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Capture value through revenue models impacted by digital servitization in the automotive industry

An interview study at CEVT

Master's thesis in Management and Economics of Innovation

AMANDA BERG
MOA ELLMARKER

DEPARTMENT OF TECHNOLOGY MANAGEMENT AND ECONOMICS
DIVISION OF ENTREPRENEURSHIP AND STRATEGY

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Report no. E2023:025
Department of Technology Management and Economics
Chalmers University of Technology
SE-412 96 Gothenburg
Sweden
Telephone + 46 (0)31-772 1000

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ABSTRACT

As a result of digital servitization, the automotive industry has undergone significant transformations disrupting traditional revenue models and revolutionizing how companies generate revenue from their vehicles. Digital servitization has created opportunities for the introduction of new revenue sources such as mobility solutions as well as the opportunity to offer smart digital services as an additional revenue source. A main challenge however is the servitization paradox, which becomes present along with these changes. It indicates that it is harder to generate high profit margins from pure services, which puts the automotive industry in a complex situation of how to be profitable. To stay profitable, it puts high demands on understanding the user-value and how to capture this value through different revenue models. By grasping how the transformation in the automotive industry impacts how companies can stay profitable, the purpose of this study is to explore how digital servitization impacts how value can be captured through existing and new revenue models in the automotive industry. To gain this understanding the study has been conducted at the innovative R&D company CEVT through an interview study. By fulfilling the purpose, the study also aims to give insights to CEVT on how to take strategic decisions and build compelling business cases with strong profitability analysis in this new automotive industry.

The findings of this study are mainly presented in the shape of archetypes visualizing how value can be captured in specific revenue models in the automotive industry. Significantly the shift from traditional to more innovative revenue models show how the impact on user-value shift from originating from the hardware and car-specification in the vehicle, to softer factors such as convenience, flexibility, and freedom of responsibility. Unexpectedly, findings showed that the potential of selling digital services as an additional revenue is equally big between traditional and innovative revenue models, if they are distributed the right way. Furthermore, the study emphasizes the importance of including value-based pricing strategy when moving across the scale of digital servitization and towards more innovative revenue models. The main theoretical contribution of this study is the proposed value-driven product-service framework that combines the theoretical concepts of digital servitization, user-value and revenue models.

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Keywords: Digital servitization, User-value, Capture value, Value-based pricing, Revenue model, Revenue source, Digital service

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1. Introduction

The rise of digitalization and its technical capabilities has been the enabler for servitization in many industries, especially in the automotive industry (Porter & Heppelmann, 2014; Vendrell-Herrero et al., 2017). This study will explore how digital servitization has impacted how companies can capture value through revenue models in the automotive industry. Annarelli et al., (2019) defines servitization as the shift from focusing exclusively on products or on services to integrating products and services together creating a product service system (PSS). The two perspectives of servitization and digitalization have been brought together under the concept of digital servitization (Vendrell-Herrero et al., 2017), which involves the offering of digital services that are embedded and connected to the physical products (Holmström & Partanen, 2014). Along with the emergence of digital servitization, traditional business models have been disrupted with implications on the revenue model including distribution, volume, and revenue source (Linde et al., 2023; Teece & Linden, 2017). According to Eggert et al. (2014) and Parida et al. (2015) this change leaves companies with the opportunity to generate higher profit if they can overcome the servitization paradox. Neely (2008) presents the servitization paradox as the challenge to reach high profit margins from services since they leave companies with several small transactions instead of few big ones. Moreover, Coreyonen et al. (2018) among other scholars highlights the importance of having digital capabilities supporting servitization to overcome this challenge (Kohtamäki, 2020; Gebauer et al., 2020). The automotive industry is currently facing this paradox as a result from the changing market trends from digital servitization.

According to Ross (2014), the market trends in digital servitization show that the status a car symbolizes has decreased. Preferences have changed and new generations are shifting the mindset from owning a car as a product to using a car as mobility (Annarelli et al., 2019; Genzlinger et al., 2020; Rahman & Tadayoni, 2018). Digital servitization has also enabled technical capabilities that have not been possible in a car before. This change in user demand and technical capabilities has resulted in new possible revenue models through which companies can capture value. Private leases, company leases, subscriptions, memberships, rentals, and additional sales of digital services are among the many revenue sources a car manufacturer of the modern day can offer mobility solutions (Delhi, 2016; Linde et al., 2023). These mobility solutions face the risks of low profit margins as they are a part of the servitization paradox and need to be supported by technical capabilities in order to capture value. McKinsey & Company (2016) present in their study how shared mobility solutions have increased 30% annually in the last five years. Shared mobility allows more efficient use of resources by enabling multiple people to use the same vehicle and thus reduces the number of cars on the road. Moreover, shared mobility services often use fuel-efficient and environmentally friendly vehicles, which helps to reduce emissions and focus on sustainability. By including sustainability as a part of a company's strategy, they can

face environmental responsibility while capturing value through new revenue models (Galvani et al., 2022; Granskog et al., 2021; Möller & Schaufuss, 2022).

As these new revenue models are moving more towards mobility services, there is also a need to adapt the pricing strategy (Linde et al., 2023). Value-based pricing is a concept that determines the price of a product or service based on its perceived value by the user, rather than more traditional strategies such as cost-based pricing (Bonnemeier et al., 2010; Hinterhuber & Liozu, 2014). The perceived value by the user will be referred to as user-value in this study and refers to the extra revenue potential that comes from understanding the relationship between user's willingness to pay (WTP) and price. Moreover, Gebauer and Friedli (2005) discusses how value-based pricing creates opportunities to reach higher profit margins and supports overcoming the servitization paradox. To conclude, for companies to be profitable, it is crucial to understand how digital servitization impacts current and new revenue models and consequently how they can capture value in the automotive industry.

1.1 Background

Because of the existing challenge in the automotive industry there is a need to gain input from a company present in the industry, thus this study will be conducted together with the automotive R&D company CEVT. CEVT (China-Europe Vehicle Technology AB) was founded in 2013 and is owned by the new electric mobility technology and solutions brand ZEEKR (CEVT, 2023a). Both CEVT and ZEEKR is a part of the Geely Group (Zhejiang Geely Holding Group), which is a global mobility and technology company with focus in the automotive, smart mobility, green transportation, and digital technology sectors (CEVT, 2023a). CEVT is the European R&D center for ZEEKR, but it is also developing products and digital services for other brands belonging to Geely Group such as Lynk&Co, Polestar, Volvo, and Lotus. They offer both B2B and B2C solutions. With approximately 1800 employees and a headquarter in Gothenburg, they are embedded with a startup attitude including three core values: Think big, Find a way and Inspire (CEVT, 2023b).

As ZEEKR is aiming to satisfy the global demand for premium electric vehicles they are now (2023) aiming for the B2C European market. While doing this they are committed to being a user centric tech-company where they break the boundaries between user and car (Geely, 2023). CEVT has experience from working in the traditional product-centric automotive industry (e.g., Volvo) as well as with mobility services (e.g., Lynk&Co). They are currently undergoing a major reorganization where they are taking a bigger role in the implementation of ZEEKR in Europe (ZEEKR EU). ZEEKR EU combines their experiences within product-centricity, mobility services and digital services, which Annarelli et al. (2019) defines as a product service system (PSS). As they are present in the rise of digital servitization, CEVT faces the challenge to understand how they can capture value through new revenue models. To build compelling business cases they need to understand the connections between digital

servitization, user-value, value-based pricing, and revenue models.

1.2 Problematization

To summarize, the rise of digital servitization has left the automotive industry with pressure on sustainability and a threat of low margins. This creates complex challenges for companies such as CEVT, to understand the user-value and how to capture value through new and current revenue models to stay profitable (Harvard Extension School, 2022; Porter & Heppelmann, 2014; Rahman & Tadayoni, 2018; Linde et al., 2023; Teece & Linden, 2017; World economic forum, 2022). To overcome this challenge, it becomes highly relevant to understand the impact of digital servitization and how it relates to user-value, value-based pricing, and revenue models. Moreover, the move towards mobility services makes it useful to also investigate how new revenue models can capture value depending on the revenue source, usage of digital services and user-value. According to Linde et al. (2023) both the topic of revenue models and value-based pricing is relatively unexplored in the era of digital servitization, which creates a gap in literature of how to capture value through these new revenue models and understand their potential.

1.3 Purpose and detailed research question

The purpose of this study is to *explore how digital servitization impacts how value can be captured through existing and new revenue models in the automotive industry*. To fulfill this purpose, the study will answer three detailed research questions:

- How has digital servitization impacted the portfolio of revenue sources in the automotive industry?
 - Are there any potential new revenue sources?
- What factors impact user-value in the automotive industry?
- How is value captured through specific revenue models?
 - How does this value vary between different revenue models?

By exploring this, the aim is to contribute to the theoretical literature about digital servitization (Annarelli., 2019; Tukker, 2004; Neely et al., 2011) together with user-value (Grönroos, 2008, 1984; Macdivitt et al., 2011) and how they impact value capturing through revenue models (Bonnemeier et al., 2010; Linde et al., 2023; Teece & Linden, 2017). By answering the research questions and fulfilling the purpose, the study also aims to provide companies such as CEVT with recommendations about understanding how value can be captured through different revenue models. The goal of the recommendations is to provide companies with a base for analyzing business cases for current and future projects within the automotive industry. Accordingly, the study aims to contribute with both theoretical contribution and practical implications.

1.4 Delimitations

In order to reach the purpose of this study, there is a need for delimitations of the scope. Since this study takes the approach of an interview study there is a need for setting a

limit of the number of companies and respondents included in the study. The study will only focus on companies within the Geely group which might have consequences in missing important knowledge from outside the organization. When only collecting data from one organization, it limits the amount of data from different perspectives and company settings. The risk with this is that the findings might be aimed for Geely as an organization and hard to apply for other companies and industries. This study is limited to focus on the B2C perspective with the end-user in mind since the business model varies between B2B- and B2C sales. Moreover, the topic of digital servitization is a wide concept that can be explored in different directions and with different aims. To reach the purpose of this study, the paper is limited to focus on topics related to digital servitization, user-value, value-based pricing, and revenue models. Lastly, there are some limitations related to time and confidentiality. The project aims to be done within the 22 weeks of time which leaves the study with limitations of the sample size and how deep analysis that can be done. Since the researchers have signed an NDA, there are some limitations of what data and information that can be disposed of within the report. Public information should always follow the regulations of confidentiality within CEVT.

2. Theoretical framework

To explore how digital servitization impacts how value can be captured through existing and new revenue models in the automotive industry, there is a need to create a theoretical framework that combines relevant theoretical concepts. To explore the topics within the research questions, we propose a user-driven product-service framework that combines the concepts of digital servitization, user-value and revenue models. This framework is created in the following subsections. The first subsection looks deeper into digital servitization and product service systems, which are two crucial concepts that have had a profound impact in a digital servitization setting. The second subsection provides an in-depth explanation of user-value and the different concepts that need to be considered to understand its impact on revenue models. Additionally, the section introduces the value-based pricing strategy, which is compared to traditional pricing strategies to highlight its effectiveness in capturing user-value. The third subsection explores various theories related to revenue models, which are essential in understanding how value can be captured in the automotive industry. Finally, the fourth and last subsection summarizes the theoretical framework and presents seven factors that impact user-value and hence how value is captured through revenue models in the automotive industry.

2.1 Digital servitization

There have been several significant impacts from digital servitization on the automotive industry, both in terms of opportunities and challenges. Changes in market trends that follow digital servitization have left companies with the incentive to update and create new revenue models in order to stay profitable (Harvard Extension School, 2022; Porter & Heppelmann, 2014; Rahman & Tadayoni, 2018; Linde et al., 2023; Teece & Linden, 2017; World economic forum, 2022). As a result of digital servitization, offering bundles of products and services has become a well-known business model. Literature refers to this business model by various names, but the most commonly used is *Product Service System (PSS)* (Annarelli et al., 2019; Mont, 2002; Neely et al., 2011). This business model does not only give incentives for more sustainable businesses (Annarelli et al., 2019; Rahman & Tadayoni, 2018), but also enables several new revenue sources. In the automotive industry the PSS has enabled both shared mobility solutions but also additional sales of digital services. Any technology-based solution that is offered over the internet with the aim to enhance user-experience or improve business-efficiency can be referred to as a digital service (Osterwalder & Pigneur, 2010; Lusch et al., 2010). These services can be delivered through various digital channels such as mobile applications, digital platforms, and cloud-based software. The offering of digital services through digital platforms and cloud-based software integrated in the car is currently a rising trend in the automotive industry (BMW.se, n.d; Mercedes-Benz.se, n.d.). In the following section the PSS business model and its categories will be further explained.

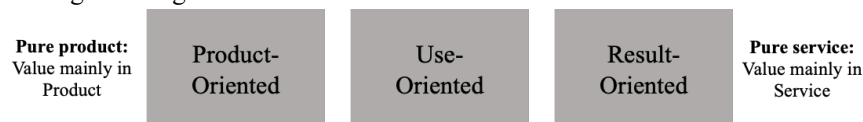
2.1.1 Product-service framework and its revenue sources

One of the first definitions of a product service system (PSS) was presented by Mont (2002), proposing that the PSS is a set of products and services that are capable of jointly fulfilling a user's needs. Moreover, a PSS can also be presented as a business model resulting from digital servitization which jointly offers products and services in a more sustainable manner (Annarelli et al., 2019; Rahman & Tadayoni, 2018). Since the first definition, many researchers have further developed the concept and proposed a classification depending on the degree of servitization. Tukker (2004) identified eight different types of PSS based on the integration between product and service, while Baines et al. (2007) proposed a four level range from basic to advanced PSS. Aligned with the higher degree of servitization, the user shifts to paying for the use of a product rather than paying for owning it, resulting in new and different types of revenue sources.

From Tukker's (2004) eight classification, three main categories can be identified; Product-oriented PSS, Use-oriented PSS, and Result-oriented PSS (see figure 2.1). The scale from product-oriented to result-oriented can be compared to the concept of "Service supporting product" (SSP) and "Service supporting customer" (SSC), where services can be more or less focused on supporting the product or the user (Annarelli et al., 2019). Moreover, when moving on the scale from pure product to pure service, Tukker (2004) argues that the value of the offering is also moving from being mainly in the product content to the service content.

Figure 2.1

The degree of digital servitization



When exploring the revenue of a product-oriented service, the user pays for the product as well as the additional services connected to the product that they own, such as maintenance, repair, and upgrade services. This category is connected to the more traditional revenue sources where the user pays for a product, or the work done. For the use-oriented service, the user pays for the use of a product rather than owning it. In most cases the manufacturer retains the ownership and is responsible for the product's total cost of ownership (TCO) as well as the risks that follow with ownership. This type of category can be connected to revenue sources such as leasing agreements or subscriptions where the user pays a monthly fixed fee for the usage of a service or a product. For the result-oriented service, the user pays for the outcome or result, such as getting from point A to point B. There is less focus on the specific product or service used in order to achieve the result. Revenue sources connected to this category could be renting agreements, pay per result or sharing agreements. Entering the next section of the value-driven product-service framework, the scale from pure product to pure service will be the base for further theory building containing the perspective of the user.

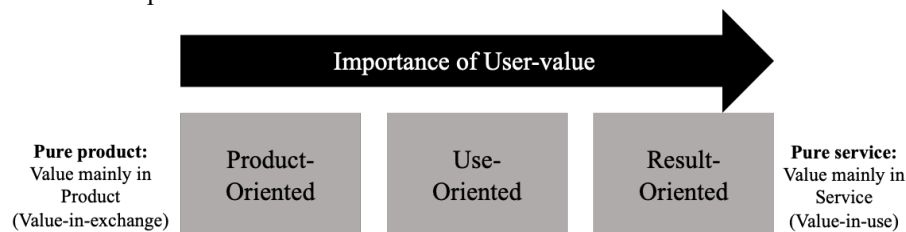
2.2 Value-driven product-service framework

As digital servitization becomes a wider used concept in several industries, understanding the user needs and values is the core of a well-functioning product service system (PSS) (Annarelli et al., 2019; Gremyr et al., 2022). In this study the user-value will be defined as *the perceived value by the user and refers to the extra revenue potential that comes from understanding the relationship between willingness to pay, value and price*. Since PSS business models offer the opportunities to create value beyond the physical product by also offering services associated with the product, the traditional ways of analyzing and capturing user-value as well as user information has shifted (Annarelli et al., 2019; Sundbo & Toivonen, 2011).

This shift has increased the complexity of understanding the user-value as the value is rather created in the user sphere while the product and/or service is being consumed (Annarelli et al., 2019; Grönroos, 1984). Grönroos (2008) and Vargo and Lusch (2004) use the concepts of value-in-exchange and value-in-use to understand how user's assign value to a product and/or service. Value-in-exchange refers to the embedded value in the product or service in terms of a monetary value, whereas value-in-use refers to the value of the good or service that is being created in the user sphere while being consumed. Furthermore, in order to reach the optimal value in the user sphere (value-in-use) the supplier needs to allow the user to have the right resources and preconditions (value-in-exchange) to create that value.

Figure 2.2

Value-driven product-service framework



In figure 2.2, the knowledge from the PSS framework (product-oriented, use-oriented to result-oriented) is combined with the two concepts (value-in-exchange and value-in-use) of how users assign value to a product and/or a service. Moving towards a higher digital servitization degree (result-oriented category), the user-value is increasingly assigned and created in the user's own sphere (Grönroos, 2008). Therefore, it becomes possible to assume that the user-value becomes even more important to understand while leaning towards the result-oriented category of the PSS (see figure 2.2). Moreover, if the user-value becomes increasingly important along with a rising degree of servitization, there is also a higher demand in collecting user data in order to understand the user needs and values. By collecting and analyzing data on the user, opportunities to involve and understand the user during the value creation process arises, which is defined as value-co-creation (Grönroos, 2008; Sundbo & Toivonen, 2011; Vargos and Lusch (2006); Von Hippel, 2005). According to Vargos and Lusch (2006) the value-

co-creation is a desired goal for a firm since it helps to improve front-end processes and thus supports businesses to understand and determine what is valuable for the user and align their expectations.

2.2.1 The benefits of value-based pricing

As a result of the importance in understanding the user-value in a PSS, companies need to pay attention towards value-based pricing methods (Annarelli et al., 2019; Bonnemeier et al., 2010). Traditionally, strategies for pricing have focused on the cost associated with manufacturing a product or delivering a service along with an extra markup to cover the company's overhead costs (Bonnemeier et al., 2010). Using this approach, the value can be measured in financial terms by using the supplier's expenses as a measure for price setting. However, as turning into digital servitization and PSS business models, Vargo and Lusch (2004) mean that companies are forced to switch their allocation base for price setting, as the value is rather realized in the users' own atmosphere. Capturing the user-value and determining a price is what Bonnemeier et al., (2010) defines as a value-based pricing method. More specifically, the pricing method highlights the user and its internal processes (value-in-use) in order to deliver both optimization and productivity such as cost and time savings (Bonnemeier et al., 2010; Grönroos, 2008). Moreover, Grönroos (2008) and Macdivitt et al. (2011) means that as industries turn into digital servitization, the user-value can also have an attitudinal dimension that is based on a feeling such as trust, comfort, and ease of use. To understand this kind of value parameters in a PSS setting, the perceived service quality model by (Grönroos, 1984) can be a useful concept to understand. The model is based on the perceived service quality, which is the difference between the expected quality impacted by marketing, earlier experiences, word-of-mouth and social media, and the service the user actually receives (experienced quality). To minimize the gap between the expectations and the experience it is of high importance to consider HOW the service is delivered (functional quality) and the outcome of WHAT (technical quality) the user has experienced in the service.

The concepts of value-in-exchange and value-in-use as well as the perceived service quality model helps to explain why people are willing to pay different prices for products and/or services that are provided with the same basic function (Grönroos, 1984; Grönroos, 2008). By allowing value-co-creation through data collection and understanding the user needs and values, it is possible to conclude that the gap between the expectations and the experience would be minimized. Thus, companies would gain a better understanding of how to use a value-based pricing strategy to align the users' willingness to pay (WTP) with the price. Bonnemeier et al. (2010) elaborate that there are great opportunities for increased profitability if using value-based pricing strategy when moving towards a rising degree of digital servitization (result-oriented).

If succeeding to minimize the gap between the expectations and the perceived experience, one can assume that a user is more willing to pay for a product or service

if it is exceeding the expected value. Contrastingly, when the value is less than the expected the user is less willing to pay and may seek for other alternatives. Moreover, strategies commonly used today to exceed user expectations is customization and personalization (Kohtamäki et al., 2021; Prahalad & Ramaswamy, 2000; Voss & Hsuan, 2009). Prahalad and Ramaswamy (2000) distinguish between personalization and customization. Personalization refers to the co-creation of the experience that is taking place in the user sphere (value-in-use), whereas customization includes the opportunities for the user to select specific existing features which takes place early in the manufacturing process.

2.3 Revenue models

Along with digital servitization and the increased impact of the user-value, the methods of capturing value have changed (Annarelli et al., 2019; Linde et al., 2023). This shift has created a disruption of traditional business models with implications for changes in the revenue models. As the automotive industry is an interesting case that is present in the digital servitization shift, companies need to re-consider how they can capture value through new revenue-models in order to build compelling business cases (Teece & Linden, 2017). Based on literature from digital servitization Amit and Zott (2018) elaborates on the definition of revenue models and describes it as different modes that generate revenue through the business model. In contrast, Johnson et al. (2018) mean that the revenue model contains how much money that can be made by looking at price and volume, where volume is referred to as the market size or purchase frequency. Moreover, Linde et al., (2023) elaborate on the different definitions of revenue models and define it as “A revenue model determines the revenue sources, their volume and distribution, which allow a focal firm to capture value from digital services”. Adapting the definition of revenue models by Linde et al., (2023), “*digital services*” get a new meaning in the shape of “*digital servitization*”. The “*distribution*” in this definition covers how the value is packaged, priced, and delivered to the user. This leaves this study with the following definition: “*A revenue model determines the revenue sources, their volume and distribution, which allow a focal firm to capture value from digital servitization*”. By aligning revenue models with the user-value, Linde et al. (2023) argues that companies can maximize their potential profitability. Moreover, industries and firms impacted by digital servitization can also capture value beyond the initial sales through digital services, which can increase the possibility to earn additional revenue. (Annarelli et al., 2019; Linde et al., 2023).

2.3.1 Revenue sources in the value-driven product-service framework

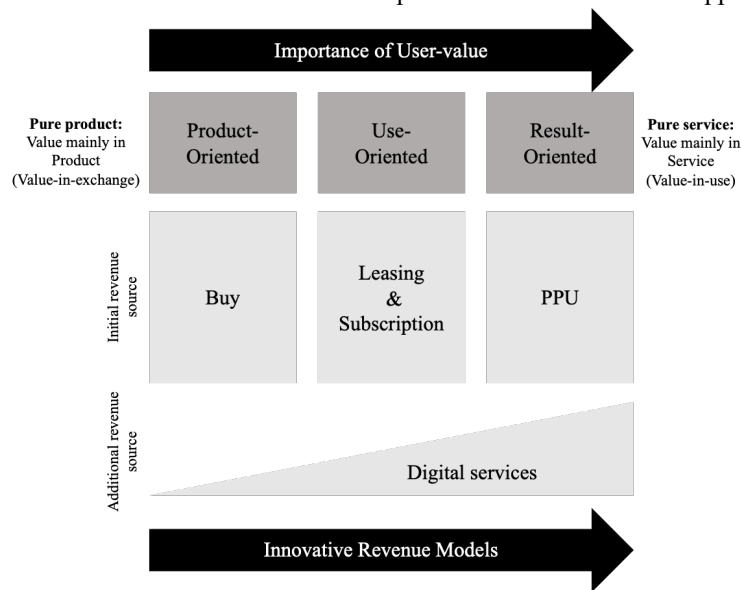
As the profitability can be maximized if the revenue model is aligned with user-value, one can argue that the revenue sources (as a significant part of the revenue model) need to be included in the value-driven product-service framework. A revenue source refers to any channel or means through which a company generates income or revenue.

According to Genzlinger et al. (2020) revenue sources in the automotive industry can

be translated into three different categories: classic, leasing/subscription and rental/sharing. Moreover, using Bonnemeier et al. (2010) research on revenue models, different revenue sources (leasing, shared mobility etc.) can be classified into traditional and innovative revenue models. The traditional revenue models include a value proposition based on conventional products or services, resulting in revenue sources such as buying and leasing. Whereas the innovative revenue models focus on the actual input or output of the user, resulting in revenue sources such as pay per use or pay for result. Combining the two perspectives of revenue sources, it is possible to collect them into a portfolio consisting of four revenue sources: Traditional including *buying* and *leasing* as well as innovative including *subscription* and *pay per use (PPU)*. Applying these revenue sources to the value-driven product-service framework, one can equate the scale of revenue sources presented in the product-service framework (Product-oriented to Result-oriented; Tukker, 2014) with the scale from traditional to innovative revenue models presented by Bonnemeier et al., (2010). Hence, the more innovative revenue source it is, the more towards result-oriented it gets (see figure 2.3).

Figure 2.3

Revenue sources in the value-driven product-service framework applied to the automotive industry.



2.3.2 Additional revenue in revenue models

Linde et al. (2023) further discusses how these innovative revenue models are well fitted to conceptualize revenue sources for sales of additional digital services. As mentioned, digital servitization allows industries to sell additional complementary services complementing the initial sale of a product and/or a service. A complementary service may be offered in order to enhance or complement the value of the primary product and/or service being sold (Andrade et al., 2022; Cenamor et al., 2017). Typically, these complementary services are offered along the main products and/or services in an effort to increase user satisfaction and generate additional revenue through additional solutions, conveniences, or benefits. Some approaches of offering complementary services are bundling, cross-selling, up-selling, after-sales services,

customization, and personalization. Industries such as the telecom-, energy- and banking industry have adapted the additional sales of complementary services with great success (Amir, 2022; Annarelli et al., 2019; McKinsey & Company., 2018). By looking at the well-known OEM's BMW and Mercedes (BMW.se, n.d; Mercedes-Benz.se, n.d.), and considering that digital services are well fitted with innovative revenue models (Linde et al., 2023), one can argue that the complementary sale of digital services has a greater potential in the innovative revenue models (see figure 2.3). Moreover, Linde et al. (2023) mention that it is important to ensure that the complementary services are aligned with the main product or service, and that customers perceive them as valuable additions that enhance their overall experience or meet their specific needs.

2.3.3 Volume and distribution in revenue models

As mentioned, the volume and distribution in the revenue model definition refers to the purchase frequency as well as how the value is packaged, priced and delivered to the user. Turning towards the result-oriented corner, such as subscription and PPU (Innovative revenue models), the servitization paradox becomes more tangible in the shape of low margins and profitability (Neely, 2008). As the automotive industry moves towards innovative revenue models the number of users per car increases as well as the numbers of small transactions, instead of a few large ones, which increases the pressure on distribution (Genzlinger et al., 2020; Ross, 2014). This pressure can for instance be diminished by utilizing the potential of selling digital services as an additional revenue source.

As mentioned in section 2.2.1, value-based pricing becomes increasingly important along with servitization and there is an opportunity to realize higher margins by setting the price based on the user-value (Bonnemeier et al., 2010). As a part of value-based pricing, it is important to consider the expected quality of an offer by for instance considering HOW the service is delivered (Grönroos, 1984). Furthermore, customization and personalization are strategies to exceed the expected delivery and thereby increase WTP. However, along with a higher servitization degree in the automotive industry, companies need to consider several user expectations because of the higher utilization rate of the vehicle, which makes customization and personalization a challenge. When having lower profit margins, companies need to streamline their costs and improve efficiency and profitability, which can be fulfilled by standardization (Kohtamäki, 2020). The two concepts of personalization and customization contradict standardization, which puts companies in a complex situation of balancing between them, especially when entering more innovative revenue models.

2.4 Capture value through the value-driven product-service framework

We propose a value-driven product-service framework in order to understand how value is captured in a digital servitization setting (see figure 2.3). To further understand

how value is captured one needs to zoom in to the different revenue models to grasp what factors impact the user-value and thereby how to capture value. Based on the literature, seven factors have been identified as significantly important factors to consider when moving along the scale of digital servitization: *sustainability, cost of ownership, risk, status, customization, personalization, and convenience*.

As the automotive industry moves towards shared mobility solutions there is a need for using and sharing resources efficiently (Möller & Schaufuss, 2022), thus *sustainability* is an important factor to consider when exploring how to capture value through the revenue models. Granskog et al. (2021) discusses how sustainability is a future trend and a fundamental user-value in the future automotive industry, hence it can be assumed that this factor has a greater impact when moving towards more innovative revenue models. If moving towards the more traditional revenue models such as buying, *cost of ownership* becomes an important factor to consider. Owning a car is expensive, not only the upfront payment, but also the total cost of ownership (TCO), including maintenance, service, charging, parking, etc. (Annarelli et al., 2019). Instead, the more innovative revenue models transfer the cost of ownership to the supplier by retaining ownership of the vehicle, which minimizes the costs related to ownership for the user. Consequently, the user-value of avoiding ownership costs needs to be considered when moving from traditional- to innovative revenue model. Moreover, when companies retain ownership it automatically also involves a transfer of *risk* for the company which needs to be incorporated as a user-value (Linde et al., 2023; Sawhney, 2006). It can be argued that the risk of damage and carelessness of the vehicle increases when not owning, since the user is less prone to take care of it.

Traditionally the car has been symbolized as an object of status with high value in the product, and as moving towards the innovative revenue models and higher digital servitization degree, the value rather lies in the service offering (Ross, 2014; Tukker, 2004). Looking into the traditional ways of owning a car, there have been high incentives to customize the hardware in the car (Barbazon et al., 2010). However, as the mindset and preferences of the user is shifting and new generations are being a part of the automotive market, one can say that moving towards the innovative revenue models will also change incentives to customize their offerings since the status of the car is decreasing. This shift in market trends and mindset by the user rather speaks for opportunities of personalization later in the value chain, as a way to customize the offering and exceed user expectations. Therefore, the three factors of *status, customization* and *personalization* will be relevant factors to consider when understanding how value is captured in this theoretical framework.

Furthermore, Grönroos (2008) and Macdivitt et al. (2011) mention how emotional dimensions such as trust, comfort and ease of use also become relevant to consider when moving along the digital servitization degree. As the perceived value by the users is created in the users' own sphere during the usage of the product and/or service, it becomes even more important to consider these emotional dimensions while moving

towards the innovative revenue models. Since emotional dimensions relate to the perceived experience of the product and/or service offering, it is possible to conclude that it is essential to analyze *convenience* as a factor when capturing value through revenue models.

3. Methodology

The research design of this study is an interview study with an inductive approach including three types of data collection: qualitative interviews, data from documents and workshops. To understand a complex issue in an industry setting, the case company CEVT is introduced. Furthermore, the chosen research methods will be explained in detail, together with a table of participating respondents. It is further explained how data has been analyzed in two levels, where different levels had the purpose of providing answers to different research questions. Lastly, a discussion of quality assurance as well as ethical consideration is brought upon.

3.1 Research design and approach

To reach the purpose of this study it has taken an inductive approach. The chosen research design is an interview study where the primary data collection tool is a qualitative research method. An inductive approach allows the study to generate new theories and hypotheses based on observed and interpreted data (Bell et al., 2019). To gain an understanding of a broader issue or general phenomenon, a sensemaking case-study has therefore been adapted (Bell et al., 2019; Gioia & Chittipeddi, 1991). Because of the highly changing automotive industry there are concepts which theory does not cover and needs to be explored in an industry setting. By allowing people within an organization to share their sensemaking of their own experiences, this study can use their interpretation to address a practical issue (Gioia & Chittipeddi, 1991). Since the aim is to contribute to theoretical knowledge (theory-building), an appropriate approach is to use a company present in the industry setting (Eisenhardt, 1989; Goffin et al., 2019). Moreover, this study contributes with its own theoretical framework (value-driven product-service framework) supporting the understanding of interrelations between theoretical concepts as well as analysis of data.

CEVT is an example of a company that is a part of the new industry setting and offers opportunities for unusual research access and collection of data. The choice of CEVT as a case-company can be described as a theoretical sampling since it helps to discover patterns from data collection and connect it to theoretical concepts (Bell et al., 2019). Based on these arguments, theoretical sampling and CEVT as a case is supported (Eisenhardt & Graebner, 2007; Yin, 1994). Moreover, Goffin et al. (2019) argues that case studies can benefit from using pilot studies. In this study “piloting” has been used in the shape of unstructured test interviews. As CEVT has close collaboration with other Geely-group companies, the study has included a few respondents from partnership companies such as Lynk&Co and ZEEKR EU in order to retrieve insights from a wider standpoint.

3.2 Data collection

The data collection needs to reassure triangularity, review and validation of data as well

as transparency of the data collection to create quality in the study (Goffin et al., 2019). Triangularity has been achieved by collecting data from three sources, qualitative interviews, document reviews and workshops. These data sources have given a basis for answering all three research questions. In order to prevent biases, misinterpretations and identify deeper findings of the data-collection, findings have been reviewed and validated through conversations and workshops with both respondents and representatives from the case-company after the interviews. To get a deeper transparency of the data collection methods, the following subsection will describe the three data sources.

3.2.1 Interview data

Two types of interviews have been conducted, semi-structured and unstructured qualitative interviews. The “piloting” of five unstructured interviews had the purpose of setting the scope, defining the research questions of the project as well as creating a base for the interview guide and sample for the semi-structured interviews. The interview guide was divided into topics related to the four research questions in mind. The 18 semi-structured interviews had the purpose to collect the empirical data in this study and to allow the respondents to make sense of their experiences related to the research questions. According to Bell et al. (2019), using this approach helps the interviewer to keep the conversation to a specific topic while allowing the respondent to freely answer the question and open up for interpretations and associations. The interview guide was used as a template, however questions did not always appear in the exact same order and new questions were added as the interviewer picked up on interesting side-tracks. As the respondents had different competence areas and an ability to contribute with different knowledge, the questions in the guide could vary. The data from the unstructured interviews were only stored with the help of notes, while the semi-structured interviews were recorded and transcribed. The interviews were aimed to be held face-to-face at CEVT’s office and the respondents were asked to approve recording and storage of personal data, which they did.

One of the main steps in qualitative research is sampling (Bell et al., 2019) and this study used a combination of two purposive sampling methods: theoretical sampling and snowball sampling. Because of the spread of knowledge within the organization, the samples were not constrained by specific departments, but rather by who possessed the knowledge. The first sampling method that was used was therefore theoretical sampling. By using this method, people are chosen based on their knowledge about a certain theoretical concept or topic (Bell et al., 2019). People with the knowledge and experience about digital servitization were approached first. Due to the reorganization and start-up attitude, snowball sampling was used to allow the study to find respondents through recommendations from interviewed respondents and support the process of finding accurate data (Bell et al., 2019).

According to Bell et al. (2019) one challenging task is to decide the sample size of the

study. Onwuegbuzie and Collins (2015) argue that the sample size should be big enough to reach theoretical saturation, but not so big that it makes it hard to make a deep and case-oriented analysis. With this in mind, the snowball sampling method allowed an iterative and structured way of data collection. The number of respondents added up to 18 people with various roles and experiences from both the case-company CEVT and partner companies Lynk&Co and ZEEKR EU (table 3.1). The intended time frame of each interview was 1h, however in some cases the interview had to be cut short, while some dragged on for an extended period of time. The interviews were held during a period of 7 weeks and theoretical saturation was achieved at approximately 15 respondents.

Table 3.1

List of respondents

Respondent	Company	Role	Duration	Where
R1	CEVT	Senior, Product definition	1h	Face-to-face
R2	CEVT	Senior, Market Intelligence	1h 15 min	Face-to-face
R3	CEVT	Senior, Innovation	45 min	Face-to-face
R4	ZEEKR EU	Senior, Products definition	30 min	Face-to-face
R5	ZEEKR EU	Product definition	1h	Face-to-face
R6	CEVT	Senior, Business Development	1h	Face-to-face
R7	CEVT	Senior, Business Development	1h	Face-to-face
R8	CEVT	Business Development Controller, Finance	1h	Face-to-face
R9	CEVT	Senior, Product Definition	1h	Face-to-face
R10	CEVT	Senior, Customer Offer & Experience	1h	Face-to-face
R11	Lynk&Co	Product Owner	1h	Face-to-face
R12	Lynk&Co	Product Owner	1h	Face-to-face
R13	CEVT	Senior, User & Project Enabling	1h	Teams
R14	CEVT	Senior, PMO	45 min	Teams
R15	CEVT	Controller Finance	2h	Face-to-face
R16	CEVT	Controller Finance	2h	Face-to-face
R17	CEVT	Senior, Market Intelligence	1h	Face-to-face
R18	CEVT	Senior, Business Development	1h	Face-to-face

3.2.2 Data from documents

Data from documents were used as a supplement to the collected data from interviews in order to gain a deeper understanding of what was said and fill in knowledge gaps. The topics in the interviews acted as a guide for what documents that were reviewed.

This gave a visual and thorough understanding of what was discussed with the respondent and could further be used to analyze the collected data.

3.2.3 Workshops

Three workshops were held in order to reassure and validate collected data and findings. These were held later during the project when the first findings were appearing and were discussed during the workshops. The first workshop was held with two representatives from the case-company CEVT. The workshop was 2h long including 30 min introduction followed by 90 minutes of discussion of data and findings. The second and third workshop was 1h long and were held with two previous respondents (R2 & R6) that gave fruitful input during their first interview. Additionally, these respondents held senior positions with the necessary knowledge to provide additional contributions from both a traditional and innovative perspective. The data from the workshops were collected by notes and recordings, which were later transcribed and analyzed together with the findings.

3.3 Data analysis

According to Bell et al. (2018) there are several ways of analyzing data in qualitative research, in which grounded theory is one of the most established and used methods when adapting an inductive approach. To adapt this method, there are four core steps: Theoretical sampling, coding of data, theoretical saturation, and constant comparison. Theoretical sampling was as mentioned used in the process of data collection. Further, data was coded in mainly two ways. Firstly, an extensive list of WTP (willingness to pay)-factors to answer RQ 2. Secondly, gathering of citations using color coding to answer RQ 1 and 3. The documentation of all data was made in excel. In the list of WTP-factors, each factor was connected to several headlines which allowed for analyzing connections between a certain WTP-factor and the content related to each headline (see example in table 3.2). To narrow down the number of WTP-factors, they were clustered into a few collective words representing similar factors. Moreover, to gain an understanding of whether the users are willing to pay extra for a certain factor or if it was expected in the base-offer, the headline of base/extra was an important connection to consider.

Table 3.2

Example list of factors

Respondent	WTP-factors	Cluster of factors	Number	Base/extra
R1	Seamless experience	Convenience	1	Extra
R6	Comfortable	Convenience	1	Extra

The color-coding of the collected citations was initially coded according to chosen topics included in the user-driven product-service framework, such as digital

servitization, user-value and revenue models. These were then iteratively adjusted along with findings from data collection. At the end of the process there were eight colors of coding representing different topics that were reappearing in the interviews. The collection of data and a constant comparison with theory was an iterative process that helped the study to move forward and find interesting coding. To make sense of the collected data, the analysis was supported by applying the developed value-driven product-service framework. The framework was used to understand how current and potential new revenue models are impacted by digital servitization and how user-value is shifting along with more innovative revenue models. When applying the collected data in relation to the framework the analysis was divided into first- and second level analysis to make sense of such a complex phenomenon.

The first level analysis aimed to provide answers to RQ 1 and 2. In this analysis, the framework was extended with additional revenue sources that appeared to be highly relevant to consider, resulting in a portfolio of six revenue sources with corresponding definitions. Moreover, the factors impacting user-value in the theoretical framework were revised together with collected data. This resulted in eight factors impacting user-value, presented with definitions. Keeping the knowledge and changes from the first level analysis in mind, the second level analysis allowed to combine the revenue sources and the factors into archetypes, which aimed to provide answers to RQ 3. An archetype is defined by Downs et al. (2002) as a reflection of a particular scenario that can be used to understand a complex phenomenon. Moreover, it is common to present more than one archetype in order to understand a given situation and the relationship between them. In this study, six archetypes were presented with the visualization of radar-charts. Citations from interviews and workshops have accounted for the analysis of how factors impacting user-value differ between the archetypes, resulting in either a nonexistent (0), low (1-4), medium (5-7) or high (8-10) impact. Furthermore, to conduct a thorough analysis, the archetypes have been put in relation to each other when exploring the impact levels. Lastly, to answer the research questions, the theoretical framework and findings were analyzed together to present both theoretical and practical implications of the study.

3.3.1 Quality of data analysis

Goffin et al. (2019) explains how there are three factors impacting the quality of the data analysis in a case study: presence of inter-coder agreement, case presentation and case interpretation. An inter-coder agreement is a result from having more than one researcher coding the data independently from each other. The involvement of multiple researchers is beneficial since it contributes to a triangulation and higher level of confidence in research findings. Moreover, when involving multiple researchers, it is necessary to describe what acceptance level the inter-coder agreement should have. This study had two researchers and an acceptance level of 85%, meaning that the percentage of agreements between the researchers has exceeded this number in order to use the data. The second factor is the case presentation i.e., visualization of data. To

ensure that the reader understands how the researchers arrived at their conclusions, data must be presented carefully and systematically, for example via tables and exhibits (Goffin et al., 2019; Miles & Huberman, 1994). This has been taken into consideration throughout the study by structuring the data collection to allow presenting the findings in tables and figures. Finally, the last factor is case interpretation which includes how well the data is theorized. Theorizing is a creative iterative process where collected data and literature is compared in order to create concrete outputs (Eisenhardt, 1989).

3.4 Reflection of ethics

Through the research process, integrity and personal data was always taken into consideration before making any information public. Before conducting any interviews, the respondents were given clear information about the content of the interview in order to give them a chance to decline participation. Moreover, to show respect for integrity the respondent always gave permission for recording of the interview and was told that they would be anonymous in the report. To review and validate the data, conversations and feedback sessions were held after the interviews in the shape of workshops with both respondents and the representatives from the case-company to reassure triangularity. Because of the laws of GDPR the information about respondents was stored carefully and deleted after usage.

4. Findings

To reach the purpose of exploring how digital servitization has impacted how value can be captured through revenue models in the automotive industry, data has been collected through interviews, document review and workshops. This section will present findings from gathered data, which are broken down into two degrees of analysis. First level analysis presents a portfolio of six revenue sources and its definitions based on collected data. Additionally, eight factors impacting user-value will be presented with definitions. Findings from first level analysis provides answers to research questions one and two. Furthermore, the second level analysis combines the revenue sources and the eight factors from the first level analysis into six revenue model-archetypes. The archetypes visualize how value can be captured in each specific revenue source which allows the study to answer research questions three.

4.1 First level analysis

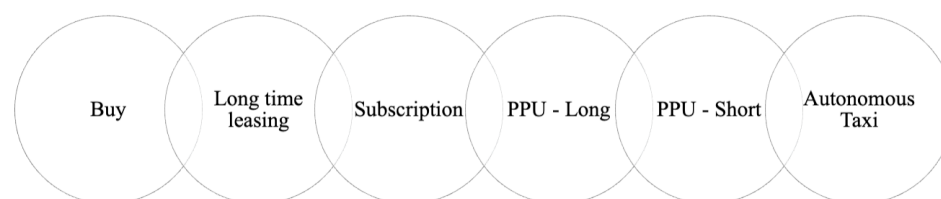
In this section, a portfolio of six identified revenue sources and eight factors impacting user-value are presented with lists of definitions (see figure 4.1 and table 4.1 & 4.2). Through interviews with respondents, it appeared that there are certain revenue sources present in the automotive industry beyond the ones identified through theory. Moreover, analysis of WTP-factors and citations also showed that specific factors have different significant impacts on user-value depending on the revenue source. Due to the differences in impacting user-value these factors become highly relevant factors to consider when understanding how to capture value through the identified revenue models. These findings provide answers to research questions one and two as well as building the base for the second level analysis.

4.1.1 Revenue sources in the automotive industry

The analysis showed that there are six revenue sources to consider in the automotive industry, which are presented through linked circles in figure 4.1. When analyzing answers from the respondents, it became transparent that they do not perceive any clear boundaries between revenue sources, but rather that they overlap each other (see figure 4.1).

Figure 4.1

Revenue sources in the automotive industry



Furthermore, it appeared that the respondents experienced significant differences in ownership, intention of usage (use-case), notice period and type of payment depending

on revenue source, resulting in six revenue sources and corresponding definitions (see table 4.1). For example, one respondent said, *“There is a huge difference between owning and not owning”*(R8). Only considering ownership to differentiate the revenue sources would result in two revenue sources - buy or use, however by adding more dimensions, several revenue sources appeared. The following citation illustrates that the definitions need to be based on type of journey and use-case, rather than only ownership. *“It’s going to depend on what kind of journey it is. I don’t think the ownership itself is the key, but rather what the use-case is”*(R9). The different use-cases that appeared were long, medium, or short intentions of usage, as well as if the user intends an experience or only a source of transportation. Hence, PPU was distinguished into two different revenue sources, depending on use-case: long or short trip with either experience or transportation as focus (see table 4.1). Moreover, buy and long-time leasing was distinguished from the other revenue sources because of the long-term intention of usage as well as subscription with its medium-term intention of usage. The autonomous taxi service has similarities with the short trip PPU-solution but differs since it rather focuses on creating an experience.

Several respondents also mentioned the distinction between different notice periods and that the flexibility of quitting the usage-contract quickly distinguishes between leasing, subscription, PPU solutions and autonomous taxis. For example, *“A subscription is basically a short time leasing contract, the difference is the notice-period and the intention of usage”*(R12) or *“It should be hassle-free and simple to use the car for a specific period and then leave it”*(R11). Lastly, the respondents highlighted how the payment method needed to match the type of usage-contract and can therefore also be identified as a difference between the revenue sources. As respondent seven indicated, *“The payment method should match the use-case”*(R7). The main differences here is how long-time leasing and subscription have different notice-periods while the other revenue sources are not offered with a notice period. Moreover, the different payment methods go from upfront payment/loan to pay per month or usage or km. To summarize, table three below presents the six revenue sources with a list of definitions.

Table 4.1

Definitions of revenue sources

Revenue sources:	Definition:
Buy	<ul style="list-style-type: none"> - Full ownership - Long term intention of owning. - Non existing notice period (owning) - Upfront payment or loan
Long-time Leasing	<ul style="list-style-type: none"> - No ownership - Long term intention of usage (>1 year) - 2 months’ notice period or more - Pays per month

Subscription	<ul style="list-style-type: none"> - No ownership - Medium term intention of usage (< 1 years) - 1 month notice period or less - Pays per month
Long Trip Pay Per Use (PPU)	<ul style="list-style-type: none"> - No ownership - Long trip experience intention of usage (3 days-3 weeks) - 0 days' notice period, no commitment - Pays per usage or km
Short Trip Pay Per Use (PPU)	<ul style="list-style-type: none"> - No ownership - Short trip transportation intention of usage (< 3 days) - 0 days' notice period, no commitment - Pays per usage or km
Autonomous taxi service	<ul style="list-style-type: none"> - No ownership - Short trip experience and transportation intention of usage - 0 day notice period, no commitment - Pays per usage or km

To analyze how value can be captured through these different revenue sources, eight factors that impact user-value have been identified which will be further elaborated in the following section.

4.1.2 Factors to consider when capturing value

Through the analysis it became evident that certain factors impacting user-value and willingness to pay (WTP) are important to explore in order to understand how digital servitization impacts how value can be captured. In other words, what was considered as user-value in one revenue source, might not be a user-value in another. By using the factors that appeared in theory in section 2.4 (convenience, status, risk, cost of ownership and sustainability) together with interviews and workshops, the analysis concluded in eight new factors that will be explained further in this section. One can determine that there are many more factors that have an impact on user-value, however this study only looks into those factors that shows a significant difference between the revenue sources. In table 4.2, the final eight factors are presented with definitions based on the analysis. Furthermore, the definitions are formulated by explaining the value through the perspective of the user. These factors impacting user-value appeared during interviews and were documented in an extensive list of willingness to pay-factors, as well as in citations. The reappearing of these factors and their definitions (see table 4.2) as well as the result of fluctuation between the archetypes, made them significant for this study.

Table 4.2

Definitions of factors impacting user-value

Factors	Definitions of factors impacting user-value
Convenience	The value created from a seamless and simplistic use experience of the car.
Customized Software	The value in adding and adjusting the offering to your own personality and values and through digital services.
Customized Hardware	The value in adding and adjusting the offering to your own personality and values through hardware.
Status	The value created from feeling status when using/purchasing a car.
Flexibility	The value of accessing mobility solutions based on use-case with a short notice period.
Monetizing form utilization	The value created from utilizing the car to its full capacity, impacting the residual value and the possibility to monetize from the car.
Freedom of responsibility	The value in receiving a mobility solution free from hassle and responsibility such as service/maintenance, insurance, tax, charging and parking etc.
Car specification	The value of a well-equipped car specification in the base-offer

The factor of **convenience** appeared in many discussions with respondents, for example in terms of connectivity and seamlessness. *“When you enter the car, normally you are disconnected from your normal life, so connectivity needs to be on top, like 5G”* (R5). The simplistic usage and experience within the car are further confirmed by highlighting how the value creation comes from creating services that make the life easier for the user. *“The value creation lies in finding simple services that make life easier for people. I think companies right now are stressing about putting as many features as they can into the cars because they want so badly to stand out. But I'm not sure if that is what the customer wants. I think the customer wants what makes things easier, simpler, and smoother for your ownership and everyday life in general”* (R9). As this citation shows, there is a value in receiving an offering that is convenient, making the life easier and seamless for the user (see table 4.2).

While talking to the respondents and keeping a user-perspective, the factors of **monetizing from utilization** and **freedom or responsibility** appeared. The analysis shows that the responsibility of owning is transferred to the supplier while moving towards a higher degree of servitization. This responsibility usually includes a lot of hassle and additional costs associated with owning. Moreover, there is value for the user to gain a freedom of responsibility. This citation is used as a confirmation: *“In the ultimate form (ex. short trip PPU), everything must be included, e.g., guarantees about*

service, repair, charging of infrastructure, insurance taxes, parking fees etc. All this should be included in the kilometer-based option”(R13). Furthermore, as the industry aims for a higher degree of shared economy, meaning an increased number of users per car (utilization), there is a higher tendency and risk for a decreasing residual value of the vehicles. On the other hand, there is a possibility to monetize from the vehicle by sharing it with others, which leads to a value in reaching a certain utilization rate of the vehicle. Respondent six and seven discussed this topic: *“The car industry is about increasing the utilization rate of everything”(R6)* and *“You make money per km and not per car produced, and that causes trouble for many car companies”(R7)* and *“We help sell more cars now (indirectly), but our endgame is that we should sell less cars, but we should make more money from those cars! For the cars that roll on the street, they should be utilized up to 22 of the 24 hours a day”(R6).* During the first workshop it appeared that the utilization rate is a value that can be considered by both the supplier and the user and should therefore be included as a user-value in terms of monetizing from utilization.

The analysis showed that the factor of **status** is an important user-value to consider in the automotive industry. The definition of status changed during the third workshop when it appeared that the factor should rather focus on the feeling of status instead of the status that comes from owning or associated with the brand. By looking at the user trends today and considering the thoughts of the respondents, it appeared that status cannot be defined in the same way as it was in the traditional automotive industry.

One factor that was up for discussion during the workshops was price sensitivity. However, it appeared that the factor of price sensitivity should not be considered as a user-value, but is rather a factor to be discussed when considering the perceived experience by the user and willingness to pay. Lastly, the analysis concluded four additional factors: **customized software, customized hardware, flexibility, and car specification**. The analysis revealed that customization has a considerable user-value, but needs to be divided into software and hardware. The primary reason for this classification was that these factors impacted user-value differently in various revenue sources. The factor of flexibility was considered as an important user-value when entering more innovative revenue models, which was indicated by several respondents. For example: *“At one time you may need a four-wheel drive car and at another occasion a small car, that is why you choose a mobility solution instead of owning”(R3).* Lastly, the car specification can also be argued as a factor impacting user-value. The analysis showed that when moving towards more innovative revenue models, the car-specification decreased in value for the user and should therefore be included in the list of factors.

4.2 Second level analysis

The first level analysis has left the study with six different revenue sources and eight factors that differ them, combining these two creates six revenue model-archetypes.

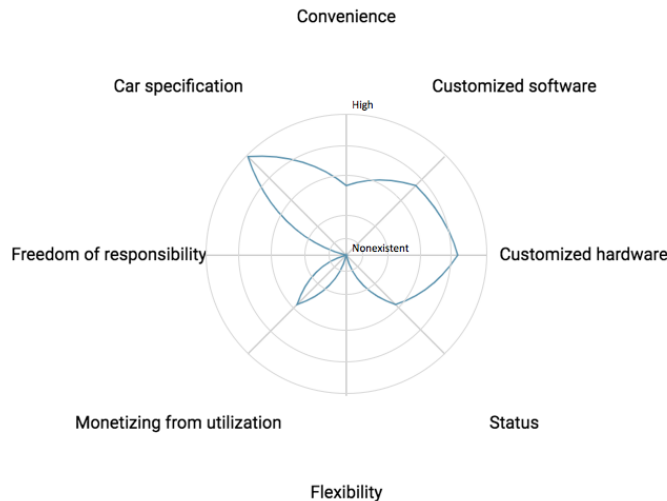
The second level analysis will deep-dive into each archetype, by analyzing findings from all three data sources. Each archetype is analyzed based on the factors impacting user-value and each factor is given a non-existent, low, medium, or high indication. Considering the indication, the archetypes will show how user-value can be captured through specific revenue models. The archetypes that will be presented and accounted for below are: Buy, long time leasing, subscription, long trip PPU, short trip PPU and autonomous taxi service.

4.2.1 Archetype 1 - Buy

The first archetype that will be presented is buy. The user pays for the full ownership of the car through an upfront payment or loan. The analysis shows that the strongest impact on user-value comes from car specification and customization (see figure 4.2).

Figure 4.2

Archetype - Buy



When asking the question to the respondents what a car-owner takes for granted in a car, the respondents generally considered that a well-equipped car is of utmost importance. Since users already spend a lot of money and expect it to be well equipped, respondents indicated that it puts a high demand on what should be included in the base offer of the car when purchasing it. The following citation accounts for the high impact of car specification when buying a car. *"Everything! Because you put so much money into it"*(R5). Moreover, the ability to customize the car specification through both software and hardware has a relatively high impact on the user-value. *"When buying, I think that you can see your own car as your own living room...When subscribing or renting, I sit in a waiting room at the doctor's"*(R2). Although the user wants to experience their own living room in the vehicle, they might feel hesitant to buy additional features since they already spent a lot and expect the car to be well equipped, which decreases the impact that customization has on user-value. Furthermore, findings from respondents indicate that there is a strong relationship between the user-value

resulting from customization and the distribution of the additional feature. One respondent stated this as: *"I think that customers buy what's available, pay a one-off cost and you have it forever [...] if you have bought a car, then you might not be interested in paying for a service per month if you say so, because there is still a legacy to deal with"*(R12). While another respondent puts it in contrast to the subscription-archetype: *"if you already have a subscription contract that ticks all the time, it may feel more natural that the additional services are sold in the same way. Contrastingly, if you have bought a car, the threshold is higher to start a subscription for some type of additional service"*(R13). Concluding from this, the way the additional customization feature is distributed, impacts the user's willingness to pay.

Moreover, the following citation together with the previous ones accounts for the fact that there is an opportunity to sell additional digital services. *"I think you choose which things you want to be able to customize and I think digital services just make it easier. There, the freedom of choice will be much greater"*(R8). However, since the additional sale of digital services generally are distributed in the shape of monthly payments, customized software has a medium impact on the user-value. Furthermore, customized hardware is often sold as a one-time fee and therefore has a greater value for the user, as shown in the subsequent citations. *"If it is the car you own or long-term cargo that you identify with, which is an extension of you as a person, you want to customize it we think"*(R6) and *"When you own a car, there are thoughts that you would like to upgrade the hardware relatively easily"*(R10). Contrastingly, a few respondents argued that the trend is going towards more standardized hardware when buying, because the younger generation does not want the hassle of choosing. *"The younger generation don't want to sit and click on a boring website if you want a yellow, black or red brake cylinder because that sucks"*(R14). Considering these aspects, customized hardware has a high impact on the user-value.

Another highly significant factor in this archetype is status. Since the user identifies with the car, respondents mentioned that it needs to symbolize what you want to show to others, but also how the brand directly impacts the value that the status symbolizes. *"When you buy a car that you pay so much for, you identify with it... When buying or leasing, you choose what you want to show to others"*(R2), *"And the perception of the brands is directly impacting the way people are willing to pay"*(R4) or *"The brand is what gives status"*(R17) are citations that gives indications for a high impact on the user-value. However, this is a more traditional way of looking at the factor of status. When moving towards a younger generation and considering new trends in the automotive industry, status can also be considered as not owning a car, being sustainable and thinking about utilization, which the following citation accounts for: *It's going very quickly now with car sharing services, that is status... Status is saving the world, status is being healthy for a long time and taking care of the earth, status is no longer having 7 cars in your garage driveway"*(R18). According to the different views of status, it turns out from the analysis that status has a medium impact on the user-value when purchasing a car.

Furthermore, the analysis shows that the factors of convenience and flexibility were perceived as medium and nonexistent impacting factors. When buying a car, respondents indicated that users expect the vehicle to be seamless and easy to use, resulting in a sense of convenience. Respondent nine stated *“I think the customer wants what makes things easier, simpler and smoother for your ownership and everyday life in general”*(R9), which accounts for the fact that convenience is an important value for all car-owners. However, because of an even greater impact in the other revenue models, convenience as a factor has a medium impact in this archetype. When analyzing the factor of flexibility instead, the factor turns out to have a nonexistent impact on the user-value. When purchasing a car, the user does not have the flexibility to change their vehicle depending on use-case, rather the vehicle needs to fit all the user’s use-cases.

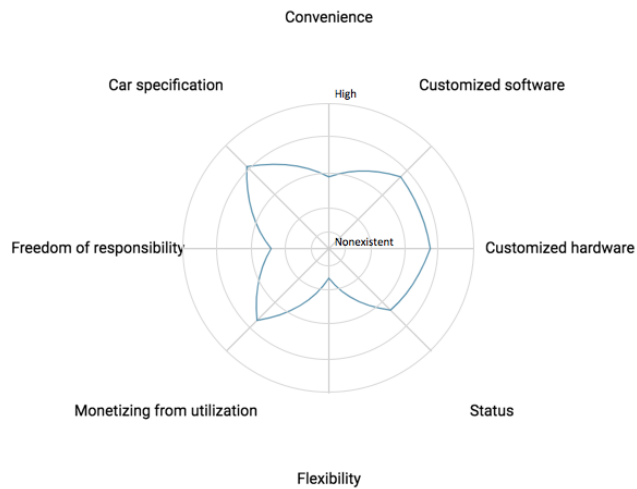
Respondents mean that there are a lot of costs associated with owning a car and there is a value in avoiding the responsibility of ownership, which is supported by the following citation: *“There is a lot of hassle that comes with owning a car”*(R9), thus the factor of freedom of responsibility has a nonexistent impact on the user-value in the buy archetype. Respondents argue that when a user buys a car, they are well aware of the costs and hassle that follows ownership, and do not consider the avoidance of this as a considerable value. Furthermore, many of the respondents talked about the future potential in shared mobility solutions in the automotive industry, which were especially indicated by one of the respondents stating: *“The car industry is about increasing the utilization rate of everything”*(R6). When owning a car there is a potential in gaining value through an extra income if users let the car be shared among others. Some of the respondents thought this would be highly considered by car-owners, while others thought that the traditional way to consider status, costs and ownership leaves the users with strong hesitations of sharing the car with others, *“I don't think you want to share your car with others if you own it, because it's yours and people don't like to share in general”*(R15). Moreover, when increasing utilization, the residual value of the car decreases, which has implications on the impact of monetizing from utilization. When owning the car, the user is responsible and well aware of the decrease in residual value since the depreciation directly impacts the user. Therefore, the factor of monetizing from utilization has a medium impact on the user-value.

4.2.2 Archetype 2 - Long-time Leasing

Long-time leasing is the next revenue model of the digital servitization degree. Since the intention of using the vehicle through long-time leasing is more than one year, there are many similarities between buy and long-time leasing (see figure 4.3). However, the archetype does not indicate any ownership of the car and has a notice period of 2 months or more. Furthermore, contrastingly to the buy archetype, users in a leasing contract pay for the vehicle per month.

Figure 4.3

Archetype 2- Long-time Leasing



It was indicated through the analysis that users to some extent consider the car as their own when long-time leasing, resulting in similar user-values as when purchasing a car. One respondent stated, *“Buy and long-time leasing is basically the same thing, users have the similar values”*(R15). Therefore, the medium impact of the factors convenience and customized software stays the same from the buy archetype. The analysis showed that in long-time leasing, users still want the vehicle to mirror their identity, while still expecting the vehicle to already include a lot of features. The users' expectations of the car specification are still high, however, because of the feeling that it is not my car, users might care a bit less. Consequently, the impact of both car specification and customization in hardware goes down marginally to high and medium impact, which is accounted for in the following citations *“If we lease a car, I still want some things [...] you go through the same thought as when I buy a car”*(R3) and *“[...]if you lease you might care less about lifetime functionality, and reason around that it isn't my car”*(R8). Moreover, respondent five stated: *“If you're leasing, then you are fine with less”*(R5).

Similarly, the impact of status increases slightly compared to the buy archetype. The analysis shows that despite the fact that there is no status in ownership, the user still cares about the status of the vehicle and what it represents since they still identify with the car and the brand. Simultaneously, the user finds some value in the status of not owning, which indicates a medium impact on status. Moreover, the user's desire to be able to change his or her vehicle after one year if it does not match their needs, results in an increased impact of flexibility to a low impact compared to the buy archetype.

The biggest shift between the buy archetype and the long-time leasing archetype comes from the impact that freedom of responsibility and monetizing from utilization gives to the user-value. *“I think the main reason why you choose to lease is to avoid the hassle and costs of owning”*(R16). The citation is one among many others that accounts for the fact that users usually choose long-time leasing instead of buying to fulfill freedom

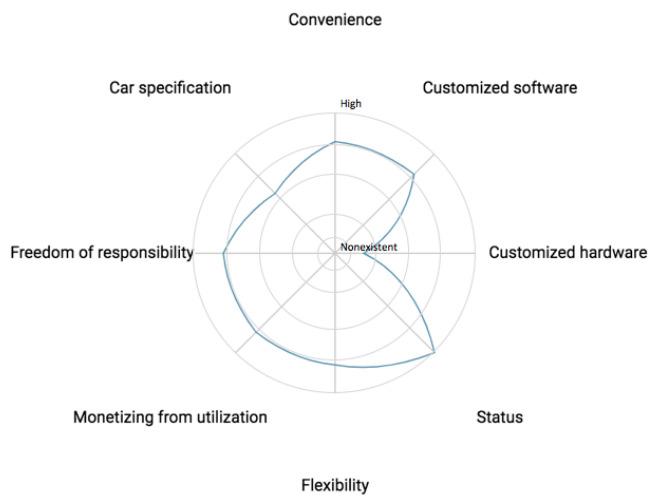
of responsibility, and thereby avoid the costs and hassles of ownership. However, another respondent mentioned that there are still high ownership costs and responsibilities when leasing, and that the only hassle a leasing-user escapes is the risk of not getting your car sold when you don't want it anymore. The respondent said: *"Leasing still means high ownership costs, you still have to pay for service and so on. The big shift in avoiding costs takes place in subscription"*(R18). This indicates an increase to a low impact of freedom of responsibility. Continuing analyzing the factor of monetizing from utilization, it was shown to have a medium impact on the user-value, based on the argument that there are still opportunities to share your vehicle with other car-riders when long-time leasing a car. Contrastingly from the buy archetype, the analysis showed that users long-time leasing a car can monetize from utilization with less concern of a decrease in residual value since the responsibility is mainly on the supplier's side. Therefore, when analyzing the factor of monetizing from utilization, the impact on user-value increases slightly.

4.2.3 Archetype 3 - Subscription

The third archetype that will be presented is subscription (see figure 4.4). The user has no ownership of the car and compared to long-time leasing, subscription has a medium length intention of usage, usually less than a year. The shorter notice period of 1 month or less, as well as the fact that the user pays for the vehicle per month, distinguishes this revenue model from the long-time leasing and buy archetype.

Figure 4.4

Archetype- Subscription



When discussing with respondents about valuable factors that impact the user-value, it turned out that convenience has a high impact in a subscription revenue model. The respondents described it as a feeling of simplicity that should follow through the whole user journey. *"It should be incredibly simple. You pay your monthly fee, and everything is included"*(R11). The importance of convenience were further confirmed by several respondents, who meant that subscription should rather be full package of solutions that

should fulfill the user needs in a smooth way *“When it comes to subscriptions, you want to be able to go somewhere in a comfortable way, have a GPS, listen to your music and be able to call, all in a smooth way”*(R2).

Furthermore, some respondents also elaborated on the generation shift and meant that they have different preferences, which challenges the traditional view of what a car symbolizes. As the younger generation (Generation Z) becomes a bigger part of the new automotive industry, respondents mean that there is less status connected to owning your car. *“The younger generation is not as eager to own (Generation Z). It's not like you personify yourself through which kind of car you buy. It's a completely different world today, people don't care what you sit in”*(R6). Compared to the previous two archetypes (Buy and Leasing), it was shown through the analysis that status has a high impact on user-value. The possibility to save time and enable flexibility in the user's choice when using the car accounts for the high impact, which the subsequent citation indicates *“Status is time and time is value”*(R18). Through the analysis it also appeared that the overall quality standard is quite high in today's automotive industry, which indicates that users in this archetype in general do not assign any value to the hardware and visual appearance of the car. However, a few respondents pointed at some exceptions regarding this, e.g., the ability to choose the size of the car. Even if this might give an additional value to the user, the factor of customizing hardware still has a low impact. From discussions with respondents, it was rather argued that the value lies in the ability to customize software and the full experience of the mobility solution. Customized software is therefore argued as a high impact factor on user-value. The following citation accounts for the differences in impact between hardware- and software customization. *“It is not the car we sell that is the value. It is more about how we can make money from the person [...] and then digital services become important. What services should we have?”*(R6). The impact of customization on user-value was further confirmed by another respondent who meant that the hardware is only there to transport the user. The value should rather come from the possibility to activate specific features through digital connections, given there is a default opportunity in the car specification to do so. The following citation illustrates this possibility, *“The car should just be a shell, it should barely move forward... but instead have the ability to digitally activate what features you want”*(R3). However, to achieve the activation scenario of specific features, it puts a demand for a quite well-equipped car specification, supporting the flexible choices the user should be able to make. Hence, it was indicated that the car specification has a medium impact on the user-value. The following citation shows the value of a well distributed car specification, but most importantly it highlights how the sale of complementary digital services becomes smart in a subscription revenue model and thus opens up for great opportunities for extra revenues. *“When you buy or lease a car, it is completely unacceptable that digital services should not be included and that you should have to pay extra for it. But when you subscribe or rent a car, is it okay then? Yes, because then it becomes smart. As a user I might not be so interested in heated seats in a car I only will have for three months during the summer. Then you're happy with less and that it will be cheaper”*(R6).

When looking into accessibility, it was indicated by the respondents that the user-value is highly impacted by the factor of flexibility. When a user reminds herself of the need of a car, there should be no hesitations for the user in how and where it is possible to get access to a car for the specific use-case. The subsequent two citations show the many ways a subscription model should fulfill several use-cases in a flexible way. *“I should get a car the right way when I need it for either a season or for a day. Or when buying three families together or share it in the BRF”*(R7) and *“With a subscription, you think in some way that you want to be able to easily leave and change the car”*(R10). The flexibility aspect gives the user a security in the ability to easily arrange, rearrange, pause, or end the subscription contract based on the user's own premises. The flexibility aspect is also something that supports the impact of status since it lets the user be very efficient with its own time.

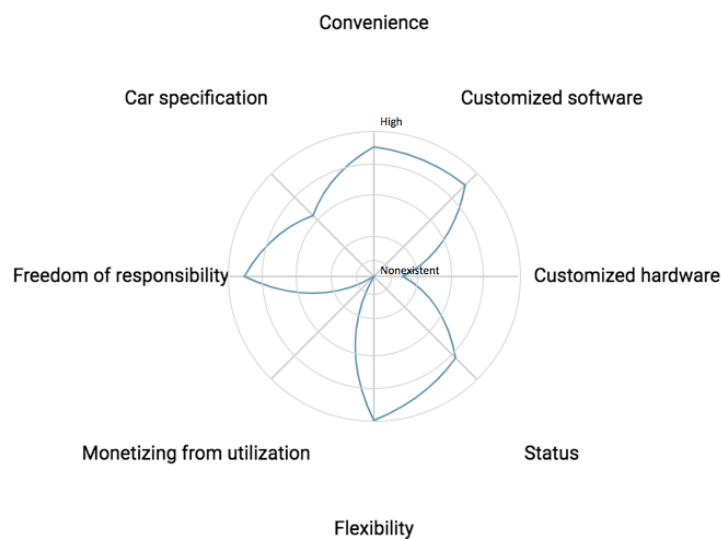
Similar to the long-time leasing archetype, when moving toward more innovative revenue models, responsibilities associated with owning a car are decreasing as they are transferred to the supplier. One of the respondents talked about this from the suppliers' point of view *“Many OEMs make money from the aftermarket, when the car is in for service and repairs etc. However, for us (Lynk&Co), it is a bit the other way around, because we own the car and then we do not want it for service”*(R11). From the users' point of view, it was indicated by the respondents that the factor of freedom of responsibility had a high impact on user-value, with the argument that the subscription-user wants to leave all responsibility, costs and hassle associated with owning to the supplier. Furthermore, as the suppliers become more responsible for the ownership of the car the users do not need to consider any decrease in the residual value. Due to this situation, there are high incentives for the user to make sure the car is highly utilized since there are great opportunities to monetize from the high utilization. Hence, the factor of monetizing from utilization is argued as a highly impacting factor. When letting one of the respondents sum up the most important in a subscription model, the respondent mentioned: *“Simply simple, it's just to keep it as simple as possible”*(R11).

4.2.4 Archetype 4 - Long Trip PPU

The fourth archetype that will be presented is long trip Pay Per Use (see figure 4.5). The model includes no ownership, but has the intention of a longer trip experience with an intention of usage between 3 days to 3 weeks and the user pays per usage or km.

Figure 4.5

Archetype- Long Trip PPU



In the model for long trip PPU the user has a clear intention with the usage of the car and is more willing to create and pay for a full comfortable experience during the usage period, which the following citation indicates. *"The customer experience is taking a bigger part of the value, and then it is possible to charge more. So, the experience is one factor that allows us to charge more, simply"*(R4). This citation not only indicates the high impact on user-value through convenience, but also how the factor of customized hardware has a low impact on the user-value and becomes less important. *"Any transition to shared modes of transport means that you care less and less about the hardware, and you care more about the user experience. There is a transition from focusing on hardware to the user experience instead"*(R13). Furthermore, to achieve a great user-experience it becomes highly relevant to consider the opportunities that are embedded in digital services and customization in the software. As indicated by the first citation (R4) there is great potential in charging a higher price towards the user for them to achieve a great experience. One of the respondents stated *"The car will just be a shell. The whole experience is in the digitized world"*(R12). Another respondent gives an example and means that users might be willing to pay for services that would add to their user experience, which they otherwise had bought in some other way. *"I believe that users would be willing to pay for an additional service when going away for a week or so, they probably would have paid for some other services associated with the trip anyway, a guide service for example"*(R9). These citations indicate that it is all about the user experience and thus customized software becomes a particularly valuable factor that has a high impact on the user-value.

To meet the demands of digital services there is a need for a decent well equipped car specification that can support the connection between the hardware and software. Moreover, when going on trips there is a user-value in receiving a car that is equipped

for an experience with high quality. Hence, the factor of car specification has a medium impact on the user-value and is supported by the following citation: *“If the occasion is just about transport, then we are down to hygiene factors, but when it comes to creating an experience you want to be more entertained and it puts a higher demand on quality and that it should be nicer in different ways”*(R6). Likewise, as in the subscription archetype there is a high status of using a mobility solution where the user is not responsible for the ownership of the car, but rather pays for a solution that makes the user experience feel seamless and time efficient. Hence, the factor of status has a high impact on the user-value. Aligned with a high impact of status the users also assign a high value to the ability of receiving an offer that is highly flexible. It was argued by several respondents that the high value comes from the ability to be able to choose a car based on the specific occasion or use-case. *“If it is per occasion, then maybe you need a four-wheel drive car on one occasion and a small car on another”*(R3) or *“I change the car when I have other needs”*(R17). As indicated there should be no hassle about receiving or leaving the car, thus the flexibility has a high impact on the user-value.

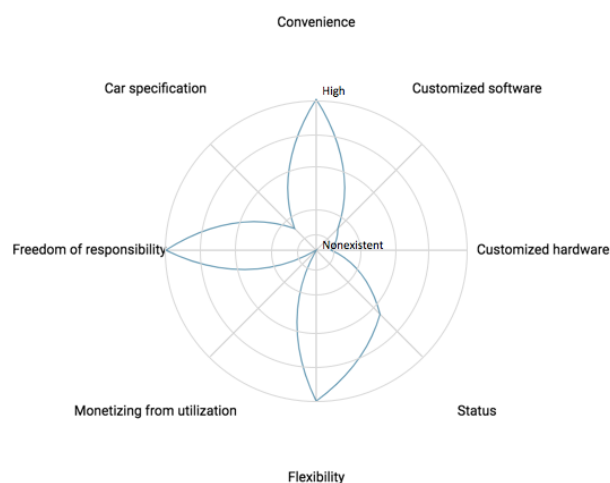
As most of the costs associated with owning a car are transferred to the supplier in this archetype, there is a value in avoiding the hassle and responsibility that comes with ownership. The factor freedom of responsibility therefore has a high impact on the user-value in the long trip PPU archetype. Moreover, as the users do not have ownership of the car and no responsibility for a decreased residual value, there is no incentive for the user to look for utilization options. This argues for the nonexistent impact on the user-value when analyzing the factor of monetizing from utilization.

4.2.5 Archetype 5 - Short Trip PPU

The fifth archetype that will be presented is short trip Pay Per Use (see figure 4.6). In this archetype the user has no ownership of the car, and the vehicle is used with a shorter intention, usually less than 3 days, and the user pays per usage or km.

Figure 4.6

Archetype- Short Trip PPU



When the car becomes a mode of transportation for a shorter period of time, users tend to switch what they consider as valuable, especially when it comes to the ability to customize the offering in terms of software as well as hardware. The analysis shows that the shorter period of usage makes users less willing to invest in something that will only be theirs in a few minutes or days. *"When it's not yours, and you're going to have it for a short period of time, then you don't really care if I have what I really want" (R17)*. The low incentive to invest in something is further indicated in the following citation. *"I want to believe that the shorter period of time you stream, lease or rent a car, the shorter the minutes and mileage, the less is the willingness to pay. You will not use as many services, and you will not care about how you travel" (R6)*. Furthermore, the respondent continues to discuss how preferences in the hardware and the overall standard are valued in a different way when using a short trip transportation model. *"It should smell okay, it should not be dirty, it should be safe and reliable. You have to get from A to B, these rather short kilometers that you travel" (R6)*. The previously presented citations indicate that the value is not in the ability to customize in the software and hardware, but rather in the ability to choose a car as a simplistic transportation method. Hence, both customization in software and hardware has a low impact on the user-value. Arguments for a low impact instead of a nonexistent one is that some respondents pointed out that there is a small value in the ability to choose the size of the car to match the use-case and should therefore be considered as a customized hardware option. Likewise, the analysis also shows there is a small value in letting the user add specific features to match the use-case. As one of the respondents stated: *"For example when going to IKEA I don't think you add almost anything when it comes to digital services, unless there is a special feature just for trailers. Then you can imagine paying for that" (R10)*. Moreover, since the user readily puts this mode of transportation in relation to taking the bus or train, the previous citations also argue for the high impact flexibility gives to the user-value. Using this innovative transportation method there is a prerequisite that the car solution meets the user needs whenever they turn up.

The analysis also shows that convenience is considered to have a high impact on the user-value. For a user to choose this transportation method in front of other options e.g., bus or train, the whole experience of using the car should be associated with a feeling of simplicity, which puts a demand on flexibility and quality. One of the respondent states: *"To get to your destination, the base needs to be there. The car needs to be clean, intact, easily accessible, and cheap, because otherwise you're taking a taxi, bus, or train" (R14)*. The citation highlights the importance of certain base parameters that will lay the foundation to a perception of convenience.

Furthermore, since the analysis shows that the user is fine with receiving a car with lower standard, there is no need for the car to have a well-equipped car specification and the factor therefore has a low impact on the user-value. *"I just buy like an entry model, with no options, and then I subscribe to whatever I need. That's probably the*

way moving forward" (R5). Furthermore, some respondents mentioned that there should still be an opportunity in paying extra for some specific features that have to do with functionality. The following citation shows the contrast between long trip PPU and short trip PPU and how the car specification should be distributed. "If you do long journeys, it puts a completely different demand on charging, and what kind of navigation support you need. But if you go to IKEA, you may not need the same type of navigation, but you still expect it to be there" (R9).

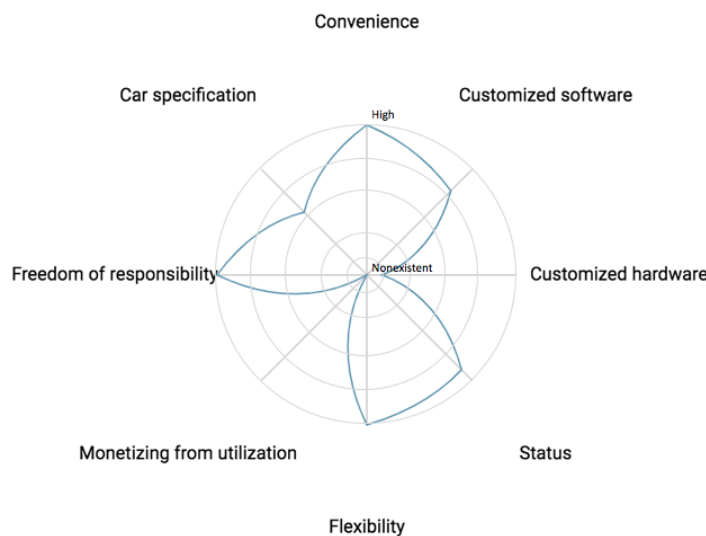
As described in the archetype for long trip PPU there are no incentives and values for the user to look for utilization options since the ownership of the car is fully on the supplier's side. This argues for the nonexistent impact of monetizing from utilization and a high impact of freedom of responsibility on the user-value. "In the ultimate form of a kilometer-based option, everything needs to be included, such as charging, guarantees of service, repair, parking, and road tolls etc. Everything like that is included" (R13). Furthermore, following the new trends in the automotive industry and the high impact of freedom of responsibility, flexibility and convenience, results in a feeling of status since it enables the user to be time efficient. The following citation accounts for the changing trend in the automotive industry. "We are not talking about the car itself, but we are talking about mobility" (R12). Hence, status has a medium impact on the user-value.

4.2.6 Archetype 6 - Autonomous taxi service

The most extreme revenue model on the digital servitization degree is the autonomous taxi service (see figure 4.7). In this revenue model the user has no ownership of the car, and the solution is used for short trips with a great experience. As the previous revenue models, the user pays per usage or kilometer.

Figure 4.7

Archetype- Autonomous Taxi service



This archetype is the most associated with a pure service. The analysis showed that the factors with the greatest impact on the user-value are convenience, flexibility, and freedom of responsibility, which all were indicated as high impacting factors. Moreover, the factors of convenience and flexibility become even more important than in the previous archetypes with the argument that the user only uses the vehicle during short trips and wants it to be as cheap, convenient, and easily accessible as possible. This is illustrated by one of the respondents: *"The user wants everything to run smoothly, have an experience and for the vehicle to be accessible when they want it, otherwise they would take a normal taxi or bus"* (R5).

Several respondents explained that the intention with an autonomous taxi service is more than just transportation, but rather an experience. *"Today, people just drive, and in the future, they do something else. Not only driving actually, they will drive less and less in the very future due to autonomous driving and so on. The ambition is to try to capture what they can do in the car, while they get driven around. What kind of service can make their life easier"* (R5) and *"It's going to be something completely different, it's the thing about seeing the car as a store. Many people will come into the store and there will be many different things on the shelves. It's very different to how you've seen the car earlier"* (R6). These citations account for an increased impact on user-value to a medium impact when analyzing the factor of car specification, while the factor of customizing software is considered as a high impact on the user-value to achieve a great experience. Respondents mentioned that for the user to trust a self-driving car and to choose it over a normal taxi, they put higher demand on the car specification and the quality embedded in the offering. Adding to this, since a lot of the intended software services that will be offered are embedded in hardware, it automatically increases the value of the car specification. Moreover, some respondents believed that the potential in selling additional digital services is at its highest in autonomous taxi services, for example: *"I think there's definitely opportunity in the services. And it will be a lot when you get autonomous cars up and running for real [...] the scenario that you might see if you Google is the person relaxing and the car is just driving and you're reading the magazine, having lunch, joining a meeting and playing with your dog or something."* (R5) and *"I don't think the profitability will be in hardware. I think it will be in digital services"* (R3). While others argued that the user will not be bothered to purchase digital services for such short trips, for example: *"I don't know if you will be bothered to purchase services while sitting in a taxi, you usually look at your phone and then you have arrived"* (R17). The high potential of selling digital services together with the hesitation that users might not want to customize when only riding shorter trips argues for a high impact of customized software on the user-value.

With the same arguments from the analysis in short trip PPU, the user chooses not to own because they want to avoid the hassle and the costs with owning, which still results in a high impact in freedom of responsibility. Similarly, the factor of monetizing from utilization has no impact on user-value in this archetype since the user only has short access and no control over the vehicle usage. Furthermore, the factor of customized

hardware is down to a low impact on the user-value. The analysis showed that in order to have a profit margin in this archetype, the vehicle needs to be standardized and have the functionality to run on the streets without hassle 22 out of 24 hours a day. Besides, since the user has no ownership of the car, the user is not bothered to or see any value in customizing the hardware for such short trips. On the other hand, status has a high impact on the user-value. The value for the user will not lie in the status of owning a fancy car with a certain hardware the user wants. Status will rather lie in the ability to get a seamless experience including digital services that is beyond what a car is today. *"Today, we are still looking into the vehicle, tomorrow we will look outside the vehicle"(R4).*

4.3 Summary of second level analysis

In the following table (table 4.3) the findings from the second level analysis are presented together with color coding. The colors represent the nonexistent, low, medium, or high impact that the factors have on the user-value in each archetype. The table will be further discussed in the next section.

Table 4.3

Summary of second level analysis, color coding of high, medium, low, or nonexistent impact

Revenue source/ Factors	Buy	Long-time leasing	Subscription	Long trip PPU	Short trip PPU	Autonomous taxi service
Convenience	Medium	Medium	High	High	High	High
Customized Software	Medium	Medium	High	High	Low	High
Customized Hardware	High	Medium	Low	Low	Low	Low
Status	Medium	Medium	High	High	Medium	High
Flexibility	Nonexistent	Low	High	High	High	High
Monetizing from utilization	Medium	Medium	High	Nonexistent	Nonexistent	Nonexistent
Freedom of responsibility	Nonexistent	Low	High	High	High	High
Car specification	High	High	Medium	Medium	Low	Medium

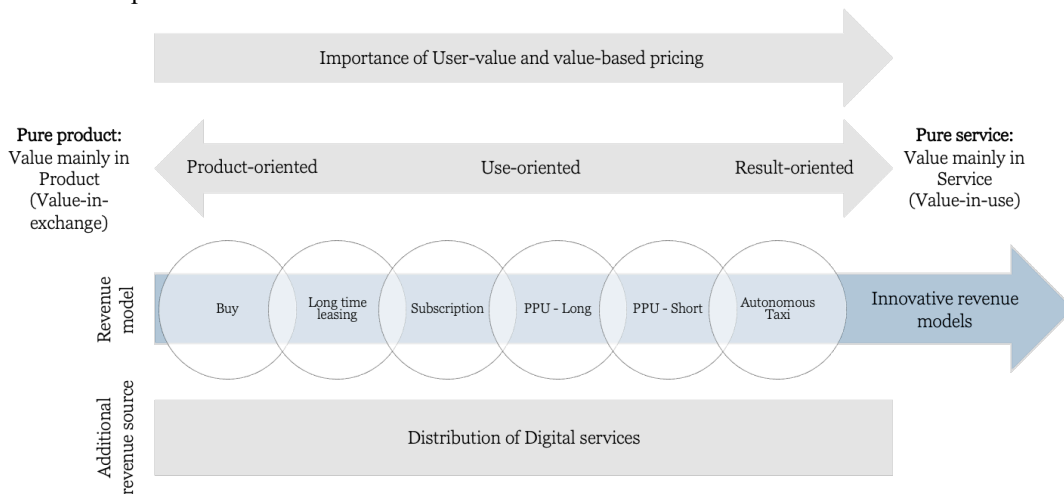
- High
- Medium
- Low
- Nonexistent

5. Discussion

This section aims to answer the three research questions in order to fulfill the purpose of the study to explore how digital servitization impacts how value can be captured through existing and new revenue models in the automotive industry. In order to do so, significant findings will be extracted and discussed together with previous research. The findings will be synthesized in a conceptual framework that shows how digital servitization, user-value and revenue models are interconnected as well as give insight to the theoretical contributions and future research of this study (see figure 5.1).

Figure 5.1

Value-driven product-service framework



5.1 The value-driven product-service framework

The first research question is: *How has digital servitization impacted the portfolio of revenue sources in the automotive industry?* followed by the sub question: *Are there any potential new revenue sources?* As previous research shows, digital servitization has given incentives for new and updated revenue models in today's industries (Porter & Heppelmann, 2014; Rahman & Tadayoni, 2018; Linde et al., 2023; Teece & Linden, 2017), which was also indicated by this research. The study shows that digital servitization has left the automotive industry with the revenue sources of buy, leasing, subscription and pay per use (PPU) services (Annarelli et al., 2019; Bonnemeier et al., 2010; Tukker, 2004). It also showed that these can further be classified into the PSS business model (scale from pure product to pure service) and be referred to as traditional- or innovative revenue models. This study claims that digital servitization has opened up for new use-cases which should be covered in the portfolio and hence, it can be argued that digital servitization has impacted the portfolio of revenue sources. A significant finding showed that it is not enough to divide revenue sources by ownership, but rather the use-case it covers. It was realized that leasing and subscription needed to be divided into long-time leasing and subscription whereas pay per use services needed to be divided into short- or long trip PPU. Furthermore, the autonomous

taxi service was added as a futuristic revenue source as it captures the future aspiration of the automotive industry. Moreover, as a part of each of these revenue sources, findings showed that digital servitization has enabled great potential in earning additional revenue from selling digital services as a part of the revenue model. This aligns with previous studies on complementary services (Andrade et al. 2022; Cenamor et al. 2017) as well as research about revenue models (Linde et al., 2023). This study proposes a new and extended portfolio of potential revenue sources in the automotive industry including six revenue sources that are impacted by digital servitization: Buy, Long-time leasing, Subscription, Long trip PPU, Short trip PPU and Autonomous taxi service (see table 4.1), which answers RQ1. Contrary to Tukker's (2004) PSS-model, our framework shows a more practical view of how the scale from pure product to pure service and its revenue sources can be presented. Findings showed that they should be presented as circles that merge into each other to visualize how there are no clear boundaries (see figure 5.1).

The second research question that this study aims to answer is: *What factors impact user-value in the automotive industry?* Findings showed eight factors impacting user-value in the automotive industry: convenience, customized software, customized hardware, status, flexibility, monetizing from utilization, freedom of responsibility and car specification (see table 4.2). Some of these are aligned with previous research touching upon the topics of convenience, customization and personalization, status, sustainability, cost of ownership and risk (Grönroos, 2008; Prahalad & Ramaswamy, 2000; Ross, 2014; Annarelli et al., 2019; Sawhney, 2006). This alignment could originate from the case-company's innovative working attitude that tries to embrace a user-perspective, and thereby had these factors in mind. It is possible to think that more or other factors worth considering may have appeared if the research scope would have invited more companies to participate with a different view on user-value. Currently there is a high pressure in all industries and could therefore be considered as an impacting factor. However, this study argues that it should not be considered as an impacting factor but rather a prerequisite moving forward in the automotive industry. Furthermore, this study as well as Möller and Schaufuss (2022) indicate that increasing utilization can be considered as a strategy for a future sustainable automotive industry, hence monetizing from utilization was considered as an impacting factor on user-value. Moreover, freedom of responsibility was also found as a factor impacting user-value. It was assumed from the research by Annarelli et al., (2019) and Sawhney (2006) that cost of ownership and risk are highly impacting factors on user-value in the traditional revenue models, and that they decrease when moving towards innovative ones. Turning the factors of cost of ownership and risk to a user-value perspective, the fundamentals were captured through the definition of freedom of responsibility (see table 4.2). Furthermore, the remaining impacting factors from theory (convenience, customization, and status) were also indicated as factors in this study. Together with an addition of two factors from findings (flexibility and car specification), it is concluded that the eight factors impact user-value in the automotive industry, which answers RQ2.

5.2 Six archetypes of revenue models for capturing user-value

Building on research question one and two, research question three asks: *How is value captured through each specific revenue model?* followed by the sub question: *How does this value vary between different revenue models?* By identifying the impact on user-value of specific factors it is possible to answer the question of how value is captured in each specific archetype (see table 4.3). The discussion below will clarify how value capturing differs between the archetypes that move between traditional and innovative revenue models and thereby answering research question three.

Findings show clear trends and shifts when moving from traditional revenue models (buying- and long-time leasing archetype) to more innovative ones (subscription-, long- & short PPU- and autonomous taxi archetype). One significant finding shows how the factors of customizing hardware and car specification are impacting the user-value mainly in the traditional revenue models and that there is a shift when moving to the subscription archetype and forward (see table 4.3). In line with previous research (e.g., Barbazon et al., 2010) this study shows that traditionally, there has been high value in customizing the hardware in the car. Moreover, Ross (2014) and Tukker (2004) discuss how there is a shift from traditionally paying for the product itself to paying for the mobility service and experience that the car gives along with digital servitization. This trend is also indicated in this study. When entering more innovative revenue models (subscription and forward), convenience, flexibility and freedom of responsibility has the greatest impact on user-value. This indicates that innovative revenue models capture values through these values rather than the hardware and the car itself as a product.

Furthermore, customized software is also found to have interesting trends. While leaning towards the more innovative revenue models, the impact of customized software increases with exceptions from the short trip PPU archetype. The exception for this is due to low incentives for the user to customize through software during such short trips, rather users achieve this value by using their own phone. Moreover, in those cases where there is an incentive to customize the software through digital services, findings show it becomes highly relevant to also consider in what way they are distributed. The study shows that the distribution of digital service should follow the same way the car is sold or used e.g., a user on a subscription contract already paying a monthly fee for the car, also wants to be flexible in their choices of purchasing additional services. Therefore, it makes more sense for the user to pay for additional services following a subscription method. Moreover, if the user should be able to lay off the contract with a short notice, there is also a need for the user to do the same with digital services. The high importance of distribution was also indicated by several scholars, who mean that distribution becomes more important to consider along with digital servitization (Genzlinger et al., 2020; Grönroos, 1984; Linde et al., 2023). Furthermore, Linde et al. (2023) indicates in their research that digital services have a higher potential when being sold in the more innovative revenue models. Unexpectedly, looking at findings it was shown that this potential might be as big in the more

traditional revenue models such as the buy archetype, IF it is distributed in the right way. For example, when it is purchased through a one-time fee, and remains the property of the user, it has a high value because of the long-term intention of owning, but in a subscription archetype the value in purchasing through a one-time fee decreases because it does not match the use-case of being flexible in the contract. As a result, throughout the scale of digital servitization (see figure 5.1) the distribution of digital services becomes relevant to consider as a way to overcome the servitization paradox (Coreyonen et al., 2018; Neely, 2008) and thus increases the possibilities to be more profitable. Moreover, taking the thought of distribution one step further, it is possible to think that the distribution of digital services does not have to match the way the car is sold or used. If connecting the digital services to a personal digital-ID it would enable the user to collect all their digital services in one account, resulting in the possibility of purchasing a digital service through a one-time payment even in the subscription contract.

As indicated above there is a possibility to customize the ride experience through digital services throughout the whole servitization scale, which can be seen as a way to exceed user expectations (Kohtamäki et al., 2021). Prahalad and Ramaswamy (2000) discuss personalization and customization, stating that personalization becomes more relevant as users actively participate in the value-creation process (value-in-use), while customization allows users to add specific features during the early manufacturing stages. When entering innovative revenue models and considering an increased impact of customized software and a decreased impact of customized hardware on user-value, the expression “customized software” might no longer be an expression that fits the actual value that the additional sale of digital service gives. Rather, using the expression of “personalization” as argued by Prahalad and Ramaswamy (2000), indicates a more nuanced view of how value is captured through digital services. Personalization indicates how the sale of digital services can give a personalized experience that exceeds the expectations of the user, after or during the purchase/usage of the vehicle.

Another highly relevant factor to discuss is status. Following the new trends of not owning in the automotive industry, findings and previous research shows that there is a shift in the mindset of what a car is and what status represents. Ross (2014) mentions in his research that the new generation do not want to own and are looking for sustainable mobility solutions instead (more innovative revenue models). In this study it appeared that traditionally, the status in the automotive industry has been owning an exclusive branded car with high status hardware. A few respondents even said that the brand is the only thing impacting the feeling of status. However, when trends are changing and new use-cases appear, it is possible to consider that the meaning of status is changing as well. Unexpectedly, this change was not identified by the majority of the respondents, which might be because of such a strong legacy in the automotive industry embedded in the automotive industry culture. What is important to consider though, is that in order to capture value with a long-term strategy, new considerations of what status is needs to be taken into account. Over the next couple of years, the new

generation will dominate the automotive industry, which will reduce the importance of hardware and the brand. A significant citation from findings visualizes this “*status is time and time is value*”. Bonnemeier et al. (2010) and Grönroos (2008) argue that the value that the user creates in its own sphere (value-in-use) can be captured by considering optimizations for the user, such as cost- and time-savings. Connecting that “status is time” argument together with that the value-in-use is increasingly present in innovative revenue models (see figure 5.1), it can be argued that for these archetypes, time-savings and being sustainable is now a way of feeling status compared to the traditional view.

Lastly, the factor of utilization will be discussed as a way of capturing value in different revenue models. As explained, users can earn a monetary value by utilizing the capacity of the car, which were present as an impacting factor on user-value in buy, long-time leasing, and subscription. However, in the more traditional revenue models (buy and long-time lease), it was indicated that the feeling of ownership and the risk of decrease in residual value interfere with the motivation of utilizing the car to its full capacity. Contrastingly, one can argue that the new way to consider status (time-savings and sustainability) is actually to share your vehicle with others, and the value captured from utilization might increase in the future along with changed trends. What is also interesting to highlight is how the value of utilization disappears when entering more innovative revenue models such as PPU or autonomous taxi service. These revenue models are actually the ones where high utilization creates most value for the supplier, but where there is least value for the user. This contradiction holds significant importance that necessitates careful consideration and awareness. In the case of a user utilizing a car with a pay-per-use (PPU) model for short trips, they are not burdened with the responsibility of contemplating its utilization; rather, it becomes the supplier's duty to ensure effective utilization. Conversely, in instances where individuals own, engage in long-time leasing, or subscribe to a vehicle, the user's interest lies in maximizing its utilization, while the supplier's interest in this regard diminishes.

Summarizing this previous discussion on how value differs between revenue models together with the research on value-based pricing by Bonnemeier et al. (2010), we can explore how value is captured by discussing pricing and profitability. Followed by digital servitization and the new trends in the automotive industry, Neely (2008) indicates the challenge of low margins and profitability. Throughout the research it has become evident that the servitization paradox is a fact and is impacting the profitability in the automotive industry. Previous research argues that both value-based pricing (Gebauer and Friedli, 2005) and digital capabilities (Coreyonen et al., 2018) can create opportunities to reach higher profit margins and support overcoming the servitization paradox. Moreover, as shown in the proposed user-driven product-service framework it becomes increasingly important to consider the user-value when moving along the scale of digital servitization and innovative revenue models, hence understanding the user becomes increasingly important (see figure 5.1) (Grönroos, 2008; Macdivitt et al., 2011). Having previously explained findings in mind, that the importance of the

hardware and car specification is decreasing along with innovative revenue models and the importance of non-material emotional values such as convenience, flexibility and freedom of responsibility are increasing, one can think that the pricing strategy needs to vary. As the user-value becomes increasingly important to consider, value-based pricing becomes a vital tool to capture value in these innovative revenue models (Bonnemeier et al., 2010; Grönroos, 1984; Grönroos 2008). Moreover, as the value from the hardware decreases, it becomes less important to consider these hardware-aspects when pricing, hence the usage of cost-based pricing becomes less important in order to capture real value. Although cost-based pricing will always be important to consider as a base to ensure profitability and covering of cost, value-based pricing will make sure to maximize the value captured from the user. For example, when offering a short trip PPU, the supplier needs to consider that the costs of producing and using the car needs to be covered, but that the hardware does not assign any additional value to the user and could be standardized. The real value for the user and what they are willing to pay for rather comes from flexibility, convenience, and status (time-savings) etc. which allows the supplier to charge a higher price.

Further, findings show that despite the possibilities to sell additional digital services, price sensitivity will most likely appear as a dimension that affects or determines whether the user has a willingness to pay or not. Furthermore, the study indicated a complexity in pricing these services. Some users may put a higher value into the ability of customizing their product and/or services and thus be willing to pay more for a certain offering. Contrastingly, some users might instead prioritize affordability. Linde et al. (2023) mention that the user needs to perceive the additional digital service as a valuable addition that enhances their overall experience in order to feel a willingness to pay. Since digital services are highly dependent on the perceived value by the user, value-based pricing can be considered as a suitable option to handle this complexity as well (Bonnemeier et al., 2010). The fundamental in value-based pricing is to understand the user and its expectations. By collecting data, suppliers can match pricing with the expectation of the user or might even exceed them (Bonnemeier et al., 2010; Grönroos, 1984). By allowing value-co-creation through data collection, it is possible to create a customized service offering that minimizes or exceeds the gap between expected value and perceived value. This exceeding of expectation can only be achieved if the price matches the user preferences, hence data collection and value-based pricing can help to overcome the complexity in pricing digital services and the servitization paradox.

5.3 Theoretical contribution

The main theoretical contribution from this research is the value-driven product-service framework shown in figure 5.1. The framework successfully contributes by combining the theoretical concepts of digital servitization (Annarelli et al., 2019; Tukker, 2004; Neely et al., 2011), user-value (Grönroos, 2008, 1984; Macdivitt et al., 2011) and revenue models (Bonnemeier et al., 2010; Linde et al., 2023; Teece & Linden, 2017) and applies it to the automotive industry. It also emphasizes the importance of creating

products and services that are designed to deliver maximum user-value, while also generating revenue through aligned revenue models. By focusing on both user-value and revenue generation, companies can create sustainable and profitable product-service offerings that meet the needs of both users and the organization.

The degree of digital servitization (pure product to pure service) is connected to specific revenue models in the automotive industry and is presented on a scale from traditional- to more innovative revenue models. The importance of user-value is also visualized and has been explained as an incentive for value-based pricing, combining the research on user-value and value-based pricing. Furthermore, adding to the research on digital services and revenue models by Linde et al. (2023) it was found that there is great potential of selling additional digital services in all revenue models if they are distributed the right way. The potential of distributing digital services is equally shown along the scale from pure product to pure service as visualized in the proposed framework (see figure 5.1).

5.4 Limitations and Future research

The respondents in this research represent the case company CEVT and its partners ZEEKR EU and Lynk&Co, which limits the findings of how they can capture value in different revenue models to the context of these companies. Furthermore, the research has collected input through respondents from the companies and not the actual users in the automotive industry. Since a significant part of the findings represent what users value in different revenue models, the research would strengthen its validity if the study would include the users in the mix of respondents. However, the findings in this study are still of high relevance, since the respondents represent the ones making decisions about what is delivered to the users in today's automotive industry and have a significant knowledge and voice in the matter. Further, the results are somewhat limited to the automotive industry, with some exceptions. One can see potential in using the structure of the conceptual framework to understand how to capture value in other industries that are going through similar transformation. For example, the banking industry is strongly impacted by digital servitization, and it would be interesting to adapt the framework to this industry. Moreover, the findings on distributing complementary digital services might be used to understand the potential of selling these in several industries. The telecom- (Appstore) and entertainment industry (e.g., Spotify and Netflix) has a lot of experience from selling digital services and it would be interesting to do a comparative study with them and the automotive industry in future research.

During the research it was found that there is not only an operational challenge in capturing value from the users, but also an organizational challenge when it comes to aligning the development of hardware and software with each other. The study further encourages future research within service modularity to address this challenge. Developing a business model embedded in a PSS requires that hardware and software are integrated in a way that supports each other, which can be handled with a service

modularity approach (Kohtamäki et al., 2021). Modularity is a general systems concept that allows organizations to offer both customization and efficiency through standardization in their digital offerings which will be of great importance when entering innovative revenue models.

6. Practical implications

The new trend in the automotive industry is a fact and is impacting the way CEVT is capturing value through their revenue models and doing business. CEVT's innovative company attitude is what is forming them to become a creative and user-centric player on the market and breaking the boundaries between the user and the car. The undergoing transformation in the automotive industry and the increased importance of user-value forces CEVT to re-think how to capture value in order to stay profitable. Knowing this will be a vital part for CEVT in order to build compelling business cases since it gives a sense and indication of the potential value that can be captured through specific revenue models.

Companies can use the archetypes from findings in order to understand the differences in profitability potential depending on the revenue model by considering the impact of certain factors. The assigned impact to each factor (high to nonexistent) in the archetypes could be used as quantitative measurements and be referred to as value-coefficients (VC) (see table 6.1). The VC could be combined with commonly used indicators involved in decision-making processes, such as Net Present Value (NPV). As an example, by multiplying 1+VC with the expected income of a certain offering, companies could integrate impact on user-value in their NPV calculations and compare profitability between revenue models. Furthermore, considering the VC and its integration in NPV, it is possible to consider two ways the archetypes can be used when conducting profitability analysis. Either companies can start by deciding what specific revenue model they want to be present in (e.g., buy, leasing, subscription etc.) and calculate potential profitability if allocating resources into the high impacting factors on user-value (high VC-number). Or companies can start by looking at their internal capabilities while considering what factors that best match the company resources and further decide what revenue model is better fitted for the business. What is important to consider when doing the profitability analysis, is that the archetypes give an indication on what factors that have the greatest impact on the potential profitability, but not what specific monetary value they can produce. Rather, the archetypes show the potential in relation to an alternative revenue model, and thus can be used to make strategic choices in the future automotive industry.

Table 6.1

Impact on user-value translated into a value-coefficient.

Impact	VC
High	0,8-1
Medium	0,5-0,7
Low	0,1-0,4
Nonexistent	0

Concluding, our findings will support the finance-team at CEVT in understanding the user-value and thus adapt the right internal capabilities accordingly to maximize the profitability potential from new business cases related to revenue models. Findings of this study will also give valuable input for other divisions at CEVT by acting as a base of information related to the revenue models and what differs them. The differences between the archetypes will open up for further discussion to analyze specific scenarios and consider both benefits and pitfalls, valuable for business development.

6.1 Recommendation for the future

As indicated throughout the study, the shifting trend towards innovative revenue models in the automotive industry, such as increased focus of achieving a higher utilization degree and a higher focus on customized digital services, has left the industry with lower margin. When having lower profit margins, CEVT will need to streamline their costs and improve efficiency and profitability, which according to Kohtamäki (2020) especially can be fulfilled by standardization. The two concepts of personalization and customization elaborated in this study contradict standardization, which puts CEVT in a complex situation of balancing between them, especially when entering more innovative revenue models where customized digital services become more dominant. Our recommendation is to use the findings from this study to support decisions within this. Since findings give an indication on what factors are valuable for the user in different revenue models, CEVT will be able to structure and plan their business cases accordingly.

As mentioned before, value-based pricing and data collection becomes increasingly important strategies to consider in order for CEVT to exceed users' expectations and retrieve maximum value through their offerings. As data collection on the users becomes highly relevant in order to allow value-based pricing and value-co creation, it puts higher demand on CEVT to structure internal processes that can handle the data collection and further enable that the information reaches the concerned employees. For CEVT to reach their users, we recommend them to work with the digital interface in which the users connect to the company through a digital platform. The importance of a well-developed platform is also indicated by Osterwalder and Pigneur (2010) and Lusch et al., (2010), which means that the platform is a way to enhance user-experience and improve business efficiency. If the platform has a complicated interface which is hard to use and understand there is a risk of losing the users already in the first meeting, which will impact if the user chooses the mobility solution in the first place. Furthermore, as indicated in the discussion, distribution of digital services becomes highly relevant to consider along with the innovative revenue models. While considering an increased importance of a digital platform, the interconnection between distribution of digital services and the interface needs to be aligned. As a result, when moving towards innovative revenue models, it becomes important for CEVT to include investments for developing excellent digital platforms in their business cases in order to reassure long-term profitability.

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