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Elizabeth Couzineau-Zegwaard, Olivier Meier

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Carsharing and innovation through the prism of actor network theory

Elizabeth COUZINEAU-ZEGWAARD
Paris Pôle Alternance, GReMOG, France
elizabeth.couzineau@gmail.com

Olivier MEIER
Université Paris-Est, LIPHA, France
meier@u-pec.fr

ABSTRACT
Research on carsharing focused mainly on the technical and organizational aspects, and the entrepreneurial and managerial dimensions were little discussed. Our work on innovation focused on a major carsharing operator to understand the mechanisms behind its success. Through the use of Grounded Theory, we have developed a framework of analysis showing the importance of the entrepreneurial and managerial dimensions in the design, implementation and deployment of the service thanks to the resource mobilization capacity, the capacity for innovation, and the role of a strong social capital. The conditions of emergence of the carsharing solution throughout the creation process of the network actor are reinforced by the conditions of creation of the family business social capital: stability, interactions, enhancement of the common heritage, influence on partners, network closure and joined vision on standards promoting innovation.

KEYWORDS: Carsharing, Electromobility, Family Business, Innovation, Social Capital
JEL CODES: O32

The question of innovation in mobility is multidimensional: mobility is a system of displacements, in relation to activity programs, the diversity of geographical positions and related modes of travel, relying on means of transport (excluding pedestrians). Displacements are origin-destination journeys, to which patterns and modes of transport are attributed (Bavoux et al., 2005). Thus questioning innovation in mobility leads to the following topics:
• Technical and technological innovation (vehicles, energies, infrastructures), defined as all the activities of design, manufacture and launch of a new product, system, a new technology (Freeman, Soete, 1997).
• Service innovation (on-demand, carsharing, self-service), concepts defining new customer services (Lenfle, 2005).
• Social innovation (carsharing, rural service development, car-pooling): Kesselring and Leitner (2008, p. 28) stress that “social innovations are elements of change that can create new social facts, i.e., impacting the behavior of individuals or certain social groups in a sense and towards recognized objects and for which economic concern is not a priority”.
• Partnership innovation (transport systems privatization, use of advertising, total or partial delegation of infrastructure installation / management) in an Open Innovation approach, for example Chesbrough and Appleyard, 2007.

Carsharing is particularly exemplary of this intricate relationship. It is a societal evolution that is linked to the sharing economy or the collaborative economy (Carry, 2014), whose expansion is observed in many areas (Le Vine, Polak, 2015; Shaheen, Chan, 2016). The sharing economy is defined by Botsman and Rogers (2010) as new business models exploiting unused resources, by replacing ownership with access to the good (Mougenot, 2015). Carsharing is sharing a vehicle, motorized or not, accessible quickly and on-demand. So far, among other topics (Novikova, 2017), researchers have focused on the evolution of carsharing (Shaheen et al., 2015), its technological aspects (Zoepf, Keith, 2016), mobility business models for the sharing economy (Cohen, Kietzmann, 2014), and the concept of mobility as services (Expósito-Izquierdo et al., 2017).

More specifically, demonstrating the complexity of this innovation, in their publication Carsharing Services—Part A Taxonomy and Annotated Review (Ferrero et al., 2015), the authors, focusing on the existing literature, have studied trends and research perspectives, showing the imbalance between operational-level literature and economic, business development and customer validation issues.

Four themes have been identified:
• User behavior analysis
• Demand analysis
• Optimization of infrastructures, activities and services and fleet management
• Carsharing business models, their development process, value proposition and customer segmentation. They note that it is on this point that there is the greatest lack of contributions.
Research has mainly focused on whether and why consumers opt for carsharing (Schaefers, 1992; Burkhardt, Millard-Ball, 2006; Nobis, 2006; Celsor, Millard-Ball, 2007; Martin et al., 2010b; Efthymiou et al., 2013; Lindloff et al., 2014; Le Vine, Polak, 2015; Böcker, Meelen, 2017). Kent and Dowling (2013) analyzed the changes to the automobile ecosystem through the use of carsharing. There is also work on demand modeling (Jorge, Correia, 2013) and the logistics optimization of carsharing systems (Sonneberg et al., 2015).

This shows the low contribution to the entrepreneurial dimension of carsharing as an innovation, even though research has recently started to focus on new business models and corporate strategy (Clark et al., 2014; Cohen, Kietzmann, 2014; Firnkorn, Müller, 2012; Münzel et al., 2017; Shaheen et al., 2015).

As part of our work in management sciences on innovation, we are interested in a major operator of carsharing. We have developed a framework of analysis showing the importance of the entrepreneurial and managerial dimension in the constitution, implementation and deployment of the offer proposed by this operator.

After a first part devoted to the constituent elements of carsharing, we will present the results of our work. We will conclude this article with lessons that can be drawn for current or future operators of innovative mobility services.

**Carsharing: definition and evolution**

Carsharing can be defined as a system that allows people to use locally available cars at any time and for any duration (Münzel et al., 2017). It differs from taxis because a shared car is driven by the renter and it also differs from car rental since cars are available locally, at any time and for any duration. Carsharing should not be confused with car hailing, Uber being one of the best-known examples, which is a peer-to-peer relationship between users and service provider as part of a Vehicle with Driver service. In carsharing, different economic models have been distinguished:

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1. For reasons of confidentiality, the elements of the case study have been anonymised. Being Germanophile, we chose the name “Lorbeer” which means laurel. On the one hand, the official name of the company under study is related to this plant and on the other hand, the laurel in its symbolic dimension refers to victory, just like the name Victor. This seemed to us a metaphor as a nod to a successful legitimacy process.
**Table 1 – Car-sharing solutions (Cohen, Kietzmann, 2014; Shaheen *et al.*, 2015)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Year</th>
<th>System</th>
<th>Operation</th>
<th>Ownership</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classic B2C model (round trip) (Le Vine <em>et al.</em>, 2014)</td>
<td>Late 80s in Switzerland and Germany (Münzel <em>et al.</em>, 2017)</td>
<td>Cars spread over a network of locations in a metropolitan area</td>
<td>Car booked before used, via Smartphone apps or website, and brought back at the origin point</td>
<td>Fleet owned (or rented) by a carsharing operating entity</td>
<td>Zipcar</td>
</tr>
<tr>
<td>B2C model of flexible carsharing (Kent, Dowling, 2013; Clark <em>et al.</em>, 2014; Le Vine <em>et al.</em>, 2014)</td>
<td>2009</td>
<td>One-way trips in a specific geographical area Floating solution: vehicles may be dropped anywhere in a designated area Point-to-point solution: car taken in a station and returned to another.</td>
<td>Spontaneous reservation</td>
<td>Fleet belongs to the system operator</td>
<td>Car2go Autolib (station-to-station)</td>
</tr>
<tr>
<td>P2P (peer-to-peer) carsharing model (round trip only) (Clark <em>et al.</em>, 2014; Böcker, Meelen, 2017)</td>
<td>2011</td>
<td>Suitable for less densely populated areas.</td>
<td>P2P online platforms where car owners rent their own car to other consumers (peers). The platform charges fees to match supply and demand and generally offers additional services such as insurance (Shaheen, Chan, 2016)</td>
<td>Private owner</td>
<td>Getarround</td>
</tr>
</tbody>
</table>

Carsharing alters the economy of driving: what was previously a fixed cost becomes a variable cost. Carsharing has been shown to reduce car travel by 67%, thanks to more frequent use of public transport, bicycles, and walking (Cervero, 2003).

It is widely accepted that carsharing has the potential to respond in a more sustainable way to individualized transport demands (Jorge, Correia, 2013), by reducing the demand for cars (Martin *et al.*, 2010b) and car parks, by reducing emissions through a multimodal mobility system and cleaner vehicle fleets, and by strengthening connections within local communities (Prettenthaler, Steininger, 1999; Shaheen, Cohen, 2007; Martin *et al.*, 2010a; Jorge, Correia, 2013; Münzel *et al.*, 2017).

2. also known as One-Way or free-floating carsharing
Within a short time, carsharing has become a major global industry in more than 30 countries. The success of unidirectional carsharing services is encouraging newcomers, including car manufacturers, to offer this model of service. Some estimates predict global carsharing revenue to rise from $1.1 billion in 2015 to $6.5 billion in 2024.

The challenges of carsharing development are therefore major from the societal, environmental, urban, economic, and financial points of view.

In this respect, carsharing can be interpreted as a Service Product System, defined in 1999 (Goedkoop et al., 1999) as "a marketable set of products and services, jointly capable of fulfilling a client's need".

It is about developing a system on three axes of sustainable development: environment, economy and societal aspects.

The successful implementation of an SPS can be a way of responding to the problem of the gap between intention and acting out, raised notably by Hamari et al. (2016): it is the balance between the three constraints that allows consumption in the context of the sharing economy.

**Figure 1 – SPS Key Success Factors**

As mentioned in the introduction, a contribution on entrepreneurial and managerial aspects seems relevant to inform the development of carsharing as a complex innovation.

Case study lorbeer

Our presence in the mobility sector dates from 1995, with a focus on alternative engines and in particular the electric vehicle. Having participated in different European projects and having worked for different ministries on these issues, while belonging to various organizations promoting alternative mobility, we have collected substantial knowledge and narratives. Over the past fifteen years, we have been keeping a detailed professional journal, intertwining the stories of our relationships with personal reflections, completing our search for a better understanding of the repeated failures of alternative vehicle projects, in particular electric vehicles and strategic reversals, with abundant but dispersed readings.

We organized our information in an ethnographic form, distinguishing the actors in the field, their attitudes, behaviors, choices, and organizations with regard to alternative mobility, simultaneously drawing the ecosystem of the electric vehicle.

This first phase of research prior to our thesis work allowed us to highlight one actor and one system: the Lorbeer group and carsharing. Since 2001, the Lorbeer Group has been present in the electric vehicle landscape, with the development of various technological products, until the sustainable deployment of carsharing 10 years later. The origin of our research started with the following question: how to explain the process of legitimization of the Lorbeer company in the innovative sector of carsharing? Specifically, we seek to understand and explain how the family-owned Lorbeer Group has achieved a legitimization process in an innovative sector, where historical mobility actors have failed to position themselves. Did the particularism of family businesses, and specifically social capital, play a role in the process?

Presentation of the Case

The Lorbeer Group can be defined as a family business: involvement of family members in the company; control of the property and effective business management by one or more family members; business transmission—projected or done—to the next generation (Cadieux et al., 2002).
Specialist in ultrathin shrink film, over the years, the group has developed activities in different sectors, grouped in 1998 in a single listed company.

In the 2000s, the group continues to diversify by entering services and focusing on batteries for electric vehicles. In 2008, the group and a European manufacturer set up a joint venture for the development of an urban and peri-urban electric passenger transport vehicle. At the end of the 2000s, Lorbeer started operations in two owned electric battery factories.

Today, the company’s storage and power solutions business operates through a primary structure, including batteries and supercapacitors, but also electric vehicle solutions, including mobile and fixed applications, and a secondary structure, which designs, develops and integrates a number of identification, traceability and mobility solutions for various sectors. At the end of 2011, the first carsharing service is launched.

**Research Methodology**

We carried out our research by conducting our literature review on four themes: family business, innovation, social capital, and legitimacy to ensure our research relevance, checking if there were proven identified links between the concepts that would allow an understanding of our case. Despite some interesting elements, we noted the insufficiency of work linking these concepts and were convinced to pursue our empirical approach. We continued our research with interviews with mobility and industry players.

For this second stage of our work, we implemented the Grounded Theory, an inductive methodology developed by Glaser and Strauss in the 1970s (Vernon et al., 1966), for the following reasons:

- Grounded Theory is an iterative process that starts with the situation the researcher wants to understand
- The central goal of Grounded Theory is to build theories, rather than theoretical tests. We appreciated an inductive approach, whereby the theory would emerge from the stories of the stakeholders themselves
- It allows the identification of new mechanisms, or new structures, relying on an inductive method, grounding in the data with a suspension of the theoretical frameworks, favoring the researcher’s creativity (Niekerk, Roode, 2009)
- Grounded Theory gives clear direction, both for the conduct of research and for the interpretation of evidence.

Our work is part of the Classic Grounded Theory, or Glaserian current, whose principles are as follows:
The data was analyzed using all the procedures included in the Classic Grounded Theory methodology (Glaser, 1998; Fernández, 2004; Holton, 2010):

**Case Analysis**

Our professional journal, held over the last 15 years, and reorganized during the initial phase of our work include interviews and the compilation of information gathered during our participation in more than 20 scientific or professional conferences in the fields of alternative energies and mobility.
In the second phase of our work, we collected data about the manager and his family, Lorbeer Group and its activities, and about the Lorbeer group’s mobility activities.

For the interviews, we used the Snowball technique (Guba, Lincoln, 1994) to identify the actors involved in the group’s electric mobility projects. Snowball, or chain sampling, aims to identify cases, rich in information on a particular subject. This strategy is often associated with a referral-based selection where the first informants are experts in a particular area, and therefore have the necessary knowledge to indicate where to go (Patton, 1990). The process begins by asking the identified experts “who knows a lot about X?”. All informants are asked “who else can I talk to about this?” And the snowball is growing (Neergaard, Ulh, 2007).

We conducted 22 formal, semi-structured interviews with Group employees, carsharing project stakeholders, researchers and consultants in the electric vehicle industry; international, European and French institutional representatives.

Each formal interview was between 30 and 90 minutes in length and then transcribed.

According to our understanding of the Classic Grounded Theory, we followed the statement that “everything is data”. We included data from a wide variety of sources as soon as the opportunity arose. This approach ...
has allowed us “to take advantage of the serendipitous in terms of valuable yet unplanned and unanticipated opportunities in data collection” (Holton, 2005).

Figure 5 – Data Sources

- data from 10 activity reports of the Lorbeer Group
- 350 reports and technical research work on electric mobility (batteries, vehicles, charging system ...) from scientific conferences and symposia (Electric Vehicle Symposium)
- 10 public interviews
- 127 articles from the reference press, the French and American economic and financial press, and general information magazine articles

According to the methodology principles, we started the substantive coding from the first interview by the initial open coding: it is a line-to-line coding, which can be in-vivo coding (Glaser, 2008), namely, the textual use of the speaker's statement. In addition to coding, we wrote memos (theoretical and initial analysis, descriptive and content-based). At the end of this first phase of coding, we obtained 215 codes, including 10 in-vivo.

When we started, we found that it could be easy to explain the success of the Lorbeer company, by the geniality of the leader, who built financial and relational strength, and protects his company:

- Frontiers are blurred between the company and the boss, as Mr. B. a Lorbeer senior executive emphasizes: “when the family is attacked, the group, its employees, its partners are attacked. Everyone who trusts us is attacked”.
- Finance seems to be at the center of the company’s practices. It is a summary of a recurrent idea in many of our interlocutors, illustrated by Xavier, territorial attaché in a French national agency: “he has the cash to do what he wants”.
- The personal network of Victor Lorbeer is put forward to explain the success of carsharing. Like the financial dimension, the relational dimension is often highlighted. The quote of Mr. S., senior executive of a construction company, summarizes this vision: “He knows everyone … From politicians, show business personalities to the captains of industry”.
- Secrecy is a work principle. In 2008, in an interview with Calvin, researcher in batteries and charging systems of the US Department of Energy, we noted “the innovation development by Lorbeer … this is top secret
in the military way: protection of know-how, research and forthcoming business”.

The constant comparison of information, and the iterative process of cross-referencing the data has brought out mechanisms in the sense of critical realism of Bhaskar4, which as they exist and are implemented (Bhaskar, 1998) have been able to produce these events. At the end of this stage, we had not yet been able to identify these mechanisms, but a draft of a central category, built on these mechanisms, was emerging. It consisted of a maelstrom:

• Reorientations of historical activities. As pointed out by Mr. R., a High official of the Industry, follower of Lorbeer for many years “He knew how to exploit the know-how of the paper bible to become a leader of the thin shrink film. Just as he was able to take advantage of the transport capacity acquired from large families to take a dominant position in multiple international transport infrastructure. No family jewel is left out”.

• Technical skills acquired. Mr. N., belonging to the Lorbeer R&D told us that “the group acquires skills that it does not have. Not that they miss it at the moment. We are rather in the logic ‘it’s interesting. It will serve us later’.”

• Men of the art. At the end of the 2000s, Arturo, President of a lobbying and promotion association in Europe, noted that “the company acquires leading companies in their field and gradually integrates teams within the group. It absorbs the company and the teams”.

• Strategic orientations in the long term. Mr. N., who belongs to Lorbeer R&D, illustrates the strategic direction of the company through the group’s flagship example of development: “the reorientation towards the batteries was natural, but innovative: there is only a step between thin paper and superconductors. One just had to make the link”.

• Partnership development. Adeline, researcher in electric mobility since the 80s noted the successful or unsuccessful partnerships: “the group sought alliances with major players in the sector. And yesterday’s enemies can become tomorrow’s allies. Everything depends on their contribution”.

The selective coding phase, the second stage of substantive coding, allowed us to clarify the mechanisms identified and to specify our central category, from 215 open codes to 13 selective codes.

4. Mechanisms are inherent in social or physical structures, allowing or limiting the occurrence of events in a given context (Sayer, 2000; Smith, 2006). Mechanisms can be conceptualized in terms of causal powers or tendencies (Sayer, 1992; Fleetwood, 2004). Causal forces are “dispositions, abilities, and potentialities of doing certain things, but not others” (Fleetwood, 2004) that emerge from the essential nature of entities (Wynn Jr., Williams, 2012).
• Entrepreneurial business father. We chose this name to highlight the “dual-hatted” profile of the leader, as summarized by Mr. O. belonging to the Lorbeer R&D: “he builds a group for his children. Everything is used, developed, valued so that the group is transmitted to his heirs when he retires.” But this denomination also refers to the passage of relay, requiring at first a strong personal investment of the father-manager in the new activity, as told Mrs. A., executive officer of Lorbeer: “The logic is always the same. He invests enormously at the beginning on the new stuff; he is present from early morning to late at night. The media, he was there permanently. Once he has put his teams, he has trust, he sees the thing, he understands the job, he delegates, while still remaining interested in the slightest detail”.

• Seizure of opportunities. This code is based on the following open codes: be on the lookout; technical ambitions; personal intuition; risk taking; clairvoyance; creation of a technical and technological portfolio; project financing; financial participation; company buyout. This code represents the technical or strategic investments made by the group in a short time. This double opportunity is summarized in the story of Jérôme, Founder of W1 who became a senior executive of the Group: “W1 won for him the D73 licenses and he then wished to enter his capital. For W1, an infrastructure business, having such a financier at its side has been a huge help for its development and the company has taken off to become the undisputed leader in its field, with more points of presence in France than SFR or Orange, their boxes aside”.

• Valuation of goods. This code emerged from the consideration of three components of the group: the financial components and capitalist practices of the group; the technological component and the ability of the group to exploit it; the human component, namely the valorization of the teams, both in their skills and know-how and in their recognition. On the financial aspects, Mr. F, former business banker, summarizes this characteristic of the group: “it is a financial and industrial group that knows how to value its assets, make them grow and ensure to have the necessary cash for development”. When it comes to human aspects, it is JP, a collaborator of the group, who offers us his vision “I have always been considered as a nerd. At Lorbeer, I am a weird, but acknowledged expert. My technicality is recognized, it is used and I am appreciated for that”.

• Strategic orientation. This code synthesizes several open codes such as: countercurrent strategy; break with the models of classical actors; ability to achieve the impossible; long-term vision; investment over time; quick decision making. To illustrate this selective code, we chose the verbatim of Jacques, Carsharing project leader: “An integrated turnkey offer is what the customer expects. That’s what we expected”.

Elizabeth COUZINEAU-ZEGWAARD, Olivier MEIER
• Product-service system. We have borrowed this term from the industrial and environmental economy to reflect the total nature of Lorbeer’s carsharing offer. Michèle, a stakeholder in a carsharing project, took up the illustration: “Compared to the other offers, the group’s offer was turn-key, with total control of the product/service offer. He masters not only the technique of electromobility, but also the user interface. They developed and proposed a dual skill”.

• Innovation. It is about a code based on the managerial and entrepreneurial dimensions of the company. Innovation is protected, carried out internally; the search for a partner is for the application and enhancement of innovation, not for its development: “the development of innovation is done exclusively in-house. The partnerships are in the testing phase, not in the R&D phase”, said Jim, a researcher in electric vehicle architecture in Canada.

• Links to others. In relation to the attitude towards the development of innovation, the relationship to others is a code that take negative postures (predation, enemy brothers, defiance, manipulation …), illustrated by Mr. L., former senior executive of the group Lorbeer “Alliances or partnerships are not traditional with the group: it seeks either to absorb to acquire a new skill or to make money, or to develop a showcase. More than partnerships, I will speak of utilization” and positive postures (loyalty, attachment, valorization of partners, patronage patriotism, tribalism…). Frédérique, Institutional Correspondent, highlights Lorbeer’s regional commitment: “Institutional partners are not associated with reflections. This is especially true for national organizations. This mistrust vis-à-vis the state echoes the attachment of the group for the Region, but also this statement ‘a detachment of the state for the benefit of local territories’”.

• Behavior of the company. The behavior of the company is dictated by the attitude of the entrepreneur who “transmits to his children since childhood the values of the family, commitment to the company and the desire to innovate. He is very attached to the region and also to family history. It is the cult of the ancestors”, as reported by Mr. L., former senior executive of the group, but has however developed a specific behavior of its own in the strategic orientation, the development of alliances and technical skills.

The following two codes were the two most complicated to generate, and disentangle as financial and industrial aspects are closely related.

• Capitalist practices. We have synthesized the codes relating to the treasury, stock market shares, financial strategies, judgments on the group under the code capital practices that can be summarized by a verbatim from a public interview with an individual close to the group “He has
a phenomenal memory. Few people in the city know as him the articulation of family holding. It has the ability to bypass hard cores of companies, enter through unexpected doors and spot weak links”. And carried to their extreme by a journalist “as soon as he has won enough shares to weigh in the business of the coveted company, begins the destabilization of leaders: various pressures to make allies or minority shareholders change side, opportunistic use of embarrassing files or public criticisms of their management”.

• Industrial practices. We wish to present the industrial practices by linking three quotes: “After his ‘raid’ on B **** […] he withdraws with a substantial gain. It is thanks to this financial leverage that he develops new technological products such as supercapacitors, batteries and electric cars, developed in particular in collaboration with an energy company … and gets into the media.” Mr. R., Senior Industry Official gives us the link between finance and industry. But finance is relegated to the background for the benefit of the industrial attitude by Ms. C., Project Manager at Lorbeer: “It has often been said that the practices of the leader were those of a financier. In any case, it is more about the implementation of industrial processes, even in the service sector, which brought some teeth-grinding.” Finally, the group becomes totally industrial, as summarized Mr. G., Director General of Services (collectivity): “the group is not only an assembler. It is an industrial manufacturer, service provider. It’s a new approach, a profession to integrate into practices, relying on the men and women of the group”.

• Corporate culture. The corporate culture is marked by strong internal exchanges, as Mr S., a long-time collaborator at Lorbeer, explains: “We are not all engineers. So we had to learn the operation of batteries, cars, interfaces. It is essential to develop and support an offer. We share our knowledge and know-how.” The culture is also specific in recruitment, as explained by Elizabeth, consultant: “the teams are constituted in 2 ways: they are often people belonging to the network more or less distant from the boss, and / or people having a recognition by their peers in the field and / or having connections in influential media. In the case of electric vehicles, the team was formed with younger employees from the group and with battery experts”.

• Cult of secrecy. This selective code takes into account the behavioral specificities of the group underlying the strategy, excluding financial or industrial practices. We illustrate this code through the words of Carlo, Deputy Chairman - IEA “When we visit the factories of the group, we feel like we are in a Chinese company: everything is covered and protected” and Mrs. Z., environmental activist “He called on a subcontractor who had to sign a clause forbidding him to say that he worked for Lorbeer. If you talk to him … he will deny that he worked for Lorbeer”.

Elizabeth COUZINEAU-ZEGWAARD, Olivier MEIER
• Reputations. The code of reputations appeared easily during our selective coding, because pride, reputation of the leader, reputation of the group, institutional recognition, recognition by peers were quickly saturated. We retain the verbatim of Joachim, Carsharing Project Assistant (USA) “Lorbeer invests to ensure the service adequacy with customers’ expectations along the value chain. It is a question of reputation” and a sentence from a public interview with a representative of the State validates the industrial reputation of the group by including it in the landscape of industrial groups: “On the electric everything, we work with those who are interested in the subject, namely the two French pioneers Lorbeer and Dassault”.

All of this work has brought out the central category, the process implemented by the Lorbeer Group to enter a new sector and become a reference actor under the same attitude: to enter via the technique by acquiring companies or by taking shares; ensure the integration of material or human “nuggets”; develop an all-in-one service offer for the final customer and, finally, develop this offer through a new company.

After the selective coding, we started the theoretical coding phase, and by reintegrating the elements of the literature review, we came up with the following eight theoretical codes: vision and attitude of the family business; family business entrepreneurial orientation; valorization of the social capital with the central player; valorization of the company’s technical capital; development of alliances; acquisition of key skills; co-innovation; legitimacy.

The central category has been renamed as part of Sirmon’s resource orchestration model (Sirmon, Hitt, 2003) highlighting the role of the entrepreneur in resource development and innovation development (Ranjatoelina Tantely, Zaoual, 2016). It was not just an acquisition of skills, but rather an accumulation of resources leading to the legitimization of the company in the sector concerned.

This analysis drew an integrating framework linking the 5 stages of the development of carsharing, and the process of orchestrating resources.
The three octagons are characteristics of the firm studied and influence the entire process of accumulation of resources, declined vertically. In this process, we have put in parallel, within rectangles, the steps that led to the development of the offer, with for each of them the resources created or mobilized.

**Figure 6 - Integrating Framework**

**Initial enrichment phase (Sirmon)**
Enlargement and elaboration on existing capacities. It is a question of re-combining the current resources in terms of knowledge and know-how to extend the capacities of the company.

**Valuation phase of non-family social capital through the development of alliances**
Implementation of non-family social capital to promote internal innovation in the short term (technological partnership), then in a long-term vision, with a view to industrialization.

**Initialization phase**
Creation of new capacities. It is about integrating new resources and recombining them with the existing ones by implementing innovative capacities (innovativness).
- Mobilization:
  - Technical capital
  - Patient capital
  - Family social capital
  - Intellectual capital

**Enrichment phase - new business**
Recognition of recombination opportunities for newly produced resources:
- Increased family social capital
- Intellectual Capital

**Legitimization phase**
Positioning acquired within the market allowing institutional recognition and acceptance by “new” peers.
1. **Internal Product Innovation (Battery-Charging Station)—Initial Enrichment Phase**

It deals with converting the historical business of the group, paper bible and cigarette paper, and turns the know-how into a skill to produce ultrathin films for supercapacitors. By highlighting one of the group’s companies acquired several years ago, two innovations are being developed: batteries and charging stations.

2. **Co-Innovation (Vehicle-Battery Building Plant)—Phase of External Capital Valuation External Capital by the Development of Strategic Alliances**

Through the development of alliances with an energy company and a family business, the group is building a battery manufacturing plant and a vehicle to test battery technology.

3. **Internal Service Innovation and All-In-One Offer (Carsharing)—Initialization and Symbiotic Integration Phase**

The company started to create new capabilities, with the integration of new resources and the recombination of the existing ones by the implementation of innovation capabilities (innovativeness). This stage requires several types of capital: technical, patient, family, social and intellectual. Thanks to deep tacit knowledge within the company, as the result of special relationships with all employees, the company quickly integrates new resources with existing resources. The approach is to ensure the integration of “nuggets”, whether material or human, within the new set. The development of innovation aims at the development of “turnkey” services / solutions. For the electromobility, it is the battery, vehicle, computer and charging station technology, combined with the technical elements required for carsharing. The group controls the value chain: it positions itself as a service provider, with technological innovations developed in-house. It is a service innovation, based on product innovation achieved through the successful integration of technologies, skills and know-how from the various integrated structures.

4. **Creation of a Company—Final Enrichment Phase—Development of the New “Job”**

It deals with the creation of a company, as a result of the two entities teams’ fusion and on the basis of product and service innovations. The developed service is at the intersection of five technologies (battery, vehicles, charging stations, communication software, and management interface) and four
companies, giving birth to a new business, but also to a new company. Thanks to successful technological and human integrations, this new company has its own image, its own culture and specific know-how.

5. Deployment and Enlargement of the Offer—Legitimization Phase

The new company (carsharing) is the result of the promotion of innovation and co-innovation: the joint integration of the teams was neither simply a means of capturing resources, nor increasing its market power. It has contributed to creating new strategic interdependencies with the acquired entity, aiming at offering a system based on new services or products with high added value, designed to meet the environment new requirements: station-to-station carsharing.

Given our core category, the results obtained in terms of process and considering that:

- The process we identified is not linear.
- Lorbeer’s success in terms of innovation is not solely the responsibility of the “entrepreneur”, Victor Lorbeer. “This exceptional being, who playing both on invention and market, knows how to bring an intuition, a discovery, a project at the commercial stage” (Akrich et al., 1988, p. 1).
- Family business social capital (internal or external) is specifically involved in the process construction and implementation by defining the idiosyncratic contributions of the different actors.
- The legitimization process relies on industrial methods and technical skills: technical objects (cars, batteries, charging terminals, telecommunication infrastructures) play an important role in it.

We have chosen to include the process of accumulation of resources as part of the interessement\(^6\) model “which allows us to understand how an innovation is adopted, how it moves, how it gradually spreads to become a success” (Akrich et al., 1988).

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6. Intersettement is a French-English word used as translation for “intérêtissement”, the theory developed by Akrich, Callon and Latour. “The etymology of this word justifies its choice. To be interested is to be in between (inter-esse), to be interposed” (Callon, 1984).
Carsharing with the prism of the actor-network

The theory of intéressement (Callon, 1979), developed in the sciences sociology context to investigate how technologies are set and spread in society (Bagla-Gökalp, 2000), complements the network theories (Granovetter, 2006, 1985) by considering all the material elements that are missing from the theory of social networks.

Technical objects, theories, and scientific hypotheses can facilitate the building of links between actors and allow compromises. The networks of actors simultaneously create society and technology.

Considering the technical elements of carsharing as network players in the same way as humans, reveals deeper mechanisms, along the intéressement phases.

*Figure 7 – The 4 Phases of Interessement Theory*

<table>
<thead>
<tr>
<th>Phase 1: the problematization</th>
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<tbody>
<tr>
<td>Phase 2: the implementation of the intéressement</td>
</tr>
<tr>
<td>Phase 3: the translation</td>
</tr>
<tr>
<td>Phase 4: the black box</td>
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*The Problematization*

Problematisation is a movement through which an actor strives to become indispensable within a network of problems and entities. The problematization defines compulsory check points and describes a system of associations.

By declaring its intentions (early 2000s, construction of an electric car), the Lorbeer group has positioned itself as the fulcrum of problematization and has given given roles to the sector’s stakeholders:

- Vehicle manufacturers role: archaic group unwilling to develop the electric vehicle. The traditional car manufacturers have a role “in negative” of Lorbeer’s. Lorbeer can present itself as the relevant alternative to the public authorities.
• Battery manufacturers: the group’s first positioning / role is battery manufacturer. This is the result of valuing trades and heritage. The technological choice is disruptive with the “classical” electrochemical couples. There is no competition, since the batteries are different. Other manufacturers have a neutral role and do not belong to the system under construction.

• Manufacturers of charging terminals: within the group, there is an entity in charge of the terminals development and electronic interfaces. The role assigned to other manufacturers is similar to battery manufacturers ones: they have a neutral role.

• Energy companies: Lorbeer is a battery manufacturer, associated with an energy supplier in a battery manufacturing plant. The energy supplier is a partner and no longer an institutional contractor: it is a first evolution of the former leading actor in electromobility. By adopting the “policy / vision” of the energy company, building plant and forcing technological choices, Lorbeer removes part of its autonomy of decision.

• Institutional actors: thanks to the battery development of the battery and the discourse displayed by the group, institutional actors are in a role of dependence: the national level is lambasted for its inertia in the sector; local actors are presented as victims of the general inertia of the historical actors.

To these “classical” actors, in connection with the actor-network theory, are added the artifacts, the (future) hybrid actors of the electric vehicle (car-sharing). “An artefact or a technical object (considered as a hybrid insofar as it is at once real, social and discursive) is the result of the confrontation of interests, constraints, representations and different trades; the system is as much of the (re) definition of the technique as of the society one, or even the definition of nature and identity of the actors” (Bagla-Gökalp, 2000).

The actors are:

• The battery: the expected role is the sufficient autonomy (autonomy displayed 250 km), which was the point of failure of previous batteries; recycling, for which the group is considering a second life (stationary batteries for storage of photovoltaic energy in Africa). The technological choice is disruptive. But the actor “battery” is anchored in the group as a long-term strategy and not an opportunistic one.

• The vehicle: it must be “electric” and adapted to the city. An electric vehicle is not an electrified vehicle (an existing model on which batteries are placed); it is a specific vehicle to stand out from conventional cars for the purpose of differentiation of use: it is the role of this hybrid actor, namely to offer both services and a dedicated, not comparable...
appearance. This is one of the conditions for the setup of an alternative socio-technical environment of the electric vehicle: it must be adapted for the city and in connection with the previous role. But the actor must also be able to respond to the expectations of the territories for the development of individual public transport solutions, such as carsharing (the robust vehicle) and meet the needs of the city dweller (compact, manageable and easy to park vehicle, able to carry several people, groceries/shopping).

- The charging station: it is the third player, fulcrum of the network, almost a bridge in the sense of Granovetter (1985). The bridge position offers the possibility of being an intermediary between different groups and allows power games, and an entrepreneurial strategy that would consist of taking advantage (Michie, Burt, 1994) of “structural holes” (Bagla-Gökalp, 2000). Since the first projects of electromobility, the car manufacturers, the energy providers and the territories passed the parcel: “we will build electric vehicles when there will be charging stations”; “We will deploy charging stations when there is an offer of electric vehicles”. The existence of this actor within the actor-network is a solution brought by the group to this question. The hybrid actor is for the carsharing solution, and made available to private electric cars. Hence the word “bridge” for the charging station: it creates the relationships between the individual and collective systems, and between the other actors of the socio-technical environment.

- IT: this actor must ensure the different levels of human-machine interfaces, (vehicle and data exchange). The central software is the backbone of the project structure. It has a role of integrator of all actors, either human or hybrid.

### The Interessement Scheme

The interessement scheme deals with sealing alliances, interrupting any parallel or concurrent alliances. It is a set of actions taken by an entity to strive to impose and stabilize the identity of the other actors defined in problematization.

The sector and the technical aspects constitute an archetype of the interessement. A successful interessement is the enrollment of the actor. To describe the enrollment is to describe all the multilateral negotiations and the maneuvers that make it possible. We can illustrate the enrollment by the partnership with two European car manufacturers, without previous interest for Lorber or the hybrid actors: the proposed car sharing has enlisted the batteries-vehicle-interfaces-communication actors resulting in an all-in-one...
offer that meets market expectations. Achieving this successful enrollment required giving up some technologies and shifting partnership.

In the words of Akrich, Callon and Latour (1988, p. 22) “Innovation is the art of interesting a growing number of allies who make you stronger and stronger”. Among the allies, beyond the actors we mentioned, we must also count the users who have joined the system, and whose numbers have grown rapidly from the first months of operation to reach more than 100,000 subscribers (data released by the company).

In search of partners to test the battery, the approaches of French car manufacturers in the 2000s are unsuccessful (no manufacturer interest).

Lorbeer turns to an Italian designer. They set up a factory for the construction of electric cars, based on the vehicle designed by the car manufacturer, allowing the latter to redeploy its business.

The launch of a territorial tender for the development of a carsharing service is a way of interessement scheme offered to the under-construction network.

The success of Lorbeer’s carsharing projects has changed the role of car manufacturers: success has interested them, and led them to seek the partnership (initially postponed) with the group. The alliance with the Italian manufacturer is stretched in favor of a more active participation of another manufacturer alongside the group. This is the reorganization of the alliances inherent to the phase of interessement.

The partnership with the energy company also mutates, but strengthens the group’s ascendancy over the energy company: instead of the energy company electricity, the group has chosen green electricity (hydroelectricity) as a way to regain reputation and ensure coherence with a strong position in favor of sustainable development.

The second evolution of the energy supplier role is the competition started by Lorbeer for the deployment of charging stations as part of a national program.

The Translation

“To translate is to express in one’s own language what others say or want” (Callon, 1986). Through its customer knowledge, Lorbeer has been able to create a project that reflects their expectations: a turnkey service and a single point of contact. We are here in “translate, it is to link statements, issues through the recomposition of a message, a fact, an information”. This translation capacity is linked to the innovativeness associated with the unique knowledge of the family business of products and customers (Miller, Le Breton-Miller, 2005).
As a corollary emerges the spokesperson. To speak for others is first to silence those for who we speak. The group and its leader become influential and listened to, because they have taken the leadership of several populations, mixing manufacturers, energy suppliers, equipment manufacturers, technology solution providers, local politicians, but also batteries, charging terminals and vehicles.

“This chain of intermediaries that leads to one and only spokesperson can be described as the progressive mobilization of actors who combine and mass to make credible and indisputable proposals” (Callon, 1986).

If consensus is reached, the latitude for each entity is narrowly defined. The initial problematization and its assumptions gave way to a network of binding links.

The black box or the end of the process of legitimacy

“One the consensus is reached, we end up with a network of binding links; it is a successful translation, a network that becomes irreversible and functions like a black box” (Akrich et al., 2006).

The black box is no longer the subject of questioning: the results of the mobilization of long and solid networks, its existence seems self-evident (Bagla-Gökalp, 1999). The black box is an explicit form of certification (Yiu, 2008).

The carsharing solution offered by the group is the manifestation of the black box, the successful translation. This is the locking of the network actor.

The black box is the finality of the process, and the manifestation of the legitimacy of the group.

Discussions and implications

Our theory is based on a two-dimensional referential: the theory of resources from management sciences and the sociology of sciences, linked with network theories. This paves the way for different future research opportunities, either tests of our theory on companies with a different profiler (family SMEs, non-family businesses...), application of our theory to other fields: is this applicable / relevant in the context of incremental innovation? Is it applicable in non-technological areas?
In addition, it might be interesting to re-read the grounded theory that emerged through other referential, such as the Garbage can model (Cohen et al., 1972) or the Product Service System mentioned earlier.

We have highlighted a strategic and entrepreneurial process for the development of carsharing. The keys to success seem to result from several dimensions:

• The “resources” dimension: the process of innovation in family businesses mobilizes specific resources, such as familiarism as an idiosyncratic accumulation of resources that results from the continuous involvement of the family in the enterprise (Habbershon, Williams, 1999).

• The “family” dimension: the socio-emotional wealth that illustrates the influence of the family (attachment to the company, tightening of social links based on kinship, unique identity coming from the identification between family members and the firm) supports the process (Mills et al., 2007).

• The “social capital” dimension. Social capital is the result of collaboration and interaction between people who share their ideas (Wright et al., 2001; Subramaniam, Youndt, 2005). Nahapiet, Ghoshal (1998) set social capital into three dimensions: structural, relational, and cognitive. Social capital—in particular deriving from mutual trust between individuals and organizations, facilitating actions and value creation (Nahapiet, Ghoshal, 1998; Kwon, Adler, 2014)—is a unique family resource that constitutes a distinctive familiarism (Pearson et al., 2008): the family is the source, builder and user of social capital (Arrègle et al., 2007, 2015; Stanley, McDowell, 2013; Panwar et al., 2014; Sanchez-Famoso et al., 2014; Suess, 2014).

If the specificities of the family business are not transposable or reproducible, it is nevertheless possible to draw lessons on the mobilization of social capital.

Social Capital in the Problematization Phase:
The Necessary Strengthening of the Structural Dimension to Develop Intellectual Capital

For Nahapiet and Ghoshal (1998), this dimension mainly influences the development of intellectual capital by facilitating the exchange of knowledge, and by encouraging participation in training. It also influences the development of relational and cognitive dimensions. It has been shown that strong, symmetrical and frequent links are often associated with the development of affective relationships, and therefore these relationships have an influence on
individual motivation in social engagement and in the exchange of knowledge (Krackhardt, Brass, 1994).

It is about creating a common understanding of the issues and goals, and gaining access to each other’s resources, promoting the production and implementation of new ideas (Sanchez-Famoso et al., 2014).

**Social Capital in the Interessement Scheme Phase: Share Goals to Reduce Conflict and Facilitate Negotiation**

Thanks to trust and the development of a common culture, the strengthening of the internal social capital, all the human and hybrid actors, each in their respective roles, have been set in motion for the creation of the turnkey system.

We are here in the cognitive dimension. The group was able to share the objectives in the network, and inspired group members with similar perceptions of how to act. The cognitive dimension acts as a linkage mechanism that helps organizational partners to integrate or combine resources and thus reduce conflict and facilitate negotiation and setting common goals (Tsai, Ghoshal, 1998)

**The Role of Social Capital in Translation: Developing Relationships of Trust and Belonging to the Network, by Sharing Beliefs**

Translation, and then the emergence of the spokesperson, is possible thanks to the exploitation of the relational dimension of social capital. The relational dimension focuses on the type of connections that are established, and the level of trust created (Hazelton, Kennan, 2000). The major concepts of this dimension are respect, friendship, trust, reliability, expectations, norms and obligations, and identification (belonging to a group of people). The set of concepts thus covers the constraint of the links of the network. To question the spokesman is to return to relationships of trust or friendship: it is the “treason” that goes beyond the sphere of business and directly affects human relationships.

In parallel with the reinforcement of the different components of social capital, we suggest the following managerial implications:

1. The process of innovation should not be seen as linear: alliances, whether technical or partnership-based, can be made and disbanded as the system evolves. It seems necessary to accept a certain level of uncertainty.
2. Success is not the sole responsibility of the entrepreneur: Victor Lorbeer, who has been compared to Elon Musk by one of our interlocutors, or Edison, as Granovetter and Callon say, are entrepreneurs and not “genius handymen”. It involves mobilizing entrepreneurial skills (orientation) and ensuring the successful integration of human and technical nuggets, while assigning idiosyncratic roles to the various actors, project members or stakeholders (local authority, state, competitors).

3. Considering technical and technological elements (batteries, vehicles, communication infrastructures) as actors (artifacts) in the same way as individuals or businesses. Therefore, the process takes on a larger dimension: each of the actors, by assuming and fulfilling the role / function assigned to them, is interested in the success of the project. Collectively, the actors federate around the initiator (the Lorbeer group and its incarnation, the leader), who becomes a spokesperson, a representative, in our case of electro-mobile services. This set is structured and restructured on itself, until becoming an indisputable solution, due to the unanimity of the actors, since they are all in the interest: it is a black box, legitimized, since everyone there contributed.

**Conclusion**

By highlighting the entrepreneurial aspects of carsharing, we have shown the importance of the company’s resource mobilization capacity, its capacity for innovation, but also the role of implementing strong social capital. The conditions for the emergence of the carsharing solution throughout the creation process of the network are reinforced by the conditions for creating the social capital of the family business. These conditions can be recreated within any company: stability, interactions between the actors, enhancement of the common heritage, influence on external partners, closure of the network with restricted access and adherence to standards promoting innovation.

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