From product related services to service related products:
OEM's transition to Mobility as a Service
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1. Introduction

Mobility as a Service, the next big thing for OEMs

Today, not a week goes by without a major OEM announcing it is developing or investing in a Mobility as a Service offer (MaaS), such as a carsharing, charging or a monthly-leasing service. Examples include the Volvo Care program (Kjellberg, R and Lagerkvist. 2018), or Renault's Marcel service. Other type of companies are also showing that they are interested in MaaS: Apple invested a billion dollar in the Chinese ride-hailing company DidiChuxing in 2016 and, more recently the AV-focused company Cruise raised $1.15B in new equity. MaaS can thus be seen as the next big thing, both for carmakers and leaders of the digital economy, although they can be difficult to efficiently implement, operate and monetize for actors not familiar with that sector.

Despite the fact that the servitization of industrial companies is not new…

The servitization of industrial company is not new: it has been studied for around 30 years, since it was first conceptualized in 1988 by Vandermerwe and Rada who introduced the concept to describe the phenomenon through which "manufacturing firms broaden their position in the value chain by seeking to generate revenues from services as well as products".

As for the servitization of OEMs and the automotive industry, it has also been the topic of academic scrutiny. In 1999, Verstrepen published "Servitization in the automotive sector: Creating value and competitive advantage through service after sales", which looks at the ways carmakers develop services via various activities that take place after the initial sales transaction such as the installation, repair, maintenance, quality control and complaints handling. This phenomenon has recently accelerated thanks to the appearance of internet and the diffusion of digital technologies that makes gathering data and transferring easier and faster. Moreover, services developed by OEMs have begun to diversify, affecting other steps of the value chain and their business model with the appearance of subscription-based services.

…OEMs have recently been focusing on a new kind of service: mobility as a service

Despite the fact that services have always been a part of the car industry, particularly when it comes to financing car acquisition, recent times have been characterized by a major shift in OEM's strategy towards services: today, many OEMs are openly stating that they are refocusing on becoming *mobility* companies. Håkan Samuelsson, chief executive of Volvo Cars, thus recently declared "Rather than just building and selling cars, we will really provide our customers with the freedom to move in a personal, sustainable and safe way." In the same fashion, Ford Motor CO.'s CEO declared in September 2016 that: "Ford Motor Co. has to transition from a car company into a mobility company, because the global transportation market and consumers' attitudes are changing." More recently, in May 2018, Akio Toyoda declared "I have decided to redesign Toyota from a car-making company into a mobility company".

Whereas most literature about the servitization of OEMs focuses adopt the strategic and marketing lenses, little research has been reported on the process of servitization at the product development project level, and the link between product innovation management and the firm's servitization strategy. This paper aims to address this gap, and is structured as follows.

First, before analyzing the ongoing move of automobile industry to mobility services, we ask in what sense such innovative offers can be analyzed as radical innovations, compared to the more traditional automobile centric services? To do so, we will characterize how the relation between product design and service design has been articulated, in order to create a valuable product and service offer on the market. Such an analysis will demonstrate how the on-going variety of mobility services that are now deploying introduces different levels of disruption in the innovation processes of automotive firms.

Second, we ask how such breakthrough service innovation strategies can be explored by the OEM, while they are running their product oriented businesses? This is typically an ambidexterity issue. We will then review such literature to build our analytical framework for studying our empirical material.

Then, with the lenses of these two theoretical frameworks, we analyze how the studied firm organizes its innovation processes on the domain. We show that this process combines various projects and experiments, managed in what we call an ambidextrous program (PMJ…). We point out the issues raised by such specific innovation strategy in a product oriented firm. We conclude with suggestions for future research.

2. Literature review and theoretical framework

Servitization in strategy and marketing literature

The concept of servitization was first formulated by S. Vandermerwe, and J. Rada (1988), according to whom "Modern corporations are increasingly offering fuller market packages or 'bundles' of customer-focused combinations of goods, services, support, self-service and knowledge. But services are beginning to dominate. This movement is termed the servitization of business". It is close to that of servuction, coined by Pierre Eiglier and Eric Langeard in 1987. These two researchers conceptualized the act of producing a new service and, just as the action of producing a product is called production, producing a service can be called servuction. Another definition of servitization is given by Ren & Gregory (2007), for whom "servitization is a process of change of strategy where manufacturing companies opt for an orientation in services and/or develop more and better services with the goal of satisfying customer needs, obtaining competitive advantages and improving company's performance".

The process of servitization allows a company to "reposition itself by moving upstream or downstream in the value stream, integrating upstream or downstream positions in the value chain into its own organization, or introducing a new, or moving into an existing, adjacent value stream" according to Chen and Johansen. This has real implications for businesses, who are shifting from products to solutions and where solutions are supplementing product rather than replacing them.

The servitization process itself consists of different elements that can been divided amongst five main categories (Harmsen, Willem & Rabetino, Rodrigo & Kohtamäki, Marko, 2016): (1)

structural organizational elements, (2) offering-related elements, (3) intangible organizational elements, (4) managers' characteristics, and (5) employee characteristics.

According to N. Kryvinska, S. Kaczor, C. Strauss, M. Greguš (2014), there are five underlying general trends responsible for the shift towards services and related approaches to explain this development. They identify five trends: (1) a shift from products to a world including solutions, which means that solutions are rather supplementing products than replacing them. (2) Classic outputs are developed into outcomes which lead to outcome-based contracts that guarantee, for example, the availability of a product. There are also (3) shifts from simple transactions to relationships, (4) suppliers to network partners, and (5) isolated elements alter to complex eco-systems.

Product related service in innovation and product development literature

Due to the growing importance of servitization in competitive strategy, product related services become naturally an important domain of innovation. But the literature on innovation management has not dug deep into this domain. In 2008, Heiko Gebauer notes that "A typical problem associated with product-related service innovation refers to the fact that new service innovation tends to be a haphazard process: it simply "happens." Rather than developing more formal structures to elicit ideas for new product-related services, it is mostly ad hoc…The major challenge to success in innovating product-related services is its conspicuous absence in the service management literature."

How can such product-related service innovation design be analyzed through the main concepts of innovation theory, such as incremental or radical innovation, architectural or modular? We will explore this question in the next section focusing on the automotive sector.

3. Servitization in the context of OEMs: from product related services to MaaS related product

Carmakers have, for a long time, developed services that support their model of selling automotive product: financing, leasing, on-board telematics services, car rental and ride hailing. The strategic and marketing literature develops the reasons for such a development of services, as a value adding process to the product offer by facilitating the acquisition of a vehicle or by developing the customer mobility experience. But when considering the innovation development issue, such service developments are far from similar. We can organize them in three different types, which correspond to three different periods: service added to product; innovating service related product innovation; dedicated product to service innovation.

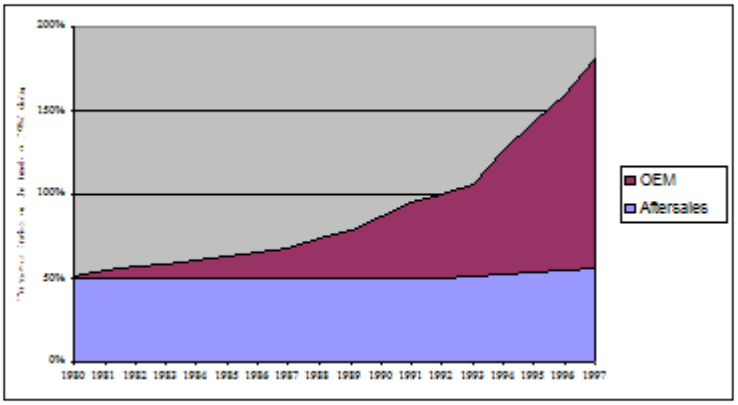
Developing innovative services around products

In 1999, Verstrepen published his paper "Servitization in the automotive sector: Creating value and competitive advantage through service after sales" which looks at the ways carmakers develop services via various activities that take place after the initial sales transaction such as the installation, repair, maintenance, quality control and complaints handling. His main argument is that services are increasingly providing new value to OEMs, and that this trend is set to last.

This kind of innovation does not interfere mainly with the product development process. It is developed through after sales complementary design. At most, product maintenance and repair constraints are gradually being integrated as new constraints into the initial design of vehicles.

Developing product related service innovation through innovation featuring process

But aiming to create more valuable services sometimes imposes introducing specific components within the initial vehicle development. In his longitudinal analysis of the connecting car concept, Midler (2002) show how the car radio, initially installed through a heavy aftersales operation, was gradually incorporated, in the 1980's and 1990's, as an integral component of the vehicle design process. Such a move from aftersales ad-on process to simultaneously designed component of the car improved mainly the value of car radio for customers (better sound, ergonomy and integration of style in the dash board while the installation cost was reduced) and favored the growth of car radio equipment and sales (figure 1).



The growth of car radio equipment in the 1980's and 1990's
Source Midler, Lenfle (2008)

The process of coordination of the car radio design and the vehicle design evaluated in the period from buying on the shelf solution from suppliers to a co-development process (Midler Lenfle 2008). The boost of communication and digitalization in the late 1990's and early 2000's was a major leverage to develop services supported by imbedded communication hardware and software. Midler & Lenfle (2003) characterize 4 types of such services: emergency breakdown service, navigation aids, communication services and infotainment, asserting that Information & Communication Technologies and the internet had enabled the proliferation of this kind of services.

This evolution was part of a more general movement to platformization of the automotive product (Cusumano & Nobeoka, 1999) and to building an innovative featuring capability (Maniak et al. 2014) among automakers: innovative services are supported by embarked modules that are first matured in the advanced engineering phase of the design process then "plugged" on the platform during the vehicle development phase. Analyzing a pioneer embarked telematics innovation, Midler and Lenfle (2003) focus on the impact of this innovative service on the car development process. They show how much intrusive is the specific service design constraints on the traditional new product development processes. They identify the evolutions that had to be implemented to coordinate the service development logic with the product development one.

Since then, the improvements and the spread of digital technologies have developed as key issues in most OEMs agenda and their strategy. This rise of autonomous vehicles, which can be shared and used by third-parties to operate their own fleet, has led to the creation product-service systems (PSS). In "Product-Service System for Autonomous Vehicles: a preliminary typology studies", Antonialli, Fabio & Habib Cavazza, et al. identify three main category of product-service systems: product-oriented, use-oriented and result-oriented. Moreover, they emphasize the business model aspect of these systems, explaining that they can be focused on leasing, renting or sharing and, finally, pooling. PSS are important to look at since they help define which of the product or the service provides satisfies customer needs.

But to what extent do such mobility services constitute a radical innovation, an escape from the automobile dominant design, defined as (i) a multipurpose family vehicle, (ii) a B to C business model, (iii) a mass manufacturing process and (iv) an industry structure with the OEM as focal firm and a hierarchized supply chain? In fact, mobility innovations as modern ride hailing as proposed by Uber or Lyft can be considered as an extension more than a disruption of the dominant design. The car is traditional (black) car, sold by OEM to ride hailer as customer-driver, and the ride hailing system and app is an aftersales equipment of the car.
To explore the various possibilities of Mobility as a Service, we propose the following mapping, resulting from implementing Concept Knowledge theory (Hatchuel & Weil, 2009) to the domain of Mobility as a Service. Such a theoretical framework leads to breakdown and ill-defined and uncertain but appealing concept (such as "Door to door ecological user oriented mobility service") along different variables (such as users : "who is transported ?" driver : "who is driving", vehicle owner) in order to clarify the definition of the offer.

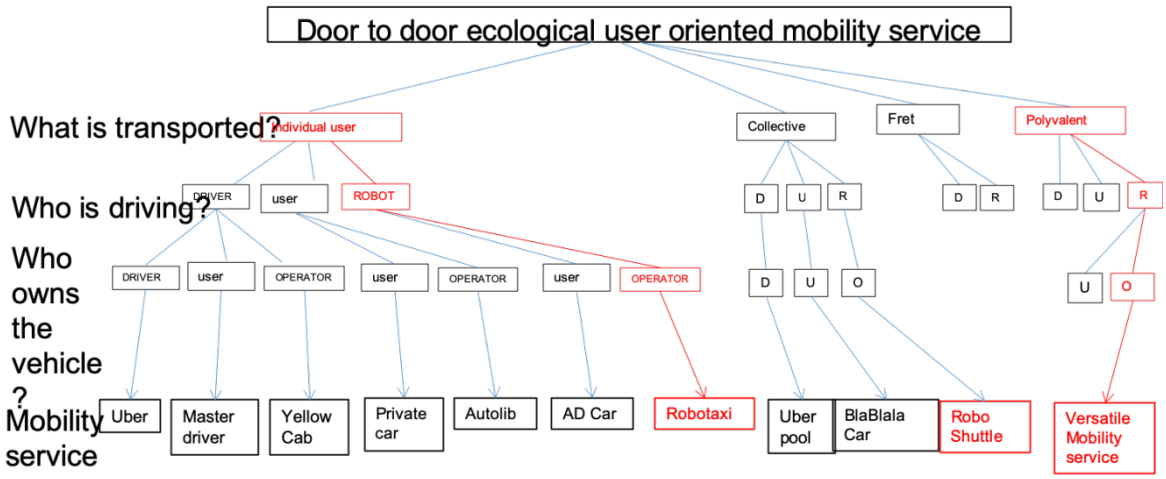


Figure 2: the mapping of the Mobility As A Service configurations
(Source Alochet Midler, 2019)

Only the red branches of this mapping appear as radical innovation moves as defined by Abernathy and Clark (1985): a new product (robotaxi, roboshuttle and versatile mobility vehicle), a new business model (from B 2C to B2B2C). All the other configurations can be implemented through the existing innovation featuring process of car manufacturers.

The exploration space of MaaS

Focusing on this red branch and basing on servuction literature and Lenfle & Midler's (2009) mobility service design framework we can frame the design space of MaaS in four integrated design domain : (i) Designing vehicle to MaaS, (ii) Designing a AV enabling infrastructure, (iii) Designing backend fleet operating system , (iv) Designing frontend mobility system (see table 1).

Key components	Designing Vehicle to MaaS	Designing a AV enabling infrastructure	Designing Backend fleet operating system	Designing Frontend mobility system
Examples	From automatized generic vehicle to dedicated robotaxi	AV dedicated infra V to V V to Infra	Maintenance hub Fleet Management Fleet supervision	Customer application CRM

Table 1: the four domains of MaaS design space.

Research question

OEMs can no longer solely focus on developing "better" vehicles: they have to take into account other specificities which can make AVs more efficient in terms of transportation for users and cities. These include developing infrastructures that help AVs navigate cities and optimize their itinerary, as well as making sure both the front and backend of the mobility system allow for a smooth customer experience.
Thus, in this paper, we will study how an OEM organizes the exploration and solution development within the aforementioned design space.

3. Method

Choice of methodology

Due to the fact that the research question is quite new and we had no previously established hypothesis to test but rather some open questions to answer, we chose to focus on a detailed single case to explore this new research question (Eisenhardt, 1998 and Yin 2009). The single case study was also chosen since looking at several projects and how they are part of an OEM's larger servitization effort requires being familiar with the company and the technology being developed.

Choice of case

The automotive industry is a good opportunity to study ambidexterity and servitization since OEMs are currently deeply involved in the shift to autonomous and electrical vehicles, as well as services since Mobility as a Service (MaaS) is becoming more and more present in the sector.

Data collection

Empirical data for this article was collected from January 2018 to April 2019 using a 3 steps approach. Firstly, an overview of the company, its ambitions and its main projects was obtained

by reading secondary sources such as internal documentation, annual reports, press releases and corporate films. Secondly, a round of semi-structured interviews was led to gain knowledge and elements from sources directly involved on the projects. Thirdly, involvement in two projects, one via direct participation and the other via observation, allowed to study how projects were managed and gain a new insight on the OEMs way of operating. This allowed the researcher to implement triangulation, in which elements coming from interviews were directly checked "on the ground" and with the project team to clarify details or check the validity of the assertions. Our first goal was to map out all the projects linked to the development of autonomous vehicles. We then selected those which were relevant in terms of service development since some projects are essentially product-centric and have no service component. This selection was made on advice of the company's management, people involved in the project and also our own observations.

4. Results

On a first batch of 21 projects associated to the rise of autonomous mobility, ten projects were found to be relevant in the context of servitization analysis. Among these ten projects, some are essentially internal projects, others are led with partners, either private companies or public entities. Some projects are founded on the development of hardware, others on software while some focus on the development of new knowledge and expertise. Finally, some are operated in real-life via Field Operational Tests (FOTs) while some are tested via simulation.

Analytical framework

The development of services requires OEMs to master several components: these are the vehicle design, both in its engineering and shape/form sense, the design of the infrastructure (ie, all equipment installed on roadways to enable the circulation of AVs, such as connected traffic lights or an operating center), the backend of the fleet operation system (the robotaxi Hub to recharge and maintain the robotaxis, the IT system and database allowing the monitoring and maintenance of the fleet) and, finally, the front end of the customer management system, which can be an application or a website. Projects focus on different degrees of development, ranging from concept formulation to field experiments while intermediary stages are namely the development of a demonstrator and a prototype. The below table synthesizes the analytical framework.

	Vehicle design	Infrastructure design	Backend fleet operation system	Frontend customer management system
Concept formulation				
Demonstrator				
Prototype				
Field experiments				

Table 2: Analytical framework of the MaaS exploration/development projects

1. Project 1

This project was launched in 2013. It is an autonomous platform mobility system designed by a core team of 5 employees with robotics and IT background that encompasses both a physical platform (an autonomous vehicle, developed from a project finished 2 years earlier) with an associated mobility system – basically a valet parking. The vehicle opens up with a badge, it can be booked online and can be driven manually when the autopilot is turned off. The finalized project was presented at the 2015 Bordeaux ITS Congress. Designed as a robot more than a car, the architecture of this vehicle was used in another project whose main purpose was to create a

vehicle that can drive itself on certain parts of the road. Once this mobility system was implemented and experimented, 2 vehicles were sent to a University in the north of France to increase their autonomous performance.

Project 1	Vehicle design	Infrastructure design	Backend fleet operation system	Frontend customer management system
Concept formulation				
Demonstrator	Automatized serie car			Reservation app
Prototype				
Field experiments				

2. Project 2

Project 2 was launched in 2016, encompassing about 300 employees. At the end of 2018, it was separated into two entities: one focusing on the software and coding of autonomous technology and the other developing the business model of a robotaxi service. A particularity of this project is that it is located in another office than the technical teams comprising engineers. It is essentially focused on the business model of a robotaxi service.

Project 2	Vehicle design	Infrastructure design	Backend fleet operation system	Frontend customer management system
Concept formulation			Fleet sizing and management simulations	
Demonstrator				
Prototype				
Field experiments				

3. Project 3

Project 3 is essentially a concept and knowledge-based project, where Renault employees from various background come together once a week to work on an urban delivery mobility concept. The project is led in an open-innovation lab, where participants are free to help the project according to their expertise. A key issue under scrutiny in this project is the design of operations and assessment of the business model, since the object being designed is radically new in terms of concept: it is connected, autonomous and modular.

Project 3	Vehicle design	Infrastructure design	Backend fleet operation system	Frontend customer management system
Concept formulation	Design and architecture study for urban shuttle concept (no technical)	Design thinking scenarios	Design thinking scenarios	Design thinking scenarios
Demonstrator	Design and architecture study for urban shuttle concept (no technical)			
Prototype				
Field experiments				

4. Project 4

Project 4 is a cross-OEM project launched in 2017 that aims at developing autonomous components such as an urban chauffeur over a 4 years period. Project 4 unites 34 entities, ranging from OEMs to Tier-1 suppliers to public authorities and aims at testing autonomous functions across 11 European countries. A special focus is made on border crossings since it is

a European project, and the OEM learns to collaborate with external actors such as public authorities to develop this new service.

Project 4	Vehicle design	Infrastructure design	Backend fleet operation system	Frontend customer management system
Concept formulation	Scope : Protocole communication between Vh			
Demonstrator	Scope : Protocole communication between Vh	Scope : Protocole communication between Vh		
Prototype				
Field experiments				

5. Project 5

Project 5 is a FOT operated between an OEM, a territorial partner, a mobility provider and an insurer that aims to implement an on-demand shared ride-hailing service via two different vehicle types, a shuttle and a smaller vehicle. It was launched in 2017 and the first line opened in 2018. In the case of this FOT, local authorities equipped infrastructures with sensors to help vehicles navigate roundabouts and crossroads. A control center was also built to allow operators to remotely operate vehicles, and the behaviors of the first customers are closely watched so as to improve the design of the service and the interior of the vehicles.

Project 5	Vehicle design	Infrastructure design	Backend fleet operation system	Frontend customer management system
Concept formulation				
Demonstrator				
Prototype				
Field experiments	Automatized vh and shuttles	Automatized vh and shuttles	Automatized vh and shuttles	Automatized vh and shuttles

6. Project 6

This project is a FOT, planned over 3 years, that should enable the OEM to experiment the operation of a mobility service in a peri-urban environment. The fleet in this test is autonomous, although it drives on dedicated roads. The technology essentially comes from another project, what is being developed here is the commercial exploitation of this technology for the operation of a service. Thus, habits of users, their behavior are being closely monitored, and specific attention is given to the particular local conditions in which the experimentation takes place. The exploitation of this service by test customers in a test phase was recently delayed.

Project 6	Vehicle design	Infrastructure design	Backend fleet operation system	Frontend customer management system
Concept formulation				
Demonstrator				
Prototype				
Field experiments	Automatized vh and shuttles	Automatized vh and shuttles		Automatized vh and shuttles

7. Project 7

This project was launched in 2017 and should last until 2020. It is made up of a valet parking service in a shopping area associated to a bus service along dedicated lanes. The municipality has closed off roads to enable the test and equipped the infrastructures with specific equipment

such as a connected traffic light. The OEM closely works with a modelling company that maps the surrounding environment.

Project 7	Vehicle design	Infrastructure design	Backend fleet operation system	Frontend customer management system
Concept formulation				
Demonstrator				
Prototype				
Field experiments	Automatized vh and shuttles	Automatized vh and shuttles		Automatized vh and shuttles

8. Project 8

This project was started in 2013 by a startup, and bought in 2017 bought by the OEM. It is a ride-hailing company that operates a fleet of small fully electrical vehicles from the OEM's brand. Although they are cheaper to operate than larger vehicles, their use is restricted to a certain perimeter in urban areas.

Project 8	Vehicle design	Infrastructure design	Backend fleet operation system	Frontend customer management system
Concept formulation				
Demonstrator				
Prototype				
Field experiments	Existing VE		Commercial exploitation	On-demand app

9. Project 9

This was the first AV prototype to be launched by the OEM, in September 2017. Based on a new electrical vehicle, it underwent testing and also welcome journalists aboard for real-life testing. It was one of the first AV to be designed with early involvement from new suppliers, such as a company specialized in geolocalization, another one in V2X communications and a leader in virtual reality.

Project 9	Vehicle design	Infrastructure design	Backend fleet operation system	Frontend customer management system
Concept formulation	New exterior and interior design			
Demonstrator				
Prototype	Drivable prototype			
Field experiments	Test on open roads			

10. Project 10

This was the second AV prototype to be launched by the OEM, in march 2018. Designed to accommodate up to 6 passengers seating in a living-room type environment, it can reach up to 50km/h. Although it was never driven on open roads, it helped gather feedback from potential users and study how this kind of vehicle should be designed.

Project 10	Vehicle design	Infrastructure design	Backend fleet operation system	Frontend customer management system
Concept formulation	New concept			
Demonstrator	Mock-up			
Prototype				
Field experiments				

A concurrent exploration of the different dimensions of the MaaS design space

The analysis of this ten projects portfolio brings the following observations.

Not surprisingly, we see in those R&D projects a majority of autonomous product and technology centric explorations. This domain is the core competence of the OEM; it is a key bottleneck to design a functional autonomous mobility service and the longest learning process.

Although the existence of functional robotaxis is far from existing to support realistic MaaS testing, the firm implements other domains of MaaS design space through various methodologies: scenarios, simulations, mockups, a chauffeur driven ride-hailing service. This implements a form of concurrent exploration approach (Gastaldi Midler, 2005) to create knowledge on the different "bricks" of the MaaS design space.

Infrastructure design and fleet operating management appear as the less developed domain. The delay in fleet operating learning is not surprising because the ongoing learning phase is to develop few functional prototypes. The first one is less obvious and is related more on a cultural and institutional variables. Enabling infrastructure, as vehicle to vehicle solutions need explorative and design cooperation between OEM and competitors or infrastructure professions, which is not a usual practice. Even if such scenario could be technically easier than the stand alone autonomous vehicle one, its learning is, for the OEM tradition, more complex to implement.
Moreover, most projects cover "vertical" ground, indicating that they develop a service that contains multiple layers that need to be coordinated to work together. This can be explained by the fact that variety of existing autonomous technologies is high and that each project develops its own specificities. Interviews highlight the fact that product-service systems, in this case, tend to appear and grow out of products, although some PSS are reinforced by investments and partnerships with service providers. The complexity for this OEM to develop PSS from a service foundation comes from the fact that mobility services require the coordination of many actors (state-level, town-level, insurance, mobility provider…) to effectively operate, while OEMs traditionally are not accustomed to that. This is changing though, including through the development of FOTs which are taking place in various legal and technical environment and thus help a project team gain new knowledge about how to design and roll out a new technology.
The firms has difficulty launching "horizontal" projects that link non-technical and technical components. Mobility services are focused on user needs and the ability of users to customize their requirements pushes the industry towards customer-centric services, to which the mass-producing automotive industry is not accustomed to. However authors have seen initiatives at the OEM which aim to get better knowledge of users practices to tailor the OEM's offering to their needs. There is currently a great divide between non-technical and technical projects, that even fablabs and open innovation spaces have not yet effectively bridged. Perhaps greater coordination between the two type of project teams would help achieve this, but so far it remains a major challenge.
Last but not least, the exploration portfolio show a heterogeneity in the solutions explored, revealing at this stage a selective exploration approach to master the many "unknown-unknown" (Loch, de Meyer, Pich 2011) of the MaaS domain.

5. Conclusive remarks

In this article, we bridge the innovation management and servitization literatures at the project level to study closely how an OEM shits from product-centered to product and service-centered strategy. we show that servitization is a process during which a company has several domains to look at to develop a coherent offering in terms of vehicle, infrastructure and front and backend. In our case, most projects rely on products (vehicles) that are quite different from what an OEM usually makes since they are planned to be autonomous. Hence, the services associated to these products are also quite innovative and require the company to be able to quickly learn to design new services, but at the same time closely watch how autonomous technology is evolving in terms of software and hardware. Thus, the servitization here takes place in an exploratory fashion for two reasons: current mobility services are new for OEMs since they differ from what was studied before by Vestrepen and Lenfle & Midler, and also because the technology used in these projects is new: autonomous technology is not yet mature and many prototypes are not secure enough to drive on roads. Moreover, these services are closely linked with new business models, which have not yet been tested and for which the rentability hypothesis differ (Nunes, Ashley, and Kristen D. Hernandez. 2019).

On the theoretical level, this article contributes to develop the product related service domain by adopting an innovation management framework to characterize different kind of product related services. This led to a new typology that differentiates product related services strategy, regarding the intrusiveness of the innovative service development within the new product development. With this perspective, we differentiate product added services, product related services and service dedicated products.

This article contributes to propose an analytical framework to the R&D management and project management field to study such project-service kind of innovation. Such a framework reveals how the R&D process of the firm “covers” and articulates the different domain on the product-service design space.

At the practitioner level, this article helps manager identify the project they are working on in relation to other servitization initiatives and thus how they can collaborate with other teams. For example, the fact that most FOTs develop the similar kind of service may help them share and create best practices.

This paper has some limitations. Firstly ,it is a single case study. Second since the OEMs servitization is ongoing and exploratory, it is difficult to assess the evolution of the model. Moreover, due to the speed of the project development and confidentiality of some projects, some projects were not addressed in this article which could have been interesting to include.

This paper opens various perspective. The first one is to go deeper in the studying of such service-product design by analyzing how the firm organize and manage such development within its ecosystem. A bridging with ambidextrous organization field and open innovation field should be useful (Midler et al. 2019). The second perspective is to extend this case to a multi-case analysis and a more quantitative approach. It could also be interesting leading a confirmatory case study research (Perry 1998). Although it is acceptable for theory exploration, the small sample size in this article is an obvious limitation for the generalization of the presented concepts. Thus, the authors will carry out a benchmark of servitization initiatives across several OEMs.

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