1. La gestion des projets de “proto-ecosystèmes”- deux cas d’étude dans l‘industrie de la mobilité intelligente

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Résumé:

Mobilité intelligente, villes intelligentes, maisons intelligentes, conduite autonome etc. Les disruptions de l’énergie et du digital promettent des expériences client homogènes, qui intègrent plusieurs produits et services. Les entreprises privées et les autorités publiques investissent pour faire avancer les projets collaboratifs dans ces environnements flous, mais prometteurs.

Des entreprises comme Tesla ou Bolloré intègrent ce changement radical en une seule entreprise, en investissant des milliards avec une profitabilité directe incertaine. Les acteurs traditionnels voient les mêmes défis et ils doivent collaborer pour faire passer les produits actuels à l’échelle de ces futurs concepts, loin de leur business principal.

Comment gérer ces projets afin de pouvoir réellement atteindre un avantage compétitif pour les parties prenantes du projet?

Nous rapprochons la littérature en gestion de l’innovation et en écosystème, pour définir la notion de “projet de proto-écosystème”, en soulignant comment des acteurs différents co-construisent des offres et des actifs dans le contexte de projet commun systémique et ambitieux.

Nous utilisons ce cadre pour analyser deux projets auxquels nous avons participé, et qui incluent plusieurs acteurs industriels et publics, qui ont investi plusieurs millions de euros dans l'infrastructure de recharge électrique (cas 1) et de marché de la donnée (cas 2).

Les résultats indiquent que les "projets de proto-écosystème" sont à la fois critiques et trompeurs pour chaque partenaire. Nous expliquons ce paradoxe, en montrant que les partenaires nécessitent de tel projet d'écosystème pour avancer et actualiser ses compétences et les feuilles de route; mais en même temps, le focus dominant de « respecter collectivement le business plan initial » a tendance à déconnecter le management de projet du riche apprentissage atteint par les partenaires et de l'évolution d'agenda de chaque partenaire.

Nous concluons par positionner le concept de proto-écosystème comme un objet intermédiaire de gestion pour le management de l'innovation, et par indiquer plusieurs implications pour gérer ces projets avec plus de flexibilité afin de permettre aux partenaires d'acquérir des avantages compétitifs.

Mots-clés : proto-écosystème, plateforme, partenariats public privé, business modèles

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Managing "Proto-Ecosystems" Projects –Two Case Studies From The Smart Mobility Industry

Résumé

Smart mobility, smart cities, smart home, autonomous driving, etc. Energy and digital disruptions promise seamless customer experiences which integrate several products & services. Private companies and public authorities invest to push forward collaborative projects in these fuzzy, but promising areas. Companies like Tesla or Bolloré integrate this radical shift in one single company, investing billions with a very uncertain direct profitability. Regular players see the same challenges and have to collaborate to make their current products scale up to these future concepts, far from their core business.

How to manage such projects in a way which really provides a competitive advantage for project stakeholders?

We bridge "innovation management" and "ecosystem" literature to define the notion of "proto-ecosystem project", highlighting the way various players co-construct offers and assets in a joint systemic and ambitious project. We use this framework to analyze two projects we took part to, involving several industrial and public players, who invested several millions of euros on "electric infrastructures" (case 1) and "data marketplace" (case 2).

Results indicate that such "proto-ecosystem projects" are both critical and deceptive for each player. We explain this paradox showing that partners need such ecosystem projects to go forward and update their competences and roadmaps; but at the same time the dominant focus on "sticking collectively to the initial business plan" tends to disconnect the project management from the rich learning made together and from the evolution of the agenda of each partner.

We conclude by positioning the concept of proto-ecosystem as an intermediary "management object" for innovation management, and pointing several implications to manage such projects with more flexibility in order to allow partners to gain competitive advantages.

Key words: proto-ecosystem, platform, public private partnership, business models

2. INTRODUCTION

Current innovation topics question the innovation management literature. Even if the "open innovation", "ecosystem" and "platform" thinking dramatically improved in the past decade, we are still far from giving concrete guidance to projects trying to build "smart cities" or "integrated healthcare". These projects require that numerous 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 & 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 (M. A. Cusumano & Gawer, 2002; Annabelle Gawer & Cusumano, 2014).

However, the innovation challenges we face are much more ambitious than aligning a chip producer (Intel) and a software producer (Windows) – the "WinTel" platform being the seminal case study of the platform leadership thinking. In order to really develop offer on "smart cities", "autonomous mobility", "smart home",… a complex set of heterogeneous players have to develop offers which are very far from their core business, investing billions of euros with a very high uncertainty about the Return on Investment.

Not all companies can afford burning billions in such projects like Tesla. But all private and public players see that they have to be proactive in such future disruptive and systemic offers. All hardware manufacturers, public authorities, data oriented companies, energy suppliers, insurance companies… try to form "partnerships" which aim 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. But public and private players intensively invest in such projects.

The central question of this article is "how to manage such projects in a way which really provides a competitive advantage for project stakeholders?" At first glance, existing literature already extensively tackled the issue. Platform leadership (M. A. Cusumano & Gawer, 2002; Anabelle Gawer & Henderson, 2007), ecosystem management (Adner, 2012, 2017), value chain dynamics (Fine, 1998; M. Jacobides, Baldwin, & Dijaji, 2007), partnerships and complementary assets (Teece, 1986) provided extensive and critical guidelines and frameworks to go beyond the "firm centric" and "product centric" approach. However, bridging these streams of literature with the project and innovation management literature (Kim B. Clark & Fujimoto, 1991; Lenfle & Loch, 2010; Loch, DeMeyer, & Pich, 2006; Midler, 2013; Thomke & Fujimoto, 2000) points a blind zone: the ecosystem / platform literature only consider that collaborative projects aim at delivering a profitable systemic offer (and fail if they don't), whereas the innovation management literature points towards a "exploration project approach" (Lenfle, 2008) which recognizes and put under control that the final offer, the relevant partners, the market,… is to be defined during the project relying on a "learning by project approach" (Brady & Davies, 2004; Maniak & Midler, 2014).

We build on this discussion to define the notion of "proto-ecosystem project" as "every innovation project which requires that several heterogeneous organizations heavily invest upfront, in order to co-construct a systemic offer with both high shared interest and high shared uncertainty".

We use this definition as an analytical template for two cases. The two projects are both co-funded by the European Commission to promote smart mobility (electric vehicles, big data for connected cars), involve several industrial partners, lasts 3 years and aims at building a joint offer (a common charging network, a common data marketplace). We will describe on each case how players align or not during the project, the impact of the project on players, and the way they consider and report about this performance.

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 two "proto-ecosystem" cases. In the last

section, we discuss the findings based on the case study analysis, and link them with existing literature.

3. LITTERATURE REVIEW

How to manage ecosystemic innovation projects? Two bodies of literature provided decisive insights about the management of such ecosystemic innovation projects.

- A "bottom-up" literature, which roots in innovation and project management, and progressively had to integrate external contributors;
- A "top-down" literature, which has been building an extensive comprehension of the "ecosystem" phenomena, and framing how several players can align and build new businesses.

3.1. BOTTOM-UP: FROM NEW PRODUCT DEVELOPMENT TO COLLABORATIVE INNOVATION MANAGEMENT

Historically, innovation management has been focusing on new product development. Scholars and companies have been wondering about how to improve quality, cost and lead times of development projects (Clark & Wheelwright, 1993; Clark & Fujimoto, 1991; Midler, 1995).

This contributed to dramatically improve theories and methods, theorizing and implementing concurrent engineering, multi-project rationalization through platform strategies (Cusumano & Nobeoka, 1998), frontloading approaches (Thomke & Fujimoto, 2000) (Thomke & Fujimoto, 2000), fuzzy-front-end and advanced engineering management (Khurana & Rosenthal, 1997). The diffusion of these theories allowed increasing the pace of new product launches maintaining R&D costs under control.

Building on this pioneering work, academic efforts had to deal with two trends.

First, as innovation based competition (Brown & Eisenhardt, 1997; Midler, Benghozi, & Charue-Duboc, 2000) got increasingly tough, differentiating on ever more fast-moving markets called for ever more innovative products, while streamlined product development processes can only deliver products in line with the *dominant design* (Abernathy & Utterback,

1978; Leonard-Barton, 1992). This stands as a great paradox since project management initially ambitioned to manage innovation (Lenfle & 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. Exploration projects ignited by new concept/knowledge introduction or by cohesion evolution have been analyzed considering private actors involved in the partnerships (Sagrestin 2006).

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 & 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).

A second important evolution of this stream of research is to increasingly consider external players not only as classical "suppliers" or "partners", but rather as "complementors" (Yoffie & Kwak, 2006) which have to co-invest upfront with the focal innovating firm. Each has to develop complementary assets and offers (Teece, 1986, 1996) so that the final offer takes benefits from various contributions. The focal firm can leverage both its existing assets and lines of products, incorporating ideas and expertise coming from a wide range of external contributors rather than only on internal forces (Chesbrough, 2003). It can also integrate a selected pool of contributors deeply and early in a given development project to incorporate their inputs in the DNA of a given project (Appleyard, 2003; Bidault, Despres, & Butler, 1998; Lamming, 1993).

Elements on strategy toward collaboration in innovation management have been provided for firms involved in business eco-systems, such as FPS (Parize 2012). But the object, typology of projects, of relationships and the numbers of industries considered differ from the ones characterizing highly systemic, disruptive and technologically driven innovation projects.

There is a strong convergence between these two trends. Since the projects becomes more and more "radical" with a high uncertainty about the direct profitability of a given exploration project, and since the projects require to involve increasingly numerous and heterogeneous complementors which have to invest "upfront", partners coordination and incentive mechanisms have radically changed. Each organization involved in such a project have a dual agenda which keep it onboard and investing: (1) feed its own strategic roadmaps & assets to exploit after / aside the collective project (2) contribute to the collective project in order to really build a successful and profitable common offer (Maniak & Midler, 2008; Segrestin, 2003). The evaluation of degree of coordination and cohesion used to characterize the collective action in exploration projects (Sagrestin 2006), becomes a complex matter once the uncertainty of the innovation object is extremely high and the governance of the project is managed by private and public entities. Evaluation criteria are not the same, and there are distortions in the use of standard parameters such as KPI. The uncertainty does not apply to the object to be conceived, but to an entire ecosystem allowing the conception of the object. Furthermore, the common purpose achievement process, needed to reach the level of cohesion adequate to navigate the expansion toward new spaces in such projects, cannot by analyzed with the sole lenses of current innovation management literature.

To sum up, existing innovation management literature provided great insights about how to manage ambitious and systemic projects. However, as far as we know, there is very little research which integrates the duality of exploration project outcomes (direct profitability + impact on assets) in a context of large and heterogeneous stakeholders which have to co-invest.

2.2 TOP-DOWN: 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).

Since the proposition of the *business ecosystem* concept (Moore, 1993), the notion of ecosystem became a central concept to represent a collaborative form of value creation involving heterogeneous partners. The analogy with earth or ecological ecosystems points the critical interdependencies among the partners. Ecosystem stands as "*the alignment structure of the multilateral set of partners that need to interact in order for a focal value proposition to materialize*" (Adner, 2017)..

Network looseness and the difficulty in defining boundaries in existing ecosystem (Iansiti & Levien 2004) already characterize the uncertainty of the ecosystem environment, but the level of uncertainty is even higher in the case of ecosystem under definition. Parameters for strategic decisions are different, as well as investments related to the decisions.

The relevance of leveraging on complementary assets for enhancing firm's performance in business ecosystems has been underlined (Iansiti & Levien 2004), but the actors considered were firms, and the perimeter of action a niche within a business ecosystem of an industry.

Focus of the ecosystem can be the technology behind the platform enabling the ecosystem dynamic (Cusumano Gawer 2002), but the actors considered are firms co-specializing in the technology. Input relevant to our study derives from the definition of external platform management, focused on platform owner competitive advantage, with the peculiar characteristics that in such industry platform end user and end product are not defined ex ante (Gawer & Cusumano, 2014). But when the ecosystem is under delineation, we are in the situation in which the platform leader and ownership are not clear and potentially not held by one sole actor.

Even if authors all agree on the definition of these form of business structures, and that an ecosystem follows a maturation process from emergence to stabilization and renewal (Moore, 1993) the process of creation of these arrangements and interdependencies is still quite underexplored.

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). Player 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; M. Jacobides et al., 2007; Michael G. Jacobides, 2006).

Some authors already identified the sustainable innovation successful deployment threatened by a conflict with the socio-technological regime within which established technologies have matured (Geels, 2002; Kemp, Schot, & Hoogma, 1998). 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). Nevertheless, public-private-partnership literature focus is mainly the legal framing and procurement aspects of the partnership. The public institutions are actors with power and wish of delegation, but not fully implicated in operational aspects of innovation projects.

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, composed by heterogeneous players coming from various classical industries and public authorities, who have to co-define a common offer and heavily invest in complementary assets and have to deal with both their classical business and a new common, hypothetical future business.

2.3 SUMMARY AND RESEARCH QUESTION

How to manage ambitious and systemic innovation projects? Current innovation topics like smart mobility, smart cities or energy transition question theories and practices. In order to answer the research question, the chosen approach was to bridge the innovation management and the business ecosystem literature, because a full answer is not available in each of them separately.

Companies have been used to deal with a specific core business offer and a linear value chain conducting to this offer. They have now to co-define connected and interdependent offers, and to invest upfront in complementary assets, which mean that these investments will be a loss if the ecosystem / common offer never take off.

Ecosystem-related theories now consider ecosystems as recognized structure for value creation and capture. Literature consider that potential business ecosystem should mature, make explicit cost and return on investments for all, deliver a minimal footprint offer then scale up. Operating this alignment for very systemic innovations also requires synchronizing with public authorities to adapt also the surrounding socio-technical regime. Innovation management theories supplement this literature and recommend that companies who face such innovation challenge engage "exploration projects" and manage them dynamically, paying attention not only at the direct profit and on the respect of pre-established specifications, but more on the resources and competences acquired during the project.

In this communication, we study this ambiguity. How players engage together for a common ambitious adventure? How do they deal within the project with both an incentive to learn and an incentive to create business? How does the project framing and reporting system can help (or not) partners dealing with this ambiguity?

To answer this issue, we will provide an in-depth analysis and discussion of two projects with both an ambition (numerous big partners, several billions euros to invest upfront, uncertainty about the final profitability and value proposition) and an important ambiguity since many partners are competitors and have many partnership scenarios.

4. METHODOLOGY

4.1. RESEARCH SITE

The mobility industry has been chosen as the example of highest level of disruption in use and systemic-ness in offer construction with projects relating private and public actors. This stands as key moment of the automotive industry, which had been able for more than a century to protect its value chain compared to other industries (M. Jacobides et al., 2007), giving power to the integrator (Michael G Jacobides & 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 electromobility and autonomous mobility systems. Every carmaker engaged in providing integrated mobility solutions, not only products, involving to team with players coming from the data industry, local public authorities, carsharing or taxi operators, legislator, competitors, etc.

Public authorities like the European Union regards is also very concerned, since they wonder about how to help old industries (like automotive) shifting to this new digital world, saving / creating job, creating economic growth, and trigger positive environmental and network externalities.

We chose to investigate two projects fitting the challenge of systemic disruptive innovation management in proto-ecosystems.

The first case, 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 2 years along a national highways network. The project was one of the several with similar goals and time-plans the European Commission launched in Europe under a global initiative to develop an interoperable charging network for electric vehicles.

The second one, formed by three carmakers, two service providers, two private IT and cloud operators and one academic institution (the authors were part of it), aims to create a marketplace common marketplace to monetize data extracted from connected cars.

The two cases are complementary because they aim to the exploration and building of both, concrete and virtual infrastructure for mobility. 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 OEMs and service providers in mobility and beyond, to extract data and create services from the data *treasure* collected by cars around Europe. New uses of vehicles and new infrastructures as well as new potentiality of user experiences 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 two cases are representative of the increase 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 international headquarters for offer generation and technical standards setting.

So, we face players who joined their forces because they felt they had a common interest to build “something big together”, and that they needed to co-invest and align to do so.

Here below in Table1 the detailed and framed explanation on the main characteristics of both cases.

Table 1: Summary of the two cases

	EV Fast Charging infrastructure	**Data Marketplace prototype**
Duration	Early 2014-Dec 2015	April 2015-April 2018
Goal	Deployment of 200 EV fast charging stations along the highways network	Creation of a marketplace for car-derived data transactions and service creation
Partners	Four OEMs, one utility provider, one service provider, one academic institution	Three OEMs, two service providers, two privacy IT and cloud operators, three management and academic institutions
Industry perimeter	Transportation first, energy management as second step. Local dimension	Transportation first, vehicle use optimization, perimeter dimensions.
Project leader	Public: Utility provider	Private: One OEM
Budget co-invested by public and private partners in the project	Several millions euros	Several millions euros

The authors were involved closely in the two projects as "business model academics". Since every project felt that the business side was a critical and hard-to-define dimension, they asked to have a short-loop feedback from management science academics.

4.2. DATA COLLECTION AND ANALYSIS

Data collection included participation to Consortia Committees, interviews to partners and project-related stakeholders, participation to international symposia on smart cities and big data-driven innovation as shown in the below table.

Table 2: Data Collection Panel

	Number of meetings	Type of data collection	People	Duration
EV fast charging infrastructure Consortia steering and operational commitees participation	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
Data Marketplace Consortia steering and operational commitees participation	8 Consortia meetings, 2 workshops, 1 two-day pre-EU review meeting	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
EU official kick-off and results presentations	2 in Brussels and 1 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.
Conferences-Symposia-Workshops	1 in Seoul (South Korea), 1 in HongKong (China), 1 in Berlin (Germany), 1 in Venice (Italy) 4 in Paris	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
Interviews	33	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 consultantinteroperability providers, fuel distributors, urbanists, International energy Agency and academic researchers.	from 1 to 2 hours each

The aim of collecting a large variety of relevant data is to increase the validation of paradigm and hypothesis (Eisenhardt 1989). Relying on these data, we followed a process analysis creating (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).

Relying on literature and project analysis, the term “proto-ecosystem” helped us to understand the duality of motivations of players, and we used this term to feedback partners about the business modeling issues.

The following section provides the narrative of the two projects, putting emphasis on the evolution of (1) the motivation of project partners and the way they make sense and report it (2) the impact of the project on a common “business ecosystem” and on each partner assets (3) the project management settings.

5. CASE DESCRIPTION

5.1. CASE 1 — HOW TO BUILD A NATION-WIDE EV FAST CHARGING NETWORK INFRASTRUCTURE?

5.1.1. Initial setting

The 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 2015. Consortium partners met regularly, in order to monitor that the project was in line with what has been defined, and that it goes at the right pace. Partners had to report regularly to the EC to show that everything was in line with the project course defined at the moment of application.

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.

5.1.2. At the beginning From December 2014 to June 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 ("*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 customer’s level.* OEM"). Discussions among partners were mainly on service providers’ responsibilities, service price and technical progression of station definition.

The business sense of the project was a key issue for both, EU and consortium partners. EU added the dedicated working package for assuring the monitoring of the business viability of the project and the partners needed viable business plans for justifying the participation to the consortium and the resources investment on related internal activities. The return on investment of the project was calculated by the service provider using business plan tools with direct sale approach, although the term of business model was often associated.

It emerged that this frame was not viable unless assigning an out-of-market price to the service, endangering the early-adoption dynamics.

5.1.3. Along the path: June 2015-November 2015

The technical constraint on station installation toward the time-plan expected by the European Commission heavily impacted on the service provider resources dedication and on OEMs push for project milestone completion. Several un-planned factors resulted, on one side, in delayed installation work kick-off, and on the other side, in modification of some stations locations.

On the commercial agreement with location managers (i.e. fuel distributors and commercial site managers), service provider discovered that conditions on station area access and use vary from case to case. Some underestimated roles, such the station manager, appeared to be key factor to the customer experience perception. It requested a learning process on negotiation for getting the adequate conditions for each site in coherence with overall project in term of use and cost of service, and time completion of the overall project ("*We are putting in place two internal processes in order to accelerate the authorization certificate delivery, from three weeks to one week".* Utility provider). 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.

Since we noticed that the initially set business plan approach was limiting the solution achievement of the "chicken&egg" problem (partners are only interested if customers are there, and customers are only interested if partners already build a consistent offer) and didn't fit the EU demand of ROI monitoring via regular reporting, we proposed a shared OPEX/CAPEX business model.

A wide exploration process through interviews enlarged the ecosystem mapping, and clarified the value related to each location for a panel of partners outside the consortium. The

awareness that viability of the network business model rely on the ability to collaboratively involve in the dynamic such partners beyond the consortium, increased among partners.

At mid-term, the concern on early adopters' group size and customer acceptance were at stake for all partners. Service provider asked consortium partners' advices on how to raise customers' awareness on the service availability. OEMs knowledge from previous experience was shared with other consortium members.

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 highly considered by consortium partners as information source on which factors to consider for a successful charging grid and on customer adoption ignition.

5.1.4. How it ended December 2015

Due to the technical and regulatory related un-forecasted events and discoveries, the project 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 200, even with no further funding from EU, because they became aware of the strategic value of a denser network for service adoption on one side, and EV sales on the other.

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 created by some participants.

As far as negotiations with location managers, the role of OEMs evolved up to being partially negotiators along with the service provider. As a result of this role and of the technical functioning of the stations, new relationships take shape for location managers and OEMs local dealers for user adoption increase.

5.2. CASE 2 – HOW TO BUILD A CAR DATA EUROPEAN MARKETPLACE?

5.2.1. Initial setting

The consortium was composed by three automotive manufacturers, one utility provider, two service providers, two privacy IT and cloud operators, three management and academic institutions. These companies, involved in the data collection, treatment or use, needed to find a way to make business sense of the data and jointly applied to the EC, answering to a call for the exploratory project on the marketplace. They finally got the funding. 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 will end in April 2018. Consortium partners met regularly for committees, dedicated workshops, and for the official meeting review with the European Commission. Partners had to report regularly to the EC to show that everything was in line with the project course defined at the moment of application.

The project had to demonstrate by the end of the project that the consortium can develop a profitable private business associated to the data marketplace prototype. 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.

5.2.2. At the beginning. April 2015- June 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.

Partners expected that the inputs were clearly defined upfront on both, offer and demand.

The key issues at stake were:

- Offer formulation: data package format and data categories, based on OEMs current data collection different methods and data use.
- Demand expectation formulation, which content and level of definition differ among partners.

As far as data categories, the initial list provided by OEMs was incremented by the interaction among them during dedicated workshops.

Service providers involved in the consortium 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) .

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).

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. Since the beginning this frame appeared not to be viable, unless assigning a "safe" high price to the service, endangering the early-adoption dynamics.

5.2.3. Along the path: July 2015-August 2016

As far as offer side, data package discussion 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.

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.

A wide exploration process of the ecosystem revealed that the panel of potential users and complementors was wider than the current partners' focus. It appeared that there is potential demand, but that as the offer is not clear, their demand cannot be formulated in details.

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.

Sessions on business model design using Business Model Canvas were performed in order to jointly defining among the partners the value proposition. The result was quite deceiving, due to the lack of reframing of target priority and value definition.

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

5.2.4. Current status September 2016- December 2016

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 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 is in some other indirect value sources, such as internal operational cost reduction, and exploration of connected ecosystems for users.

The question on the business model is at the core of the discussion and how to ignite the adoption starting from a relevant niche, and on the joint definition of the value proposition. The need of a "risk mentality" appears key to the partners in order to make business sense of the project. Some partners (OEMs) declare the gap between this approach and their traditional logic of business plan ("*the service platform business logic, in which we have to create together something to become quickly viral…..without having proof it's gonna work….we never did it*" OEM)

As far as technical knowledge, partners expressed their improvement on both sides knowledge (offer-demand sides).

6. DISCUSSION OF THE CASES: A COMMON PATH

The two projects stand as important actions for all players to go forward on future trends of smart mobility: energy and data. The analysis of these two projects provides a common path for "proto-ecosystem projects". In this section, we describe this common path.

6.1. INITIAL SITUATION

Each player in each project had its own roadmaps concerning the future, however were all tailored by the same mega-trends. "Big data", "Autonomous driving", "Energy revolution", "smart cities" structured the R&D projects of each private actor. Public authorities at a European, national and local level also wondered about these macro trends, believed that they can drive future competitiveness for industrial players and provide important positive externalities in term of job creation and environment.

Each player initially realized he could not go alone given the ambition and the systemic aspect of the challenges. Providing electric infrastructures for electric vehicles requires converging toward a common standard, developing together the customer acceptance / desirability for electric vehicles, building business on data coming from cars requires joining forces and to define a common standard among carmakers, define together a strategy for data valuation, try to initiate a market for data.

The "European Call for Project" appeared as an opportunity for all players to go forward on these critical issues, including a relevant set of partners to make this real.

On the first case study, the project could be a way to converge towards a common standard for electric vehicles charging stations. Each carmaker wanted to promote the sales of its own electric models, but failed to develop a charging standard & a massive customer appeal for EVs. Europe wanted to trigger the EV market, but could not impose a charging standard or a single customer experience given the heterogeneity of carmakers, energy suppliers, customers, etc.

On the second case study, the project could be a way to converge towards a common data business. Each carmaker had been trying to build business on car data alone, but (1) the scope was too narrow and they had to get the money back for their huge investments in sensors and cameras for the "connected car" (2) each carmaker was afraid of the GAFA (Google, Amazon, Facebook, and Apple) actions in the automotive business. On its side, Europe saw

that the "Data Economy" could stand as an enormous "game changer" for industries, providing jobs and growth if "connected objects manufacturers" develop a common standard and valuation approach.

The two projects began with this "fuzzy" common vision of the future and joint interests. The European Commission "H2020" provided "calls for project" to initiate business ecosystems and create value. Industrial companies teamed together and apply, showing that they wanted to create value together in line with this vision. And both projects were accepted, entering a 3-year project with massive public and private investments.

6.2. ALONG THE PATH

Both projects had to commit toward a very specific plan, defining work packages, milestones, a planning of tasks and deliverables for the three-year project. For the European Commission, this stood as a guarantee that the public funding was used in line with the initial objective.

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

Regarding lead time, the pace of installation of EV charging stations was too slow, and the take-off of the data marketplace was also too slow. The European reporting committee was quite disappointed because of that (deviation in lead time).

Regarding the quality dimension, results were quite the same. On the EV project, very few customers used the new charging stations and they often complained because of complexity of customer experience. On the data project, early pilot customers did not really find the value they expected, and it was difficult to involve new potential customers.

There was another important deviation concerning "business model". Each project committed to find a self-standing profitability by the end of the project, demonstrating that the private partners can charge enough final customers to cover the operational costs (Europe covered the investment costs, for the installation of charging stations, and for the definition of the data standard). However, no project could show enough customer volume or appeal to support incomes, or show a converging running cost structure.

The explanations are convergent on the two projects.

Partners needed several months to better known each other, build trust relationship, and shift from the initial common "fuzzy shared vision" to a concrete definition of what to be done

together. This was not only a question of personal relationship, but rather on exploring the in-depth alignment of partners. Once the European Project is launched, each company shifts from a long-term plan to a concrete 36-month delivery plan with relevant partners. The demanding reporting process, showing the official position of each company to the European Commission, requires a strong investment from each partner, empowering each corresponding internal project internally, and requesting to validate this position with various internal divisions (technical, legal, strategy, R&D, finance). This took a lot of time in each project and contributed to the project initial inertia.

Once this initial "common commitment & trust" are acquired, players go into details. The move from research to business results in more complicated consortium meetings, but much more intense and rich in term of information sharing. Partners discover the real strategic agendas of other partners, go deep into their technical background, see that they also have other partnership on the same issue, and discover that they compile the data in very different format.

6.3. AT THE END OF THE PROJECT/CURRENT STATUS

If we stick to the initial and official targets, we should expect that everyone must be upset and disinvest the project. However, the observations on the projects show the opposite.

First, even if partners discover the gap between the initial official "shared destiny" and the real in-depth shared potential, they have to be "clean" towards the official European project reporting system, and to show that they converge towards the initial plan. This keeps everyone incented to go beyond the a priori divergences, and to find ways to go forward.

Second, the empowerment of the project topic inside each partner's organization – because of the in-house project visibility within carmaker organization, at the European level, within complementors' organizations – triggers an updated motivation from each partner to reinvest in the subject. What was initially a fuzzy topic became a priority. In our case, this nurtured and pushed forward the existing roadmaps on "connected car business", "big data", "new mobility"; and made concrete the fact that it was important to collaborate with external players to deploy a dense EV charging network, and to develop a collaborative approach with other public and private players to get a real data monetization.

The project for itself is deceptive regarding official targets, but intensively contributed to partners' roadmaps & competences. The European Commission leveraged the outcomes of each project to build other complementary "Call for Projects" in the same two areas (EV infrastructure and data platform), selecting projects with quite the same consortium members, building on what has been done by the previous project, but refining the purpose and the scope. Each private partner developed its portfolio of "proto-ecosystem projects" in these two areas, building on the dynamic created by the European project, and trying to empower other partners in a similar dynamic.

7. CONCLUSION & FURTHER RESEARCH

7.1. SUMMARY

The communication aimed to contribute to provide elements about how to manage modern innovation projects facing new concepts like smart mobility, smart cities, which require that several heterogeneous organizations heavily invest upfront, in order to co-construct a systemic offer with both high shared interest and high shared uncertainty.

The research perspective is the exploration of the first months of emerging ecosystems, which are originated by heterogeneous partners, coming from traditional and digital industries, and public institutions, who all together have to define jointly a common offer of services and heavily invest in complementary assets in order to create the offer.

We bridged the innovation management and ecosystem literatures to propose the notion of "proto-ecosystem project" as an analytical framework and intermediate step of the innovation deployment process.

Then we tracked two projects using these lenses, paying attention on how heterogeneous players, initially motivated by the same future business concept (in our case electro-mobility, data marketplace) progressively build a common business and interdependencies and how this collective move forward nurtures / articulates / cohabits with the in-house dynamics of each

partner; and how the surrounding project management philosophy helped dealing with this tension.

After the in-depth analysis of two case studies involving both several big private companies and public authorities, putting together several millions euros to reach shared objectives towards the future of their industries and their societies, we showed that the two projects followed a common path pointing towards convergent messages:

- Partners engage together in a common breakthrough projects because they all feel a big distance between their current business/social concerns and the upcoming business challenges, incenting to bridge industries, define common standards, scale up together.
- The shared initial motivation relies on fuzzy beliefs and concepts for future such as “big data”, “data marketplace”, “new mobility”, “electro-mobility systems”, etc. Each partner had its own plans and experience about this concept, but needs to go beyond that and to try something big with others to overcome the in-house blind-spots and move forward.
- This initial shared motivation triggers a big project with important investments from each partner. The project setting, reporting system and visibility strongly incents players to get real common achievements, motivating to go deep into the details, increasingly sharing private roadmaps and information, paving the way for the maturation of the ecosystem and the alignment of players, and empowering the corresponding topic and competences internally for each partner.
- On the other hand, there is a clear mismatch between this win-win dynamic and the project management setting/reporting systems. Focusing on delivering on-time what has been defined together at the moment of joint project application creates strong incentives for all, but progressively un-correlates from the rich learning made together and from the evolution of the agenda of each partner.
- Partners try to navigate between these various constraints and opportunities. They have to report internally and for the common project that the project meets the initial targets, even if the final “business plan” of the project does not cover the big picture of the real project outcomes.

The proto-ecosystem is an intermediate step in the innovation deployment, which has strategical relevance for both private and public partners. Such projects are an enabling factor for participants. They have a strong impact in allowing actors to act into high systemic disruptive innovation, when there are no conditions for fully integrated, open-budget projects (i.e. Tesla, Robot Taxi Uber). Partners discover the opportunities from the ecosystem, and they can pursue them with the consortium partners, or with others, but the process of taking participation to the ecosystem started. Partners progressively align their interest on projects completion and on parallel they align roadmaps, while contributing to the internal roadmap evolution. Partners' alignment creates a tension between learning and creating together, while planning the exploitation on its own. The project path sharing is needed for individual commercial exploitation, which is a new management configuration. These projects are kicked-off with a declared common interest, which is partially real. The initial interest is a common projection. The common and individual road-map alignment is not known at the beginning of the project. The real interest of the project is not on the direct output and partners realize it along the way.

Finally, each company and public authority deals with this ambiguity. Each has different similar projects on its portfolio. Each "proto-ecosystem project" stands as a way to go forward on these several dimensions.

7.2. IMPLICATIONS

7.2.1. Theoretical implications

Bridging innovation management theories and ecosystem theories open a promising research arena. Ecosystem literature show the ambition of modern project like "smart mobility", which is not only to develop technologies, but mostly to trigger the maturation of a public private business ecosystem and also to move a socio-technical regime. Innovation management brings the idea of managing dynamically not only the direct profit and loss of each, but also to make explicit the "learning by project" footprint for each partner.

The relevance of the role of public institutions as funding, co-governing as well as operational partners, makes the above mentioned literature and traditional evaluation metrics not fully adapted to such projects.

The "proto-ecosystem project" logic invites to go beyond the binary logic of ecosystem projects (it fails if it doesn't scale up) which is prevalent in the platform leadership and ecosystem management literature. This opens new research avenues to manage the ecosystem alignment at a multi-project scale, and that each "proto-ecosystem" project paves the way to a collective alignment and socio-technical regime shift.

7.2.2. Managerial implications

Our results highlight the fact that we still lack a relevant project management framing for such "proto-ecosystem projects". Ecosystems so far involve mainly private partners in innovation partnerships (Gawer Cusumano, Sagrestin, Maniak, Iansiti & Levien). The observations of the selected research field showed that when there is a public-private co-management system, there are relevant distorsion impacts on the performance parameters functioning. Furthermore, the dominant project reporting process imposes to stick collectively to the initial plan, and provide a self-standing viable business plan for the project itself. We saw that this provides strong incentives for partners to explore deeply technical and business synergies. However, this project framing could inspire from "exploration project" mindset (Lenfle, 2008; Lenfle & Loch, 2010) to also track and manage the learning process of each partner, which also appears as a critical dimension and incentive factor. This also encourages companies and public authorities to consider such projects as stepping stones to aggregate. Since each player has in-house a portfolio of such "proto-ecosystem" projects, players could rationalize the global impact of this portfolio not only on direct profit, but also on resources, competences, and strategic agenda update.

7.3. RESEARCH LIMITS

Proto-ecosystems projects appear to have strategic impacts for partners' roadmap and on complementary assets investments, it would have been beneficial to observe partners since the very first idea of project creation was shared among some of them, and to observe the actors dynamics at the earlier step than project kick off.

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