develop complementary assets and offers (Teece, 1996, 1986).

In this perspective, innovation 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, 2016, 2008; Lenfle and Loch, 2010).

To overcome this, scholars identified a new type of project called "exploration project", which aims not only at launching "quick win" products, but rather to explore promising value arenas, discovering and adjusting along the project its specifications, strategic impact, required partners, etc. (Lenfle, 2008). The management of such projects requires shifting from a "cost-quality-lead time" control perspective to a learning-based project management perspective.

This also implies to manage and evaluate in parallel the dual impact of the project: (1) on direct profit, since the disruptive offer can eventually be a successful “blue ocean” market success (Kim and Mauborgne, 2004) (2) on firm resource and competences, since the project can be a commercial failure but provide a critical update on firm competitive advantage (Brady & Davies, 2004; Maidique & Zirger, 1985; Maniak & Midler, 2014).

Furthermore, literature brings evidences that organizational rigidities hamper disruptive innovation, which development urges incumbents to foster ambidextrous capacities (O’Reilly & Tushman, 2004; Raisch & Birkinshaw, 2008; Tushman & O’Reilly, 1996). A separate unit is then suggested as structural solution toward alignment and adaptability capacities development (Gibson & Brikshaw, 2004; O’Reilly & Tushman, 2004).

But technology alliances requested for open innovation development can lead to divergent performances for a single firm, as positive value creation in product innovation performance is associated with simultaneous negative effect as costs associated to technology scouting increase (Faems, D et al., 2010). Furthermore, although ambidexterity has been proven to be linked to increased firm innovation, better financial performance, and higher survival rates especially under conditions of environmental uncertainty (Caspin-Wagner et al., 2012; Jansen et al., 2005; Uotila et al., 2009), other studies highlighted the difficulties in successfully achieving ambidexterity management over time (Danneels et al., 2013), as certain factors, such as the CEO support, are not a guarantee ambidexterity initiatives will succeed.

The above challenges might results in overall negative effects in competitive advantage structuring; if ambidexterity is unsuccessfully managed, cost increase lowers product innovation performance and exploration projects in organizations do not survive until deployment phase.

There is a strong convergence among the above evolutions at organizational level, as investment decisions and management related to innovation projects are strongly related to the capacity of involving an increasing number of complementors to coordinate and to incent, as partners must contribute to the collective project in order to really build a successful and profitable common offer (Maniak & Midler, 2008; Segrestin, 2003; (Maniak, 2011)). To sum up, existing innovation management literature provided great insights about how organizations can create value with disruptive and systemic innovation. Tension between innovation exploration and deployment was solved by network ambidexterity, mainly through

alliances ((McNamara, P and Baden-Fuller, C, 1999)

, however the focus of previous researches was on individual firms and performances in accumulation and exchange of resources (Lin et al., 2007) . The investigation on impact of organization structure and processes and value creation in the context of ecosystem dynamic is still un-investigated.

## 2.2 THE ECOSYSTEM APPROACH

Another stream of research began with a macro view of players, their complementarities and the alignment dynamic.

Systemic innovation implies significant transformations of the role of certain actors along the value chain, from suppliers to service providers\_ (Afuah & Bahram, 1995). The contribution of different players and of various mechanisms of variation, selection and retention are needed for technological transition (Geels, 2002).

Systemic innovation challenge also requires that players align their output to construct offers which make sense together (Gawer, A. and Cusumano, M. A., 2002) (von Pechmann et al., 2015)). The deployment of highly systemic and disruptive innovation appears then linked to socio-cultural, economic and legal frames evolution, as already described for sustainable technologies (Kemp et al., 1998). In this context, the relevance of dynamic alignment of private and public actors for systemic and disruptive innovation management has been clearly identified (Pinkse, Bohnsack, & Kolk, 2016).

Since the proposition of the *business ecosystem* concept (Moore, 1993), the notion of ecosystem has been widely used to represent such systemic innovation challenges, where a collaborative form of value creation involves heterogeneous partners. In this case, the requisite of sense-making process goes beyond offer construction, as it is necessary toward partners' engagement into ecosystems, as stated in the case of entrepreneurial ecosystems (Autio and Levie, 2017). Focusing our ecosystem assessment on value creation and interaction among partners, two approaches to ecosystems appeared to us more relevant in the realm of emerging ecosystems. Ecosystem formation needs the interaction of multilateral partners in order to jointly create a concrete value proposition, and for this scope it is an "*alignment structure*" (Adner, 2017). On the partners' relationship side, the relations among

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partners are defined by “*nongeneric*” complementarities, not controlled, but to be coordinated without vertical integration (Jacobides, M. G. et al., 2018).

Such considerations drove us to the assessment of ecosystem encompassing the several definitions provided by literature, but concentrating on how the ecosystem as a network creates and delivers value, and how value is appropriated by the actors in it (Adner, 2012; Thomas, Autio, and Gann, 2014; Williamson and De Meyer, 2012).

Value creation and value capture empirical link within ecosystem contexts has been described (Adner & Kapoor (2010)), and elements key toward it identified (Autio, E and Thomas, L., 2014). Players who control the architecture and interfaces of the final offer are in the best position to capture most of the value created by an ecosystem, which stands as a great incentive for certain firms to become and remain platform leaders (Jacobides et al. 2016; Jacobides et al., 2007; Jacobides, M. 2006).

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Ecosystems might present linear or not linear value creations processes, as shown for existing knowledge and business ecosystems (Clarysse, B et al., 2014). Nevertheless, value creation and capturing strategies become complex and related to the role firms decide to play in the ecosystem (Jacobides et al., 2006; Jacobides & Tae, 2015) as firms are getting aware of the widening of the related ecosystem (Adner 2017) and that ecosystem participation might generate specific costs (Kapoor & Argaval 2017, Claussen, Kretschmer & Mayrhofer 2013) not easily fungible elsewhere in organizations.

Value creation and capturing in an ecosystem cannot be considered without mentioning the business model of the platform at the base of the ecosystem. It can be interpreted as a network-oriented extension of the *business model* concept that specifies the value logic for an individual firm (Adner, 2016; Osterwalder and Pigneur, 2010; Zott, Amit, and Massa, 2011), as business model is nowadays designed along with the definition of constitutive elements of the ecosystem (Jacobides, M. G. et al., 2018). As far as business model concept, the network oriented extension involves organizations at different levels, as they have to operate trade-offs between overall decision coordination and the specificity of professional adaptations to personal information (Hagi, A. and Wright, J., 2015).

Furthermore, developing value in the ecosystem context is difficult for the choice on the complex system building options, as the perspective needs to include the demand side of the platform (Massa, et al., 2017).

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The need of a maturation process from emergence to stabilization and renewal of an ecosystem has been stated (Moore, 1993), but the phase of creation of these arrangements and interdependencies is still quite underexplored, as the role of organizations structure on such phase, potentially impacting ecosystem design and value creation.

Ecosystem design appears to be kicked off by modularity, nature of complementarities among partners and fungible investments, on one side, or by unintended process by firms involved in modular technologies (Jacobides, M. G. et al., 2018). Authors clearly identified that potential ecosystem members' investment relies on strong incentive mechanisms. That's why the identification of intermediaries and complements, as well as analysis of costs and benefits for intermediaries are set as key step for ecosystem to take off (Adner, 2006).

Recent research stated that the value creation and capturing on emerging ecosystems are linked to bottleneck ecosystem role (Hannah, D., & Eisenhardt, K. M., 2016). But conclusions were related to strategies of cooperation and competition among firms, driven from case studies on entrepreneurial firms and not on incumbent of their sectors, with no insight of individual organizations' characteristics enabling such strategy pursuit.

As the ecosystem emerges, it does it on the base of a platform. The design of the platform has been identified as a collaborative process among partners, including activities such as the management of value creation, the organization of knowledge production and the management of interests of each partner (Le Masson, P. et al., 2011). How such activities interact with partners' internal organization is still to be investigated.

The ecosystem-related literature provided critical templates to consider that a collection of players can deliver and share value in a more complex way than a linear value chain. Ecosystem became a recognized structure. However, we clearly need more insights about the early months of emerging ecosystems, and about the interaction between the ecosystem generation dynamics and the role of the organizational structures of the heterogeneous actors of such generation.

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The aim of this communication is to investigate how incumbents react to emerging requirements of a nascent ecosystem, and consequently how they progressively contribute to steer their future positioning in such ecosystem.

### **3. METHODOLOGY**

#### **3.1. RESEARCH SITE**

The mobility industry has been chosen as the example of high level of disruption in use and systemic-ness in offer construction with projects relating private and public actors.

We chose to investigate three projects fitting the challenge of systemic disruptive innovation management in the emergence of ecosystems.

The first two cases are part of European Commission (EC) funding research initiatives to develop interoperable platforms for EV adoption scaling and car data value collection. The first one aims at the installation of a physical infrastructure for EV adoption scaling, while the second one aims at the ideation of the optimal marketplace allowing Original Equipment Manufacturers (OEMs) and service providers in mobility and beyond, to extract data and create services from vehicles in Europe. The third case aims at the design of the vision of future urban mobility services enabled by autonomous driving.

The three cases are complementary. They aim to the exploration and building of both, concrete and virtual infrastructure for mobility services. New uses of vehicles and new infrastructures as well as new potentiality of user experiences, sustainable energy management, urban life quality improvement and revenue from car data are at the core of the discussion for the future of mobility, the relationship between territories and vehicles, including the development of autonomous driving.

The three cases are representative of the increasing degree of systematic-ness and of disruptive-ness, because they both involved on the offer side, the setting of partnerships with public and private partners, with collaboration needed among competitors. The level of systemic-ness is also given by the need of coordination of some of the partners with their headquarters for offer generation and technical standards setting. Incumbents act together through projects involving co-investment and cooperation, as they need to jointly create the value propositions for the future mobility services.

The inductive multiple case study methodology (Eisenhardt, 1989; Yin, 1994), was chosen and the number of cases was defined in order to add validity to the results on strategies adopted by one single firm or consortium.

Here below the detailed and framed explanation on the main characteristics of the cases.

Table 1: Summary of the three cases

	EV Fast Charging infrastructure	Data Marketplace prototype	Autonomous Driving vision
<b>Duration</b>	Early 2014-Dec 2016	April 2015-April 2018	January 2017-March 2018
<b>Goal</b>	Commercialization of a service through the deployment of 200 EV fast charging stations along the highways network	Exploration validation through the creation of a prototype of marketplace for car-derived data transactions and service creation	Vision creation of urban applications of autonomous driving through the knowledge sharing and co-construction using design methods, prototyping of object and of service
<b>Partners</b>	Private+Public: Four OEMs, one utility provider, one service provider, one academic institution	Private: Three OEMs, two service providers, two privacy IT and cloud operators, three management and academic institutions	Private+Public: One OEM, one tier one supplier, one graphic design agency, one experience design agency, local authorities, public service provider, one academic institution
<b>Typology of partnership</b>	formal- consortium contract	formal- consortium contract	informal-target principle based collaboration agreement
<b>Industry perimeter</b>	Transportation first, energy management as second step. Local dimension	Transportation first, vehicle use optimization, local and European perimeter dimensions.	Transportation and logistic first, resource management as second step. Local dimension
<b>Project leader</b>	Public: one entity, Utility provider	Private: one entity, One OEM	Private: two entities, One OEM and one Tier One supplier

The author was involved closely in the projects as business model academic and design methods expert. Researcher participated to all European consortia meetings and to the weekly meetings of the Autonomous Driving (AD) project, she conducted 43 interviews, organized and or animated several seminars/workshops acting as facilitators and or moderators in creative and brainstorming sessions dedicated to innovation management and business model design, as shown in the table here below.

Table 2 Collected data

	Number of meetings	Type of data collection	People	Duration
<b>EV fast charging infrastructure Consortia steering and operational committees</b>	3 operational committees, 7 steering committees, 1 dedicated workshop	written field notes, strategic orientations and priorities, available knowledge, technology roadmap, financial concerns	EU Consortia partners (utility provider charging network manager, service provider CEO and project manager, consortium contract legal advisors, OEMs EV business units responsible and managers, academic partners)	Half a day each
<b>Data Marketplace Consortia steering and operational committees participation</b>	11 Consortia meetings, 2 workshops, 2 two-day pre-EU review meetings	written field notes, strategic orientations and priorities, available knowledge, technology roadmap, financial concerns	EU Consortia partners (OEMs responsible of data management, responsible of telemetry, service provider in mapping and weather information CEO and business development managers, cloud computing managers, privacy management consultant, academic partners for technical framing of the platform)	1,5-2 days each
<b>EU official kick-off and results presentations</b>	1 in Brussels, 2 in Luxembourg	written field notes, EU commission priorities, available performance on current and previous projects	EU Consortia partners, European commission leaders	one full day each
<b>Autonomous mobility system meetings</b>	29 meetings in Paris	written fields notes, strategic orientation, vision of futures, current available knowledge, reaction to new process	OEMs open innovation and NPD managers, Tier1 supplier innovation manager and designer, public municipality representative, external experts and potential customers	Half a day each
<b>Conferences-Symposia-Workshops</b>	1 in Seoul (South Korea), 1 in HongKong (China), 1 in Berlin (Germany), 1 in Venice (Italy), 6 in Paris, 1 in Vancouver (Canada) 1 in London	written notes on smart cities strategies, big data management, mobility intermodalities, automotive sector trends, strategic management, design theories	private firms, public institutions, academic institutions	couple of days each
<b>Interviews</b>	43	written interview notes, interviews recording, managerial considerations on strategic positioning and value chain perception	public and private stakeholders such as local municipalities, smart cities architects and actors, insurances, highway operators, Automotive and digital platform consultant interoperability providers, fuel distributors, urbanists, International energy Agency, mobility service providers, digital platform managers and academic researchers.	from 1 to 2 hours each

Relying on these data, we followed a qualitative process through floating attention and we created (and recreating dynamically) a narrative of how things (Dumez, 2006)– organizations, people, opinions, objects, etc. – evolve overtime and why they evolve in this way (Van de Ven, 1992). We also created tables and charts (Miles, M. B. and Huberman, A. M., 1994), in order to detect paradigms and compare the cases on such base.

The tables resulting from such analysis and presented in this communication are aimed at exploring the connections between organizational features and actions requested toward exploration target and value proposition definition on one side, and on giving a preliminary appreciation of the roles partners are taking in emerging ecosystems.

Data analysis and interviews ended when the results of additional data analysis were not adding any further elements.

The following section provides the narrative of the three projects, putting emphasis on the evolution of (1) the engagement of partners and the way their awareness of the value of the project evolved (2) the influence of partners' organization in value proposition definition in this early phase of ecosystem definition.

## 4. CASES DESCRIPTION

### 4.1. CASE 1 –EV FAST CHARGING INFRASTRUCTURE

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#### 4.1.1. Initial setting

The imperative of environment protection pushed European Commission to fund charging infrastructure projects (TEN-T) in different countries, in order to move the EV adoption forward, toward a trajectory of widespread economic and social benefit. OEMs, Utility and Service providers interpreted it as an opportunity to join forces with limited internal resource expenditure toward a shared effort for EV use adoption progress, having each actor contributing with its know-how and capabilities, aiming at direct value generation through sales increase. We observed the French consortium, composed by four automotive manufacturers, one utility provider, one service provider and one academic institution. The goal set was to implement and commercialize a network of 200 EV fast charging stations covering the highways in France and commercial areas in the vicinity of highway exits.

The consortium activity started in early 2014 and ended in December 2016. The project had to develop the infrastructure with focus on interoperability with neighboring initiatives and on the demonstration of profitability of the charging service. Committees' members, tasks, objectives, deliverables and meeting schedules were defined upfront, as the interactions and sequences of partners' collaborations and actions through a formal flow map, the "Schema Directeur". With such tools, partners could embark the project with a well-thought setting to manage uncertainty linked to the infrastructure deployment and adoption.

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

Since the project kick-off, 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, but which had not so far been achieved by individual initiatives of participating actors.

For some partners it was the ultimate goal of the project, "*All the initiatives on the EV are aimed to reduce the ownership costs through in order to increase sales.*"(EV business development manager, OEM), while for others it was a bridge to wider strategic considerations ("*Our engagement in such project is also for the potential connection with*

*other sectors (building construction) for making money from the energy storage.”* E-Mobility General Manager, OEM). Discussions among partners were mainly on service providers’ responsibilities for contract signature finalization, interoperability interpretations, service price, future ownership of the network, and technical progression of station definition. Differences arose between contract negotiation and partners’ internal processes, which impact project development. 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, but all partners confirmed priority to successful project achievement as condition to receive the full funding. A certain degree of incoherence between individual targets and EC project goal was also revealed: *“Our first worry is the network funding for our customers, and not to have a network open to everyone”*. E-mobility Project Manager, OEM), and *“Value construction is always done in tandem with a partner for a specific project. There is no global vision. The value of the project is in the contract delivering the energy. The user comfort during use is the target, but there is no economic value attached to it.”* (EV business development manager, OEM)

Diffused requisite of communication performance on the subject, and approaching mid-term official report to EC commissioner pushed partners to seek collaborative actions on public presences and announcements.

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

Since contract agreement signature, few operational activities were kicked off as shared consortium decisions, while a certain progress was performed on service infrastructure technical definition. Several un-planned factors emerged, such as length on negotiation with installation partners, local site managers and RMP requirement per station. Negotiations with un-forecasted counterparts in an uncertain legal frame had to be kicked off: *“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.



They resulted in, on one side, additional partners' resource deployment with delayed installation work kick-off, and on the other side, in modification of some stations locations. 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, revealing an iterative process of learning. First level of interoperability of the station with different OEMs and telecom operators through digital platform was reached at mid-term. Simultaneously, the concern on early adopters' group size and customer acceptance were at stake for all partners. OEMs knowledge from previous private initiatives and from parallel European TEN-T projects was shared with other consortium members.

Besides the learning process, 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).

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. Nevertheless, internal conflicts appeared as obstacle to such sharing process: *"Some people do not understand why we are working with competitors, and they resist. Engineers resist to cooperation because the legal binding among partners is not clear."* (E-Mobility General Manager, OEM). At this stage, the project was visible by the top management and actors took a higher level of internal organization's involvement in order to recover EC goal achievement or its deviation.

Communication emerged to be a goal for the project, to be compliant with EU expectation and formal requests, but also for each partners, at headquarters' level; the project contributes to a wider scope of communication strategy toward electrification of OEM product range and CSR concerns.

Nevertheless, a certain awareness of the value of the project for extended knowledge achievement and missing bridge toward customers was undoubtedly stated: *"Three years ago, we were in the back of the room, taking notes! There is now a good understanding of the topic at the European level; we must make sure we are making the same job at the customers' level."* (E-Mobility General Manager, OEM).

Through a process of the ecosystem mapping using interviews and ad hoc created innovation management tools, partners became aware that the viability of the infrastructure business model relies on the ability to collaboratively involve in the dynamic such partners beyond the consortium.

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

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. Partners started to share consideration of other revenue stream collectable from the infrastructure. The value network assessment clarified the typologies of values generated by the charging infrastructure and helped the comprehension of the granularity of value proposition of such infrastructure.

The project formally ended in December 2015 with 120 stations installed on a total of 200. Nevertheless, Consortium partners committed to the completion of the project to reach the original target of the commercialization of 200 stations, even with no further funding from EU, as they became aware of the strategic value of a denser charging network.

Partners' initial vision of the project as individual brand sales booster evolved toward a more collaborative vision on how to reach the desired global adoption effect, with arising awareness on the current impact of the project in their strategic roadmap and as co-innovation partnership. Partners elicited the involvement of management at higher level *"Our European headquarters wants to be involved in the call with the Oil company and Utility provider for these two stations. We want to participate to the discussion in order to separate price from general agreement discussion."*(E Mobility General Manager, OEM), and they changed internal and external approach to such project as it became *"a marketing site to work on together"* (Negotiation Manager, 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 three weeks to one week*

*delay. We have just been able to identify this knowledge improvement now, during the deployment process.”*

Based on the relationship and alignment achieved in the project, Utility provider, Service provider, and OEMs with declared internal focus on EV adoption as strategic priority, they unite intent and resources as a new team and embarked in a second European project for a neighboring EV fast charging infrastructure deployment.

## **4.2. CASE 2 –, EUROPEAN THE CAR DATA MARKETPLACE**

### **4.2.1. Initial setting**

Mobility actors have in their strategic roadmap the consideration of how the value generated by vehicles' data can be collected and distributed. Data marketplaces can be an option, but data aggregation and normalization among different suppliers are needed in order to ignite successful multisided dynamics and scalability performance. Furthermore, new entrants in the automotive sectors, such as the GAFAs, destabilize the confidence OEMs have in traditional strategies toward future sustainability, and they ignited actions on EC side as they were identified as a threats to EU data value protection and related value collection by European actors. EC launched the data Marketplace Research project in the aim of build a European marketplace prototype for business creation from car data packages. The consortium was composed by three automotive manufacturers, 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 marketplace for the exploitation of data collected from cars, for new services creation in automotive-related field and in cross-sectorial applications. The project started in April 2015 and ended in April 2018, and it had to demonstrate that a technically viable and profitable data marketplace prototype can be developed. It faces high level of complexity for information sharing among competitors, tech (data package standards, sensors quality etc.), public social, environmental and economic utility of the project output at European level, privacy and cybersecurity boundaries to be determined, with an heterogeneous and large panel of stakeholders involved, with unknown upfront offer.

### **4.2.2 Marketplace technical features: not an easy add-by-add process, but a shared decision-making process: April 2015- October 2015**

Since the kick-off, the project was associated by the European Commission to ambitious goals in exploring innovation spaces, building the ecosystem considering the strong connections with the schema of public private partnership (PPP) for ecosystem building, ensuring visibility of the action beyond usual circles and setting examples for other industrial sectors.

For involved partners, the declared interest in the project was initially linked to direct sales increase of current products for OEMs and services for service providers. The will and ambition of strategic action on connected vehicle is declared at the high level of the hierarchy, but *“the operational results are not coherent with it»* (R&D Manager, OEM), and incumbents openly exposed some reluctance in the possibility of getting some results on the business case dilemma of such marketplace (*“We tried everything already and no business model worked. There is no business model for such platform”* Telemetry services manager, OEM).

Incoherencies emerged between actors in the offer and the demand side of the marketplace platform, as the definition of the content of both was shallowly given for granted. On the offer side, data availability, data package format and data categories harmonization, based on OEMs current data collection different methods and data use, appeared to be a challenge for the consortium and for each incumbent. The need of convergence on a standard on data collection and categorization was then negotiated with internal hierarchy (*“Our technology of data collecting and storage are quite the same among brands, but the data are stored in different places. I have some data only for research purposes, which can be shared under certain conditions. I need to ask authorization to access other data, and some data are just unreachable for me because of internal rules.”* R&D Manager OEM).

On the demand side, content and level of definition differ among partners. Service providers started expressing fuzzy needs: *“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”* (Business Development Manager, Service provider) .

Cyber-security concept and standardization were identified as sensitive factors for the project impact. 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).

#### **4.2.3 Defining-by-doing acceptance: November 2015-August 2016**

At the end of the first year of the project, the relevance of data aggregation emerged, as the role of aggregator as value capturer in the network. The scope of the bid slowly appeared to be too narrow compared to the ecosystem to be crafted from the data marketplace. Some partners changed their perspective on the project from a strategy and decision making point of view, as *“Our future role is becoming to be the aggregator. We are preparing to become the biggest mobility aggregator in the global scale.”*(Business Development Manager, Service Provider), and *“Decision on this project cannot be taken in a classical way. Business Model of Google twenty years ago was clearly a no-go. To make people thinking differently is the core of such projects, as it is for ours.”* (General Manager, Service Provider).

On data package format and use cases, partners embraced the iterative process of definition between offer and demand, as *“the world cannot be defined at the beginning of the project”* (OEM). Some OEMs started to provide raw data to service providers to start exploring use of them.

The business plan exercise was slowed by the pricing building mechanisms, as partners were divided between a newly-discovered exploratory performance, and a “quick and dirty” commercial viability of the marketplace (*“our goal of the packages resulting from the brainstorming is to feed Californian developers”* Telemetry Service Manager, OEM).

A wide exploration process of the ecosystem revealed that the panel of potential users and complementors was wider than the current partners’ focus. Partners started to realize that the strategic positioning of the marketplace relies on the ability to involve in the dynamic such users and complementors beyond the consortium, but still didn’t align on reframing of target priority and value definition.

All the above considerations drove the project to a delay in deliverables completion compared to time-plan.

#### **4.2.4 Service provider partner replacement as use case boosting and first data availability: September 2016- September 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), and the model pillar of the data packaging, the CVIM, is becoming more representative of the market needs.

As common data format, it is set to provide harmonization between signal descriptions, and the obligation of EC project delivery pushed partners to find common intent on such harmonization. The need of data to be tested by service providers pushed OEMs partners to ignite internal procedure for the collection. Tests were designed, and links with existing test were searched. But, this process showed that every OEM has specific internal procedure for collecting data, and conflicts emerged. *“We have problems in convincing the test track people to accept the plan of testing. The problems test people shown were linked to technical aspect of data transfer, what we are asking is not approved so far”*(Telemetry Service Manager OEM), and *“ We cannot do big data analysis. Brand X collects a lot of data and they have no idea on what to do with that, but I have no access to such data..”* (R&D Manager, OEM). While debates on how to collect more data proceeded, the first assessment on currently available signals resulted in 21% of signals are shared among OEMs, making much lower than forecasted the available quantity of data to be aggregated and sold through the marketplace. Consideration on technical implications and business impact proceeded.

A partner decided to abandon the project, as the exploration path for data collection and usability test would have involved internal process revision *“The purchase of the weather station is a problem....The problem is on our internal financial procedure for expenditure approval, on balance sheets and P&L, as the station was not financed by EU.”* (Business Development Manager, Service Provider). As a consequence of such decision, and in order to respect the initially signed Bid and do not jeopardize the ongoing funding of the project, Consortium found a new Service Provider, which expressed a more strategic vision on project output. As data packages were progressively defined through the CVIM tool, and digital infrastructure designed and tested, partners revealed impacts of the project on their organization. *“Project portfolio crosspollination from Automotive data to IoT and Smart Cities is taking such a strategic relevance within the company that our top management is*

*designing a huge restructuration of the company”* (Business Development Director, Service Provider). Furthermore, the ongoing data collecting test for the project allowed several internal departments, such as IT services, R&D and testing to work together for some OEMs, and in some case creating ad hoc working groups, while it didn’t generate such dynamics for others (*“There is no constructive interaction with other departments or brands on data so far, we are asked data, but with no information on what they are gonna do with them. As we are now within the Platform Department, our vision on strategic projects is limited”*. R&D Manager OEM).

Mid-term review meeting with the EC highlighted the positive results in term of technical achievement, but the difficulties in information sharing on business model sensitive topics. The main problem in setting realistic solution for the Chicken&Egg problem was the lack of real and quality meaning-full data for Service Providers to assess value of it. In May 2017 it appeared clear that some of the activities initially included in the project, and linked to the business model viability assessment, could not be performed for technical (lack of real data), commercial (lack of appropriate budget) and project framing (project timeline and duration not modifiable) reasons. Further exploration of potential users needs outside the consortium was performed, as well as management tool proposal to be used with existing information.

In September 2017, first real data packages are finally available from OEMs to be used as a sand-box for service providers to check the correspondence with their needs in term of quantity, quality and characterization.

#### **4.2.5 Service Providers interplay with the platform: the achievement of an horizon of concrete interest and reciprocal trust- October 2017- April 2018**

The approaching of the project end boosted the discussion on final presentation agreement, although the divergences of approach to the project still exist, and incumbent still expressed the internal challenge of considering such project as a data-research project and not an industrial one. The awareness of the real problems faced by partners helped partners to explain the mismatching between certain deliverables request and the results achieved, as for instance: *“The time spent to find technical standards gave elements needed for the business*

*model, and we learnt that business model could not be done upfront*” (Project manager, Project management consultancy). Simultaneously, certain elements, such as the sequence on data loading infrastructure and the acceptable latency, appeared to be keys in defining the value capturing of a potential industrialization phase for the Marketplace. Some partners already assessed the potentiality of cross fertilization with other internal activities, as stated by the Marketplace manager: *“We have plans to use the features and app of the marketplace, but not the data. We want to play a role in the data platform behind smart city management”*, and Service Provider: *“Parts of the project will go into other parts of your current activities at home”*. At project end, different results are declared by partners to EC. Handling data through the project generated knowledge fueling internal dialogue and collaboration as *“we have learnt a lot. There are three level of harmonization to be developed, because we have three OEMs, but no further analysis on cost optimization has been possible.”* (R&D Manager, OEM), and *“We know now we need to have a strategy to reduce raw data; we cannot just say that there are too much raw data.”* (Telemetry Service Manager, OEM).

Confidentiality and lack of focus on data business strategy defined the boundaries of partners’ collaboration and therefore the level of performance achieved. Declarations such as *“We are not a data company; we are good in metal, engines, and sometimes software.”* (Telemetry Service Director, OEM) clarified the official position of certain incumbents, but other voices such as *“this project for us is very important because we understood on the data capture system issue, which is a way to reduce the collection.....We are trying to figure out the best solution in term of feasibility and cost.”*(SW Specialist, OEM) confirmed that indirect and intangible value have been created.

### **4.3 CASE 3 –THE VISION OF AUTONOMOUS DRIVING FOR READY-TO-TEST URBAN USE CASES**

#### **4.3.1 Initial setting**

The raising expectation for autonomous driving triggered by Google, Tesla and Uber, and the discussion on the evolution of the dominant design for the automotive sector, all find convergences in the hottest debate of the future of urban mobility. As all its competitors, one major OEM player defined at headquarters level the autonomous driving deployment as



strategic asset 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 various projects in different departments, and consequently performance responsibility spread across the organization, with no clear intersection points or coordinated resources use toward a common goal. Besides, public authorities seek life quality and wellbeing as relevant factors in the global cities competitions. Current tools, procedures, partners, and parameters available at Paris municipality hardly answer the challenge of increasing such intangible assets through the development of new mobility services driven by digital technology and speed. In such a scenario, Paris mobility manager is expressing urgent need of initiatives to be co-developed with them.

In order to take action for exploring solutions, the OEM decided to empower one of its open lab to federate actors for an open innovation project.

The set of players was 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, and collaborative service platform managers). These actors united effort in order to explore and converge towards a shared vision of autonomous mobility leading to future services. There was no formal frame or funding provided by one of the actors or by external entities.

The project started in January 2017 and researcher's observation ended on January 2018.

#### **4.3.2 The relevance of the perspective and the team composition: January 2017-February 2017**

From kick off meeting, players did have an initial clear idea of their expectations, mostly in term of open innovation development. The working methodology was defined as a mix of creative methodologies, applying an overall frame of design thinking with an exploration path based on C-K theory. The brainstorming and creative process allowed an initial shift from the consideration of the dominant design of a transportation object, to a wider consideration of the action within the urban environment. The goal of the project was extended to learn how to work collaboratively, and the choice of the open lab choice confirmed as "*set to maximize*

*opportunities to learn. The organization of work frame is done in the aim of learning opportunity fostering, business and culture increasing.*" (OEM Open Innovation Manager). Exploration preliminary results were discussed with a representative of the public local institution. It was the occasion to confirm shared interest in the exploration. The creative process was pursued reconsidering the target perimeter and the width of the team to be involved. The relevance of the direct dialogue among players was recognized and the regular and purposeful involvement of players defined as key success factor. 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.

#### **4.3.3 Discovering the augmented target: March- April 2017**

Additional sessions of open discussion with stakeholders were added and the internal debate resulted in widening the scope of the target of the project and in an extension of project duration. Declarations such as "*Mobility is a social and cultural issue before being a technical one. Companies must positioning themselves as providing tools for new dialogue*" (Urbanist), contributed to the discussion depth and width.

Team members realized that the project could be a way to perform shared knowledge and participants' intention convergence, to be used beyond the scope of the project itself, but that would keep requiring collaborative approach in knowledge sharing and process steps iteration and pertinence verification.

As part of the creative process, the state-of-the-art of project progress was challenged by an information graphic designer. Partners realized that they could 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.

As stakeholders suggested path toward project relevance (“*these projects make sense and got adopted when linked to social practices*” Urbanist), OEM confirmed the accuracy of the project frame, as “*what is great in the process of this project is that we do not have to discuss with the internal hierarchy and functioning practices on how we proceed and on decisions about who we put in the team*” Open Innovation Manager, OEM).

The key value to the incumbent appeared progressively as the knowledge structuring on urban mobility, as step toward POC formulation within the company. Nevertheless, in March 2017 the need of additional knowledge and network establishment involved a deadline postponing of another month.

#### **4.3.4 The development of the two deliverables for a vision: May-September 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. What was considered value generator by the team has an ambiguous meaning for the municipality, potentially leading to public manipulation. Besides, the lack of traditional information on market viability still impacted initiatives at incumbent level, as “*the market request in term of volumes are not there, this is why no OEM is moving forward*” (Mobility Manager, OEM).

In order to solve this paradox, the team needed to reformulate mobility problems using the language of local municipality, and it adopted a visual tool strategy to convey the vision message. An infographics and a simulation of a real situation in an urban area, with potential evolution to an augmented model, were the tools added to the project as dialogue enhancers within the team and within each partner’s organization. The working sessions at the open lab became then an innovation space, as “*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. Current internal frustration is due to the fact that we do a little bit of everything, but without coherence. We are un-initiated to the mobility subject.*” (Design Manager, Software Company).

Since early September, partners visualized the deliverable as a multi-form object, with a layer-based structure driven by technical standards and adaptation to use cases. Such vision of

the deliverable drove partners to re-formulate the configuration into a multi-layer value proposition, the achievement of which was divided into sub-team tasks.

#### **4.3.5 Project sense-making through internal and external communities: October- December 2017**

At this stage, the project team decided to focus on local impact of the project for a later definition of a wider impact, and decided to include even more participants from the open lab community. A workshop on smart city was organized and more people got involved in the reflections. The deliverable of the project evolved toward the inclusion of a process as a deliverable itself, as a way to show a new path to object creation, with business model definition along with technical constraint liberation, once use cases have been considered. The team matured the awareness that use cases will allow the liberation of technical constraint. The access to virtual simulation seemed the step for injecting confirmation and evolution for the ecosystem structuring and business model design, which must evolve in parallel.

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.”* (Mobility Manager, 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.

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, open to external contributors.

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. Objects developed by different departments appeared to be strategically linked, as *“X-object*

*is a complementary project compared to Y-object. Business model problem exists, but it is not isolated. Some work on the W-object business model is reusable for the X and Y, but in order to build an OEM internal community and move all forward, we need to find soft topics of complementarity” (Innovation manager, OEM).*

The knowledge asset created through the project got internal and external momentum, but transition to development and deployment urged the concrete connection to other incumbents’ departments, such engineering and marketing. The working packages are set to be all delivered by the end of the current year while project merging is sought internally by industrial team members.

## 5. DISCUSSION OF THE CASES

The observed projects were part of the actions incumbents took in the last years in order to position themselves in the future connected autonomous mobility ecosystem, based on energy and data infrastructures. The analysis of the cases highlights a common evolution path toward value proposition generation, and different reactions by incumbents to the emerging requirements of nascent ecosystems. In this section, such elements are described.

### 5.1 AT THE BEGINNING

While facing pressure from mega-trends such as “Big data”, “Autonomous driving”, “Energy revolution”, “smart cities”, the blurring of sectors boundaries and the increase and diversification of competitors, participants to the projects had their own roadmaps concerning the products and services to be developed, but struggle to establish a dominant position in the mobility value network.

Each player initially realized he could not go alone given the ambition and the systemic aspect of the challenges. The services provided by the projects requested upfront investment and the participation of several partners in order to combine the value proposition; seamless charging for EV, usable data packages to be transformed into business by service providers and reliable urban services generated by autonomous vehicles, all need a certain level of common standards, and the joint development of customer acceptance toward platform scalable adoption for a still weak or not-existing market. Previous individual experiences in systemic innovation project resulted in diffused deceiving performances across internal organizations. As a consequence, limited resources were available for each partners for such systemic ambitions; resource scarcity jeopardized the creation of innovation space.

To counterbalance such internal circumstances, different collaborative opportunities emerged. In two cases, the “European Call for Project” appeared as a formally framed and reassuring opportunity for all players to explore solutions for such critical issues, while being connected with a relevant set of partners and through a financed project. In the third case, the presence of an ambidextrous unit of an incumbent allowed the kick off of an exploratory participatory project with certain flexibility in partners’ selection and project management.

In the case of H2020 projects, partners embarked the projects thinking that deliverables completion would have implied a smooth and fairly quick merging of technical standards

among partners, a top-down acceptance of the project output for external partners and users, and that the value proposition of the ecosystem would have been created by the consortium partners using current processes and with no interaction with further actors in the value network.

In the EV Charging infrastructure case, the project was intended to deliver a convergence towards a European interoperability of the network to boost sales of EV, the appeal of which directly depends from a charging and payment standard.

In Data Marketplace case, incumbents need a convergence among data collection and processing (enriching, packaging), in order to achieve data package standardization and therefore usability. OEMs attempts to build a business model around car data didn't provide any sustainable result, as the scope of the business model was limited compared to the ROI target on the considerable investments in sensors and cameras for the "connected car".

In the case of AD vision project, participants considered that technical standards from vehicle and urban infrastructure would have merged as a consequence of the exploration result in term of service needs and structuration.

## **5.2 ALONG THE PATH**

All participants committed to initial time-plan and deliverables definitions. In the case of the H2020 projects, the formal contract and the link between deliverables completion and funding stood as a guarantee for the EU and for the internal stakeholder (the hierarchy) that the project would have been completed with minimal risk. In the AD vision project, the relationship between the unit and the headquarters allowed the progressive integration of external partners, with consistent modification of deliverable definition and project mission.

However, each project had to report important deviations in time, quality and profitability.

Partners' initial definition of milestones, mostly compliant with existing processes and previous experience in exploration projects, resulted not adapted to value proposition structuration. Nevertheless, due to partners' internal established processes of financial evaluation of each division, to strategic roadmap including observed projects, the goal must be achieved.

As the technological standards and the value proposition definition took place all along the project and not based on the upfront expectations of participants, partners had to consider deploying several actions along the way in order to achieve exploration targets:

- Deployment of additional resources
- Input of external additional knowledge, often not related to incumbent core business
- Consideration of partners' choice as key to structure the value proposition resulting from the emerging ecosystem.
- Internal acceptance of new technical standard defined in such projects.
- Collection and merging of internal knowledge from different exploration projects
- Awareness and internal acceptance of indirect and/or intangible value created by the ongoing exploration project by considering a larger network of ecosystem participants
- Collective sense-making of the project among project participants and for each project participants, diffusion of such sense within their organization

In order to perform such activities, participants had to deal with some features of their organizations. Through observation and data analysis, I identified six categories of features: information flow, decision making process, innovation project evaluation practices, knowledge internal transfer and exploitation processes, and hierarchical distance from other departments in charge of R&D and departments in charge of exploitation.

As example of observed connection, in the Data Marketplace project, as a new definition of data quality was achieved as key step for the Marketplace value proposition definition, OEMs needed to deal with internal decision making processes. On the OEM side, decision making processes for device investment authorization had been challenged as the validation of the relevance of certain data collection and related investment authorization, were blocked by current decision making processes.

Based on my observations and on the data collected during the projects, the connections between needed actions and organizational features are shown in the table here below:

Fig 1: Partners' actions and organizational features connections

	Information	Decision	Innovation	Knowledge	Distance from	Distance from
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	flow	making process	evaluation	transfer/exploit internal process	R&D dept	Exploitation
Resources deployment	X	X	X			
New Knowledge acquisition	X			X	X	
Partners choice		X	X			
Tech standards acceptance	X	X			X	
Internal knowledge merging				X	X	
Intangible value awareness	X	X	X			
Project sense- making	X		X		X	X

From the above table, we can perform a preliminary identification of organizational features impacting the achievement of exploration target and value proposition definition during the emergency phase of an ecosystem. Information flow, decision making processes, Innovation evaluation practices and distance from R&D department appear to be strongly linked to the effective actions deployment.

During the projects development, partners realized that the initially defined value chain was only a partial vision of the value network they should consider while assessing the project as they were contributing the generation of a proto-ecosystem based on the connected car (Marcocchia, G. Maniak, R. 2018). While assessing strategic decision regarding engagement in such project, some partners realized they had to assess and manage such projects in conjunction with other exploration projects, complementary to them and useful to a better positioning of the company in the ecosystem and value network to be. I designed value networks and discussed them with partners, engendering different reactions among partners.

In some cases, partners progressively modified the organizational features impacting the effective development of the needed actions, and they achieved a more structured positioning in term of role in the ecosystem.

The delay in project completion with a more diffused awareness of projects strategic value resulted in a stronger engagement toward completion for most of the partners.

In the three cases, a so-called “business model” was one of the expected results in term of self-standing profitability by the end of the project development. However, no project could show enough users adoption rate in the business plan time range, and the cost structure was still heavy compared to the users’ volume.

Such deviations are explained by a common trajectory observed on the three projects.

Partners reciprocal knowledge requires to be deepened in order to build the trust needed to define what to be done together and act toward it. Beyond personal relationship among participants, or business connections among partners, the in-depth alignment of partners emerged as a factor to move projects forward. And each partners needed to involve its internal organization in order to keep contributing effectively to the projects. All projects had great visibility within partners’ organizations. The commitment was slowly achieved in H2020 project, which were driven by formal settings such contracts, several deliverables and reporting, defined participants and roles. It was quickly reached on the third project, but the effectiveness of it in action was delayed by the lack of defined object. The level of un-definition of the third project output was greater than the first two.

Partners discover progressively not only the real strategic agendas of other partners, but the connection of the current project with other exploration projects among their organizations.

### **5.3 AT THE END OF THE OBSERVATION**

From initial targets, partners experienced an evolvment phase which was internal to the project, and in some case internal to their organization.

Based on the project need toward completions, some partners were able to influence the current structure of their organization, and were able to perform several evolutions, as in the case of the Marketplace manager for the Data Marketplace project. Processes were modified




when existing ones were jeopardizing the completion of the tasks requested by the project, and in some cases, new processes were created in order to solve un-forecasted difficulties in dealing with external contributors.




In some cases, the development of the project generated the need of a new division in order to dedicate time and resources to the development of a service-based activity far from the current core business, but ignited by the current project and connected to the potential of the service platform. The link between automotive and smart city business opportunities matured during the projects in more concrete terms that just expectations of traffic flow optimization and pollution reduction. Partners clearly started to see their future positioning in a larger value network than transportation.

Furthermore, projects generated a high level of coordination among some participants and their internal organization, which was needed in order to manage the projects as part of a strategic roadmap in conjunction with other projects, budgets, and knowledge pockets.

In the table here below I represent the identification of evolutions per partners, with the indication of the preliminary roles in the emerging ecosystem, as observed in the first stage of ecosystem formation.

Fig 2 Adaptation actions

	KINGPIN	KEystone	BOTTLENECK	ANCHOR
	UTILITY PROVIDER- OEMS	SERVICE PROVIDER	UTILITY PROVIDER	LOCATION MANAGER
	OEMS	MARKETPLACE	CLOUD OPERATOR	SERVICE PROVIDERS (Broker/User)
	OEMS CLOUD OPERATOR	PUBLIC AUTHORITIES	AD TECH SUPPLIER CLOUD OPERATOR	MOBILITY PLATFORM

-  PROCESSES CREATION OR MODIFICATION
-  CREATION OF NEW DIVISION
-  INTERNAL COORDINATION INTENSIFICATION

When considering such evolutions from the actor performing them, I observed that the modifications in term of organizational features were performed by the partners with the following characteristics:

- Performance evaluation: innovation projects were evaluated on the basis of value generated in conjunction with other projects and not as stand alone, following a strategic vision of future positioning in the emerging ecosystem. Projects were considered as part of a strategic roadmap, to which departments contribute with certain flexibility in performance assessment.
- R&D projects: organizations were involved in similar exploration projects
- CEO was directly engaged in the positioning in the emerging ecosystem.
- The hierarchical position of project participants compared to headquarters and decision makers in term of strategy was quite close.
- The process of decision making, although framed by formal rules, was shorter
- The knowledge flow among different departments was encouraged by top management

- Current available assets were in line with the new capabilities requested for value capturing.

On the opposite side, partners who didn't perform any evolution and didn't seek the proto-ecosystem project as an opportunity to consolidate a future strategic position in an ecosystem, they all shared the following characteristics:

- Project participants were far from the hierarchical level on which strategic decisions and budget allocations are discussed. Information from the project on the relevance of certain technical and user-related features never reached the decision makers.
- Performance evaluation for innovation projects is done on the bases of the ROI of a single project, with no openness to change the rule. Departments' performance was strictly framed and didn't allow having a transversal assessment of projects with impact on other departments.
- Exploration activities were strictly managed by one single department and the results were seldom and very difficultly shared with other departments.
- The key role of data exploitation for value creation was not diffusely and homogeneously understood and accepted within the organization.

If we assess the organizational changes compared to the strategies adopted related to ecosystem positioning in the timeframe of observation, we might note that none opted for a "system strategy" (Hannah, D., & Eisenhardt, K. M., 2016), but organizations operated changed in order to:

- Be consistent with the pre-existing capabilities, as for the OEMs, and in this case we can define they adopted a component strategy
- Be involved in the preliminary identified bottleneck, removing obstacle to growth of the ecosystem in link with a wider strategic frame at headquarter level, as for marketplace manager and service provider in the data-related project, both active in increasing capabilities in cloud operations and data aggregation and enrichment.

In the case of the service provider in the data-related project, elements have been provided to make the hypothesis of their initial strategy as a first step toward a later system strategy, as *"The users' willingness to pay depends on how the system is efficient... at the beginning we*

*might decide to subsidize the efficiency.*” (Business Development Manager, Service Provider). Nevertheless, available literature confirms strategic decision making in one industry (solar panel), with bottleneck cycle of 3-years and observations performed after the ecosystem was established. The observed cases are at the preliminary stage of such ecosystem establishment process, with more complex interaction among partners because of the degree of systemicness and disruptive-ness of the innovation engaged by the deployment of autonomous connected mobility services.

From the above, we can assume that organizations might benefit from proto-ecosystem projects as they can be a tool to explore and influence the identification of bottleneck in a future ecosystem. Through this process, I could suggest that organizational evolutions might take place in order to progressively build future positioning in the emerging ecosystem, but such positioning performance, impacting value creation, is influenced by actors’ initial organizational characteristics and its ability to modify them.

Furthermore, I can propose that that the empowerment of each actors in such dynamic depends on its capacity of being involved in a portfolio of “proto-ecosystem projects” and in recognizing and managing organizational characteristics which might jeopardizing that path.

## **6 CONCLUSION & FURTHER RESEARCH**

### **6.1 SUMMARY**

The communication aimed to provide elements about the relationship between value creation and individual characteristics of incumbent firms participating and positioning in nascent ecosystems.

Innovation management and ecosystem literatures were reviewed and a gap emerged on the assessment of the impact of organization structure and processes and value creation in the context of emerging ecosystems, and on the interaction between the ecosystem generation dynamics and the role of the organizational structures of the heterogeneous actors of such generation. Three projects were tracked, paying attention on how heterogeneous players, initially motivated by the same future business concept (in our case electro-mobility, data marketplace and autonomous-driving-generated services) progressively build a common business and interdependencies and how this collective move forward nurtures / articulates /

cohabits with the in-house dynamics of each partner. The three projects followed a common path pointing towards convergent messages. The influence of organizations features on how partners perform during the phase of emergence of an ecosystem has been highlighted, as well as the evolution of positioning of the actors in the ecosystem related to internal organizational evolution.

The research highlights that organizational evolutions might take place, but that value creation and ecosystem positioning are influenced by actors' initial organizational characteristics and its ability to modify them, while being involved in a portfolio of similar innovation projects.

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## 6.2 IMPLICATIONS

### 6.2.1 Theoretical implications

Contribution to the ecosystem literature had been provided by adding elements on internal organization structure related to strategy pursue on emerging ecosystem. We show that in the case of future mobilities based on connected and autonomous vehicles, organizations structure influences partners' accomplishment during the phase of emergence of an ecosystem. In their structure and processes, organizations suffer of inadequacy as far as the width of the scope needed for systemic innovation projects on which the value creation cannot be performed by a single actor. Organizations participate with a different degree of performance to ecosystem generation when considered to ecosystem structuring and future value capturing. The positive effect of participating to a nascent ecosystem is highlighted, as organizations' core business seizes partnership opportunities beyond the project through which they contribute to ecosystem emergence.

The process of ecosystem structuration actively contributes to organizations' structure and processes evolution, in a dynamics influenced by actors' initial organizational characteristics and its ability to modify them, while being involved in a portfolio of proto-ecosystem projects.

As far as further research, the fact that the ecosystem is under creation doesn't allow research to assess on the confirmation of preliminary positioning once the ecosystem will be established. Close observations should be continued, and also complemented with similar

observation in other sectors in order to assess results on strategy definition with a stronger empirical basis.

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### 6.2.2 Managerial implications

Management contributions are provided to incumbents as far as insights on which organizational features, such as information flow, decision making processes, innovation evaluation practices, distance from R&D center, should be monitored and managed toward exploration target achievement and value proposition definition. This process could contribute to value creation and captation in emerging ecosystems. The decision of funding an innovation project should then be considered with such elements and within a scenario of portfolio of a specific typology of innovation projects, in order to steer the organization's positioning toward future value capturing. Preliminary insights on connections between organization features modification and actors positioning on emerging ecosystem are provided.

Follow up on observation of ecosystem structuring and actors positioning evolution could be performed as complement of second phase of ecosystem emergence and toward systemic innovation deployment phase.

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