

# ORCHESTRATING ORGANISATIONAL TRANSFORMATION FOR BUSINESS MODEL INNOVATION TOWARDS SERVITIZATION IN THE AUTOMOTIVE INDUSTRY

**Prasanna Kumar Kukkamalla**

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DOCTORAL THESIS

ORCHESTRATING ORGANISATIONAL TRANSFORMATION FOR BUSINESS MODEL INNOVATION  
TOWARDS SERVICIZATION IN THE AUTOMOTIVE INDUSTRY

PRASANNA KUMAR KUKKAMALLA

2020





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ORCHESTRATING ORGANISATIONAL TRANSFORMATION FOR BUSINESS MODEL INNOVATION  
TOWARDS SERVICIZATION IN THE AUTOMOTIVE INDUSTRY

PRASANNA KUMAR KUKKAMALLA

2020

DOCTORAL PROGRAMME IN LAW, ECONOMICS AND BUSINESS

Director: Andrea Bikfalvi PhD

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A thesis submitted on fulfilment of the requirement for the degree of Doctor by the  
University of Girona with International Doctor mention

Girona, July 2020



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WE DECLARE:

That the work entitled "Orchestrating organisational transformation for business model innovation towards servitization in the automotive industry", presented by Mr Prasanna Kumar Kukkamalla for obtaining the title of doctor, has been done under our direction and that meets the requirements to be presented in the thesis format as a compendium of articles.

Mr Prasanna Kumar Kukkamalla has contributed in a relevant and specific way in the preparation of this thesis and the publications that derive in different aspects:

- Literature review and framing research questions
- Selection of research methods, data collection and analysis
- Participation in doctoral courses
- Preparation of results
- Selection of journal and communication with Editorials
- Preparation of manuscripts and submission
- Presentation of the papers in the conferences and seminars
- Participating in workshops
- Participation in research stay in foreign university

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- Prasanna Kumar Kukkamalla, Miia Martinsuo, Andrea Bikfalvi and Anna Arbussa (2019). “Creating and developing the actor-network for a car manufacturing firm’s mobility services”, accepted in *International Journal of Services and Operations Management*
- Prasanna Kumar Kukkamalla, Andrea Bikfalvi and Anna Arbussa (2020). “Business model innovation: The case of BMW’s ConnectedDrive services”, accepted in *Journal of Business Strategy*

We accept that Mr Prasanna Kukkamalla presents the articles cited as the principal author and as part of his doctoral thesis, and that said articles cannot, therefore, be part of any other doctoral dissertation.

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## Doctoral Thesis by a compendium of publications

### List of publications

- Prasanna Kumar Kukkamalla, Andrea Bikfalvi and Anna Arbussa (2019). "Collaborative partnerships in the automotive industry: key motives and resource integration strategy", accepted in *International Journal of Business Innovation and Research*
- Prasanna Kumar Kukkamalla, Miia Martinsuo, Andrea Bikfalvi and Anna Arbussa (2019). "Creating and developing the actor-network for a car manufacturing firm's mobility services", accepted in *International Journal of Services and Operations Management*
- Prasanna Kumar Kukkamalla, Andrea Bikfalvi and Anna Arbussa (2020). "Business model innovation: The case of BMW's ConnectedDrive services", accepted in *Journal of Business Strategy*



## Intermediate contributions

The author wants to highlight conferences and workshop that I participated and presented my research work during my research period.

- SERVICE BUSINESS INNOVATION: IMPLICATIONS ON GOVERNANCE, MANAGEMENT ACCOUNTING AND CONTROL, WORKSHOP & SPECIAL ISSUE, Scuola Superiore Sant'Anna, Pisa, June 29-30, 2017.  
Presentation: Collaborative partnerships as a strategic option for servitization in the automobile industry
- I Conference of Pre-doctoral Researchers 2017. University of Girona, Girona, Spain.  
Presentation: Orchestrating organizational transformation for business model innovation towards servitization in the automotive industry  
Conference proceedings, p.51, ISBN: 978-84-8458-502-2
- 6<sup>th</sup> International Conference on Business Servitization (ICBS 2017 - Barcelona).  
Barcelona School of Building Construction (EPSEB), Universitat Politècnica de Catalunya, Barcelona, Spain, 16-17, November 2017  
Presentation: Systematic review of organizational change towards servitization in manufacturing  
Conference proceedings, p.87 (DOI: 10.3926/serv2017 / ISBN: 978-84-946352-7-4)
- 12<sup>th</sup> International Conference on Industrial Engineering and Industrial Management, XXII Congreso de Ingeniería de Organización, Girona, Spain, July 12-13, 2018  
Presentation: Orchestrating organizational transformation for business model innovation towards servitization in the automotive industry
- 4<sup>th</sup> International Conference on New Business Models. "New Business Models for Sustainable Entrepreneurship, Innovation, and Transformation". ESCP Europe Berlin, 1-3 July 2019, Berlin, Germany.  
Presentation: Framework for service business model innovation: An explanatory case study on BMW ConnectedDrive services  
Conference proceedings, p.776 (ISBN 978-3-96705-001-1)

As part of Erasmus+ for Traineeship, the author spent one-year at Tampere University, Tampere, (Finland). Professor Miia Martinsuo, Industrial Engineering and Management, Faculty of Management and Business, hosted and guided me during my stay. She also allowed to participate in paper development workshops and academic writing workshop at the Tampere University, and publishing the following article:

- Prasanna Kumar Kukkamalla, Miia Martinsuo, Andrea Bikfalvi and Anna Arbussa (2019). "Creating and developing the actor-network for a car manufacturing firm's mobility services", accepted in *International Journal of Services and Operations Management*.

For the LORD gives wisdom;  
from his mouth come knowledge and understanding.

**Proverbs 2.6**





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Prasanna kumar Kukkamalla

## **ABBREVIATIONS**

ANT	Actor-Network Theory
BM	Business Model
BMI	Business Model Innovation
BMW	Bayerische Motoren Werke AG
CPs	Collaborative partnerships
EU	European Union
GM	General Motors
IBM	The International Business Machines Corporation
IJBIR	International Journal of Business Innovation and Research
IJSOM	International Journal of Services and Operations Management
JBS	Journal of Business Strategy
M&A	Mergers and acquisitions
OEMs	Original equipment manufacturer
PSS	Product Service Systems
R&D	Research and development
SME	Small and medium-sized enterprises
SUV	Sport Utility Vehicle
UK	United Kingdom
USD	United States Dollar

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## Abstract

The objective of this dissertation is to present a firm's business model innovation (BMI) and organisational change during the servitization process. It mainly aims to produce new knowledge on BMI and the factors that influence the transformation process and organisational change during servitization in the automotive firm. A qualitative, multi-case research design was employed in this research. The data were obtained through secondary sources, including annual reports, press notes, media releases, websites, and auto magazines. A total of 103 public documents were obtained from various sources during the period 2016-2019. The thematic analysis technique was used to analyse the data.

As a trilogy of studies, this dissertation has produced new knowledge and collectively answered the research questions framed. The first study revealed the firms' motivations for collaborations during service transition, in addition to mapping their resource integration strategy. The second revealed the evolution of customer service and presented the actors and their roles in the service network of the automotive firm. In this study, the actor-network theory was used as an analytical tool to analyse customer service evolution. The final study disclosed the BMI and the factors that influence the change of business model in the automotive firm. In this study, the McKinsey 7s Model framework, the elements of which are strategy, structure, systems, shared values, style, staff, and skills, was used as an analytical tool to discuss new business model implementation.

The study has identified three new issues. First, building a better customer relationship was uncovered as one of car manufacturing firms' key motives for making collaborative agreements. The strategic alliance literature mostly focuses on the resource-based view, while the findings of this thesis extend the view to the customer relationship management theory, highlighting how firms use this strategy to improve customer relationships with new service offerings. Second, a novel actor category in the mobility service network was uncovered: co-branding actors. This aspect has not been clearly discussed in the previous research and is a novel contribution to the research on mobility service design and the actor-network, providing knowledge about the actors' positions and activities in the mobility service network. Last, this study reveals the BMI of a car maker's digital services and its key motivators and drivers. BMW mostly innovates in three key dimensions of the BM: value creation, value delivery, and value capture, most of the elements of which are innovated. It also contributes to the BMI literature by revealing the key motivators and drivers during servitization.

## Chapter 1. Introduction

### *1.1 Background*

Manufacturing firms in the developed economies face tremendous pressure due to competitors, environmental policies, customers' expectations, high production costs, and intensive competition from emerging economies, especially Asia, South America, and the Middle East, minimising sales in manufacturing businesses. This turbulence is making European manufacturing firms shift the paradigm of their core business activities. Many companies are moving their business operations, from product sales to the service offer, to create benefit in their value chain. This transformation is known in the research community as servitization. Since the word “servitization” was published for the first time in the business literature by (Vandermerwe and Rada, 1988) (Vandermerwe and Rada, 1988), it has become an emerging area of interest for the business world, and among policymakers and academics alike. Servitization is one of the critical strategic choices for many leading manufacturers to gain differentiation from competitors by offering value-added services (Ahamed et al., 2013). Companies like Xerox, HP printers, and IBM have become an iconic symbol of this transformation.

Servitization is also a way of finding new possibilities for growth and extending the range of existing offers into services (Baines et al., 2009; Mont, 2002). However, at the same time, the transformation of manufacturing companies towards servitized organisations is challenging (Manzini and Vezzoli, 2003; Mont, 2002). By being less visible and more labour dependent, services become a sustainable source of competitive advantage, given that they are much more difficult to imitate (Goedkoop et al., 1999).

The automotive industry is one of the primary industries for a dynamic business transformation. Many car manufacturing firms, including BMW, GM, Volkswagen, and Daimler, have shifted to customer-centric business. This transformation comes about because of some external factors including technological advancements, changes in urban transportation behaviour, and the environmental policies mountain. Along with these external factors, some internal factors, such as the decline in product sales revenue, have forced these firms to review their core business activities. Consequently, a new product-service offering system has evolved in the automotive industry. The adaptation of this strategy varies from firm to firm. Some firms adopt essential services like general maintenance services or value-added services, while others radically innovate customer services to provide infotainment or on-demand services (Tian et al., 2016).

Servitization, however, is not a natural strategic choice, and manufacturers need to design their services carefully to avoid the pitfalls. A manufacturer is likely to need some new, alternative organisational principles, structures, and processes to succeed with

servitization (Annamalai et al., 2011). Wise et al. (1999) claim that to successfully implement servitization as a strategy, organisations are required to change their policy, operations and value chains, technologies, peoples, and system integration capabilities. Manufacturing companies are often considered to add services to protect their market share or in response to a legislative threat, customer demands and expectations, or a competitor's dominance (Beaumont and Balding, 2004; Gebauer, Bravo-Sanchez, and Fleisch, 2008). Oliva and Kallenberg (2003) state that product manufacturers must respond with new organisational principles, structures, and processes to deliver services, while Johansson and Olhager (2004) suggest that they must realign their entire organisation. Creating, developing, and fostering a service culture appears to be one of the significant challenges to traditional manufacturing organisation (Bitner et al., 2008; Gebauer et al., 2008).

Servitization is described as an uncomfortable organisational change (Foote et al., 2002) which requires a shift from a manufacturing culture to a service culture (Mathieu, 2001b). As companies address increasingly complex business challenges, they recognise the need to achieve an integrated perspective within and across organisational boundaries, where it is no longer the single organisation that is the unit of transformation, but the entire enterprise (Al-Haddad and Kotnour, 2015; Valerdi and Rouse, 2010). Servitization requires the manufacturing company to develop a new business model in which the emphasis changes from transaction to relationship-based (Gebauer et al., 2008; Oliva and Kallenberg, 2003b). The manufacturer must select suitable business models to support service products and use various models for different products and life cycle stages (Cohen and Agrawal, 2006). To be successful, the company has to generate a variety of revenue streams from both product and service transactions and find new ways of making services tradable (Araujo and Spring, 2006). Developing services business also requires new structures and forms of organisation in the company (Araujo and Spring, 2006; Cook et al., 2006).

Davies et al. (2006) suggest that the new organisational structure should consist of front-end customer-facing units, back-end capability providers, and active strategic centres. There is agreement in the literature that integrating services into existing production systems creates a new organisational complexity (Baines et al., 2009; Cohen and Agrawal, 2006; Williams, 2007). However, very little knowledge is available in the literature on organisational transformation during servitization in the automotive sector.

## *1.2 Research objective and settings*

This research focuses on car manufacturing firms that have transformed into customer-centric businesses. In the automotive industry, service integration is a strategic decision for competitive advantage and a means to create new revenue streams in industrial

economies. Premium services such as car sharing, on-demand, and mobility services are generating substantial revenue for these firms. In the process of transforming into a customer-centric business, these firms must change their organisation structure and ways of collaborating with other firms, as well as introduce new business models. Little attention has been paid to these perspectives in the literature. Hence, the central objective of this dissertation is *to advance knowledge about organisational transformation and the BMI of automotive firms in the servitization context.*

To achieve this objective, a car manufacturing firm's strategic movements, collaborations, new business activities, and service integrations are investigated, the research topic emerging from a curiosity to understand why automotive firms introduce customer services and how they change the business model. Hence, the aim is to analyse the impact the servitization transition has on the internal organisational structure of the firm, framing the business model, and to provide answers to the following questions.

*R1: How does the organisational structure change during the servitization of the firm?*

Even though significant knowledge on the servitization process is available, the research community and practitioners still face significant challenges regarding how to efficiently transform a manufacturing firm into a service-oriented one (Baines et al., 2017). Several authors call for research on the servitization of organisational perspectives, including inter-organisational power in complex networks (Finne et al., 2015) and degrees of collaboration (Fleury and Fleury, 2014). According to Kowalkowski et al. (2019), despite the sharp rise in publications in recent years, there are still many pertinent research themes within the domain of servitization that need to be explored, including inter-organisational collaboration. RQ1 was framed to investigate changes in the organisational structure of car manufacturing firms. More specifically, the aim was to explore how firms make inter-organisational collaborations, what motivates them to associate with other partners, and how these collaborations advance service integration. Papers I and II were partially conceived to answer RQ1 by presenting two findings: key motives for collaborations (Paper I) and the role and evaluation of partners' customer services network (Paper II).

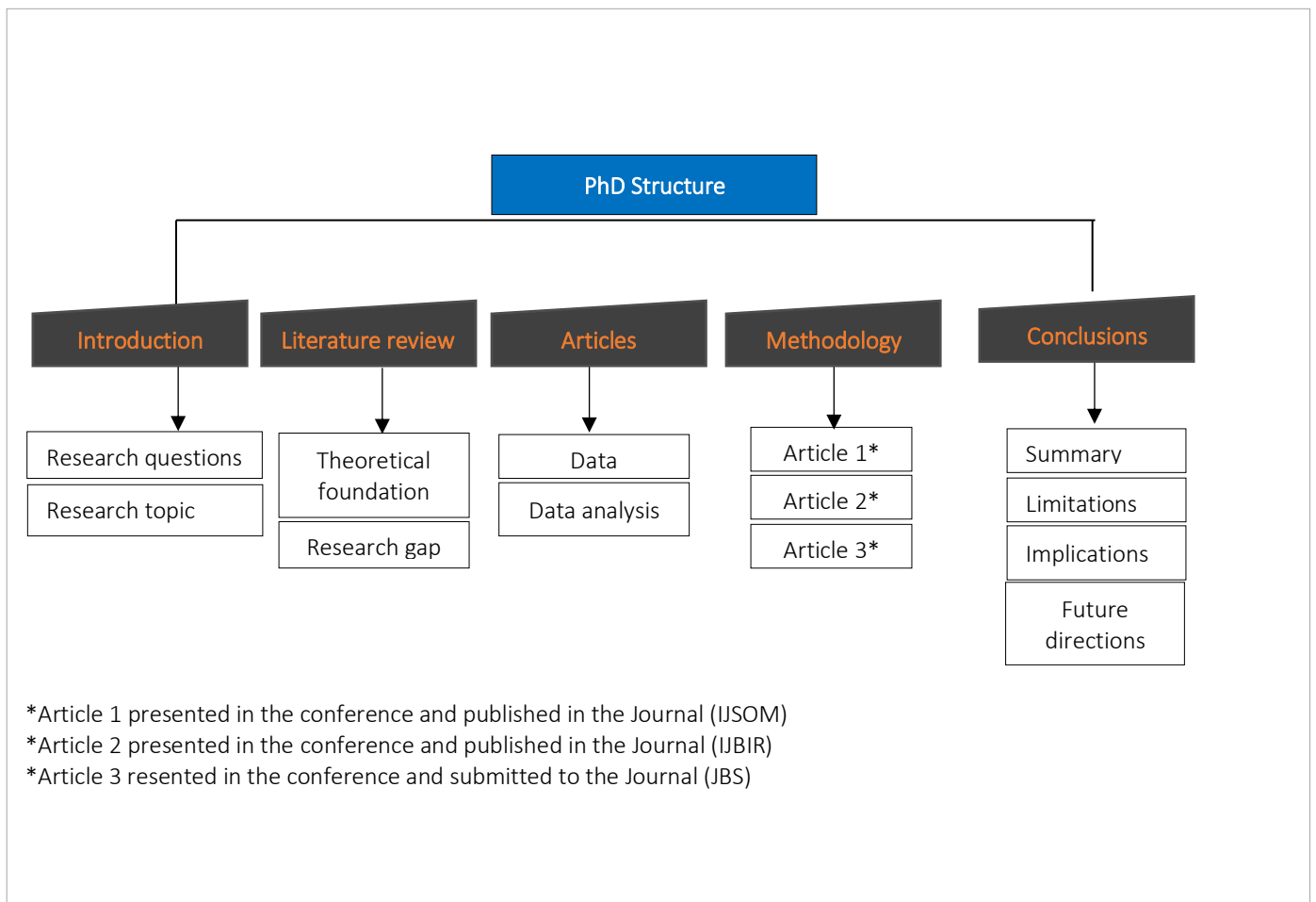
*RQ2 How does the business model change throughout servitization?*

New arrangements in business activities are pivotal to address the challenges faced during servitization. A product-service oriented system requires an incremental or radical change in the business model. However, much of the discussion in the servitization literature has explored service-product strategies, with little attention paid to the importance of business models (Huikkola, 2018). To this effect, the study framed RQ 2 to explore the motives and impacting factors for business model change, and the level of innovation of each element of the business model. To answer this question, a review of

the literature was first carried out, synthesising the critical factors and elements. A conceptual framework for BMI for advanced services was then developed by examining different publications, and subsequently validated with the case firm. This research work was presented as Paper III.

### 1.1 Dissertation structure

This research was conducted as an individual research project. A literature review was conducted at the onset of the study (2016-2017) to find the research gaps. The research proposal was developed based on gap analysis and the plan was presented to the Research Committee for approval in January 2017 as the primary step in the process of producing this dissertation, as shown in Figure 1.



**Figure 1** Dissertation structure

Paper I, the objective of which was to explore the key motives for collaborative partnerships in the automotive industry, was written in the middle of 2017. Secondary data from four car manufacturers were collected and analysed. The results revealed the firms' key motives, and a resource integration strategy for automotive firms was mapped.

This paper was presented in *Service Business Innovation: Implications on governance, management accounting, and control*, Workshop & Special Issue PISA, ITALY, JUNE 29-30, 2017.

Paper II, the aim of which was to present the customer service evolution and the actors in the network, was written at the beginning of 2018. In this study, the actor-network framework was adopted to position the partners in the car mobility service network. The results revealed the evaluation steps and presented the actors involved in the mobility service network.

Paper III was written in late 2019, with the objective of constructing a BMI model for advanced services. This study adopted a mixed methodology. First, the literature for the factors that influence BMI was explored, followed by the development of a model for service BMI, which was then validated using a case firm. The research objectives of each paper and their contribution to the central theme of this dissertation are presented in Figure 2.

The dissertation is organized in 9 chapters. The first chapter introduces the research backgrounds, objectives, and dissertation processes. The second chapter discusses the theoretical background. The third chapter describes each paper's research context and methodology. Chapters 4, 5, and 6 present research papers 1, 2, and 3, respectively. The contribution of the three research papers is presented in Chapter 7, and Chapter 8 summarises the key findings of the dissertation. The final chapter presents the conclusion, theoretical and practical implications, limitations of the research, and suggestions for future studies.

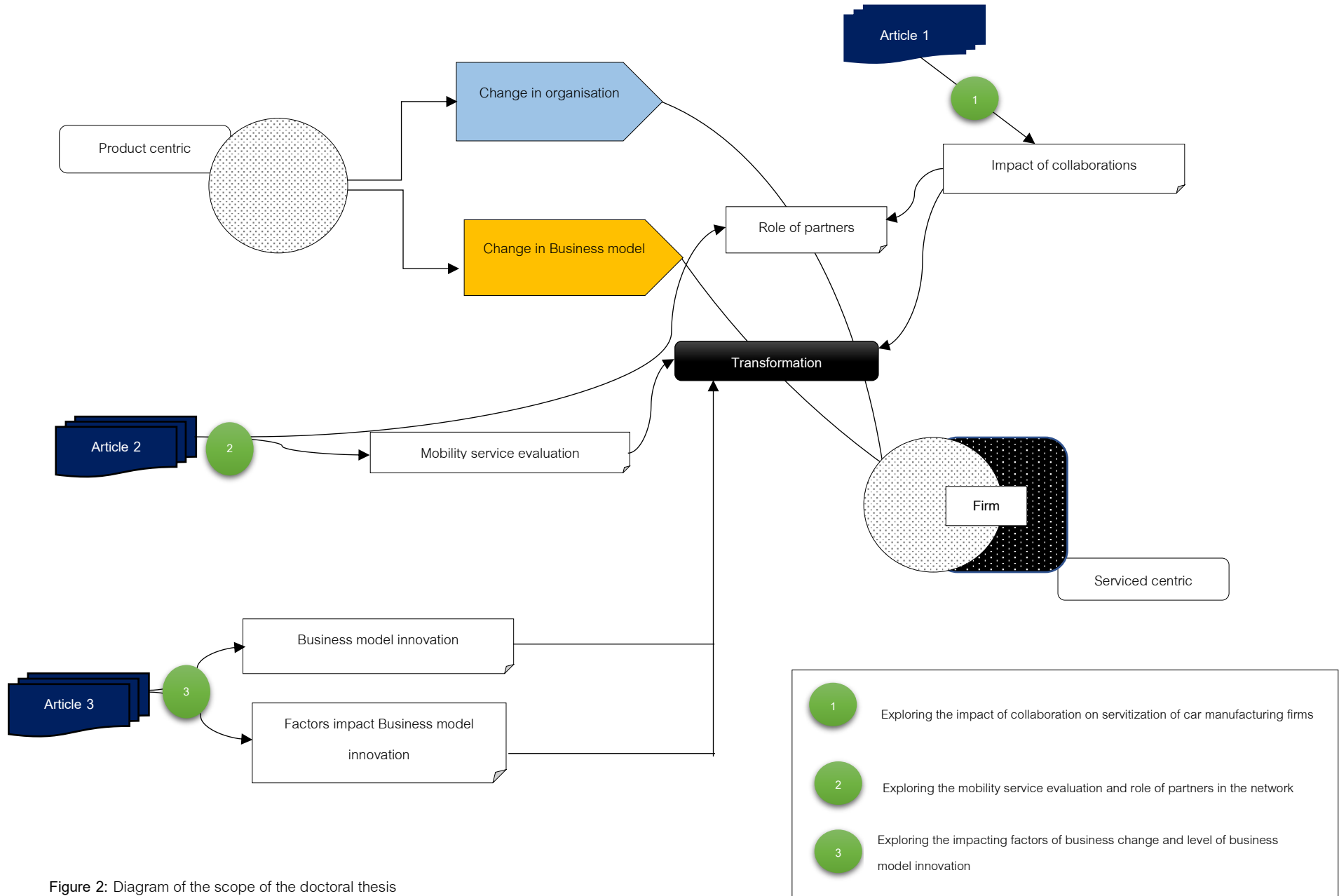
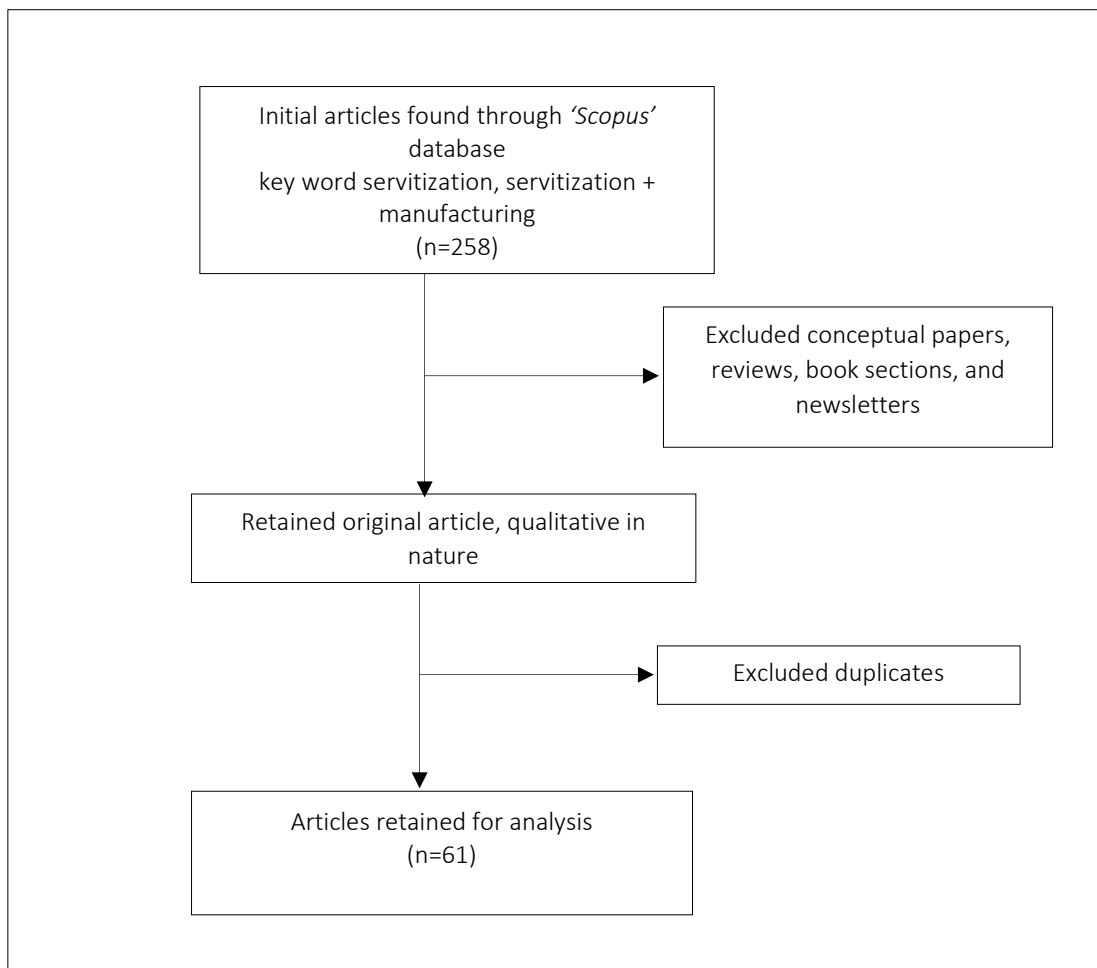


Figure 2: Diagram of the scope of the doctoral thesis

## Chapter 2 Theoretical background

The study relied on the abstract and citation database *Scopus* to find significant publications. *Scopus* is an essential tool for research communities, and is widely acknowledged as a world-leading source for academic research (Baines et al., 2009). This research focused on papers published prior to August 2018 with servitization as the central theme of debate. The single keyword 'servitization' was employed to capture publications and obtain the available knowledge on the topic of servitization. Given that the servitization theme has gained massive attention from various research communities and has produced a substantial amount of expertise, the aim was to narrow the search down to publications that use purely servitization terminology. Other keywords, such as product-service system, service integration, service infusion, servicisation, and service innovation, may have produced a huge number of publications which would have been challenging to analyze. Figure 3 represents the publication selection and analysis procedure.



**Figure 3:** Publication selection and analysis procedure



The search resulted in 258 publications in the first phase of the literature review. In the second phase, the results were restricted to original papers, qualitative in nature, and published in English. Conceptual papers, reviews, book sections, and newsletters were excluded since the study objective was to focus on empirical research in manufacturing firms. During the third phase, papers were limited to the manufacturing sector and duplicates were removed. The main reason why the focus was restricted to publications on manufacturing firms is that servitization has become the most promising transformation and strategic decision supported by the academic community and practitioners. In the final stage, 61 publications directly related to the servitization inquiry were chosen for further analysis. The author, year, and abstract of the selected papers were recorded in an Excel worksheet. A few of the abstracts did not have a clear purpose or research objectives, and in such cases the study was extended to incorporate the introduction and research questions of the publication. Last, the discussion, conclusion, limitations, and future research sections of each paper were examined.

### *2.1 Servitization and critical definitions*

The servitization (Vandermerwe and Rada, 1988) concept is an emerging topic of interest across research communities, practitioners, and policymakers. The wave of servitization literature was fuelled by a publication by Baines et al. (2009), who presented a framework for operations principles, structures, and processes that can guide a manufacturer in the delivery of product-centric servitized offerings. The research communities have produced extensive knowledge on and around the servitization concept in different contexts. Several research institutes such as the Advanced Services Group, Aston Business School, and Cambridge Service Alliance have committed to servitization research. Platforms like the International Conference on Business Servitization and the Spring Servitization Conference are also engaged in spreading knowledge on servitization across the research communities. Several scholars have defined servitization in various ways, with those most widely used in the servitization literature presented in Table 1.

**Table1** Author and definitions

<b>Author</b>	<b>Definition</b>
Vandermerwe and Rada (1988)	Fuller market packages or bundles of a customer-focussed combination of goods, services, support, self-service and knowledge
Baines et al. (2009)	Combination of products and services that deliver value in use

Mathieu (2001b)	It provides values that enable companies to respond effectively to business conditions and to formulate competitive advantages to overcome market obstacles
Miller et al. (2002)	The process of tailoring value propositions to enable consumers' greater efficacy in achieving desired outcomes
Weeks and Plessis (2011)	The strategic innovation of the organization's capabilities and processes to shift from selling products to selling an integrated product and service offering that delivers value in use

## *2.2 Servitization and organisational transformation*

The literature review showed that several authors have studied organizational strategy, the transition process and policy implementation, and value proposition. Other publications have focused on organisational issues such as manufacturers' services strategy (Authoreks and Benade, 2015; Burton et al., 2017), their operation strategy (Szász and Seer, 2018), design decisions (Raja et al., 2018), and organisational thinking (Resta et al., 2015), the nature of industrial servitization (Viitamo et al., 2016), the product-service system (PSS), risk perception during servitization (Ziaee et al., 2018), servitization decision-making processes (Dahmani et al., 2016), and industrial practices during the designing of product-service systems (Clayton et al., 2012; Roos and O'Connor, 2015). Ferreira et al. (2016) propose the typology of the dynamic solution process. Benade (2009), Oliva and Kallenberg (2003a), and Wise (1999) claim that to implement a servitization strategy successfully, organizations are required to change their strategy, operations and value chains, technologies, peoples for supporting cultural shifts in the organizational blueprint, and system integration capabilities. The challenges involved in transforming manufacturing companies towards servitized organisations have also been referred to as barriers (Manzini and Vezzoli 2003; Mont 2002), factors (Mathieu, 2001a), steps (Reinartz and Ulaga, 2008), success factors (Gebauer et al., 2006), and factors of change (Williams, 2007).

Servitization has been described as an uncomfortable organisational change (Foote et al., 2001) which requires a shift from manufacturing culture to service culture (Mathieu, 2001a). The adoption of servitization requires modifications in the company's organization, and particularly in terms of culture. According to Mont (2000), during the servitization process companies face cultural shifts and corporate challenges. Service orientation of organisational culture appears as a success factor for the transition from products to services in manufacturing companies (Gebauer, 2007). Lienert (2015)

demonstrates that organizational culture acts as a promoter of path creation, and therefore as an enabling factor within the servitization process. Contrarily, Nuutinen and Lappalainen (2012) claim that culture appears to be difficult in the transition and does have an impact.

Studies have shown that firms are moving towards the service-centric need to collaborate with external partners, acquire knowledge and technology, and effectively delivery services. Gebauer and Kowalkowski (2012) presents organizational guidance for managers to restructure their companies towards service and customer orientations. First, this involves intra-business unit collaboration across corporate functions, which is responsible for products and services; and second, inter-business unit collaboration, which includes linkages between service and product service units. Rapaccini (2019) analyses how alliance plays a crucial role in service strategy as a driving force. Employees play a large part in the servitization process since they are in direct contact with the customer (Gebauer et al., 2008). Baines et al. (2011) find evidence of the impact of service employees on the service innovation process. Santamaría et al. (2012) identify that training activities are positively linked to service and process innovation. Ng and Nudurupati (2010) point out that success depends on employee empowerment, and their having clear jobs and the right types of behaviour and attitudes. Santamaría et al. (2012) show that manufacturing firms that engage in collaboration with customers are more likely to achieve successful service innovations. Collaboration with other actors has a significant effect on servitization. Several authors suggest a collaboration, for instance, a partnership between manufacturers and their suppliers (Karatzas et al., 2017), customers (Kohtamäki, 2017), and intermediaries (Finne and Holmström, 2013).

The prior literature deals with organisational change, theoretical models, and discussions on organizational success factors. These studies primarily explore organisational elements such as culture, employees, and external collaborations. However, there is no model or research related to the specific issue of organizational success towards implementing a servitization strategy (Vladimirova et al., 2010). The following section discusses business model transformation during servitization to provide a comprehensive view of servitization.

### *2.3 Business model transformation*

The literature has demonstrated that manufacturers should configure strategies to meet business objectives, acquire resources and capabilities, design service offering, and develop new pricing models. All these activities allow the firm to build its business model to create, deliver, and capture value (Huikkola and Kohtamäki, 2018). Oliveira et al. (2018) argue that to effectively implement servitization, firms need to alter their business model. Some authors address these issues, for instance, Huikkola and Kohtamäki (2017) and

Kanninen et al. (2017), who examine the kinds of capabilities required for servitization. Leoni (2015) describes how knowledge management systems can support the adoption of the servitization strategy in a manufacturing firm. Other publications focus on themes like the interaction between new product development (NPD) capabilities and BMI (Beltagui, 2018). Some scholars demonstrate how technological capabilities support servitization; for instance, Kamp et al. (2017) study the role of advanced manufacturing technologies in developing smart goods and smart production environments. Some publications debate issues such as the benefits of Remote Monitoring Technology (Chester and Faullant, 2018), the role of intelligent product-service systems (Zheng et al., 2018), the installed base information system (Stormi et al., 2018), the impact of digitization (Coreynen et al., 2017), and cloud-based manufacturing business models (Authorn and Zhou, 2016). Chiu et al. (2017) and Kowalkowski et al. (2017) describe how existing service capabilities have converted into organizational skills for advanced services. Lim et al. (2018) explains how to design informatics-based services in manufacturing industries.

Transition to service-orientated business demands certain practices and activities. Servitization is also a way of finding new possibilities for growth and extending the range of existing offers into services (Mont 2002; Baines et al. 2009), as discussed in different publications. For example, some scholars (Baines and Shi, 2014; Rabetino et al., 2017; Chakkol et al., 2018) have reviewed the activities, practices, roles, and functions adopted by manufacturers during servitization. Cenamor et al. (2017) explore how a platform approach facilitates the implementation of advanced service offerings in manufacturing firms. The success of the servitization strategy depends on the effective delivery of service offerings to customers, a vital issue discussed in some publications; for instance, Baines et al. (2009) present a framework that helps firms build their internal production and support operations to enable the effective delivery of products and services. Hakanen et al. (2017) and Settanni et al. (2017) discuss the implications of servitization for global business-to-business distribution and how services should be delivered.

Firms moving towards product-services businesses need to collaborate with other partners for resources and services delivery. Sophisticated knowledge is available on these issues. Sacconi et al. (2014) explore the linkages between the types of services and the relationships they establish with their suppliers. Finne and Holmström (2013) study the effects of the relationship between the subsystem supplier and the end-user on suppliers. Other publications discuss a buyer's relationships with its suppliers ( Bastl et al., 2012), the vertical integration practice of manufacturers (Baines, 2011), knowledge sharing mechanisms between companies and their suppliers (Ayala et al., 2017), and servitization strategies in M&As (Xing et al., 2017). Very few publications offer knowledge on the revenue model, pricing strategies, and customer relationships; for example, Rapaccini (2015) discusses a firm's pricing strategy for service offering, and Pagoropoulos

et al. (2017) study the influence of the costs and benefits of Product-Service Systems (PSS). Despite the vast knowledge available on business model elements and servitization, there is still a gap in the literature. For example, Gebauer and Kowalkowski (2012) suggest studying the internal and external motivators of the different changes in organizational structures.

#### 2.4 Case studies in the servitization literature

Table 2 presents a summary of the case studies related to the theme of the dissertation. Using a single case study, Rapaccini et al. (2019) study the strategic alliance among SMEs during servitization, concluding that the strategic partnership plays a crucial role in the servitization process, first by driving the elaboration of a service strategy and by providing an environment that helps the partners to overcome the barriers of servitization.

**Table 2** Summary of studies and contribution in servitization literature

Author	Study objective	Findings	Focused areas	Related to the research question
Rapaccini et al. (2019)	Explored how a strategic alliance among SMEs can facilitate this transformation	The strategic alliance plays a double role; first, it elaborates the service strategy as an emergent. Second, it removes the traditional barriers of servitization by providing a shared environment for service development	Strategic alliance	Q1
Wang et al. (2018)	Explored how equipment companies in China using ICT to realize service transformation	Integration of remote monitoring is an essential function, which is the basis for providing services such as maintenance and product design	Key activity key resources	Q2
Sassanelli et al. (2018)	Analysed what could affect companies along with their transition from a product-centric approach to a service integrated one	For an effective service orientation assessment of a company needs to start from a focus on the type of customers, and service offers	Customer segment	Q2
Wang et al. (2017)	Analysed the service transformation through mass customization	The manufacturers in the process of service transformation should pay close attention to the integration of information technology	Key resources	Q2

Robinson et al. (2016)	Explored how organizational changes enabled a multinational construction company to transform its business model in pursuit of servitization	Systems integrators should consider their position within their existing value chain and coordinate internal and external activities as they move forward to service-centric	Key activities	Q2
Iriarte et al. (2016)	Assessed the results gathered from an experiment of the implementation of service design in six Basque manufacturers already undergoing servitization processes	Manufacturers need to consider and build competencies in service design manage all the change elements for servitization	Capabilities	Q2

However, firms considering a move toward servitization previously need to find and build the required competencies and capabilities (Iriarte et al., 2016). Firms execute vital activities to successfully integrate the servitization strategy. For example, Wang et al. (2017) state that manufacturers in the process of service transformation should pay close attention to the integration of information technology, remote monitoring (Wang et al., 2018), and the need to adopt advanced IT tools like IoT (Rymaszewska et al., (2015).

Robinson et al. (2016) study firms' organizational changes in pursuit of servitization, concluding that systems integrators should consider their position within their existing value chain and coordinate internal and external activities as they move forwards to service centric. Aside from the crucial operations and resources that drive servitization, firms al need to consider other factors that also play a vital role, such as customer segment. Sassanelli et al. (2018) analyses the factors that could affect companies, in addition to their transition from a product-centric to a service-integrated approach, concluding that a company needs to start from a focus on the type of customers and service offers to effectively assess its service orientation.

Empirical studies extend their research to different manufacturing firms, while the automotive industry still needs to be explored. The literature has demonstrated that change in business model elements is a crucial success factor in servitization. However, there is still a gap in terms of case studies in the automotive industry, for example regarding how the business model evolved in the automotive sector in the servitization context and how external partnerships influence servitization. Table 3 and Figure 4 shows the literature and research gap.

**Table 3** Summary of servitization literature

Perspective	Key findings
Organization	The factors such as vision creation, mindset, leadership, communication, service culture have a positive influence on company changes towards servitization (Ahamed et al.,2013)
	The adoption of servitization requires modifications in the company's culture (Dubruc et al., 2014)
	Employees play a large part in the servitization (Gebauer et al., 2008)
	The relationships within service triads and servitization improve the performance of the firm (Karatzas et al., 2017)
	Firms that engage in collaboration with customers are more likely to achieve successful service innovations (Santamaría et al., 2012)
Business model	Servitization requires a business model change (Adrodegari et al.,2017)
	Servitization requires changes in all areas of the business model (Kindström, 2010)

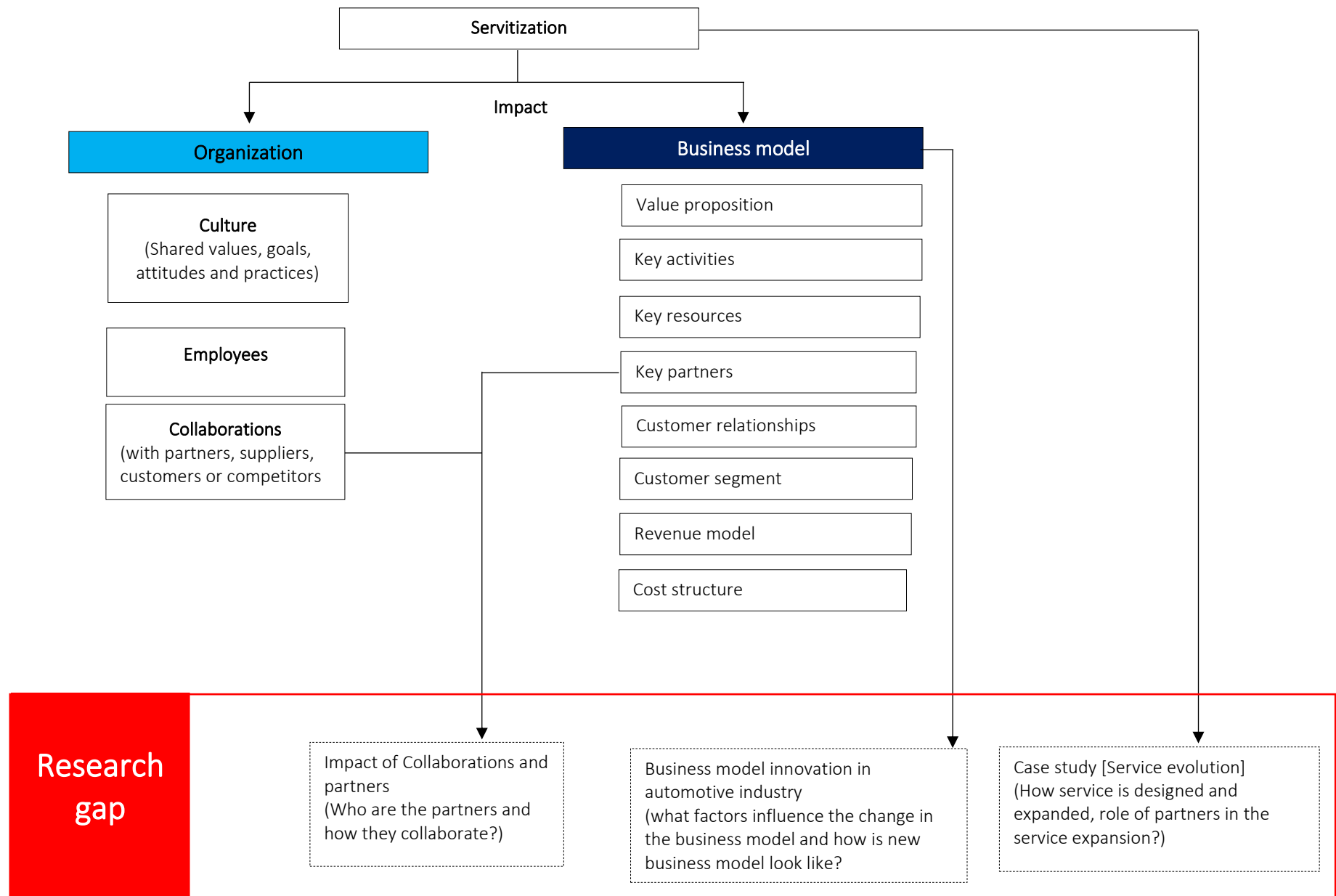


Figure 4 Graphical illustration of servitization literature and research gap



## Chapter 3. Methodology

### *3.1 Research context*

The research is focused on automotive companies in Europe. The case companies included in the study provide customer-based services alongside traditional business activities. The literature review was primarily conducted to find out the servitization practices in various industries, revealing that knowledge of servitization in the automotive industry is at an early stage and that new knowledge needs to be produced on how the automotive industry is adopting this new servitization trend. The data on the firm's activities, services, and collaborations were collected through secondary data sources, including annual reports, press releases, online interviews, media releases, press notes, and collaborative announcements.

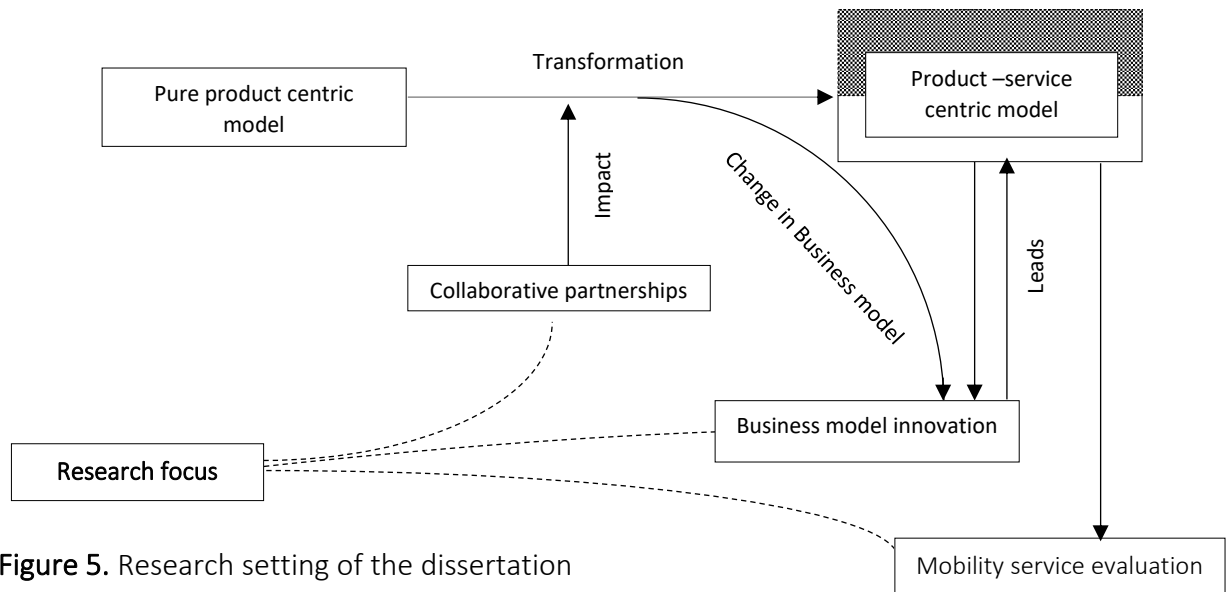
The European transport manufacturing industry still holds a strong position in the worldwide market and has a high-quality reputation. Furthermore, it provides more than 11.6 million jobs across the continent (Gaiardelli et al., 2014). Car sales in the EU had fully recovered from the economic crisis by the year 2016 and new car registrations have increased to 14.6 million. Traditional automotive revenues derive mostly from vehicle sales, leading to a market volume of about USD 3.500 billion. One-time vehicle sales amount to USD 2.750 billion and the aftermarket to USD 0.720 billion (Konrad and Stagl, 2018). These revenues are expected to grow and diversify with new services to become a USD 1.5 trillion market by 2030 (McKinsey & Company, 2016). The high expected growth rates are related to new business models and services commercializing the future IT-potential. The automotive industry's annual growth rate is expected to reach 4.4 % by 2030, based on the new revenue streams stemming from new technologies and new business models (McKinsey & Company, 2016). The three main revenue streams (one-time vehicles, aftermarket, and recurring revenues) will increase sharply (Auguste et al., 2006). After-sales services for vehicles are estimated to generate at least three times the turnover of the original purchase (Gaiardelli et al., 2014).

However, dynamic market conditions, the rise of customers solutions, and changes in customer travel behaviour minimise revenue from product sales. Some industrial players from non-traditional domains with vast financial resources and innovative skills, such as the IT sector, may reshape the existing value chains of transport manufacturing at a rapid pace. The automotive revenue pool will be driven by innovations related to new technologies and new business models related to sharing concepts and connectivity solutions, thus leading to increased recurring revenues, with a 30 % jump expected by 2030 up to around USD 1.5 trillion. This development is mainly influenced by shared mobility, including new car-sharing and e-hailing services. More than USD 100 billion will

be generated through data connectivity services such as1 apps, navigation, entertainment, remote services, and software upgrades (McKinsey, 2016, p. 6).

### 3.2 Research setting

Figure 5 presents the research setting adopted in this dissertation, which focuses on three aspects of servitization. First, the study explores collaborative partnerships during service integration, followed by the aspects of business model innovation for advanced services. The dissertation then presents the mobility service evaluation and its partners.



**Figure 5.** Research setting of the dissertation

### 3.3 Research approach

A qualitative research approach was adopted in this research setting. It is primarily exploratory research, the aim of which was to gain an understanding of the underlying reasons, opinions, and motivations. This approach provides insights into the problem and helps to develop ideas and hypotheses for potential quantitative research. It is used to uncover trends in thought and opinions and to delve deeper into the issue (Kokolakis et al., 2016).

*‘Qualitative research is a multifaceted approach that investigates culture, society, and behaviour through an analysis and synthesis of people’s words and actions. Unlike quantitative approaches, it does not try to transform verbal symbols into numerical ones; the data remains at the level of words, either the research participants’ own words, the words written in documents or the words used by the researcher herself/himself to describe the activities, images, and environment observed. It tries to get to the heart of what exactly led to decisions, or choices, that were made, and how these choices came to take the form that they ultimately did (Hogan et al., 2009)’.*

As Marshall and Rossman (1999) point out, 'qualitative research is pragmatic, interpretive, and grounded in the lived experiences of people'. The media through which people communicate have greatly expanded in recent years, giving qualitative researchers a much broader field to inquire into. Qualitative research has 'traditionally' been conducted by means of direct observation of a sample, case studies, personal experiences, introspection, examination of relevant texts, interviews, focus groups, life stories, and the researcher's own participation in the settings they are researching (Hogan et al., 2009b). However, with the advent of various new types of information technology devices and media, the range of things to be directly observed in qualitative research has dramatically increased.

When focusing on the problem statement "How do organisations transform in a servitization transition period in automotive industries"? it is essential to use a methodological framework suitable for examining causality given that causality between servitization and organizational challenges is an essential aspect of this thesis, striving as it does for an explanation as to "how" and "why" the servitization process influences the organizational structure, and in the belief that qualitative methods provide the best framework for highlighting these issues. Regarding qualitative research, it is essential to be aware of potential influence and bias, which can be due to the close interaction and relations between the investigated and investigator (Kvale and Brinkmann, 2009) .

This research is based on secondary data due to the lack of primary data on the servitization strategy and transformation process of the firm. It is structured into 3 papers as illustrated in Figure 1. Study I was conducted using the qualitative exploratory methodology with the aim of producing knowledge on the role of collaboration during the servitization of car manufacturing. Study II employed the actor-network framework to present an evaluation and a characterisation of the partners in the firm's mobility services. And in study III, a conceptual framework for business model innovation was designed, and subsequently validated by the firm's advanced services business model.

### *3.4 Research methods in articles*

Table 4 summarizes the research methods, data collection, and data analysis technique employed in each individual article. Each individual article discusses the research methods, data collection, and data analysis more thoroughly.

**Table 4.** Research methods used in individual articles

<b>Article</b>	<b>Research method</b>	<b>Data collection</b>	<b>Data analysis</b>
Article 1	Qualitative research approach	Secondary data	Thematic analysis
Article 2	Qualitative research approach	Secondary data	Thematic analysis
Article 3	Qualitative research approach	Secondary data	Thematic analysis

**PUBLICATION I**

**Collaborative partnerships in the automotive industry: key motives and resource integration strategy**

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Andrea Bikfalvi and Anna Arbussa, 2019

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## **Collaborative partnerships in the automotive industry: key motives and resource integration strategy**

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**Abstract:** The research communities on international marketing and strategic partnerships have produced extensive knowledge on strategic alliances, but they remain silent on collaborative partnerships (CPs) in the servitisation context. This paper aims to analyse CPs in the automotive industry and to present the key motives and the resource integration strategy. It adopts a document-based multi-case method. The data is analysed through thematic analysis, identifying five key motives – new revenue streams, resource acquisition, competitive advantage, market demand and customer relationship – and revealing the service strategies of case firms by tracing their resource integration strategy. This is the first study to attempt to provide new insights into CPs in the automotive industry in the servitisation context. It contributes to customer relationship management by revealing that customer relationship is one of the key motives for a firm's strategic alliance.

**Keywords:** collaborative partnerships; motives; automotive; servitisation; strategy; strategic alliance; service integration; service innovation; resource configurations; customer relationship; partnership agreements; car manufacturers; innovation and research.

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Germany, Finland, Croatia, Portugal, etc. Her main research interest is in holistic approaches of innovation in all types of organisations – mainly, but not limited to – public administration, private enterprises, and education. Her expertise is in strategy, organisational innovation and business model configuration.

Anna Arbussa Reixach is an Associate Professor at the Department of Business Administration, Management and Product Design, at the University of Girona in Spain. She received her PhD in Business Administration in 2001 from the same university, and her areas of academic interest include firm innovation, technology management, human resources and management of public health, on which she has published articles in several international journals. She has taught in management, human resources and entrepreneurship, and consulted and participated in academic and institutional projects on electronic commerce, electronic payment systems, technology transfer, technology management and related topics.

This paper is a revised and expanded version of a paper entitled ‘Collaborative partnerships: a strategic option for servitization in automobile industry’ presented at Service Business Innovation: Implications on Governance, Management Accounting and Control Workshop, Pisa, Italy, 29–30 June 2017.

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“The challenges we face are far too great to go it alone. That’s where teamwork and collaboration come into play.” – James E. Lentz III, CEO Toyota Motor

## **4.1 Introduction**

Strategic alliances have recently attracted enormous attention from academics, policy makers, and practitioners (Albers et al., 2016). A strategic alliance is cooperation or collaboration between two or more independent companies to cooperate in the process, production or sale of products and services, or other business objectives. Scholars have defined it as a mutual agreement between two firms to pursue common objectives (Simandan, 2018) and achieve long-term benefits (Gulati et al., 2012). Firms can build skills and capabilities by establishing networks with partners in the form of M&A or by means of a strategic alliance (Alaaraj et al., 2018). Through a strategic alliance, the partners may provide resources such as products, distribution channels, manufacturing capability, project funding, capital equipment, knowledge, expertise, or intellectual property. These alliances are well discussed in operations management from various perspectives, such as cooperative behaviour and resolving competitive conflicts, dealing with turbulence and market uncertainty, and improving technical skills (Yang et al., 2014).

Automotive firms have been using cooperative alliances for many decades to deliver products and services in the same ecosystem (a network of organisations). The technological giants Apple and Google, and even startup technology companies, have entered automotive businesses with their disruptive technological solutions. This competitive environment increases pressure and at the same time opens up new opportunities for automotive firms. In these dynamic conditions, firms need to cooperate with other actors and form new alliances across and beyond the industry to continue being competitive (McKinsey & Company, 2016). Competitive pressures have

encouraged firms to seek additional sources in cooperation with other firms (Ćetković et al., 2016). These cooperative arrangements have focused on achieving common strategic objectives, which may lead to a significant and lasting exchange, and to sharing and joining in the development of new knowledge, products, services, or technologies, providing access to complementary competencies that are expensive to develop within a company (Krupnik and Jolly, 2002).

Strategic alliances can benefit firms by providing innovation capability and dyadic quality performance (Yang et al., 2014), accelerating growth, efficiency, and profitability (Saxena, 2012). Strategic alliances also speed up competitive positioning and technological leadership in markets (Gottinger, 2007), and help gain competitive advantage (Jeje, 2014). However, strategic alliances can sometimes have a significant, negative impact on R&D intensity, decreasing in-house R&D and external technological sourcing (Cefis and Triguero, 2016). Firms opt for strategic alliances to reduce risk and access resources, physical assets (Cohen, 2010), and knowledge (Un et al., 2010).

Much of the literature produced until now has focused on strategic alliances, while automotive firms' collaborations in the service integration context are less discussed. Although sizable research effort has been made on the benefits of strategic alliances (Gottinger, 2007; Saxena, 2012; Yang et al., 2014), no previous work has focused on the key motives for collaborative partnerships (CPs) during service expansion. Our aim was to reveal the key motives for CPs by investigating firm strategic movements and partnerships in the context of servitisation. We base our research on the context of car manufacturers for two reasons. First, the complexity and trends characterising this industry make it a rich field for illustrating both servitisation and strategic alliances. Second, the inherent importance of the sector is justified not only by its links to other industries, but also by its global magnitude, providing jobs for 12 million people and accounting for 4% of the EU's GDP (European Commission, 2019).

Consequently, the interest in this paper is in researching how multinational automotive firms form collaborations with technology companies, what motivates them, how they work together to add more value to the services they offer, and how they remain competitive in the market. The goal is to identify key motives and the service integration strategy through CPs and to produce new knowledge on the practices needed to promote their adaptation. The study answers the following research questions:

RQ1 What are car manufacturers' key motives for collaborating with technology companies, including startup companies?

RQ2 How do car manufacturers set up these collaborations to enhance servitisation?

The paper adds to the strategy literature that calls for research in different industrial settings (Xing et al., 2017) by revealing the firm's strategy. The research contributes to the debate on CP strategy by identifying car manufacturers' key motives.

The paper is structured as follows. The literature on firms' resources and capabilities, service integrations and strategic alliances is discussed in the next section. The research design, the nature of the data, and the characteristics of the case firms are described in the methodology section. The findings of the study are presented in the results section. The case firms' key motives and why these strategies would be more advantageous than other types of alliance methods are presented in the discussion section. Last, the findings, implications, and limitations of the study are briefly presented in the conclusion, where future research directions are also suggested.



## **4.2 Literature review**

The competitive landscape has grown more complex and the pace of change is accelerating. Margins are being squeezed in capital-intensive industries. Competitors are increasing in number, becoming more formidable and global, and some destroy more value for incumbents than they create for themselves (McKinsey Global Institute, 2015). As profit growth slows, more companies will be fighting for a smaller slice of the pie, and incumbent industry leaders cannot focus simply on defending their current market niche (Dobbs et al., 2015).

To survive in this competitive environment, firms have shifted their core business from pure product offering to product-service offering. Besides profit, other factors also play a key role in the shifting core business practices described above. For example, as stated by Beaumont and Balding (2004), companies often consider adding services to protect their market share or in response to a legislation threat, customer demands and expectations, or a competitor's dominance. Competitive advantage is one outcome of service transition (Bustanza et al., 2015). Scholars have produced empirical evidence of how manufacturing firms have shifted to servitised firms, for example Rolls-Royce Aerospace's power by hour and IBM's business solutions (Ahamed et al., 2013; Neely et al., 2011). However, to successfully deliver a servitisation strategy (Griffith and Neely, 2011), firms must build the right organisational capabilities and culture. In a context of global competition and decreasing profits from vehicle sales, the automotive industry is also focusing on service offering. The study by Mahut et al. (2016) on product-service systems for the servitisation of the automotive industry pointed out that after-sale services remain an important part for the company's activity in the automotive industry, and innovation keeps being brought into maintenance services.

### *4.2.1 Firm's resources and capabilities*

Firms require proper resources and skills to keep competitive market positions. Most companies possess firm-specific resources and capabilities (Pisano, 2006) that can help them compete in the market. These resources and capabilities can be acquired from the markets, or they can be created internally through learning and experience (Baines et al., 2009a). Additionally, firms can use inter-organisational collaborations as a strategic choice for resource acquisition (Četković et al., 2016; Porrini, 2004). In such a context, firms collaborate with others and share resources to create new services. For example, BMW collaborated with ParkNow to access vehicle parking knowledge.

New services often require new resources and skills to design and deliver them. However, it is not easy for firms to have or to acquire these essential resources. In such a context, firms collaborate with others, with the two firms in the partnership sharing resources to create new services. Such resources, however, may not be perfectly tradable or they may even be completely untradeable. The literature strongly suggests that inter-organisational collaborations are strategic choices for resources acquisition (Porrini, 2004). Competitive pressures in the market also force firms to seek additional sources in cooperation with other firms (Četković et al., 2016) (see Table 4). Thus, companies that are not in the partnership cannot access these resources, which also cannot be developed by a separate action taken by the company in the market.

#### *4.2.2 Service integration*

Profits are shifting from capital-intensive industries, where margins are being squeezed, to idea-intensive sectors that revolve around R&D, brands, software, and algorithms. To survive in this competitive environment, firms have shifted their core business from pure product offering to product-service offering (Mont, 2002; Beaumont and Balding, 2004; Baines et al., 2009b). To do so, some market players focus on core competencies since increasing technological complexity leads to a higher specialisation, outsource the rest under pressure to downsize and become more flexible organisations (Oliva and Kallenberg, 2003; Tukker, 2004).

While service expansion is a different strategy for creating competitive advantage, firms should design their customer services carefully, if not they can lead to the firm's bankruptcy. For example, Benedettini et al. (2017) suggests that firms can escape the likelihood of bankruptcy if they expand product related services. However, pure product related services cannot help firms to survive in the competitive market. Firms should also focus on product -unrelated services to reduce bankruptcy likelihood.

Market players focus on core competencies and on increasing technological complexity, which leads to greater specialisation, to become more flexible organisations (Oliva and Kallenberg, 2003; Tukker, 2004). To be successful, the company must generate a variety of revenue streams from both product and service transactions and find new ways to make services tradable (Araujo and Spring, 2006). Developing a services business also requires a new structure and new forms of organisation in the company (Araujo and Spring, 2006; Cook et al., 2006). Davies et al. (2006) suggests that the new organisational structure should consist of front-end customer-facing units, back-end capability providers and strong strategic centres.

In a context of global competition and falloff profits from vehicle sales, automotive firms have focused their attention on service offerings. This transition in the automotive industry has been studied by a few scholars. For example, Mahut et al. (2016) studies product-service systems for the servitisation of the automotive industry, pointing out that after-sale services remain an important part of companies' activities in the automotive industry. The authors expanded this view, stating that part of the automotive industry turns into user-oriented services and result-oriented services as part of their strategy to survive the competition. Lay (2014) says that original equipment manufacturers (OEMs) increasingly resort to mergers, acquisitions, or alliances to survive in a complex, global market characterised by heavy research, development, and innovation costs, together with high fixed production capacity costs. Services are not just offered to improve vehicle performance but also to enhance customers' operations, improve the efficiency or effectiveness of their activities, or advance their skills. Some automotive firms offer advanced services such as sport and eco-driving courses, mobility solutions for disabled persons, training and consultancy for fleet maintenance and management, and spare-parts management optimisation, all of which are examples of the wide range of advice, training, and consultancy services (Pistoni and Songini, 2017).

Hence, scholars have discussed the importance of servitisation for manufacturing firms to be competitive in the market. However, previous research has not yet produced enough evidence of how servitisation can be enhanced through collaborations. There is a need to understand why automotive firms enter into collaborative agreements with other firms, and how this cooperation helps to create and/or enhance service offerings. The authors have expanded the literature review on strategic alliances to address these issues.

**Table 5** Key goals or benefits of CPs in the literature

<i>Goals/benefits</i>	<i>Authors</i>
Acquire dynamic capabilities	Harrison and Leitch (2005) and Junni et al. (2015)
Acquire physical assets and talent	Cohen (2010)
Enter into new markets	Chung and Alcácer (2002) and Yang et al. (2014)
Improve skills, competencies, and organisational learning	Vermeulen and Barkema (2001)
Improve firm performance and competitiveness	Van De Vrande et al. (2011) and Cohen (2010)
Improve firm innovation	Un et al. (2010) and Cefis and Triguero (2016)
Acquire licences, patents, and R&D facilities	Danzon et al. (2007) and Miozzo et al. (2016)
Gain a competitive advantage	Saxena (2012) and Gottinger (2007)
Reinvent a business model	Christensen et al. (2011)
Create potential value for a product or services	Gomes-Casseres (2015)

#### 4.2.3 *Strategic alliance*

Firms choose different types of alliance formation, including the strategic alliance, M&A, and CPs to expand the market, enhance service design, and increase firm performance. A strategic alliance is a relationship between two commercial companies, usually formalised by one or more business contracts, and is a short- or long-term cooperation, which might include partial or contractual property to implement strategic goals (Forrest, 1989). On the other hand, Nishimura (2010) defined CPs as certain business processes of two or more companies, which may effectively increase the competitive strategies of the firms involved, while providing mutual benefits through exchanging technologies, skills, resources, or products. Collaboration is an important strategy for firms to generate new products and services (Schleimer and Faems, 2016), mutually complementary assets (Teece, 1992), and/or new technology (Rothaermel, 2000). Despite these various definitions and the fact that different wording is used to describe strategic alliances and CPs, they are very similar in what they aim to do. Therefore we use the two concepts interchangeably, as they appear in the original source (scientific literature and empirical evidence).

#### 4.2.4 *Research need*

In summarising the literature review, the authors acknowledge that a considerable amount of literature has been published on strategic alliances from different perspectives such as strategy, competitive advantage, market position, and customer satisfaction. However, knowledge of the service offering perspective is still unexplored. Hence, we believe that research work on the influence of CPs on the service offering of car manufacturers is a novel contribution to the servitisation and alliance literature.

### 4.3 Research methods

#### 4.3.1 Research design and selection of case firms

The focal point of this research is CPs in the servitisation context in automotive industries, and more specifically in car manufacturing companies. In contrast to earlier studies that focus on manufacturing firms and government institutions, this qualitative multiple-case research paper strives to reveal car manufacturing firms’ interest in CPs rather than mergers and acquisitions. A qualitative method is a powerful tool for management scholars and has several merits beyond those of traditional quantitative methods, demanding rigor in its procedures to ensure the reliability and validity of the results obtained (Shah and Corley, 2006). According to Yin (2003, p.2), “the distinctive need for case studies arises from the desire to understand complex social phenomena, because the case study method allows investigators to retain the holistic and meaningful characteristics of real-life events, such as organizational and managerial processes.” The multiple-case design offers more benefits – such as vitality, versatility, and replication – than single case studies (Yin, 2003).

This study follows the document analysis method (Bowen, 2009). Information on the collaborations that took place among the automotive industry during the four-years period 2013–2016 was collected. Thirteen collaboration activities during this period were identified, five of which were selected because their aim was to introduce new services. Our data search period lasted six months (January 2017–May 2017). First, the authors searched for collaboration and partnership announcements in different issues of specialist magazines and newspapers (The Economist, Automotive News, TechCrunch, and *The Wall Street Journal*<sup>1</sup>), and on the internet. The key words used in the search process were ‘collaboration in automotive’ and ‘strategic partnerships in the automobile industry’. The authors then checked the authenticity of the news announcement by cross-checking the information with company websites, press releases, and news sections. Five collaborations were subsequently chosen for further analysis. A total of 13 public documents (nine press releases and four annual reports) were collected. The firms’ annual reports were collected for the strategic plans of the collaborative agreements. These documents help the researcher to develop understanding, discover insights relevant to the research problem, and produce a solid description of what is under examination (Bowen, 2009). We used 15 pages of text documents from media releases and press notes, and four annual reports (of between 20 and 60 pages each). All these data were entered into an Excel spreadsheet and coded. Descriptions of the case firms, collaborations, and data sources are presented in chronological order in Table 6. Four car manufacturing firms were chosen to reveal their motives and strategy.

**Table 6** Description of the case firms, announcements, and data sources

<i>Cases</i>	<i>Automotive company</i>	<i>Technology company</i>	<i>Collaboration announced</i>	<i>Data source</i>
Case 1	BMW	NOW! Innovations	14 March 2013	BMW press information
Case 2	BMW	Accenture	27 February 2015	Accenture newsroom
Case 3	Porsche	AT&T	22 February 2016	AT&T story
Case 4	GM	Bosch	4 February 2013	Bosch press release
Case 5	Volvo	APPLE	3 March 2014	Volvo press release

**Table 7** Characteristics of the case companies

Companies	Tagline/slogan	Mission/vision	Core services	Employees (2016)	Total assets (billion/euros)	R&D expenditure (2016) (millions/euros)
BMW Group	Sheer driving pleasure	“To become the world’s leading provider of premium products and premium services for individual mobility.”	Drive now, reach now, charge now, park now, digital energy solutions, alphabets, design work, financial services, spare parts, maintenance and service.	124,729	€188.04	€5,164
General Motors	People in motion	“We are dedicated to providing products and services of such quality that our customers will receive superior value while our employees and business partners will share in our success and our stockholders will receive a sustained superior return on their investment.”	Vehicle financing, spare parts, maintenance and service, and maven car-sharing service.	215,000	€198.23	€8,100
Porsche Holding	There is no substitute	“Porsche doesn’t simply build sports cars. Porsche is more. Much more. And Porsche is different. We love to carry engineering skills to the extreme.”	Leasing, loans, insurance, maintenance, fleet management, car rentals, and mobility services.	35,631	€26.82	€13,672
Volvo	For life	“Driving prosperity through transport solutions.”	Financing solutions, insurance, rental services, spare parts, preventive maintenance, service agreements, assistance services, and IT services.	94,914	€42.06	€398.66

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The reason for selecting just these firms was that they have been offering value-added services and making collaborative agreements with firms for many years. Hence, the authors believe that these data justify the study objectives. Table 3 is a summary of the characteristic features of the chosen companies participating in partnerships.

*4.3.2 Data analysis*

The thematic analysis technique was used to analyse the data. The documents were organised and imported into Excel spreadsheets, the cells of which were headed firm, year, partner firm, and key announcement. The data were initially coded using the open coding method, based on the researcher’s understanding and interpretation of the data (see Table 7). They were then categorised into the themes that emerged from the literature (Walker and Myrick, 2006). The analysis procedure followed Bowen’s (2009) approach.

**Table 8** Sample coding process

<i>First code</i>	<i>Themes (motives)</i>
“Establish a new sales channel.”	New revenue streams
“Strengthen our competitive position.”	Competitive advantage
“Generate significant advantages and substantially strengthen our business.”	
“Increase market coverage.”	Enhance service offerings
“Expand the range of solutions on offer.”	
“Provide capabilities for ConnectedDrive.”	
“Enhance our product offer.”	
“Provide a game-changing solution.”	
“Open up completely new forms of communication.”	
“Develop smart technology and vehicle safety and security solutions.”	
“Expand value-added services.”	Customer demand
“Offer a wide range of new technologies for customers.”	
“Develop mobility services.”	
“On-street capabilities for parking solutions.”	
“Offer the latest consumer technologies and services.”	
“Serve individual needs.”	
“Adapt to the specific needs of each society and market.”	
“Availability of a wider range of new technologies for the customer.”	Customer relationship
“Car buyers want the latest consumer technologies.”	
“Enhance product offer and be even more attractive for our customers.”	
“Gain a much closer relationship with their customers.”	
“Customers feel completely at home.”	

#### 4.4 Results

This section is divided into two parts. The case firms' collaborations and their announcements are introduced in the first section, and their integration strategies are discussed in the second section. The data analysis showed that the case firms were associated with four multinational technology firms and one startup firm. Five key motives, presented in Table 8, were identified among the selected case firms during the CPs.

**Table 9** Key motives for collaborations

<i>Case 1</i>	<i>Case 2</i>	<i>Case 3</i>	<i>Case 4</i>	<i>Case 5</i>
Enhance service offerings	Enhance service offerings	Enhance service offerings	Enhance service offerings	Enhance service offerings
	Customer demand		Customer demand	Customer demand
Customer relationship	Customer relationship			Customer relationship
	New revenue stream			
			Competitive advantage	

##### *Case 1*

The BMW Group is one of the most successful makers of cars and motorcycles worldwide and among the largest industrial companies in Germany. With BMW, MINI, and Rolls-Royce, the BMW Group owns three of the premium brands in the automotive industry. In 2015, a ParkNow service platform for parking-related services was launched, and to expand this service's portfolio the firm initiated collaborative agreements with companies that offer parking-related services. The strategy for partnerships was stated in the 2013 annual report as:

“Working together with other business partners helps to increase market coverage, expand the range of solutions on offer and encourage the development of forward-looking technologies. Co-operations of this kind generally result in the increased availability of a wider range of new technologies for the customer, and they increase the likelihood of successful market launch in the long term.” (p.78)

In 2013, BMW iMobility services (a sustainable mobility venture) signed an agreement with the Estonian-born tech company NOW! Innovations to expand the ParkNow service portfolio. The aim of this partnership was to provide mobile parking solutions for BMW customers. Its functionality includes dynamic billing mechanisms and multiple payment sources. During the announcement, the director of BMW iMobility services stated the following:

“Now! Innovation is a perfect match for us. The current scope of our ParkNow service is off-street parking. With the on-street capabilities of Now! Innovations we will soon be able to strategically enhance our product offer and be even more attractive for our customers. The integration of on-street parking is a major step in creating a one-stop parking experience.” (BMW Press Release, 2013)

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Three years later, in 2016, BMW introduced a parking payment service through the ParkNow app for their fleets in Germany and Austria. Since 2017, this service has been available to all BMW customers.

#### *Case 2*

In a line to expand customer-focused services, in 2015 BMW teamed up with Accenture to develop the 'business integration platform' (BIP), which supports product management, customer management, and ordering and contract management capabilities for ConnectedDrive service (web-based in-car services) within the BMW Group (BMW, MINI, and Rolls Royce). This collaboration led BMW to add new services to the ConnectedDrive catalogue, as explained by the managing director of Accenture's automotive and industrial equipment practice:

"Car buyers want the latest consumer technologies and services integrated into connected vehicles, so being able to add services in the future is very important. Leading car companies that sell a range of connected vehicle services directly to customers gain a much closer relationship with their buyers, establishing a new sales channel." (Hatter, 2015)

BMW ConnectedDrive service has been available in the US market since 2016. In August of the same year, its availability was extended to all European countries. This partnership was set up not only to obtain technology from Accenture but also to create a new revenue channel for BMW through these services.

#### *Case 3*

Porsche AG is a German automobile manufacturer specialising in high-performance sports cars, SUVs, and sedans. Its headquarters are in Stuttgart and it is owned by Volkswagen AG. It offers customised services though Porsche connects internet-based service for its customer in 40 countries. As part of the mobility services launch, Porsche established a partnership strategy with a technology firm. This partnership strategy was disclosed in the 2016 annual report, as:

"As part of the future program 'TOGETHER – Strategy 2025', Volkswagen is setting up a new mobility solutions business through which it will press ahead with its transformation into a global leader in sustainable mobility. Volkswagen will develop and market mobility services independently or in partnership with others." (p.76)

In 2016, Porsche and AT&T signed a multiyear agreement. As part of this collaboration, AT&T provides the technology for services such as WiFi hotspot, navigation, news and weather alerts, and other infotainment services. A senior vice-president of the internet of things described this collaboration as:

"Porsche's technologies have advanced performance and spurred improved innovations within the automotive industry. Our work with Porsche will continue that innovative tradition and deliver a connected experience in their cars for drivers and passengers." (AT&T News story, 2016).

In 2017, AT&T initiated wireless connectivity services in the Porsche Macan, Boxster, and 911 models. The Connect Plus module ensures maximum connectivity services in the Porsche fleet. It features a built-in LTE module with a SIM card slot for an excellent



wireless internet access point, which provides in-car online access from WLAN-enabled client devices such as laptops, tablets, and smartphones.

#### *Case 4*

General Motors (GM) is an American multinational corporation headquartered in Detroit, which designs, manufactures, markets, and distributes vehicles and vehicle parts, and sells financial services. GM has been offering in-vehicle services through Cadillac CUE, a service platform, since 2012. To keep their market position and technological resources, the company entered into cooperation agreements with other firms. These partnership strategies were mentioned in the 2015 annual report:

“We continue to monitor and evaluate opportunities to strengthen our competitive position over the long term, while maintaining an investment-grade balance sheet. These actions may include opportunistic payments to reduce our long-term obligations, as well as the possibility of acquisitions, dispositions, investments with joint venture partners, and strategic alliances that we believe will generate significant advantages and substantially strengthen our business.” (p.38)

GM and Bosch announced a collaboration to introduce an infotainment system into the fleet. As part of this collaboration, Bosch would develop and supply the head unit, i.e., the central operating device, for several different GM car models. Uwe Thomas, President of the Car Multimedia division at Bosch, commented on this collaboration:

“With our new head unit for General Motors, we will connect the car driver to the internet world in a way that is adapted to the special environment in the automobile. New technology is based on the extensive experience in technology of the world’s largest supplier for the automotive industry. Another highlight is the device’s easy operation using natural voice input.” (Bosch Press Release, 2013).

In February 2017, Cadillac introduced the Cadillac user experience system, which offers personalised, intuitive interface services.

#### *Case 5*

The Volvo Group is a Swedish multinational manufacturing company headquartered in Gothenburg. Its core business activities include the production, distribution, and sale of cars, trucks, buses, and construction equipment. Volvo also supplies marine and industrial drive systems and financial services. In 2013, Volvo Group’s sales amounted to approximately SEK 273 billion. Volvo Car Corporation has been offering the infotainment system Sensus since 2012. This was the interface that promoted instinctive communication with the car, connecting it to the driver’s digital world. The firm has strongly focused on research developments and collaborations with other partners to design vehicle and customer-centric services. The firm’s strategy was stated in the 2013 annual report:

“We invest in advanced research and development and collaborate with key partners to develop smart technology, and vehicle safety and security solutions that improve conditions for drivers, road users, pedestrians, vehicles, and cargo. As a global manufacturer of transport solutions, the Volvo Group works to help

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develop solutions adapted to the specific needs of each society and market, and strives to find ways to collaborate with raising traffic safety standards.” (p.1)

In 2013, Volvo announced a partnership with Apple to introduce an operating system known as Apple Carplay into their fleets. President and CEO of Volvo Cars commented as follows:

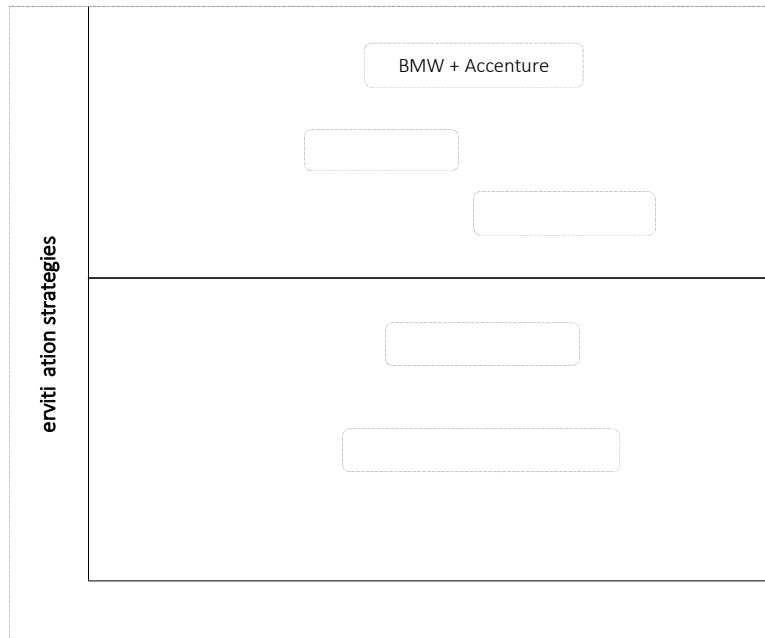
“Apple’s clean and intuitive user interface is a perfect match with Volvo’s Scandinavian Design approach and our focus on fluid functionality [.....] we have created a wholly-integrated user experience in our large portrait-oriented touch screen that takes the in-car mobile device experience to a new level. That, coupled with the obvious driver safety benefits of an advanced voice control system like Siri, made Apple a perfect match for Volvo.” (Volvo Press Release, 2014).

Three years after the collaboration announcement, Volvo introduced Apple Carplay technology into the V90 Estate and the XC90 crossover models in the USA and UK markets. The 2016 model XC90 became the first Volvo vehicle in the USA to support Apple’s CarPlay, enabling iPhone owners to access some apps from the crossover SUV’s dash display. Apple Carplay provides access to Apple Music and to apps such as Spotify, Beats Music, iHeartRadio, and Stitcher.

*4.4.1 Resources integration strategy*

Figure 6 shows the resource integration strategies of the case firms. The findings are discussed from the three integration strategy perspectives proposed by Xing et al. (2017).

**Figure 6** Resource integration strategies of firms



Three firms, GM, Volvo, and BMW were identified as having adopted reconfiguration strategies. In other words, these firms modified existing services or designed new services with the help of the partner's knowledge and resources. As part of an agreement with GM, Bosch developed and supplied the head unit, the cars' central operating device. This technology is only designed for GM fleets. Volvo Cars enhance Apple's capabilities by linking them to an especially developed interface that allows drivers to use voice and steering wheel controls to access Apple features and services, ensuring that the entire interaction is always safe and easy to use. By using the Apple operating system, Volvo designed a user interface to access Apple features and services in Volvo cars. Consequently, Apple CarPlay integrates with Volvo Cars' new user interface, becoming part of the onboard system and displaying well-known icons for Apple applications. As part of the agreement, Accenture designed the BIP to enable the BMW Group's connected vehicle to offer ConnectedDrive. Using the new BIP, the BMW Group can add new services for ConnectedDrive customers through the product catalogue and it will increase the range of services in the future. The ConnectedDrive Store enables new services to be sold to existing customers depending on the vehicle capabilities. It also enables used car buyers to tailor their vehicles' ConnectedDrive services to their needs.

Two case companies, BMW and Porsche, adopted utilisation strategies to introduce new services for their customers. Prior to its collaboration with NOW! Innovations, BMW could only provide off-street parking solutions for its customers. However, as part of the collaboration agreement, and with the knowledge accessed through NOW! Innovations, the firm has now integrated both on-street and off-street parking technology into their fleets. As a partner, AT&T delivers WiFi and infotainment services to Porsche Macan, Boxster, and 911 models. These services are either standard or are an available option in several models and include a WiFi hot spot, navigation, news and weather alerts, and other infotainment services.

## **4.5 Discussion**

With this study, the authors contribute to the research debate on CPs by revealing firms' strategic choices. Attention is drawn to the motives and servitisation strategy of car manufacturing firms through focusing on CPs. The study was designed to respond to two research questions: the key motives for a car manufacturer collaborating with technology companies, including startups, and how car manufacturers configure these collaborations to enhance servitisation. The key announcements, media releases, press notes, press releases, official websites, and annual reports of five case firms were examined. The discussion section is presented under two subheadings, the first part focusing on the key motives for the CPs and the second part on the servitisation strategies of the firms.

### *4.5.1 Key motives for CPs*

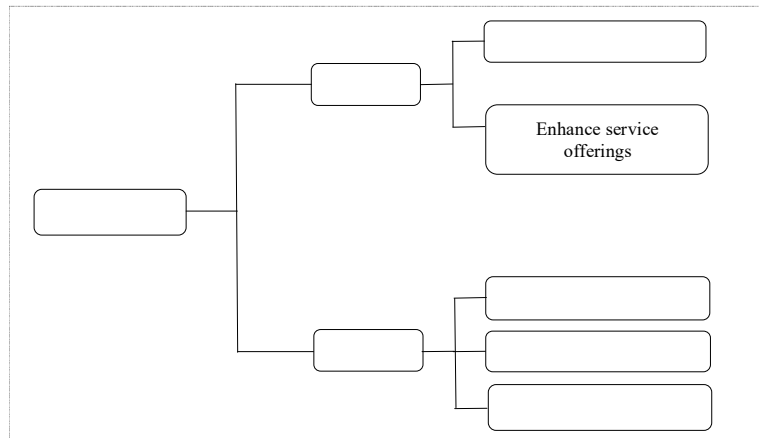
The study identified the five key motives for collaborations: market demand, customer relationship, enhancing the product or service portfolios, competitive advantage, and new revenue streams. These motives are categorised into internal and external motives, as shown in the model in Figure 7. Among these five motives, three play a more key role in collaborations: competitive advantage, enhance service portfolio and customer demand.

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To strengthen their competitive position in the market, firms design and develop products and services that are hard to imitate, a strategy that creates a competitive advantage for their services and products. The firms' announcements emphasise that they choose partners for the best services and technology, for example, GM collaborates with Bosch to design their driver information system, which is completely new in the market. This study showed that to keep their market position firms collaborate with another market leaders to access technology or to develop new services or products, a finding that coincides with the results of the Pateli and Giaglis's (2005) study "technology innovation-induced business model change: a contingency approach." Firms choose their strategic incentives to apply technology innovation and to differentiate themselves from the competition.

The study found that the case firms collaborate with other partners to access services, technology, and knowledge to integrate them into their service portfolio. The firm only chooses services that are already well accepted in the market or that respond to customer demands. This kind of strategy can help firms to deliver high intellectual value-added services (Muller and Doloreux, 2009). Firms engage in strategic alliances for different business needs. Koza and Lewin (2000) emphasise that the main reason for entering into alliances is to augment and support the adaptation strategies of the firm.

**Figure 7** Firms' motives for CP for value-added services



Another motive found in this study is customer demand, which firms constantly strive to meet. To create more value for products and services, firms should identify customer needs and respond to them by introducing new products and services. Several key people's views and documents in our analysis provide strong evidence to support the finding that customer demand is a key motive behind their collaborations. Goldman et al. (1995) claims that companies must be very sensitive to losing their customers to be able to survive in rapidly changing markets. They must relentlessly improve their product and add services to achieve customer enrichment. They must introduce services that satisfy the new demands of customers and to remain in the increasingly competitive market (Goldman et al., 1995).

Creating a new revenue stream is another motive in the set of key motives for CPs. In advanced industrial environments, manufacturing firms struggle to generate income from a pure product business. To this effect, they have moved to a product-service business, where customer services can generate additional revenue. In our study, we find that firms enter into collaboration agreements with technology firms to introduce new services, which provide new revenue channels for the firms. More specifically these services are customised. In other words, services are provided in a premium model, such as those offered by BMW and Accenture, where the customer can opt for the services they want when they want, by paying. Scholars have argued that service integration has a greater impact on the firm's revenue, for example Baines et al. (2009a) states that servitisation frequently occurs due to financial drivers. A recent study by Benedettini et al. (2017) suggests that greater numbers of product-related and product-unrelated service offerings do reduce the likelihood of bankruptcy when properly complemented by firm level contextual factors. Offering more product-related services decreases the bankruptcy likelihood of companies that have a sufficiently diversified product business. Another empirical study by Sawhney et al. (2004) shows that firms earn stable revenues from services despite significant drops in product sales. Koza and Lewin's (2000) study confirms that firms achieve new sources of income by combining complementary resources acquired through partnerships, a goal which is in line with the motives for collaboration listed by Settanni et al. (2014). One of the key drivers for servitisation is the desire to increase revenue and reduce costs.

The study identified a new motive for collaborations: customer relationship. This motive was witnessed in two cases: the BMW and Accenture, and the Volvo and Apple partnership agreements. These firms aim to expand their service offering by integrating services complemented by partner firms and creating a better customer relationship. The key motive 'customer relationship' has not been explained in the servitisation context in previous research and offers a novel contribution to the research on CPs in the automotive industry.

#### *4.5.2 Resources integration and servitisation strategy*

By adopting the Xing et al. (2017) resources configuration model, the study found that the case firms configure resources in two directions, *utilisation* and *reconfiguration* modes. We observed that two firms, BMW and Porsche, extended their service offerings by utilising the partner's capabilities and skills. In other words, the two firms take advantage of their partner's resources and services to increase their services portfolio. These collaborations illustrate that the case firm may utilise their partner's existing services to empower their services system. A recent study by Story et al. (2017) confirms that firms can develop and deliver more customised services by combining complexly interconnected capabilities found within a network.

Three other case firms – BMW, GM, and Volvo – adopted the integration strategy to enhance their service system. These firms form collaborations to develop new services and products with the help of a partner's resources and knowledge. This kind of approach leads both parties to reconfigure their resources to build new technology, services, and products, which ultimately fulfils the partner's business needs.

Our analysis highlights firms' intentions behind CPs and their service integration strategy. This perspective is less debated in the literature and it is expected that the

findings of this study will motivate researchers to focus further on collaborations in the servitisation context.

## **4.6 Conclusions**

The analysis of press notes and key person statements from car manufacturing firms revealed a set of key motivations for CPs. Four out of the five collaborations were found to be with multinational technological firms, and only one partnership was with a startup. It was observed that car manufacturing firms have a keen interest in integrating customised services into their core business operations and are pro-active in value creation for their services. Possible explanations for this transition are the decline in product sales revenues and changes in customer behaviour. These firms introduced or enhanced customer-based services to survive in this competitive environment, choosing a different partner that had prior knowledge or the resources to design services for their hasty market launch.

The study also discussed how these firms integrate the resources and technology accessed through collaborations. The goal was to understand why automotive firms make collaborative agreements instead of mergers or acquisitions, and what motivates them to make partnerships with technological firms. In this line, the study attempts to reveal firms' motives, although it does not study the entire partnership process or post-partnership performance. The model presented in this study is context-based and should not be generalised. It was observed that automotive firms in advanced economies (Europe and North America) are continuously ideating ways to shift their core business operations from product centric to product-service centric to meet market challenges, gain competitive advantage, and ultimately meet sophisticated customer demands. This study is among the first attempts to frame service strategy through CPs.

### *4.6.1 Theoretical implications*

The present study initiates a debate on CPs in the automotive industry during servitisation. The findings support and extend our understanding of CPs and the role of network partners in the firm's strategy, and a model is framed that illustrates the key motivations of firms' CPs. As a novel finding, customer relationship was uncovered as one of car manufacturing firms' key motives for making collaborative agreements. The strategic alliance literature mostly focuses on the resource-based view. Our findings extend the view to the customer relationship management theory, highlighting how firms use this strategy to improve customer relationships with new service offerings. This finding suggests that further exploration is required of firms' CPs from the customer relationship perspective (Lostakova and Pecinova, 2014). The study also indicates that collaboration could play a role in value creation for the services offered by automotive firms. Earlier studies (Rodrigues, 1999; Rosenberg et al., 2010) have also concluded that strategic networks, including alliances, are actions that companies take to expand their service market and acquire resources.

#### 4.6.2 Practical implications

The findings of this study offer practical possibilities for automotive firms to prepare to launch services more quickly in the market. The CP not only reduces time and costs, but it also reduces the financial risk. Both multinational OEMs and SMEs also need to consider collaboration partnerships as a strategy to access technology and resources to meet market demands. These kinds of agreements could help to offer customers the best services and can ultimately create competitive advantage, especially in the servitisation context. Moreover, the findings act as primary information to help the practitioner to view CPs as an alternative strategy in the servitisation context.

#### 4.6.3 Limitations and future research

Although this study offers new insights it also has some limitations. The primary limitation of this study was that it was restricted to secondary data publicly available on the firms' websites, since the authors could not access information in a direct way such as through interviews. Another limitation is that the data were collected and analysed and the findings discussed only from the servitisation perspective.

In future studies it would be interesting to focus on the empirical analysis of partnerships with some case studies that focus on the service transition process and a firm's competitive advantage. Another research area could be the analysis of CPs from the target company perspective. Studies on barriers and difficulties during collaborations would be much more fruitful when compared between different industrial settings and contexts.

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## Notes

- 1 The Economist – <https://www.economist.com>.  
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## **PUBLICATION II**

**Creating and developing the actor-network for a car manufacturing firm's mobility services**

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## Chapter 5 : Article 2

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# Creating and developing the actor-network for a car manufacturing firm's mobility services

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**Abstract:** Changes in urban travel behaviour, customer perception of car ownership, and government policies support the rise of mobility services. Car manufacturing firms have joined this new service ecosystem, which is complex in nature and requires collaboration between several actors. Scholars have explored these mobility services, but knowledge about how a firm initiates and expands its mobility service network, and how the activities of the different actors are deployed within it, is still limited. Hence, this study aims to shed light on how a car manufacturing firm creates and develops its mobility service network, and to define the key actors and their activities in it. The actor-network theory framework and the document analysis theory are used to interpret the empirical observations and generate the empirical evidence, respectively. The findings reveal the evaluative process of the mobility service network and who the actors who join the network by offering their core business services are. The study concludes by presenting a new actor category, namely co-branding actors.

**Keywords:** actor-network theory; ANT; mobility services; manufacturing; car sharing; service innovation; co-branding.

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## 5.1 Introduction

Technological discoveries combined with novel market dynamics such as digitalisation and servitisation are concurrently opening up innovative opportunities for new types of transport services (Smith et al., 2018). Customised mobility solutions are becoming an increasingly popular way to meet urban transportation needs, improving urban mobility and reducing private car use. This mobility service phenomenon has entered the

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mainstream, with a broad array of major automakers (BMW, Citroen, Daimler, Ford, Renault, Toyota, etc.) investing in shared mobility services (Le Vine and Polak, 2015), which are subsequently attracting much attention from researchers, policy makers, and the automotive industry. Academic scholars have explored mobility services from different perspectives such as cost-based analysis (Bösch et al., 2018), business models (Lisson et al., 2015), impact on the automotive industry (Spulber and Dennis, 2016), travel behaviour and preferences (Miramontes et al., 2017), and competences (Proff et al., 2015). However, empirical research that provides an understanding of how car manufacturers initiate and expand their mobility services, and who their partners and what their activities in the network are, is still lacking. Hence, the objective of this study is to understand how a car manufacturing firm creates and expands its mobility services, and how it orchestrates the mobility service network involving various partners.

Mobility service (or mobility-as-a-service, MaaS) is a relatively new concept in the service literature and a basic definition has yet to be established. The European MaaS alliance has defined MaaS in broad terms as follows:

“Put the users, both travellers and goods, at the core of transport services, offering them tailored mobility solutions based on their individual needs. This means that, for the first time, easy access to the most appropriate transport mode or service will be included in a bundle of flexible travel service options for end users.” (Eupomm, 2017)

In line with this description, mobility services are viewed here as any tailored solution that firms or individuals offer users (other firms or consumers) to fulfil their individual and varying travel and transportation needs.

The shifting paradigm of urban mobility has increased the need for innovative solutions to meet the demand for individualised travel. One possible solution is to move towards shared mobility services (on-demand cars, car sharing, carpooling, etc.), especially in combination with traditional public transport, thereby amalgamating various transport modes to serve as substitutes to owning private vehicles (Kamargianni et al., 2016). The integration of new technologies and the development of more user-focused concepts of mobility are facilitating the entry of newcomers, powerful high-tech corporations, data management companies, and energy companies who – together with traditional mature car manufacturers- are exploiting new business models, and innovative ideas from software solutions to new vehicle concepts (Cassetta et al., 2017).

Market change and the promising revenue stream are prompting car manufacturing firms to create mobility services. Schmidt et al. (2018) suggests that by the year 2030, revenues from the manufacture and sale of vehicles will be around €2 trillion, while revenues from mobility services are projected to soar to almost €1.2 trillion. Many car manufacturing firms that offer mobility services, such as BMW’s ReachNow, Daimler’s Car2go, and Volkswagen’s MOI, are to some extent directly involved in these services. Daimler Auto Group entered the market with Car2Go, a car-sharing organisation with a fleet composed entirely of Smart Fortwo models. It began in Austin, Texas, with a pilot program providing several car-sharing innovations. BMW DriveNow was launched in Munich in June 2011 and now operates throughout Germany and in several other countries. These mobility services, some of which are operated by local organisations such as Arriva in Copenhagen and OP financials in Helsinki (Kortum et al., 2016). The market expansion rate and customer interest in mobility services have prompted many automotive firms and other start-up companies to focus on this service business. For

example, in 2011 Volkswagen entered the mobility services business by collaborating with an on-demand mobility provider Gett, and in the same year Volvo car corporation launched their e-mobility services in collaboration with Siemens. A start-up firm MaaS Global entered the market with their integrated mobility services in 2016, which are growing at a remarkable rate (Warwick et al., 2017).

MaaS research focuses heavily on private car users and how to change user travel patterns (Utriainen and Pöllänen, 2018). Even though the research community has produced substantial knowledge on mobility services, the predominant focus is on private car users and their travel patterns (Utriainen and Pöllänen, 2018). A recent study by Smith et al. (2019) illustrates how personal mobility is planned, operated, and executed, with the authors suggesting that further research on the development stages of MaaS is required. Indeed, multi-actor collaboration in MaaS ecosystems is indispensable. Kamargianni et al. (2017) categorise these actors as transport operators, data providers, technical backend and IT providers, ICT infrastructure, insurance companies, regulatory organisations, universities and research institutions, and customers, based on the relationship they have with the MaaS provider. The author further state that as the MaaS ecosystem evolves other actors could also be added. Hence, it appears to be both relevant and interesting to study the MaaS ecosystem created by the car manufacturer. The focus in this paper is on the mobility services offered by a car manufacturer in Europe, in the pursuit of increased knowledge of how the firm creates the actor network for mobility services. This study has two research questions:

RQ1 How does a car manufacturer build its mobility service network?

RQ2 How are the different actors positioned and orchestrated in the car manufacturer's mobility service network?

The goal of this study is to understand the early phase evolution of the actor network involved in a car manufacturer's mobility services. It is purposefully focused on an early adopter company and explores its initial experiences in establishing the actor network. Investigating such an early adopter will provide thorough knowledge of how these services are designed, implemented, and extended, and of the emergence of the actor network for mobility services. Other domains of service research have previously covered inter-firm relationships in manufacturing firms' transformation toward services (Lappalainen et al., 2019); the role of after-sales services in company reputation and customer satisfaction (Ullah et al., 2018); and customers' involvement in co-creating service innovations (Shah, 2018), but only in types of businesses other than mobility services and in less complex relational settings.

This paper is organised as follows. In Section 2, following on from the introduction, the literature on mobility services is explored and the actor-network theory (ANT) proposed as the theoretical foundation for examining the emergence of the mobility services network. In Section 3, the research design, the case firm background, the nature of the data, and the sources are introduced. In Section 4, the findings are presented, providing a comprehensive view of the mobility service network from the perspective of the ANT framework and the different actors' positions. The findings are discussed and compared with earlier mobility service research in Section 5. Section 6 concludes by discussing how the mobility service network has evolved and developed over time, focusing particularly on collaborations with other actors, and on who the other actors involved in the mobility services are. Some theoretical implications of ANT in service



design and some practical implications for collaborative agreements are suggested, along with the limitations of this study and future avenues for research.

## **5.2 Literature review**

### *5.2.1 Mobility services*

Mobility services are a new transportation solution (Jittrapirom et al., 2017), and several schemes such as car-sharing, carpooling, and cars on-demand have emerged around the world (Kamargianni et al., 2016). Various scholars have defined these mobility services in different ways. For example, the first definition was offered by Hietanen (2014, p.1) as:

“Mobility distribution model that delivers users’ transport needs through a single interface of a service provider. It combines different transport modes to offer a tailored mobility package, like a monthly mobile phone contract.”

Atkins (2015, p.2) extended this definition further as:

“A new way to provide transport, which facilitates users to get from A to B by combining available mobility options and presenting them in a completely integrated manner.”

MaaS can be considered as the novel mobility concept that promotes tailoring various mobility solutions to meet customer needs. It not only fulfils the needs of urban mobility, but it also promotes a sustainable mode of transportation. Table 9 summaries the literature on mobility services and their research focus. Apart from customer demand, this mobility concept provides some environmental benefits such as the opportunity to decarbonise the transport sector (Gould et al., 2015) and implement the sustainability vision (Per Erik et al., 2015).

Growing trends in urban mobility, sharing transportation, and customer behaviour, in addition to environmental policies and the prevailing economic conditions have forced the automotive industry to focus on these integrated transportation services. Different mobility service schemes such as carpooling and car sharing are becoming increasingly popular in Europe and USA due to their flexibility, pricing system, and choice of various models (Perboli et al., 2017). Car manufacturers (Daimler, BMW, and Volkswagen) are directly involved in car-sharing operations, seeking new channels to market their cars, extend their business portfolio, and increase revenue. BMW currently has an international membership of 900,000 and 11,000 vehicles, and Car2Go has 2,900,000 members and 14,000 cars (Hawkins, 2018). Car sharing requires the active involvement of companies, customers, public authorities, and municipalities, in addition to strong cooperation among different actors in the system. Several actors need to collaborate for a scalable integrated mobility service to materialise (Per Erik et al., 2015), which presents a huge challenge, especially in larger countries. Combining distances and urban services requires separate negotiations with a large number of operators (Finger et al., 2015).

**Table 10** Summary of key literature on implementing mobility service concepts

<i>Author</i>	<i>Context, method, and data</i>	<i>Study summary</i>	<i>Research gap</i>
Cohen and Kietzmann (2014)	Conceptual study, based on empirical data for car-sharing, ride-sharing and bike-sharing business models.	<p><i>Focus:</i> The relationship between service providers (agents) and local governments (principals) to achieve sustainable mobility.</p> <p><i>Main results:</i> Agency theory was used to explain the relationships between different actors and the degree of alignment. Private and public models are fraught with conflicts. A move toward merit-based business models may offer a more optimal alignment between the service provider and local government objectives.</p>	<p>This study opens up discussion on the research topic of public and private collaboration in delivering shared mobility services.</p> <p>What is the relationship between municipal sustainable objectives and interactions with the private sector?</p> <p>Proper alignment of incentives to achieve sustainability objectives while allowing for sufficient profit making with private sector partners is an important area of research.</p>
Sochor et al. (2015)	Six-month field operational test (FOT) in Sweden, where 195 participants tested the UbiGo mobility service for everyday travel.	<p><i>Focus:</i> Identification of matches and mismatches between the expectations and experiences of three stakeholder groups: users (FOT participants-customers), commercial actors (mobility broker and service providers), and society.</p> <p><i>Main results:</i> To create integrated solutions, truly collective transport must involve close cooperation between public and private actors and the consideration of at least the three, sometimes conflicting, stakeholder perspectives.</p>	New business models are needed to address the challenges associated with future integrated urban mobility solutions.

*Source:* Authors' own elaboration based on the cited authors

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**Table 10** Summary of key literature on implementing mobility service concepts (continued)

<i>Author</i>	<i>Context, method, and data</i>	<i>Study summary</i>	<i>Research</i>
Terrien et al. (2016)	A case study of public and private experiences with five one-way car-sharing services in Europe and the USA. Interview data from both the public and the private sectors.	<i>Focus:</i> Public and private experiences of car-sharing services  <i>Main results:</i> Proposes a systematic and balanced public-private approach to foster transportation innovation management. Recommends that public and private actors should co-manage innovation since pilot projects lack certainty and require risk management.	Specific analysis tools should be developed and employed in pilot projects, as they enable local governments to build knowledge, skills, and new project management capabilities.
Sochor et al. (2016)	Data on travel behaviour and related changes on UbiGo services were collected in Sweden	<i>Focus:</i> Trial and evaluation of mobility services.  <i>Main results:</i> Key service attributes such as the transportation smorgasbord concept, simplicity, improved access and flexibility, convenience and economy. Successful implementation of MaaS requires careful consideration of service design and attributes (service providers, price models, invoicing, support functions, etc.), and it requires innovative and dedicated service providers committed to the challenge.	This study emphasised the fact that MaaS requires cooperation and collaboration between actors such as the public and private sectors, but it did not provide knowledge on how this collaboration can work with other partners.

*Source:* Authors' own elaboration based on the cited authors

Even if car manufacturers take the lead in developing and providing mobility services, they still need to identify and engage stakeholders in the network in a broader sense. Hanley (2012) suggests a categorisation of mobility stakeholders, classifying them into infrastructure providers, city administrators, and transport mode operators. The Urban ITS Expert Group (2013) grouped these stakeholders into public and private actors, expanding the categorisation to include mobility service users who they claim can contribute to refining services by providing feedback. Later, Van Audenhove et al. (2014) named the three main stakeholders – the city administration, the private sector, and citizens – who set out the purpose and objectives of the mobility system. Janasz (2018)

grouped the main actors in the mobility arena into three categories: public, private, and customers, each of which manages different activities in the value chain of mobility services. These actors need to define their own value proposition and then form partnerships to build and deliver products and services (Somnath and Matthew, 2017). Shah (2018) suggested that customer involvement in new service innovation should be treated as a successful strategy to improve firms' services.

Meanwhile, transport operators are beginning to understand that both their business models and their role in the emergent ecosystem will likely need to shift as they seek to harness technological advances that enable a wider range of choices, different uses of data, and a higher level of responsiveness (Warwick et al., 2017). The key factor for MaaS to succeed is that all the actors must work together in the ecosystem. Private sector participants may join the movement in search of profits, while government agencies might be motivated by the public policy benefits that stem from reduced congestion: higher productivity, better air quality, fewer traffic accidents, and a smaller urban footprint for parking (Warwick et al., 2017). While the first type of competitors challenge car manufacturers on their home turf by providing new types of cars for people to buy, the second type threaten the very foundations of the car manufacturing industry by providing customers with a substitute to owning a car in the first place. In response to this threat, premium car manufacturers such as Daimler, BMW, and AUDI are going beyond using digital technologies to create smart, connected cars, having long been developing IT-enabled mobility services built around car sharing (Mocker and Fonstad, 2017).

Mobility services require the integration of different partners since no single company can satisfy the needs of all customers, given the complexity of urban mobility systems (Spickermann et al., 2014). New actors, networks, and technologies are fundamentally challenging the extant regime of transportation (Docherty et al., 2018). Sarasini et al. (2016) proposes that collaborative approaches to integration must focus on two dimensions. The first dimension includes individual mobility service providers, who constitute the business model ecosystem to make MaaS business models operable and economically viable. The second dimension includes a broader range of stakeholders with divergent interests and visions, who are critical to the legitimacy of MaaS offerings. The integration of diverse stakeholder interests through participatory processes is essential to secure commitments to sustainable mobility and to overcome private car ownership (Banister, 2008).

Despite mobility service businesses being attractive to firms in terms of potential additional revenue and competitive advantage, some issues still need to be addressed. For example, Lyons (2018) states that urban mobility is dynamic in nature, and faces significant change and uncertainty. Mobility service providers not only need to understand this complexity and consider how to interact among the wider set of actors and processes that define and co-create the urban mobility system, but they must also consider the interests of public sector clients (*regulators*) and end users.

Some scholars (see Table 1) have discussed the importance of collaboration between different actors, including both public and private partners, for the success of mobility services. However, previous research has not sufficiently addressed the matter of how the network with other actors emerges and evolves. There is a need to understand how car manufacturers can activate the network with other actors, and how these actors engage in mobility service expansion. To address these issues, we have expanded the literature review to include the ANT, which can be used as an analytical tool to explain the evolution of technology innovation and partner networks.

### *5.2.2 ANT for mapping the network for mobility services*

ANT is a theoretical approach to social theory in which everything in the social and natural worlds exist in constantly shifting networks of relationships (Simandan, 2017). It was first developed by Law and Callon (1988) in the early 1980s. According to these authors, a network seeks to define and distribute roles, and to mobilise or invent others to play these roles. Such roles may be social, political, technical, or bureaucratic in nature, and the objects that are mobilised to perform them are also heterogeneous and may take the form of people, organisations, machines, or scientific findings. ANT enables researchers to map the actors in the networks, and to trace their evolution from how they come into being, to how human and technological actors are enrolled in them, the interactions between the different actors, and how they achieve stability or otherwise (McBride, 2003). The theory originated in science and technology studies as an approach to social theory and research. Its primary objective is to explore how networks are built or assembled, and maintained, to achieve a specific objective (Vicsek et al., 2016).

ANT has been recently been attracting considerable attention from organisational and innovation research communities. For example, Garcia et al. (2019) employ the theory to explain the technology transfer process and actors' involvement in it. It is a particularly suitable tool to discuss complex network development. For instance, Shim and Shin (2019) combine ANT, used as a theoretical framework, and institutionalisation theory to interpret the industry policy of Chinese TV and the role of technology in it. It has also been used to report interrelationships between actors in the ecosystem. Wan and Yau (2018) apply ANT as a qualitative analytical framework to examine the multilateral platforms in transport infrastructure projects, arguing that it helps describe the dynamic interrelationships among various actor. A recent study by Aka (2019) suggests that ANT not only provides theoretical and methodological tools, but it also helps to answer questions such as how sustainable innovation develops through the interactions and transformations made by various actors, and what mechanisms firms use to facilitate these. In Eze and Chinedu-Eze's (2018) study, ANT is used to examine the process of emerging information communication technology adoption and actors' roles.

Uden and Francis (2009) believe that ANT can be used as a theoretical lens to study the development and adoption of service innovations. It is well-suited to explain and help with the design of service systems. The development and adoption of service innovations require the integration of multiple elements including people, technologies, and networks across organisations, and technologies and actors' interests need to be aligned and coordinated for their success. The authors show how ANT is adopted as a theoretical framework to understand the relationships among actors and to illustrate how these actors' needs are shaped by the network formation during the development and adoption of service innovation by a university. Adaba and Ayoung (2017) state that the ANT perspective may be helpful to demonstrate how non-human actors are not only passive but also active participants, who interact with human actors to facilitate the development of an actor-network. Their study also confirms ANT as a theoretical framework for examining the deployment and diffusion of innovations in information and communication technologies for development research. Adamides and Karfaki (2016) develop a conceptual framework using ANT to explain organisations' strategic processes, implementing it to analyse an operations-led strategic initiative by a training services provider, and focusing on how it links to the strategic processes at the operations and business levels. Carroll et al. (2012) present a literature review on ANT, discussing how

it can be employed to examine the socio-technical nature of service networks, and affirming that it provides a rich vocabulary to describe the interplay of the socio-technical dynamics that influence service system reconfiguration. These authors also address the issue of why ANT is considered as suitable to be applied to service science research, focusing on the concepts of ‘materiality’, ‘inscription,’ and ‘translation’, and explaining how the introduction of a service system impacts on the structure of a service network. They also offer a discussion on how ANT may be employed to examine the complexity of service systems and service innovation.

Many factors such as focal actor interest, representative and commercial actors, and even customer demand influence the evaluation of a network. Kimbrell (2016) studied the impact of specific actors and technologies on the process of sustainable energy transitions in road transport, applying ANT in a local level case study of an electric car-sharing company in Brno, the Czech Republic. The study revealed that both the human and material actors within this network play crucial roles, both of which influence its successful expansion. These roles are agreed by the different actors in response to the negotiated issues particularly surrounding the material elements of the network (Kimbrell, 2016). Since co-operation between different actors influences the expansion and success of mobility services, we believe that ANT is a suitable theoretical framework to explore the emerging mobility services network. More specifically, it is useful in revealing how partner networks are built and identifying the activities carried out by each actor in the network.

### **5.3 Methodology**

#### *5.3.1 Research design and case selection*

To achieve its objectives, this study used a qualitative research strategy, which is an appropriate method to comprehensively study the service journey (Edmondson and Mcmanus, 2007), and it adopted an exploratory single case study approach (Stake, 1995). Given the theoretical immaturity of the research phenomenon of mobility services, a single case study is considered appropriate since it enables a thorough research inquiry to be made from as close to the research phenomenon as possible (Dyer and Singh, 1998). A single case, based on detailed qualitative data, can provide a good illustration of the dynamic processes played out over time (Siggelkow, 2007), and generate insights into a particular issue or topic (Stake, 2000) such as mobility services in the automotive industry.

When selecting the case, the focus was on large car manufacturing firms in Europe. Their market growth, number of partners, and number of value added services alongside its mobility services were considered in the search for a forerunner company that would be exemplary in terms of adopting mobility services. From the main extant alternatives, the focus fell on the BMW Group, who started providing mobility services in 2011, and currently offers services in Germany, Austria, the UK, Finland, Sweden, Italy, Denmark, Portugal, and Belgium.

### 5.3.2 Case company

The BMW Group is the world's premium manufacturer of automobiles and motorcycles, also providing financial and mobility services. As a global company, the BMW Group operates 31 production and assembly facilities in 14 countries and has a global sales network in more than 140 countries. In 2017, the BMW Group sold over 2,463,500 passenger vehicles and more than 164,000 motorcycles worldwide. Net profit for the 2017 financial year was €10.655 billion on revenues amounting to €98.678 billion. As of 31 December 2017, the BMW Group had a workforce of 129,932 employees. The group has been offering value-added services such as infotainment and parking solutions, in addition to more advanced services such as mobility services, alongside its core business services that range from spares, repairs, and fleet maintenance to more complex (customised) services, since 2011 (BMW Pressnote, 2018).

### 5.3.3 Data collection

A document-based technique (Bowen, 2009) was used to extract the data. Document analysis is a systematic procedure for reviewing and evaluating both printed documents and digital material. It is especially applicable to qualitative case studies, which are intensive analyses that produce rich descriptions of a single phenomenon, event, organisation, or program (Stake, 2000; Yin, 1994).

The study focused on BMW mobility service (DriveNow) developments during the period 2007–January 2018. The group actively started offering mobility services in Germany in the year 2011. The mobility service network is our unit of analysis. The primary data was gathered from BMW press releases, websites, and annual reports (2007–2017), and the secondary data from company announcements, collaboration announcement news items from automobile magazines, and websites. The authenticity of the data collected from websites was established through crosschecking it with the company's official press releases and annual reports (see Table 10).

**Table 11** Summary of data types

<i>Document type</i>	<i>No. of documents</i>
Annual reports (2007–2017)	11
Press releases	10
Media information	2
News (websites)	2
Case studies	1
Blog	1
Web information	4
Online auto news	17
Total	48

The authors believe that these official data sources are suitable for tracking the firm's strategic movements and actions since the documents were generated by the firm itself to provide information about their progress, activities, and engagements. The literature also approves the use of publicly available data as research data. Some examples are:

“One of the advantages of the public document as data is that the researcher can identify themes other than those that are visible ‘to the naked eye’. Publicly available data often convey important and useful information that a researcher can effectively use as data.” [Berg, (2011), p.214]

“Private records such as unsolicited documents are particularly useful for creating case studies of life histories. Owing to the personal nature of private documents, the subjects’ own definitions of the situation typically emerge in private records, along with the way they make sense of their daily living routines. More precisely, these bites of self-disclosure allow researchers to draw out a complete picture of the subjects’ perceptions of life experiences.” [Berg, (2011), p.220]

### 5.3.4 Data analysis

In this study, a coding technique was used to identify concepts, and themes from the data were categorised by applying the first two steps, data collection and coding (Long et al., 2006). The ATLAS.ti 8 coding application was used to code the data in two phases. In the first phase, open coding was used to detect and label key concepts and quotes in the text. A total of 19 open codes were created in this phase, which were subsequently grouped into the four phases of actor-network development: problematisation, intersement, enrolment, and mobilisation (see Table 11). The intention behind this first coding phase was to map the mobility service development and the respective evolution of the mobility service network. In the second phase of the coding process, all the actors’ activities were coded openly, and the actors subsequently categorised into three groups (adapted from Sadeghian et al., 2012): demand-side actors (mobility services users or customers), regulatory actors (local authorities), and supply-side actors (service firms). In this study, BMW is categorised as the focal actor who initiated, monitors and manages the mobility service network.

**Table 12** Categories of ANT stages, a listing of codes and example quotes from the document data

		Profit loss
Problematisation	Sales drop	The focal actor announced a 14% decrease in worldwide sales for September 2008. In Western Europe, the passenger car market experienced sharp volume contraction. The number of new registrations fell by approximately 8% to 13.6 million vehicles [BMW, (2008), p.18].
	New strategy Customer demand Change in urban travel behaviour	“...to strive for organic growth in the core line of business, the BMW Group will also engage in new and profitable areas of activity throughout the automotive life-cycle, and all the way along the value-added chain.” (BMW, 2007)  “As a mobility provider, the BMW Group is not simply an automobile manufacturer. There is a growing demand for flexible mobility products in urban areas.” – Ian Robertson, Member of the Board of Management of the BMW AG for Sales and Marketing



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**Table 12** Categories of ANT stages, a listing of codes and example quotes from the document data (continued)

Interessement	Mobility services Fleet management Experience in car rental	<p>In the middle of 2008, SIXT pioneered innovative car sharing when it started up its SIXTI Car Club in Berlin. Together with BMW, we have now taken this concept a stage further to become DriveNow.</p> <p>“...the wealth of experience which we have already gained in car rental processes and fleet management systems will enable us from the outset to offer our DriveNow customers complication-free mobility combined with excellent customer service, the basis for a sustainable and profitable business model.” – Detlev Pättsch, Member of the SIXT AG Board of Management</p>
Enrolment	Common goals Market experience Business expansion Service integrations Strategic partner Customer experience Customer demand	<p>“...we have nothing against cars. There is no need to own three cars per household, especially in Brussels where there is such an integrated and all-round mobility solution. What we are doing with DriveNow and this intermodal solution is probably one of the most efficient ways forward with the infrastructures currently in place.” – Philippe Lefrancq, Co-Founder at Ahooga</p> <p>“Working with BMW to support its sustainability efforts is a perfect fit for Green Mountain. BMW’s DriveNow program amplifies the environmental impact by offering consumers the opportunity to drive an electric vehicle that also supports renewable energy.” – Scott Hart, president of Commercial Services for Green Mountain</p>
Mobilisation	Strategic development Future plans Cooperation with partners City partners Franchise	<p>“We have achieved extraordinary success with DriveNow over the past seven years – thanks to the efforts of the DriveNow employees and the excellent cooperation with our joint venture partner, SIXT. SIXT will remain a strong partner for us in the future. Our aim is to win 100 million customers for our premium mobility services by 2025. With DriveNow as a wholly owned subsidiary, we have all the options for the continued strategic development of our services in our hands. Our experience with mobility services supports our development of future autonomous, electrified and connected fleets.” (BMW Group, 2011)</p> <p>“In 2017 our customers drove over eight million kilometers (five million miles) with the DriveNow electric fleet – that is equivalent to driving around the globe more than 200 times on electric power. DriveNow not only reduces traffic and improves the parking situation in urban areas, but it is also supporting the breakthrough of electromobility.” – Sebastian Hofelich, DriveNow Managing Director</p> <p>“We look forward to working with our franchise and city partners to continue actively shaping urban mobility in a sustainable manner.” – Sebastian Hofelich, DriveNow Managing Director</p>

Additionally, the coding revealed a fourth category of actors who did not fit directly into any of the three initial categories, which was labelled ‘*co-branding actors*’. These actors promoted mobility services within their own business, typically offering some complementary services that did not necessarily deal directly with vehicles or transport. For example, BMW DriveNow customers obtain a special discount in the McArthurGlen Designer Outlet in Roermond (The Netherlands).

## 5.4 Findings

The global manufacturing industry was hit by recession in 2008. Sales volume in the automotive industry dropped dramatically and the focal actor announced a 14% worldwide decrease [BMW, (2008), p.18]. These market conditions prompted the case firm to develop a new strategy for added value services, setting in motion a separate organisational unit known as ‘Project I’ (Number ONE strategy, as stated in the annual report) as part of the main strategy to develop new mobility concepts. The firm revealed their expansion plans in the 2010 annual report:

“For many years we have successfully been providing car-related services for BMW and MINI customers under the name BMW ConnectedDrive. This range of services will be significantly expanded in the future. The strategy is in line with our full-coverage approach, which includes vehicle-related and non-vehicle-related mobility services designed to cover the whole spectrum of premium mobility services.” [BMW, (2010), p.40]

This section is an analysis of the evolution of the mobility service in BMW’s network, with explanations of the roles of the different actors in the network.

### 5.4.1 *Mobility service network evolution*

The results show that the mobility service network began in 2011 and 30 collaborating actors had been involved in it up to January 2018. The evolution of the mobility service network was mapped through the four stages of ANT (Law and Callon, 1988).

#### 5.4.1.1 *Problematization*

The rise of alternative urban travel solutions has changed patterns of car ownership, and a drop in vehicle sales has forced the focal actor to change their business model. With the aim of understanding customer behaviour around mobility services, the firm setup a separate organisational unit known as Project I, the aim of which was “[to] develop new mobility concepts, especially for densely populated areas.” The project enabled the firm to assess customer behaviour around urban mobility and market demand for new mobility services. Ian Robertson explained the market conditions in the following way:

“There is a growing demand for flexible mobility products in urban areas. DriveNow’s premium car sharing services are aimed precisely at this gap in the market.” (BMW Group, 2011)

At this point, the focal actor had clearly defined the market shift and expressed the desire to capture this opportunity. However, it lacked technical knowledge on mobility service operations, and so it began to search for a partner to create a joint venture for mobility

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services. At the same time, SIXT AG, a mobility business operating across Europe that had been in car rentals since the mid-1900s, and a pioneer in car sharing technology, was seeking new opportunities. After a series of collaborative negotiations, the focal actor and SIXT AG formed a strategic partnership to create a car-sharing venture to meet urban travel demands.

#### *5.4.1.2 Interessement*

The mobility service was launched in 2011 and was widely accepted by customers, with 10,000 users registering for it within a year. However, the provider needed to offer more customised services to provide a better customer service and reach wider customer segments. The focal actor alone could not design and provide these services, needing different business partners who were already offering or were able to design these services. Hence, the mobility service network began to evolve by engaging with a range of actors for different business needs. This study observed that the focal actor negotiated with 30 actors (see Table 12) about joining the network during the period 2012–January 2018.

**Table 13** Actors and year enrolled in the network

<i>Actors</i>	<i>Year</i>
SIXT AG and mobility services users	2011
Green Mountain Energy Company and MyCityWay	2012
Europ Assistance Italia SpA	2013
Islington Hackney and Haringey councils, Twilio, McArthurGlen Designer Outlet, and Rewe Supermarket	2014
London City Airport, Vodafone, EasyPark, Alphabet, Arriva, and ARBÖ Club Card	2015
TOTAL, Deutsche Post, Moovit, and Hype Life	2016
Free and Hanseatic City of Hamburg, OP financial Finland, Chargery, Woshapp, Modalizy and XXIImo, Ahooga, PHIZZ, Local Tennis Leagues, Fragters, and ARBÖ Club Card	2017
E.ON	2018
<i>30 partners</i>	<i>8 years</i>

#### *5.4.1.3 Enrolment*

A total of 30 actors engaged in the mobility network (see Table 13) were identified, each performing specific roles assigned by the focal actor. For example, SIXT AG and Green Maintain Energy were providing fleet management technology and renewable energy certificates for the fleets, respectively. Some actors were assigned to integrate these mobility services into their business portfolio, such as Arriva in Denmark, and Modalizy and XXIImo in Belgium. The city councils of London and Hamburg also joined the mobility service network as part of a sustainable mobility service strategy. Furthermore, to make these mobility services more attractive to customers, the focal actor was collaborating with two retail market businesses, McArthurGlen Designer Outlet and Rewe Supermarket, who were offering the mobility service users discounts and shopping vouchers.

**Table 14** Actors and their main task in the mobility service network

<i>Actor</i>	<i>Role in the network</i>
SIXT AG	Technology for the fleet management system
Islington, Hackney and Haringey councils	Provides on-street parking spaces
London City Airport	Provides parking spaces and service information
Free and Hanseatic City of Hamburg	Provides charging infrastructures
Green Mountain Energy Company	Provides Renewable Energy Certificates (RECs)
Total	Digital payment methods for fuel
Europ Assistance Italia SpA	Roadside assistance such as the replacement of punctured tyres, the replacement of batteries and the phone fix service in Italy
Deutsche Post	Provides a digital identification process to verify both a driver's identity and their driver's license
OP financial	Manages DriveNow services in Helsinki
Chargery	Provides on-demand battery charging services in Berlin
Woshapp	Provides car washing services in Stockholm
Twilio	Provides mobile communication service like SMS
Vodafone	Offers SIM chips which link BMW with its vehicles and provides customers with access to innovative in-car services such as online services, a 24/7 personal concierge service for drivers, and an emergency call function
EasyPark	Provides technology for parking locations and payment
MyCityWay	Provides infotainment services including weather, traffic, parking, nearby events, dining and nightlife options, public transit updates, etc.
Moovit	Integrates DriveNow services into their mobile app
McArthurGlen Designer Outlet	Shopping vouchers for DriveNow customers and free parking for 30 minutes on their premises
Rewe Supermarket	Discount on purchases and ten minutes' free parking
Modalizy and XXI	Integrates DriveNow services in their business portfolio
Ahooga	
Alphabet	
Arriva	
PHIZZ	Promotes DriveNow services through their website
The Local	
Hype Life	
E.ON	
Local Tennis Leagues	
ARBÖ Club Card	
Fragters	
Users	Utilises mobility services and provides feedback on service quality

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In 2018, the focal actor announced partnerships with two start-up firms in Germany. The first, Chargery, charges BMW cars in 30 minutes using its innovative battery technology. The second, Woshapp, offers cost-effective cleaning services for BMW vehicles. The focal actor only selects partners who have market experience and/or firms with innovative technology or solutions.

#### *5.4.1.4 Mobilisation*

The mobility service network was expanded by the focal actor, who was aligning with a wider range of actors for its various business needs, reaching a total of 30 actors at the time of this study. At this stage of network development, the focal actor's role is to monitor the interests of the actors and to stabilise the network. No breaks in the network or loss of interest in the mobility services on the part of any of the actors were observed in this study. However, because the network is still in the early phase, it is not yet clear whether it is generating continued success and how it will evolve in the future.

#### *5.4.2 Actors' positions in the network*

All the actors were clustered into four groups – *demand-side actors*, *regulatory actors*, *supply-side actors* and *co-branding actors* – based on the positioning of the firms in the mobility services network [classification adopted from Sadeghian et al. (2012)]. The supply-side actors were categorised in a more detailed way due to their variety. A summary of this clustering is provided in Table 14.

**Table 15** Categories of actors in the focal firm's mobility services network

<i>Category</i>	<i>Actor</i>
Demand-side actors	Mobility service users: consumers
Regulatory side actors	Islington, Hackney and Haringey councils Free and Hanseatic City of Hamburg
Supply-side actors:	Deutsche Post
• Vehicle service suppliers	SIXT AG Woshapp Twilio Vodafone EasyPark MyCityWay Moovit Green Mountain Energy Company Chargery
• Infrastructure operators	London City Airport Total McArthurGlen Designer Outlet Rewe Supermarket Europ Assistance Italia SpA

**Table 15** Categories of actors in the focal firm’s mobility services network (contin-

ued) <i>Category</i>	<i>Actor</i>
• Transport operators	Modalizy and XXIImo
	Ahooga
	Alphabet
	Arriva
Co-branding actors	OP financial
	PHIZZ
	The Local
	Hype Life
	E.ON
	Local Tennis Leagues
	ARBÖ Club Card
	Fragters

Data about complaints and feedback on the quality of the service were acquired through various platforms such as the mobile application, the website, and *demand-side actor* surveys. The mobility service provider uses this data to enhance service quality and customer experience. The network had one million customers by the end of 2017 [BMW, (2017), p.64]. The main reasons why the number of users for mobility services is growing are their convenience and low price. Some customers have reviewed the service on the Trustpilot website.<sup>1</sup>

- Review 1

“...more convenient and cheaper than an Uber, and sometimes even cheaper than getting a bus. I’ve recommended it to a number of friends.” (Trustpilot, 2018)

- Review 2

“Well researched and implemented system. Cars are clean and the app is intuitive, including the damage report system.” (Trustpilot, 2018)

*Regulatory actors* are the local authorities, who are responsible for providing permits and parking spaces for mobility services. Two regulatory actors were identified in the mobility service network: Islington, Hackney and Haringey councils (London), and Free and Hanseatic City of Hamburg (Germany). These regulatory actors have different motivations for joining the network. For example, Islington, Hackney and Haringey councils’ Ben Plowden, Director of strategy and planning for surface transport at transport for London, commented on mobility services in the following way:

“In the next 20 years that’s [the figure for the number of mobility service users] going to rise to 35 million and so we have to respond and find some way of dealing with that. The mayor and transport for London have long supported the growth of car sharing schemes across London, as they can help encourage more alternative travel choices.” (Brigstock-Barron, 2014)

Hamburg city council has a different motive for supporting mobility services. Free and Hanseatic City of Hamburg Mayor Olaf Schulz, comments that:

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“Hamburg is preparing for future mobility with state-of-the-art technologies. Cooperation with the BMW Group will play a major role in systematically expanding e-car-sharing services. Integrated e-car-sharing, combined with classic public transport solutions, will ensure that future urban passenger transport offers greater flexibility and capacity, even at peak times.” [BMW Press Release, (2017), paragraph 3]

*Supply-side actors* provide technology, fleet maintenance services, and infrastructure facilities for mobility services. A total of 21 actors were identified in the supply-side actor position. Three types of actors, including vehicle suppliers, infrastructure operators, and transport operators can be identified in this group (as detailed in Table 6). *Vehicle service suppliers* (11 actors) provide services such as customer registration, communication, and parking solutions. Eight actors are in this position in the mobility services network, selected by the focal actor because they have pioneered in the market with their business solutions. For example, Easypark offers parking-related solutions for mobility service. According to Fredrik Ellsäter, CEO of DriveNow in Sweden:

“If our car sharing service is to work as smoothly as we want it to, parking fees must be handled automatically. EasyPark is the company that has made the most progress in the market, with a fully automated solution that makes this possible for us.” (Laroussi, 2015)

Five actors, considered as *infrastructure operators*, provided services related to infrastructure such as parking facilities and fleet management services for mobility services. Europ Assistance Italia SpA joined the mobility service network in 2015. Luca Pelizzari, Head of Automotive of Europ Assistance Italia SpA, expressed his reasons for collaborating:

“We are very proud to be an active part of modern and sustainable mobility projects. We are certain that our ability to intervene, our specialization in all types of rescue, and the continuous search for innovative solutions will meet the needs of this new and prestigious partner.” (Europassistance, 2016) (Original text in Italian)

There were five *transport actors*, who were engaged in transportation-related services. These are firms who are already in the mobility service business, including car rentals and taxi services, integrating the focal actor’s mobility services into their business portfolio in order to increase business and meet market demand. For instance, Arriva, a public transportation company in Denmark joined the mobility service network in 2015. In their media announcement, Nikolaj Wendelboe, Managing Director of Arriva, declared:

“DriveNow is the most ambitious and innovative public transport solution we have seen. With the 400 city cars, we tie Copenhagen and public transport together in a new way, giving citizens a flexible, coherent, and simple travel experience.” (Corporate News, 2015).

OP financial expressed similar motives for this partnership. Masa Peura, Director of new business areas, announced:

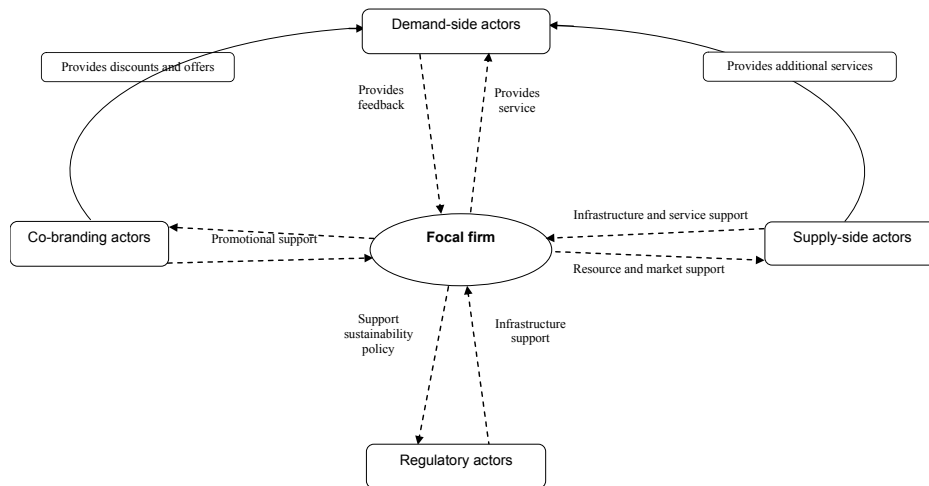
“We are happy to announce the co-operation with DriveNow and the further expansion of our range of mobility services. Our strategy is very future-oriented, and we want to build it together with the best partners. Based on these principles, we believe that DriveNow is the right car sharing service partner for us and our customers.” (Palomäki, 2017)

This study identified a new group of seven actors in the mobility services network, who engage in promotional activities for mobility services. These firms promote mobility services through their websites and business premises, their customers receiving free registration for mobility services as a mutual benefit. As an example, Local Tennis Leagues (2017, paragraph 1) joined the mobility services network, describing the partnership as follows:

“We’re delighted to welcome DriveNow into the Local Tennis Leagues family.  
The modern flexible car club and the modern flexible way to play tennis.”

A mobility service framework was created from the data reviewed to summarise and graphically illustrate who the actors involved in the focal firm’s mobility service network were and their positions in it (see Figure 8).

**Figure 8** Framework for the mobility service network



## 5.5 Discussion

Through document analysis, the study revealed BMW’s mobility service ecosystem and the position of the actors involved in it. The process of deploying mobility services was reviewed using the ANT lens to discover who the actors in the network were and how their positions in it were orchestrated. This is the first study to adopt ANT to illustrate network evolutions. By evaluating the types of actors and their key activities in the mobility service network, this study has extended knowledge on cooperation between actors and how they help to achieve the goals of the network. The discussion is presented in two sections, the first related to the mobility service network itself, and the second to the position of the actors in it, each responding to the initially raised research questions.

### 5.5.1 Car manufacturer’s efforts in building the mobility service network

BMW’s mobility service network, launched in 2011 to meet urban travel demands, evolved through four stages (ANT lens). Another factor in its creation was the rise in



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alternative urban mobility solutions from Uber and Ola in Europe and USA, forcing the focal actor to address the issue and their own competitive position, and to look for alternative solutions for urban mobility services. This process of sensing customer demand and competitors' strategic movements is referred to as *problematisation* in ANT (Ezzamel, 1994). To compete with mobility service providers in the market, BMW launched the mobility service venture called DriveNow, with SIXT AG as its technological partner. SIXT AG was already in the vehicle rental services business, pioneering car-sharing technology. The focal actor successfully engaged SIXT AG in collaboration and technology exchange, an argument supported by the findings of Carrington and Johed (2007), who state that actors need to convince others to subscribe to their own view by showing they have the 'correct' solution, and to work towards imposing their definition of a problem onto others.

After defining the urban mobility problem and identifying the possible solution to it, the focal actor started negotiations with the different actors regarding the activities and services required by the network, known in ANT as *interessement*. The focal actor needs to convince others that they will achieve their own goals when they join the network (O'Connell et al., 2014), and also to create a bond between the various actors' interests and support them. Lowe (1997) addresses this phase, in which various firms' interests are linked together and strengthened. To extend the services and increase customer experience, the service provider should align with third parties (Van Audenhove et al., 2014), but it is also important that the aligned partner benefits from the network (Per Erik et al., 2015). Singleton and Michael (1993) state that in order to succeed in the enrolment phase, the focal actor needs more than just one set of actors imposing their will on the others. They observed increases in customer numbers and positive reviews of service quality mainly in response to more flexible services and the additional services integrated by the actors.

Despite their differing interests and expectations, the focal actor's network has been built and expanded with 30 active actors (known in ANT as the *enrolment* phase). Hilgert et al. (2016) suggest mobility services are highly complex in nature, requiring the collaboration of many partners. Koglin et al. (2017) express the same view, stating that various actors need to collaborate for a scalable integrated mobility service to materialise. This is a crucial stage for the success of the network, when the focal actor aligns actor positions in it based on their knowledge and resources. The network is built up based on agreements among the different actors concerning their interests and how they can be aligned with the focal actor's (Alcouffe et al., 2008). The focal actor's mobilisation phase is currently in progress, which means that other external (allies) actors are still joining the network to support the mobility services. At this point, the focal actor needs to monitor the interests of the various actors to stabilise the network (Mouritsen et al., 2001). According to O'Connell et al. (2014), mobilisation occurs as allies move to support the network. This process is not without problems, and controversies can cause actors to unenroll. However, the acquired data did not reveal any change in the network at the time of writing this paper; in other words, all the actors remained in the network and there were no apparent controversies.

Hence, these findings using ANT provide new insights into mobility services, potentially inspiring other studies to adopt this analytical framework to produce knowledge.

### *5.5.2 Actors' positions in the mobility services network*

A new group of seven actors named co-branded actors, who integrate mobility services into their business category, was identified in the network. This cooperation enhances visibility and attracts new customers. These actors promote mobility services through their website campaigns and on their business premises. As a mutual benefit, these actors' clients can register free for the mobility services, a collaboration that considerably increased the number of customers in Austria, Germany, and Denmark.

These findings deviate slightly from the earlier study by Sadeghian et al. (2012), who categorised all the actors involved in the mobility service ecosystem into three groups. Our findings add one more category to Sadeghian et al.'s (2012) classifications. One possible explanation for the presence of co-branding actors in the mobility service network is that BMW, as a mature car manufacturer attempting to move into a completely new business line, needs promotional partners to penetrate the market faster. Grębosz-Krawczyk and Pointet (2017) state that co-branding primarily enables partner companies to accomplish the objectives closely linked to the area of brand management. The findings are also supported by Smirnova and Moreva (2015), who claim that a co-branding agreement between a small company and leading companies can only exist in a highly competitive market.

The study found 30 influential actors, who were mapped using the three categories described in Sadeghian et al. (2012). Regarding the actors' activities in the network, the study found that the network expanded very quickly and was widely accepted by customers. Nearly 0.8 million users (demand-side) had registered in the mobility service network by 2017. Demand-side actors use the mobility services and provide feedback on service experience, issues, and service quality. The focal actor collects data from customers through various platforms such as social media, websites, and mobile applications concerned with user experiences, analysing them to develop better services. The fast expansion of the network created a demand for additional, more customised services.

As part of this network expansion, the focal actor collaborated with two local authorities, one in London and the other in Hamburg. Alignments of this nature are mutually beneficial for the actors. From the regulatory actor perspective, the key interests in joining the mobility service network were to reduce the volume of private vehicles and to support sustainable mobility solutions. This study found that this mutual co-operation between private and local authorities also helped to gain customer acceptance and trust in mobility services. Many scholars have advocated this kind of co-operation. For example, Cohen and Kietzmann (2014) state that an optimal relationship between the service provider and the local government is vital to achieve common objectives. Sochor et al. (2015) extend this view further, stating that close co-operation between public and private actors is needed to create integrated mobility solutions. This argument is also supported by Van Audenhove et al. (2014), who state that support from a city's top management is vital for establishing broad partner ecosystems and successfully implementing integrated mobility solutions. This finding suggests that mobility service providers need strong, close cooperation with local governments not only to obtain the legal permits and access infrastructure, but also because this influences user perception of mobility services.

The findings of this study identify another group of actors, who not only provide technology, fleet management, and infrastructure facilities, but also integrate added value

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services for mobility services. These were mapped as supply-side actors in the network, and their role greatly influences the success of mobility services. Mobility service providers need to carefully consider service design and attributes, and innovative and dedicated service providers are required to meet the set goals (Karlsson et al., 2016). Warwick et al. (2017) also state that a diverse range of actors need to cooperate to perform the different activities: technology providers, mobile communication providers, payment processors, public and private transportation providers, and local authorities. The network was observed to contain heterogeneous activities ranging from vehicle washing to automatic parking payment services.

The findings suggest that the mobility service provider needs to collaborate with the demand-side, as well as the regulatory and service-side actors. This study revealed a new actor category, namely co-branding actors, which has not been discussed clearly in previous research and is a novel contribution to the research on mobility service design.

## **5.6 Conclusions**

### *5.6.1 Theoretical contributions*

This paper contributes to the service design and actor network research by increasing knowledge about the actors' positions and activities in the mobility service network. The founding and expansion of the mobility service of a car manufacturing company that is pursuing a more customer-oriented business in collaborative settings, was discussed. Previous research (Sadeghian et al., 2012) reveals that car manufacturing companies collaborate with different actors to provide mobility services and has covered other types of services in inter-organisational settings (Shah, 2018; Ullah et al., 2018; Lappalainen et al., 2019). This study specifically revealed the pattern of the emerging and growing actor network for mobility services.

This exploratory study of a car manufacturer and its various service partners uncovered a novel actor category in the mobility service network: co-branding actors. These actors engage with service providers and promote mobility services to reach a wider customer segment. The mobility service network evolved and grew to involve both the previously identified actors – demand-side actors, regulatory actors and supply-side actors - and the newly discovered co-branding actors.

The study also showed that to successfully design and expand mobility services, a firm needs to associate with all four actor categories, highlighting that co-branding actors can significantly influence service expansion. The study suggests that mobility service providers should use these external actors' skills and capabilities to promote the network's shared competitive advantage and reach wider and uncovered customer segments.

### *5.6.2 Managerial implications*

The results suggest first that the manufacturer needs to recognise and understand customer heterogeneity and the business interests of the different actors, and they must negotiate to exchange resources and capabilities to fulfil their business needs. Second, attention needs to be drawn to the issues involved in the service network. Third, the pertinent interests and activities are often only formulated and orchestrated during

negotiations on very specific design features. Since the other actors are not the initiators of this network, as the focal actor the car manufacturer needs to conceptualise the others' role and activities. In some cases, cooperation between actors is based purely on the financial perspective. The focal actor always looks for cost-effective solutions and there is the likelihood of excluding existing actors and enrolling new ones.

### *5.6.3 Limitations and ideas for further research*

While this study focuses on new insights into mobility services, it has some limitations, which represent opportunities for further research. The single-case design, the choice of the case firm, and the early phase in mobility service diffusion in the industry limit the generalisability of the findings. The data was acquired from secondary sources (press notes, media releases, and annual report), so the authors' understanding could differ from the documents' original intention. The firm choice was purposeful, since learning from an early adopter of mobility services may be particularly beneficial for followers. The findings are based on documents that are limited by the assumptions of their creators, so this study should be considered as a preliminary attempt to explore mobility services through the lens of ANT. However, efforts were made to use various documents to enable triangulation across document types and sources, thereby improving the research validity.

Using the actor network lens, this study not only provides new knowledge of mobility service networks, but it also opens up avenues for discussion on the role of ANT. Further research is needed to understand the evolution of mobility services. This study opens a discussion on how actor engagement makes a difference and how different types of actors support the heterogeneous network of mobility services. More research is encouraged in new directions such as managerial experience during networking. The embeddedness of mobility services in the context of the Smart cities of the future, whose sector boundaries are being blurred through progressive digitalisation, is another significant research opportunity. This study is an early attempt to bring new insights into mobility service development, the results of which could inspire researchers to apply ANT to other kinds of mobility services contexts in the search for new knowledge.

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## Notes

- 1 Trustpilot.com is a consumer review website founded in Denmark in 2007, which hosts reviews for businesses worldwide. The site is free for consumers and it offers freemium services to companies. Trustpilot has offices in New York, Denver, London, Copenhagen, Vilnius, Berlin, and Melbourne, employing more than 700 people and receiving nearly 1 million new posts each month. The firm relies on its users, reviewed businesses, and software to detect questionable reviews, which can be removed if they violate Trustpilot's content guidelines.

### **PUBLICATION III**

The new BMW: business model innovation transforms an automotive leader

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# The new BMW: business model innovation transforms an automotive leader

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## 6.1 Introduction

Technological innovations, market dynamics and changes in customer preferences have greatly impacted the traditional business model of manufacturing firms. While many firms struggle to generate a substantial profit from product sales, others try to identify opportunities by integrating product-related and value-added services. The days are gone when firms focused solely on product-centric business. A new business strategy known as service integration has evolved in the manufacturing sector. Changes happen at the level of value creation, value delivery and value capture. Any change in these dimensions ultimately results in business model innovation which is defined as an activity or process in which core elements of an enterprise and its business rationale are purposely transformed to achieve operational and strategic advancements.

The innovation in business models is novel and complex in nature, and it connects with various aspects such as corporate strategy, technological capabilities and firms' innovation processes. Business models are periodically impacted by technological innovations either by creating an opportunity or by taking a risk which will result in competitive advantage or disruption. Business model innovation is often the result of external factors such as competition law, labour market legislation and environmental legislation. The automotive industry has long been applying the traditional model. The value of this kind of model depends on being able to offer more cost-effectiveness, low emission engines and extra safety packs that may include auto-braking and chassis control, among others (Chrysakis, 2017). However, these features no longer create competitive advantages, and they have proved easy to copy. Many car manufacturing firms have lately integrated or are planning to integrate customer services such as mobility services, on-demand services and infotainment services in their core business operations. While practitioners and research communities have paid much attention to business model innovation, an industry-specific model, for example how car manufacturers orchestrate their business model and which elements are impacted by this change, is yet to emerge. To fill this knowledge gap, we narrow down the research on innovation in business models by focusing attention on BMW, considered to be one of the leading industry players for advanced services and a successful business model innovator.

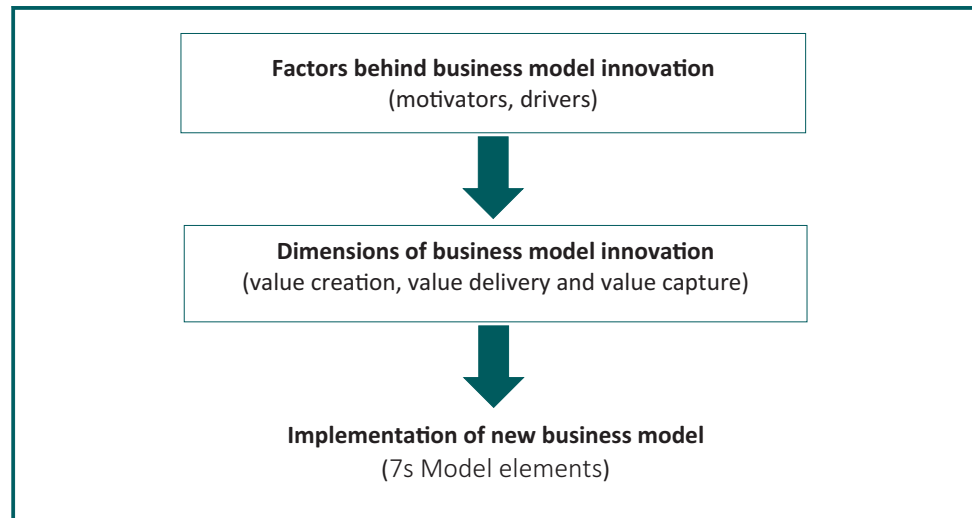
The structure of this article is as follows: first, this study explores the business model literature to outline the factors impacting innovation, and a framework for the business model innovation process is proposed. This framework is then used to discuss each element of the business model related to *ConnectedDrive* and the corresponding degree of innovation. Last, the paper compares the traditional and service integrated business models, as Figure 1 shows.

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**Figure 9** Framework of analysis



## 6.2 The factors behind business model change

A set of factors was synthesised and classified into two groups (Figure 1): motivators (inspire the firm) and drivers (facilitate change).

### 6.2.1 Motivators

Change can be triggered by internal factors such as organisational culture, the firm's aspirations, management support and new revenue channels, or by external factors such as market pressure for innovation and differentiation.

### 6.2.2 Drivers

Different factors can facilitate the innovation process, including market-level factors such as information and communication technologies (ICTs), big data, external drivers (globalisation, deregulation), the ability of firms to identify changes, co-development relationships, stakeholder demands, knowledge management infrastructure and management processes.

## 6.3 Dimensions of innovation

Rayna and Striukova (2016) find five dimensions of value in the business model literature: creation, proposition, capture, delivery and communication. This article discusses three of the most relevant values to the case study: creation, delivery and capture.

### 6.3.2 Value creation

Firms create value for the product and services with their core competencies, key resources, governance, complementary assets and value networks.

### 6.3.2 Value delivery

This dimension describes how the value created is delivered to customers through distribution channels. These elements offer ample opportunity for innovation by addressing the needs of the market segment (for instance, a mobility service that targets short term

travel needs), or by introducing a new way to deliver products or services (for instance, Netflix or Amazon Prime).

### 6.3.3 Value capture

This refers to the firm's ability to benefit from the value created. It includes the revenue model used to generate cash flow and the cost structure. Value capture also includes profit allocation across the value chain. Innovation may allow a firm to gain market leadership through cost restructuring.

## 6.4 Degree of innovation

Changes in the elements of the business model influence the degree of innovation. [Amit and Zott \(2012\)](#) categorise innovation as radical or incremental. Radical innovation is an innovation with a high degree of novelty, which breaks with what existed previously. John Deere, for example, has revolutionised the farming industry by integrating sensor technology into its tractors. In contrast, incremental innovation has a low degree of novelty, and with less risk and cost than radical innovation. For instance, electric windows, air bags, cup holders and ABS brakes are all examples of the incremental innovations made to cars.

## 6.5 Case background

BMW is one of the leading firms in the automotive industry, not only offering premium vehicles but for many years also providing customer with financial, on-demand and telematics services. The firm's transformation to customer-centric began by introducing telematics services in 1997. For the past 22 years, BMW has not only been offering telematics services, but has become the dominant force in the digital service market. The range of services available for current BMW models includes a personal telephone information service, emergency calls, Google Local Search, traffic information and internet-based services for navigation, communication and infotainment. These services are available in 45 countries, and there are already over 10 million connected BMW vehicles on the world's roads.

## 6.6 Methodology

For this research, a single case study method was used. The case study research method as described by [Yin, 2003](#) is a suitable method for obtaining insights into the innovation approach. This study follows the document analysis technique [\(Bowen, 2009\)](#), a systematic procedure for reviewing and evaluating both printed documents and digital material. It is especially applicable to qualitative case studies, which are intensive analyses that produce rich descriptions of a single phenomenon, event, organisation or programme [\(Stake, 2000; Yin, 1994\)](#). The data was gathered from BMW press releases, websites, annual reports, company announcements and collaboration announcements.

## 6.7 Findings

### 6.7.1 Factors behind innovation

**6.7.1.1 Motivators.** Three motivators behind BMW's decision to change its product-centric model to a service model were identified. These are organisational culture, competitive advantage

and additional revenue [\(Table 1\)](#). Regarding organisational culture, as a pioneer in the market, BMW always strives to be innovative in its core business activities. With aspirations of being a pioneer in technology and a first mover in the market, in 1997 BMW launched internet services in the car (telematics service). BMW has kept its commitment to offer more customer-centric solutions, expressing its organisational culture in the following ways: "we

**Table 16** Factors behind business model innovation

<i>Classification</i>	<i>Factors</i>	<i>Explanation</i>
Motivators	Organisational culture	Shared assumptions, values and beliefs
	Competitive advantage	Unique, high demand, or superior quality products or services
	Additional revenue	Revenue from additional services
Drivers	Technology integration	Use of technology tools to enhance service quality or portfolio
	Collaborations	Association with other organisations to achieve goals
	Dynamic capabilities	Ability to integrate, build and reconfigure internal and external competences
	Knowledge process	Method for creating, acquiring and using knowledge

committed”, “as promised”, “being a first mover” and “technology pioneer”. The integration of services of this kind prompted the start of change in its business model.

The increase in competition from emerging markets and dynamic market conditions has led car manufacturing firms to focus more on innovations. In 1997, the digital service market was in the expansion stage, and there were not many players in the market. BMW used this opportunity to create a competitive advantage for their fleets. Twenty years in telematics services have proved their strategy to be successful, and BMW has kept its leading position in the digital service market. Creating a competitive advantage is one of the reasons behind innovation.

Light vehicle production on a global basis dropped during the 1998 calendar year, falling nearly two per cent to 51.6 million units. This decline, starting in 1997, stemmed from the collapse of the Asia-Pacific region economies where automotive output declined by 11% to 14.5 million units.

To create additional revenue streams, BMW introduced digital services into the market. In-service integration model firms generate revenue by providing customer solutions and creating new revenue channel sources (Liang *et al.*, 2017). This could have been one possible motivation for BMW to change to a service-based firm. One vice-president described this movement: “We build digital products and services that are meant to help us differentiate our core product, the car, and generate revenue.” These services have been offered for several years, but the firm does not reveal its exact revenue from these services. Information gleaned from the annual reports and the expansion of third-party services in the digital service platform indicate that BMW receives a substantial amount of revenue from these services. Aspirations of additional revenue is obviously one of the factors behind the change.

**6.7.1.2 Drivers.** Regarding the drivers that facilitated the change, BMW relied on technology integration, collaborations, dynamic capabilities and knowledge process activities. IT (information technology) firms have expanded their business into the automotive industry landscape, offering customer services such as parking payments and in-vehicle services. With their dominant technological knowledge and market power, they disrupt the business model of the automotive industry. In this competitive situation, instead of competing with each other, BMW teamed up with these firms. A board member commented on this move: “We cannot offer clients the perfect experience without help from one of these technology companies. Two worlds are colliding here. Our world focused on hardware and our experience in making complex products, and the world of information technology, which is intruding more and more into our life”.

Given that the telematics service business seemed to be taking off, BMW escalated the service integration process by making collaborative agreements with various stakeholders such as technological firms and telecommunications providers. Instead of developing the technology itself, the company opted for a collaborative strategy to access a partner’s service and to provide an opportunity to integrate services as third-party service suppliers.

For example, the firm has developed central engine control units through cooperation with partners such as Bosch and Siemens.

To sum up, the firm's key motivation behind these collaborations was not simply to integrate the partner's services but to select only innovative technology and widely accepted solutions in the market such as on-demand music and navigation services.

With regard to dynamic capabilities, in an online interview Ian Robertson, member of the Management Board BMW AG, pointed out that "We are one of the world's, if not the, most successful automotive companies and we are rapidly becoming a technology company". In line with this vision, BMW has developed new capabilities such as the ability to integrate, build and reconfigure internal and external competencies to address rapidly changing environments. In 2001, the BMW Group Launched VIA 2.0 (The Virtual Innovation Agency), the online platform for people with ideas. All ideas, concepts and patents for new technologies that could be used by the BMW Group in its products and services in the short, medium and long term can be submitted online.

Effective knowledge process activities accelerate the change process. These activities include the capture, transformation and use of knowledge to design new services (Ansari *et al.*, 2012). BMW generates a huge amount of data about vehicle conditions, drivers' behaviour, and user service preference through the digital service platform. This data is processed by the firm and/or supply chain partner to design and develop new services. These (data collecting) processing activities serve BMW's legitimate interest in meeting the high standards placed by customers on existing products and services and being capable of satisfying customers' future wishes through the development of new products and services (Data protection, BMW). BMW has associated with leading technology centres in Europe, Japan and the USA, immediately entering all the knowledge and information gained into a central Intranet system made available to all associates to promote new ideas and networked thinking.

### 6.7.2 Traditional business model vs service business model

Press notes and media announcements made by BMW were analysed to present the two models. One is the traditional model (Car as a product) and the other is a new model (Car as a service). The first still exists in the company and the new model is being built for *ConnectedDrive* services (Table 2). Analysis of the business model reveals different views, one traditional and the other new.

In the traditional model, value creation is based on the firm's resources, capabilities and activities. Sometimes key resources are acquired from the supply chain network, but within the automotive business landscape. Meanwhile, in the new model, value comes from integration technology (established in the market or new to the market), knowledge process activities (customer knowledge) and collaborations (mostly IT firms).

In the traditional model, the firm uses dealer networks and their own distribution channel to deliver the product (car). The customer segment is mostly people who love luxury products, fuel-efficiency and design. However, in the new model, BMW uses its own network (store and online) to deliver services. BMW mainly targets people who love digital services. In the traditional model, BMW generates income through the sale of products and spare parts. Other basic services like maintenance and insurance also contribute a substantial amount of revenue. Most of the cost structure in the traditional model involves R&D, production, sales and marketing and training. In the new model, BMW has created various pricing models to generate revenue such as Freemium and Subscription mode (bundle and flexible). They invest money in activities such as service design, technology acquisition and knowledge management.



**Table 17** Comparison of business model components – car as a product vs car as a service

	<i>Car as a product model</i>	<i>Car as a service model</i>
<i>Value creations</i>		
Key resources	People and technology	Partner's resources, customer knowledge
Key activities	Production, Sales and Marketing R&D, Training	Service designing, Knowledge management
Key partners	Supply chain network Insurance firms, Designers, Research institutes	Other firms, (music providers, navigation service providers, telecommunication firms)
Customer relationship	Maintenances, customer service assistance	Feedback and reviews, Social media interaction
<i>Value delivery</i>		
Channels	Dealers and traditional car distributors/stores	Own network (app store, customer office)
Customer segment	Urbanites, Performance driven, quality-minded people	Tech-savvy consumers
<i>Value capture</i>		
Revenue streams	Car sales service and maintenance Insurance premium	Subscription fee service fee (Bundle and flexible)
Cost structure	R&D, Productions, Sales and marketing	Service design, technology acquisition cost and knowledge management activities

Source: Author's own elaboration

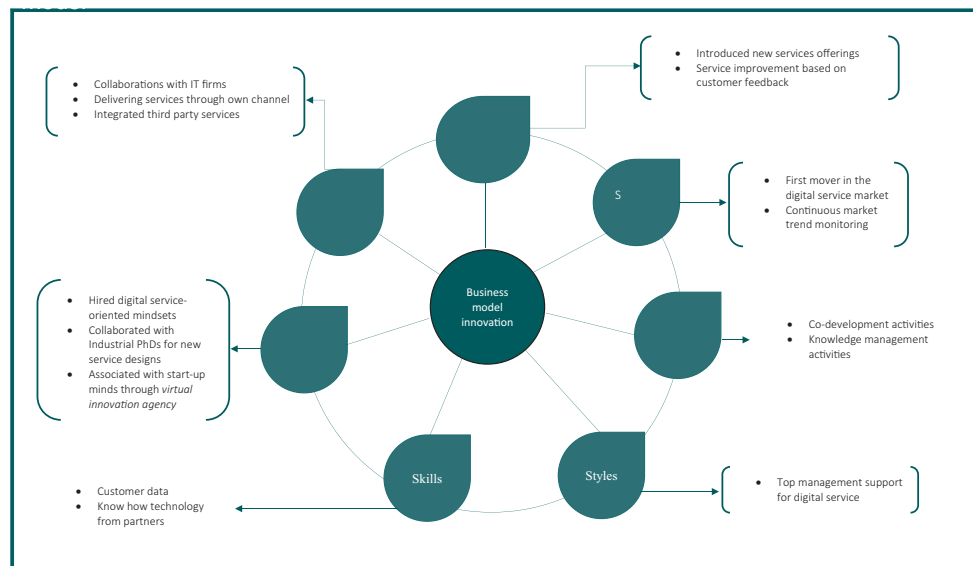
### 6.7.3 Implementation of a new business model

The study explored BMW's new business model implantation process through McKinsey's 7S Framework (Waterman *et al.*, 1980). The model is often used as an organisational analysis tool to assess and monitor changes in the internal environment of the firm. The findings are discussed through seven aspects of BMW that align for the successful integration of digital services and expansion of *ConnectedDrive* services: structure, strategy, systems, skills, style, staff and shared values (Figure 2).

#### 6.7.3.1 Structure

This defines how a firm is organised for transformation. The automobile industry has expanded into a digital service ecosystem. External factors such as the evolution of digital

**Figure 10** Illustration of business model Implementation through McKinsey 7 s



services, customer preferences and market trends have led BMW to focus on digital services. BMW introduced these services in 2008, and they have gradually expanded over the years. The company continually monitors these service adaptabilities in the market and improves them based on customer reviews and feedback. This observation emphasises the fact that for effective transformation a firm needs to focus on external elements such as market trends and customer preferences. Firms also need to focus on customer complaints, reviews and feedback to improve service quality.

### 6.7.3.2 Strategy

Strategy is the way a firm aims to improve its position through better value for its customers. BMW adopted technologies that are well accepted in the market and integrated into their service portfolio. Chesbrough and Schwartz (2007) argue that firms can innovate the business model by establishing co-development relationships with different stakeholders. Along with their own digital services, after collaborations. BMW started third-party services in a digital service network. The reason behind these third-party service integrations was that customers like technologies such as apply play, on-demand music and navigation services while driving. BMW set up its own digital platform to deliver its services to customers who can acquire them through the website and the App Store. The results showed that BMW adopted a collaborative strategy with established IT firms.

### 6.7.3.3 System

Systems are defined as all the procedures, both formal and informal, that make the organisation perform better. BMW's digital services emerged from the innovation of elements in the business model. Innovation started with changing the key activities of the firm. BMW set up a 24/7 customer service centre to answer all enquiries related to *ConnectedDrive* services, where customers can interact with the service provider through social media. In March 2019, the firm also introduced an intelligent personal assistant to help drivers with driving-related issues. These kinds of activities lead to generating customer information and related knowledge. In addition, BMW also involves customers in early customer service designing processes. This innovative step enables a more collaborative relationship with customers as a way of meeting customer expectations.

### 6.7.3.4 Staff

In 2014, BMW appointed Dieter May as senior Vice-President for digital products and services to lead the way in staff. At that time, he had had 23 years' experience in global high-tech companies, spanning mobile products, large-scale cloud-based consumer services and semiconductor technology. BMW also invited creative ideas for products and services through the "Virtual Innovation Agency". The company associated with selected people for service development, and with several research units and start-ups for new service developments, for instance offering industrial PhDs where researchers develop products and services for BMW. A general manager of product and channel development at BMW Group UK commented: "BMW opened its doors to external entrepreneurs to partner with them to support our innovation plan. This way we develop new services that tackle the changing customer needs we are seeing, and they help us find new ways to capitalise on new technologies". This observation showed that for an effective transformation a firm should take advantage of experienced personnel and associate with creative minds.

### 6.7.3.5 Style

Style refers to how management acts in achieving the organisation's mission within the cultural context of the firm. BMW is one of the first movers in the digital services market,

striving to be a market leader and pioneer in the digital service business. A general manager of product and channel development at BMW commented: “You need to learn to get from idea to implementation quickly. It’s something we strive to do. And BMW’s commitment to innovation across our business is coming from the very top of the company – our executive team see this as a key part of their strategy for the business”. Another factor observed in this study is that BMW clearly defined its transformation and new image in the market. The vice-president of digital services and business models commented: “The BMW Group is working to shift from a traditional luxury auto manufacturer and service provider to a technology company, with automated driving, digital connectivity, mobility services and electrification as some of the central pillars of our new strategy”. The results show that the firm needs support and cooperation for transformation, and they must have a clear vision of where this transformation is leading.

#### 6.7.3.6 Skills

Skills are the organisation’s dominant attributes, competencies and capabilities. BMW established the capabilities required for digital services, which include sensing, identifying and assessing emerging opportunities. Establishing these capabilities is completely new in the automotive industry. First, the company hired experienced people to lead the digital services business. It then associated with established IT firms and other firms to acquire know-how technology and competences. For instance, BMW acquired analytical capabilities by teaming with IBM. IBM’s cloud platform Bluemix gives developers access to BMW’s entire service catalogue and its ecosystem partners to build and operate innovative new service offerings. The general manager of IBM explained this collaboration: “The concept of a neutral server fosters innovation by establishing a single point of contact for multiple parties to access vehicle data from various manufacturers, thereby reducing integration cost whilst ensuring fair competition”. The results showed that BMW acquired skills and competencies from IT partners. Some competencies are co-developed with partners. To sum up, for effective new business model implementation a firm needs to develop and acquire skills and capabilities.

#### 6.7.3.7 Shared value

Shared value is defined as the norms and standards that guide a firm’s action, or the core vision of the firm. Creating a digital environment for drivers is the core vision of *ConnectedDrive* services. The vice President of Digital Products and Services expressed this vision as: “We build digital products and services that are meant to help us differentiate our core product, the car, and generate revenue. These digital services also provide us with channels and touch points that allow us to now have a direct relationship with the customer on the sales side and talk to the customer directly”. BMW’s mission for *ConnectedDrive* services is to establish better customer relationships and new revenue streams.

### 6.8 Conclusion

The aim of the present study is twofold: first, to examine a business model innovation framework with influencing factors and to contrast it with empirical evidence. This goal was achieved by presenting a conceptual framework and applying it as an analytical tool to describe BMW’s model development. Second, this research showed how BMW innovates each element in the model dimensions, which were then categorised into various degrees of innovation. The study also showed how BMW orchestrates innovation for digital services. To effectively adopt changes in the business model, the firm must first clearly understand what motivates this transformation. The firm should focus on factors such as market dynamics and other external forces that influence business landscapes. However, the firm should be aware that these forces can create an advantage or risk. Motivation alone is not

enough to change the model, but the firm should find drivers that facilitate this transformation. The firm must have the support of these drivers to create an efficient model.

Market dynamics have changed dramatically, and the firm needs to develop dynamic capabilities to shape business activities according to demand. Firms cannot create value through their products or services alone but rather need to collaborate with other stakeholders to create a value constellation, as suggested by Haggège *et al.* (2017). By adopting the latest technology, constant service-integration and customer knowledge can transform business activities to be more efficient and effective.

This paper has some limitations. The first one is that it develops a conceptual framework with the factors that emerged from the literature and are validated with a signal case study. The second limitation is that the study depends solely on secondary data. Regarding future research directions, this study recommends that research communities validate the proposed framework in a different context and with multiple case studies. The key element category presented in this study should be expanded further through empirical analysis.

The business model literature focuses on the impacts and benefits in general, proposing strategies for innovation. However, context-specific studies are yet to be uncovered. As a result, empirical illustrations of business model innovation in the automotive industry are lacking. This study contributes by highlighting the issue through presenting the business model of BMW for digital services. The results of this study can help managers to understand how innovation in business models may be orchestrated and what elements they need to focus on.

**Keywords:**  
Business model innovation

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### About the author

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## Chapter 7. Contribution of the papers

This dissertation is a trilogy of research papers, two of which have been accepted in Q3 journals, and the third paper accepted in a Q2 journal. The characteristics of the papers are presented in Table 18, and the contribution of each is presented in the following subsections.

**Table 18** Characteristics of articles

Article	Year	Status	Journal	Index	Quartile	Subject area
1	2019	Accepted	International Journal of Business Innovation and Research (IJBR)	Scopus	Q3 (2018)	Business and International Management  Management of Technology and Innovation
2	2019	Accepted	International Journal of Services and Operations Management (IJSOM)	Scopus	Q3 (2018)	Industrial and manufacturing engineering Management of Technology and Innovation
3	2020	Accepted	Journal of Business Strategy (JBS)	Scopus	Q2 (2018)	Management Information Systems Strategy and Management

### 7.1 Contribution of Paper I

Paper I explored the patterns of collaborative partnerships in the automotive industry during service design and integration. More specifically, the key motivations for collaborations and the resource integration strategy for servitization were examined. This multi-case analysis exposed key motivations for partnerships, with the results showing that most collaborations were with multinational technological firms, and that the reason behind them was to access technological firms' knowledge. It was also observed that car manufacturing firms have a keen interest in integrating customised services into their core business operations and are pro-active in value creation for their services.

The study also discussed how these firms integrate the resources and technology accessed through collaborations, unfolding five key motives, namely new revenue

streams, resource acquisition, competitive advantage, market demand, and customer relationship, although the entire partnership process and post-partnership performance were not studied. As a novel finding, customer relationship was uncovered as one of car manufacturing firms' key motives for making collaborative agreements, contributing to customer relationship management by revealing that customer relationship is one of the principal motives for a firm's strategic alliance. The findings support and extend our understanding of CPs and the role of network partners in the firm's strategy, and a model is framed that illustrates the critical motivations of firms' CPs. The findings answered RQ1 framed in this dissertation. For successful transformation towards the servitization model, firms need to collaborate with other players in the market. This kind of partnership is not necessarily established to acquire knowledge but can be used to develop services as a joint venture. Firms need to extend their key activities with external partners.

### *7.2 Contribution of Paper II*

Paper II explored service evaluation and mapped the partners in the service network. It was purposefully focused on an early adopter company, examining its initial experiences in establishing the actor-network. This study revealed BMW's mobility service ecosystem and the position of the actors involved in it. The process of deploying mobility services was reviewed using the ANT lens to discover who the actors in the network were and how their positions in it were orchestrated. This study specifically revealed the pattern of the emerging and growing actor-network for mobility services, which has evolved and grown to involve both the previously identified actors – demand-side actors, regulatory actors, and supply-side actors - and the newly discovered co-branding actors. These actors engage with service providers and promote mobility services to reach a broader customer segment. The study suggests that mobility service providers should use these external actors' skills and capabilities to promote the network's shared competitive advantage and reach broader and uncovered customer segments. The findings emphasized that firms need to collaborate with various partners to acquire the knowledge, skills, and capabilities required for service design and integration, and not only within the ecosystem but also outside the business domain. The findings of this study answered RQ1 and RQ 2, partially framed in this dissertation. First, the research uncovered the service evaluation and how the firm prepared for servitization at the within-firm level, later focusing on how elements in the business model, especially the key partners and activities, changed.

This exploratory study of a car manufacturer and its various service partners also uncovered a novel actor category in the mobility service network, which has not been discussed clearly in previous research and is a novel contribution to the research on

mobility service design: co-branding actors. This paper contributes to the service design and actor-network research by increasing knowledge about the actors' positions and activities in the mobility service network.

### *7.3 Contribution of Paper III*

In the third paper, business model innovation for advanced services in a car manufacturer was studied. The aim of this analysis was twofold. The first objective was to provide a practical illustration that typically represented a comprehensive BMI framework, including positively influencing key factors, and to validate it with empirical data. This goal was achieved by presenting a conceptual framework and applying it as an analytical tool to describe BMW's BM development. The BMI process reveals that for an effective change in BM, the firm should clearly understand what motivates this transformation, focusing on factors such as market dynamics and other external forces that influence business landscapes, and they should adopt these changes. However, the firm should be aware that these forces can create an advantage or a risk. Furthermore, motivation alone is not enough to change the BM, and the firm must find drivers that facilitate the transformation. To create an efficient BM, the firm should be supported by these drivers, as discussed above, and market dynamics should be dramatically changed, with the firm needing to develop dynamic capabilities to configure business activities according to demand.

This research reveals how BMW innovates each vital element in the BM dimensions and then categorise them in varying degrees of innovation. The findings of this study answered RQ II framed in this dissertation. First, the principle factors in the literature that drive the firm to change the business model were synthesised. The traditional (product-centric) and new (service-centric) business modes were then compared, revealing critical changes in the business model. Last, a service business model for a car manufacturing firm was presented.



## Chapter 8. Conclusion, contributions, and implications

### 8.1 Conclusion

The central objective of this thesis was to bring new knowledge on organisational transformation and business model innovation, and two research questions were framed to achieve this objective. The findings of this research work answered these questions. The first research question was “*How does the organisational structure change during the servitization of the firm?*”. The study showed that car manufacturers associate with different partners to enhance their service portfolios, expanding their collaborative alignment with in-car services providers such as the music industry, navigation service providers, infotainment providers, and parking service providers. Other partners such as cleaning service providers and regulatory authorities also joined in the network. Some firms collaborated to acquire knowledge, skills, and capabilities. A few firms worked jointly with partners to design and develop customer services and products. Carmakers also initiated mobility services and on-demand services, services that are operated by a separate venture but controlled by the parent firm. This knowledge contributes to the servitization literature by showing that the collaborative partnership acts as a driving force of effective transformation towards servitization and is vital for knowledge exchange and co-development activities.

Regarding the second research question, “*How does the business model change throughout servitization?*” the study showed that car manufacturers alter and redesign the traditional business model during servitization. Key elements in the business model, such as key partners, key activities, key resources, value propositions, and the revenue model are greatly influenced by this change. Car manufacturers create collaborative networks with unconventional partners such as IT firms, the music industry, parking service providers, and regulatory authorities. Car makers adopt new activities such as customer knowledge management, customer service design, alongside traditional car-making activities. Through partnerships, car makers acquire or develop new skills and capabilities to create and deliver customer services. Firms establish new revenue channels during this dynamic change. New revenue sources have evolved from customers services, such as on-demand services, parking services, and mobility services. The value proposition has radically changed from product superiority to customer service. The firm's primary focus has shifted from the sale of cars to offering customer services such as mobility services, on-demand services, and parking services.

This knowledge advances understanding of BMI. The study showed that the business model is influenced by both external and internal factors of the firm, and that the firm must adopt a change in the business model to sustain in the market. It is also suggested that prior to changing the business model, the firm first needs to carefully consider its motives for the change, as not all changes bring the expected results.

## *8.2 Contribution to the literature*

This thesis was motivated by the fact that the automotive industry is transforming into a service-centric business. Therefore, research is needed to provide knowledge on how this transformation proceeds and what factors impact the transformation. This research contributes by providing new insights into the servitization process (See figure 11).

The first contribution is to the collaboration literature. Paper I demonstrates that firms should establish collaborative partnerships to access technology and knowledge from technological firms. As a novel finding, customer relationship was uncovered as one of car manufacturing firms' key motives for making collaborative agreements. The strategic alliance literature mostly focuses on the resource-based view.

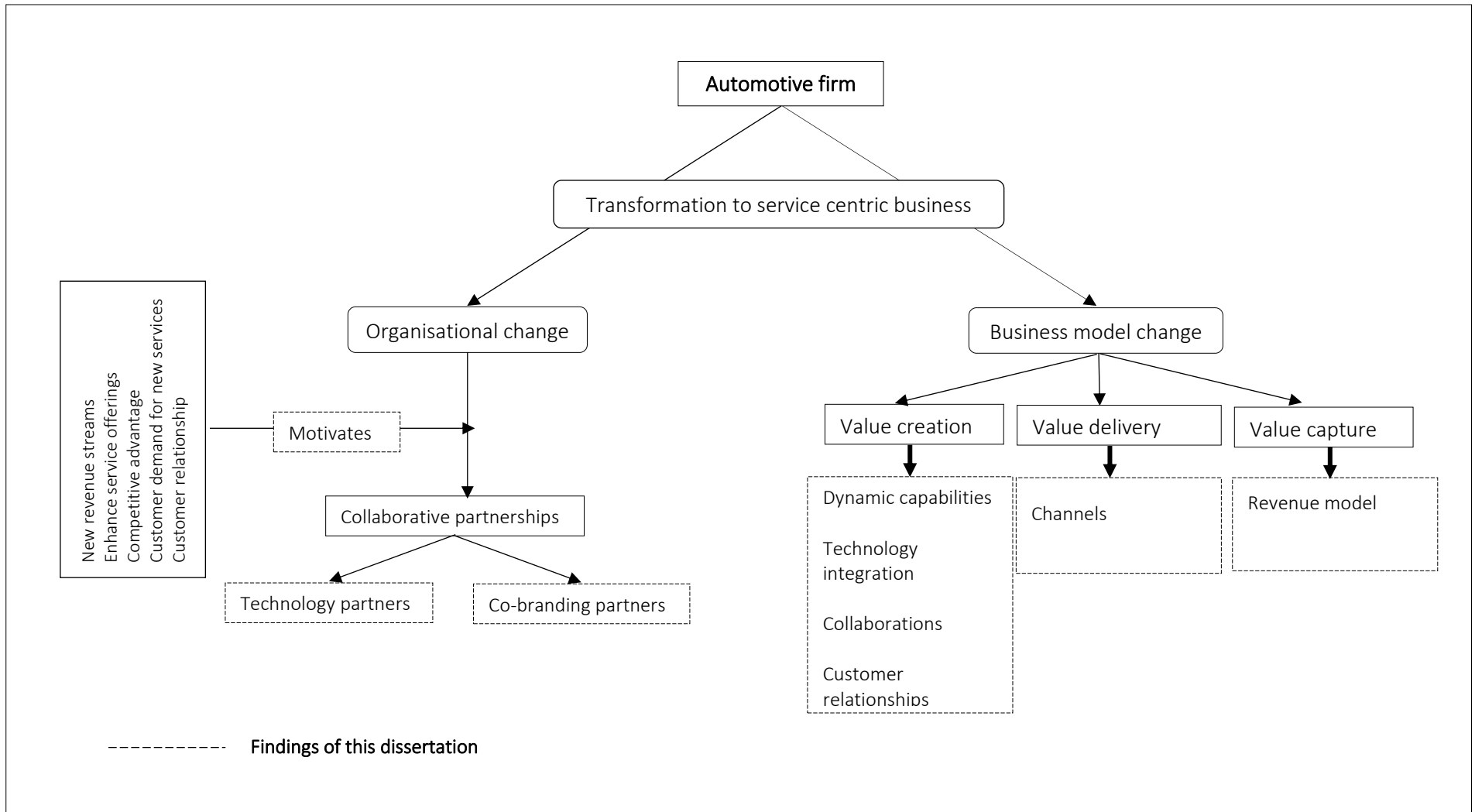


Figure 11 Contribution of this dissertation

The findings of this thesis extend the view to the customer relationship management theory, highlighting how firms use this strategy to improve customer relationships with new service offerings. Paper 1 also contributes to the service design and actor-network research by providing knowledge about the actors' positions and activities in the mobility service network.

Paper II specifically reveals the pattern of the emerging and growing actor-network for mobility services. This exploratory study of a car manufacturer and its various service partners uncovered a novel actor category in the mobility service network: co-branding actors. These actors engage with service providers and promote mobility services to reach a broader customer segment. The study suggests that mobility service providers should use these external actors' skills and capabilities to expand the network's shared competitive advantage and reach broader and uncovered customer segments.

The study also contributes to business model research. Paper III discloses how the firm orchestrates BMI for advanced services. For an effective transformation of BM, the firm should clearly understand what motivates this transformation, focusing on the factors that influence business landscapes such as market dynamics and other external forces, and they should adopt these changes. However, the firm should be aware that these forces can create an advantage or a risk. Moreover, motivation alone is not enough to change the BM, and the firm should find drivers that facilitate the transformation. To create an efficient BM, the firm should be supported by these drivers, as discussed above. Market dynamics have dramatically changed, and the firm needs to develop dynamic capabilities to configure business activities according to demand. Firms alone cannot create value through their product or service, and they need to collaborate with other actors to develop a value constellation, as suggested by Haggège et al. (2017).

### *8.3 Managerial implications*

This research offers practical possibilities for automotive firms to prepare to launch services more quickly in the market, suggesting that CPs are essential to this end. CPs not only reduce time and costs, but they also reduce the financial risk. Both multinational OEMs and SMEs also need to consider CPs as a strategic choice to access technology and resources to meet market demands. These kinds of agreements could help to offer customers the best services and can ultimately create a competitive advantage, especially in the servitization context. Moreover, the findings act as primary information to help the practitioner to view CPs as an alternative strategy in the servitization context.

Paper II also suggests that the manufacturer needs to recognise and understand customer heterogeneity and the business interests of the different actors, in addition to negotiating and exchanging resources and capabilities to fulfil their business needs;

second, that attention needs to be drawn to the issues involved in the service network; and third, that the pertinent interests and activities are often only formulated and orchestrated during negotiations on design features. The results of paper III reveal factors associated with business model innovation during servitization, suggesting that the firm needs to develop dynamic capabilities to configure business activities according to demand.

Overall, the study highlights the servitization process in automotive firms. Earlier research has revealed that the transformation towards service-centric is impacted by several factors. Therefore, the transformation must be carefully executed, and the firm should craft driving factors for business model change. It is evident that the partner has a crucial role to play during the servitization process by providing the knowledge and technology needed to develop customer services. Hence, this study encourages practitioners to establish collaborations with partners both inside and outside business landscape to build customer services.

#### *8.4 Validity and reliability of the research*

A qualitative methodology was employed during the research process. Although secondary data was used in this study, its authenticity was cross-checked with official sources (firms' websites and annual reports). A document-based technique (Bowen, 2009) was used to extract the data in this research, which is a systematic procedure for reviewing and evaluating both printed documents and digital material, and is especially applicable to qualitative case studies, intensive analyses that produce detailed descriptions of a single phenomenon, event, organisation, or programme (Stake, 2000; Yin, 1994). Furthermore, two of the papers have been published in journals, confirming the validity of the research given that the articles were peer-reviewed and revised based on reviewers' comments before publication.

#### *8.5 Limitations of the study*

This study was limited by its single phenomena servitization context, choices regarding the research methods, and the data collection.

- The data was limited to secondary data. This was not the researcher's first choice, but lack of cooperation on the part of automotive firms led to the focus on alternative data.
- The data were collected and analysed and the findings discussed only from the servitization perspective.
- The data were acquired from secondary sources (press notes, media releases, and annual reports), so the researcher's understanding could differ from the documents' original intention.

- In paper 3, this study developed a conceptual framework with factors that emerged from the literature, which was then validated using a signal case study, so the results cannot be generalised.
- This dissertation purposefully focused on car manufacturing firms during the servitization context. Therefore, the results cannot be generalised.

### *8.6 Future research directions*

This thesis focused only on car manufacturing firms in the servitization context. Further research is encouraged to explore how inter-organizational relationships would help the service transition process and provide a competitive advantage for the firm in different industrial settings. Examining the collaborations from the target company perspective is also suggested as a topic of future research. A case study on barriers and difficulties during collaborations would be useful when comparing different industrial settings and contexts. While this study focuses on new insights into mobility services, it has some limitations, which represent opportunities for further research. In this thesis, the actor-network theory was used as an analytical tool to present the evolution of customer services and its partner network. Multiple case study is encouraged, using the actor network to explore service evolutions at the industry level.

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