



Norwegian University  
of Life Sciences

**Master's Thesis 2021 30 ECTS**  
School of Economics and Business

# **Development of a digital advisor to support the decision-making process of acquiring a car**

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Entrepreneurship and Innovation, Digital Business Transformation

# PREFACE

This thesis is written as a part of the Master of Innovation and Entrepreneurship at the Norwegian School of Life Sciences (NMBU), where we specialize in Digital Business Transformation.

We would like to thank our supervisor Odd-Ivar Lekang who has been very helpful and supportive. Moreover, we would like to thank our co-supervisor Kristian Omberg, who has assisted and guided us throughout the entire process with his support, constructive criticism, and jokes through many discussions.

We would also like to thank Bilbanken for giving us the opportunity to work with a real and interesting case. In a period where a global pandemic changed our everyday life, the chance of working physically in an office and having constructive discussions with the project team has been very valuable.

Also, we would like to express gratitude to the interview participants, who took valuable time out of their busy schedules to answer our questions. Without their honesty and willingness to participate, this research would not have been possible.

Lastly, we would like to give a special thanks to our partners, friends, and family, for all the love and support they have given us. They have all been an instrumental part of our student experience, and we are grateful for all the good memories. We especially want to thank our partners, who have supported us and prepared many dinners that kept us fed and happy, especially the last month. They have endured one too many discussions about mobility, cars, car loan, and sharing economy, and are surely looking forward to discussing new topics in the months to come.

Oslo, June 2021

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# ABSTRACT

This thesis explores how consumers behave in the process of acquiring a car and aspires to solve the main challenge that consumers are facing in the decision-making process. The mobility landscape is rapidly evolving and offering consumers more choices than ever before in meeting their transportation needs. The rise of sharing economy and the development of new technologies has facilitated the entrance of new business models and thereby new car ownership types. With the increased use of internet as an information source, much documentation is at the consumer's disposal. Still, the number of alternatives may lead to confusion, stress and sub-optimal decision-making.

The goal of the thesis is to develop a digital advisor that would provide the end-user with unbiased decision support for acquiring a private car. To achieve the described goal, the study was designed to collect data and test concepts through four phases, in line with design thinking. A theoretical review of the trends in the mobility market, environmental drivers, sharing economy, and the psychology of the decision-making processes was conducted to form the framework. The first phase of the thesis explored the car loan application process through testing current solutions and interviewing consumers. The results showed the car loan application process was not considered problematic for consumers, and that the main challenge was to search, navigate and evaluate information and thereby deciding on an ownership type. The second phase explored the consumers' information search and decision-making process through interviews. This resulted in a simple prototype for a digital advisor that could solve the identified challenges in the process. The prototype was tested in the third phase, and the content of the digital advisor was defined together with consumers. The fourth and last phase resulted in a definition of the characteristics of each ownership type based on data collection through a survey.

The developed solution to the consumers' challenge is a digital advisor that provides the end-user with an unbiased decision-support for acquiring a car. Based on the answers the end-user provides through nine questions, the digital advisor recommends two ownership types. A back- and front-end solution has been created, which consist of a technical weighting system for calculating the recommendations and a clickable prototype that visualizes how the advisor will look and work.

The results from the study clearly show that car acquisition process is complex and that many consumers desire guidance in the process. With the increasing number of new alternatives for car access, the digital advisor provides a solution to the challenge of consumer confusion in the market today. Moreover, it contributes to educating consumers by making them reflect upon their needs and make them equipped for making conscious decisions. The developed digital advisor can attract and retain customers for an actor in the mobility market and create business opportunities with relevant partners. It is recommended that the advisor is tested on several consumers to continue improving the weighting system and thereby elevating the quality of the recommendations. Moreover, it is recommended to continue developing the advisor by creating an API structure to collect and store structured and unstructured data automatically.

## SAMMENDRAG

Denne masteroppgaven utforsker hvordan forbrukere oppfører seg i prosessen med å anskaffe en bil og ønsker å løse hovedutfordringen som forbrukerne står overfor i beslutningsprosessen. Mobilitetslandskapet er i rask utvikling og gir forbrukerne mange valgmuligheter for å dekke behovet for transport. Utviklingen av ny teknologi har bidratt til en vekst i delingsøkonomien, noe som har resultert i at nye forretningsmodeller har blitt til og tilført nye typer bilhold i markedet. Med den økte bruken av internett som informasjonskilde har forbrukeren tilgang på mye dokumentasjon. Derimot kan antallet alternativer føre til forvirring, stress og et suboptimalt beslutningsgrunnlag.

Målet med oppgaven er å utvikle en digital rådgiver som vil gi sluttbrukeren upartisk beslutningsstøtte for å anskaffe bil. For å oppnå det beskrevne målet ble data samlet og konsepter testet gjennom fire faser, i tråd med Design thinking. En teoretisk gjennomgang av trendene i mobilitetsmarkedet, miljødrivere, delingsøkonomi og psykologien i beslutningsprosesser ble gjennomført for å danne rammeverket. Den første fasen av oppgaven utforsket søknadsprosessen for billån gjennom å teste nåværende løsninger og intervjuer forbrukere. Resultatene viste at søknadsprosessen for billån ikke ble ansett som problematisk for forbrukerne, og at hovedutfordringen var å søke, navigere og evaluere informasjon og derved bestemme seg for typen bilhold. Den andre fasen utforsket forbrukernes informasjonssøk og beslutningsprosess gjennom intervjuer. Dette resulterte i en enkel prototype for en digital rådgiver som kunne løse de identifiserte utfordringene i prosessen. Prototypen ble testet i tredje fase, og innholdet i den digitale rådgiveren ble definert sammen med forbrukerne. Den fjerde og siste fasen resulterte i en definisjon av egenskapene til hver type bilhold, basert på datainnsamling gjennom en undersøkelse.

Løsningen som ble utviklet for å løse forbrukernes identifiserte utfordring er en digital rådgiver som gir sluttbrukerne en upartisk beslutningsstøtte for anskaffelse av bil. Basert på svarene sluttbrukeren gir gjennom ni spørsmål, anbefaler den digitale rådgiveren to typer bilhold tilpasset sluttbrukerens profil. Det er laget en back- og front-end-løsning som består av et teknisk vektningssystem for beregning av anbefalingene og en klikkbar prototype som visualiserer hvordan den digitale rådgiveren vil se ut og fungere.

Resultatene fra studien viser tydelig at anskaffelsesprosessen for bil er sammensatt og at mange forbrukere ønsker veiledning i prosessen. Med det økende antallet av alternativer for bilhold, gir den digitale rådgiveren en løsning på utfordringen med forbrukerforvirring i markedet i dag. Videre bidrar den til å opplyse forbrukerne ved å la dem reflektere over egne behov og gjøre dem videre rustet til å ta bevisste beslutninger. Den utviklede digitale rådgiveren kan tiltrekke og beholde kunder for en aktør i mobilitetsmarkedet og skape forretningsmuligheter med relevante partnere. Det anbefales at rådgiveren testes på flere forbrukere for å fortsette å forbedre vektningssystemet og derved heve kvaliteten på anbefalingene. Videre anbefales det å fortsette å utvikle rådgiveren ved å opprette en API-struktur for å samle og lagre strukturerte og ustrukturerte data automatisk.



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# 1. INTRODUCTION

## 1.1 Background

In the last decade, the focus on climate challenges has become increasingly present in public and private sectors, and the everyday lives of individuals in society. The Paris Agreement on Climate Change, along with the 2030 Agenda, including the Sustainable Development Goals, provide the foundation for all countries to act together to ensure sustainable, low-carbon and resilient development under a changing climate (United Nations, 2021a). Norway has committed to these agreements and has created strategies to reduce the emissions of CO<sub>2</sub>, and this action applies pressure on all organizations and firms to act accordingly. A trend of increased awareness can also be seen among consumers, who form new demands for sustainable development and are becoming more aware of the impact of their choices (Bringnorge, n.d.; Framtiden i våre hender, 2021). Furthermore, a survey performed among Norwegian consumers found that 81 percent wanted to make climate-friendly decisions when choosing products, however, 76 percent perceived it hard to make conscious choices (Barne-og familiedepartementet, 2019).

The Norwegian government aims to reduce the climate gas emissions in the transportation sector by 35-40 percent within 2030 compared to the levels in 2005 (Engedal & Melby, 2019). Almost a third of the total emissions in Norway today stem from transportation, where half originate from road traffic. The Transportation plan for 2022-2033 entails an updated action plan for reaching the goals in this sector, and this plan is critical in fulfilling the long-term climate goals (Samferdselsdepartementet, 2021b). Mobility is undergoing one of the most transformational shifts of a generation, where sectors are being disrupted, with markets emerging, converging, and disappearing, and the sector of mobility is expected to be the most important business area in the world economy by 2030 (KPMG, 2018; Ruter, 2020). The disruptive change is facilitated by new technologies and driven by the goal of reducing the carbon footprint stemming from it (Baltic et al., 2019). Experts foresee that ownership of cars will decrease over time due to increased urbanization and changing needs, and that ownership may be replaced by mobility services delivered by professional market players in a holistic system (2018). Another study refers to the combination of car sharing, carpooling, and self-driving cars as the most serious challenge for the car industry in this century (Ruter, 2020).

The growth of companies with sharing economy at the core has been significant in the last years (Barland, 2015). Some of the most popular sectors that can be seen in sharing services are housing and property, mobility, and services (DSS, 2017, p. 36). One of the main drivers of the sharing economy has been identified as the evolution of the internet and digital platforms, which have made resources and new solutions available for a broader range of people (Bardhi & Eckhardt, 2012; Barland, 2015). Moreover, growth in urbanization and lack of space has resulted in more sharing (Borghan et al., 2017). Car sharing services have been identified as a contributor to reducing the carbon footprint stemming from traffic, with its high use of low- and zero emission-technology such as electric vehicles and the natural decrease of car use for its users (Sørensen, 2019).

The traditional forms of car ownership types, owning and leasing, are still the most dominant alternatives in the market today. Nevertheless, the habits and attitudes of consumers are changing and

sharing services are attracting a growing number of users (Nabobil, personal communication, 2021). New generations desire access over ownership, they rely heavily on the internet to find information and purchase, and are faced with an enormous amount of information and choices (Kasasa, 2021; PwC, 2015). The statement “the more choices, the better” has been questioned in psychological studies, as this may lead to confusion, stress, and sub-optimal decision-making for the consumer (Iyengar & Lepper, 2001; Matzler et al., 2007). In combination with the increasing amount of information that the internet provides, more choices can make navigation confusing for consumers in the decision-making process (Y.-C. Chen et al., 2009).

## 1.2 Case company introduction

The thesis was written with and for Bilbanken, a start-up company in the exploration and establishing phase. Bilbanken has set two goals to keep up with the evolution of the mobility sector and banking industry. Firstly, they want to be relevant for consumers and build a bank infrastructure that solves the regulatory requirements by using cloud-based services, automated processes, and API structures to connect with relevant partners. Secondly, Bilbanken aspires to be the banking service for everything related to people’s car ownership. While their primary focus is on loans and leasing, they also want to facilitate subscriptions, the purchase of a car with several owners, and the option of creating private car sharing groups. As shown in Figure 1-1, Bilbanken wants to be present and relevant for the consumer in the entire process, from the initial research and finding the right car, during the car ownership period, and until the consumer decides to end the ownership.

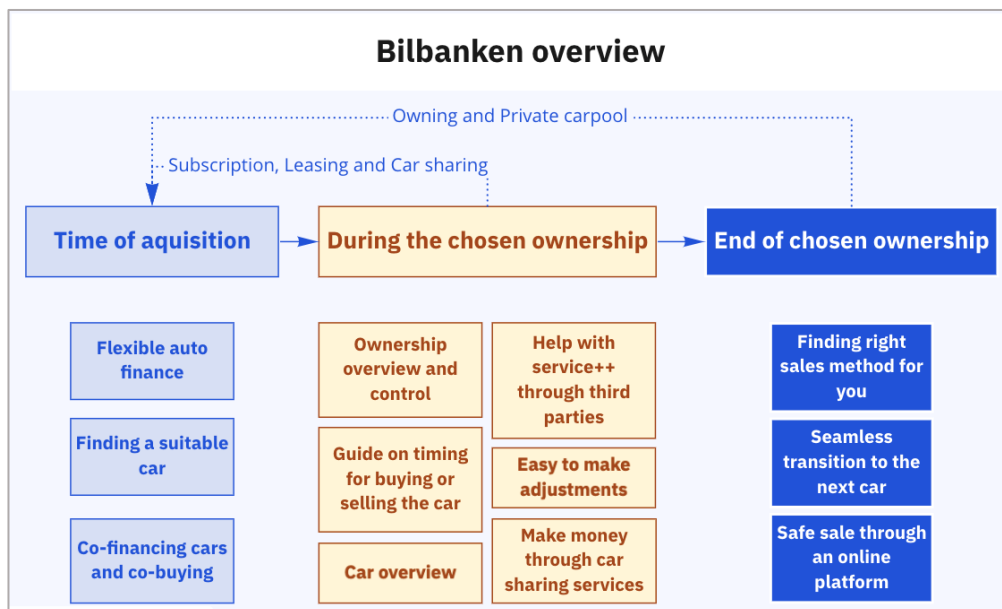


Figure 1-1 Overview of Bilbanken. Made by the authors.

The foundation for the study was to investigate the part of the service called “Time of acquisition”. Our mandate was to explore the current challenges of consumers and develop a solution that could be implemented in Bilbanken upon the company’s launch.

### 1.3 Problem description

The rise of the sharing economy and the development of new technologies have facilitated the entrance of new business models and, thereby, new car ownership types. Furthermore, with the increased use of the internet as an information source, much documentation is at the consumer's disposal. However, the number of alternatives may lead to confusion and sub-optimal decision-making for the consumer. Therefore, the study aimed to explore how consumers behave in the car acquisition process and solve the primary challenge consumers face in the decision-making process.

The purpose of the thesis was to outline how one can assist consumers in the process of acquiring a car.

The main goal was to develop a digital advisor that would provide the end-user with unbiased decision support for acquiring a car.

### 1.4 Limitations

To meet the research objectives and collect high-quality data that allowed for the creation of meaningful results, a set of limitations was defined.

- The solution is aimed at the acquisition process for *privately owned cars*.
- The solution will not be implemented in the case company as a part of the thesis, but the technical specifications and the layout for the solution will be provided.

### 1.5 Relevance

This thesis can contribute to an understanding of consumers' choices regarding mobility. Few studies have intended to find the motives, attitudes, loyalty, and actual behavior regarding sharing services from a consumer perspective (Iversen & Hem, 2018). The consumer behavior and patterns discovered in the study are transferable to other studies about consumer behavior in the mobility sector today. They are also relevant for different mobility actors in the market today. Moreover, findings about how consumers navigate and process information on digital platforms when making decisions can be transferred to other contexts. Lastly, it can contribute to making the case company user-oriented.

### 1.6 Structure of the thesis

This thesis starts with an overview of the theory relevant for studying today's mobility and car industry and consumer behavior and trends. After that, the methodology is presented to provide an overview of the research design, target audience, and data collection methods. Subsequently, the four phases are presented in chronological order, where data collection and development methods, in addition to a discussion and summary, are presented for each phase. Moreover, the final developed solution is presented. Then, a discussion of the solution and the work performed will be provided, followed by a

presentation of the practical implications for Bilbanken. Next, the conclusions of the thesis are presented. Finally, the last section gives recommendations for further development of the solution.

## 2. THEORY AND KEY CONCEPTS

The theory chapter will introduce the core concepts that form the background information necessary for further reading and understanding. An introduction of central terms used throughout the research will be provided, followed by a presentation of the environmental drivers, sharing economy, trends and consumer habits in the mobility industry, and the psychology of making choices.

### 2.1 Definition of central terms

#### *Mobility sector*

The mobility sector is used to describe the services and products that allow for the transportation of people or goods.

#### *Car loan*

Car loan refers to the financial product that one can choose when buying a car without full outright payment in cash. The loan cannot be larger than 100% of the car's sales price, as stated in the contract (DNB, 2021). One can apply for car loans through different banks, and the processes differ in the amount and type of information needed to fulfill the application.

#### *Car acquisition*

The term car acquisition refers to the action of acquiring a car through one of the car ownership types presented below. Car acquisition is a more neutral and forward-thinking term, as there is an increasing number of consumers who no longer have access to a car as a result of having purchased it but have access to a car through another ownership structure.

#### *Car ownership type*

There are many ways to acquire and have access to a car. The term car ownership type is used in this research as an umbrella term for all the forms of having access to a car. Today, there are several alternatives to having a car at your disposal, through owning, leasing, subscribing, renting from a professional entity or a private person, and car sharing. For an overview with examples of different providers in Norway identified for each category, see Appendix A.

#### *Owning*

Owning a car means that the consumer disposes and owns the car on the consumer's terms, and is fully responsible for all expenses related to the car such as insurance, fuel, service, toll, and depreciation.

#### *Leasing*

Leasing, or Personal Contract Hire (PCH), is a long-term rental, and the contract usually lasts for about 3-4 years before the consumer returns the car to the leasing provider. The consumer disposes of the car and is accountable to the leasing provider during the contract period. In a leasing agreement, the



consumer must usually provide a deposit at the beginning of the agreement and pay a monthly fee (Rammen, 2020). Moreover, there is a limit on the kilometers that can be driven during the period, which can be extended at an additional cost.

### *Subscription*

In a car subscription, the consumer disposes of the car for an indefinite period at a given monthly price and is accountable to the subscription provider during the contract period. The monthly amount usually includes insurance, depreciation, and service. However, the contract time, limit on kilometers (monthly), and the possibility of changing to another car for a shorter period (i.e. “cabin car”) differ among the providers (Fleks, 2021; iMove, 2021).

### *Car sharing*

Based on the definition used by George and Julsrud (2018), car sharing refers to the practice whereby registered members of an organization or platform can rent and operate vehicles on a self-access basis for short- and medium-term use. The most common business model typology to describe the different types of car sharing focuses on the relationship between the service provider and customer, yielding categories such as business-to-consumer (B2C), business-to-business (B2B), and peer-to-peer (P2P) car sharing (George & Julsrud, 2018). Another definition classifies car sharing as agreements where one either owns and lends out one’s car when it is not in use or rents, disposes, or owns one or several cars in cooperation, thereby avoiding the responsibility of owning a car (Sørensen, 2019). George and Julsrud (2018) state that the boundaries that used to distinguish the different types of car sharing in Norway have changed due to platforms having adopted hybrid business models that incorporate aspects of the P2P, B2B, B2C, and cooperative models.

The development in the area accentuates the importance of understanding the term “car sharing” as it includes more services and types of car ownership than one might initially think. Their common denominator is that they provide a service where several people can share a car fleet and replace the need for owning a car oneself. The market players that can be included in the term are therefore:

- Short/long-term rental services from professional to professional (B2B)
- Short/long-term rental services from professional to private person and (B2C)
- Car sharing services and carpools that give access based on membership (B2C)
- Short/long-term rental services from a private person to a private person (P2P)

Car sharing providers have pricing models based on time use, kilometers driven, and fuel use. Common for all is that insurance is included, whereas the inclusion of tolls, fuel, and charging in the price depends on the different services.

### *Sharing economy*

The term sharing economy refers to collaboration that results in efficiency and can, in many ways, be seen as an efficient economy (Killeen, 2015). The term is inclusive of centralized marketplaces in which resources owned, managed, or aggregated by a third-party institution are shared by marketplace users

in a manner that results in a higher rate of resource usage than would be expected of a sole user-owned resource (Killeen, 2015).

Other sources have a narrower definition of the term. For example, according to van de Glind et al. (2015), sharing economy is strictly bound to P2P platforms and not about renting or leasing a good from a company, which is B2C. Similarly, Andreassen (2018, p. 90) states that sharing economy is about consumers giving each other “temporary access” to a good and not about transferring ownership to someone.

This research uses the definition of Killeen (2015) as the foundation when making use of the term. The definition of van de Glind et al. is not used as it is believed to diminish the term by stripping it of essential service categories, which in essence are about sharing and using the resources available in a better and more sustainable way.

### *White paper*

White papers (Meld.St.) are drawn up when the Government wishes to present matters to the Storting that do not require a decision. White papers tend to be in the form of a report to the Storting on the work carried out in a particular field and future policy. These documents, and the subsequent discussion of them in the Storting, often form the basis of a draft resolution or bill at a later stage (Regjeringen, 2012).

## 2.2 Environmental drivers

The 2030 Agenda for Sustainable Development was adopted by all United Nations Member States in 2015 (United Nations, 2021b). The agenda contains 17 Sustainable Development Goals (SDG) that all aim for peace and prosperity for people and the planet, now and into the future. The goals entail plans to end poverty, improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests (United Nations, 2021b). Among the SDGs, there are two of relevance to this thesis: SDG 9. *Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation* and SDG 12. *Ensure sustainable consumption and production patterns*. SDG 9. addresses the urge to upgrade infrastructure and make industries sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes. Concerning this goal, Norway has expressed a plan to invest in research and innovation to create a sustainable future. Furthermore, the UN recommends that consumers start using technologies that make daily life more sustainable (United Nations, 2021b). SDG 12. entails encouraging large companies to adopt sustainable practices and ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.

The Paris Agreement is an international agreement aimed at ensuring that all the countries in the world manage to reduce climate change (UN, 2020). It commits all countries to make national plans for emission cuts for which they should report on the work and results every fifth year. Norway’s commitment is to reduce emissions of CO<sub>2</sub> by 50-55 percent within 2030 compared to the levels of

1990, in addition to the long-term goal of reducing 90-95 percent within 2050 (Klima-og miljødepartementet, 2021). Almost a third of the total emissions in Norway stem from transportation, where half comes from road traffic (Engedal & Melby, 2019). In relation to this, the Norwegian government aims to reduce the climate gas emissions in the transportation sector (roads, rails, sea, air) by 35-40 percent within 2030 compared to the levels in 2005 (Engedal & Melby, 2019).

An updated action plan for reaching the goals in this sector was presented in the National Transportation plan for 2022-2033, which is vital in fulfilling the superior climate goals (Samferdselsdepartementet, 2021b). One of the objectives is that all new passenger cars and vans should be zero-emission vehicles within 2025. Accordingly, the Oslo city council has implemented several remedies and incentives to increase the share of electric personal vehicles in society. Among these are public charging stations, cooperation with companies to establish fast-charging stations, tax relieves and subsidy schemes, green mobility houses, and more (Oslo Kommune, 2019, p. 156). Moreover, the city council is working for all growth in personal transportation in the largest city areas to happen with public transportation, biking, and walking, and aim for no increase in the use of privately owned cars (Oslo Kommune, 2019, p. 46). Furthermore, as the public transport authority for Oslo and Akershus, Ruter published a strategy for sustainable mobility in 2020, and they expressed that mobility should be seen in a holistic context, where public transportation, biking, and car sharing services must be seen as an integrated solution (Ruter, 2020).

In 2019, the Norwegian environmental directorate published a report on climate gas emissions from 2009 to 2017 in Oslo (Miljødirektoratet, 2019). The report stated that emissions resulting from privately-owned cars and vans had been reduced by 25 percent and 23 percent, respectively. However, the two together stood for 40 percent of the total emissions in Oslo in 2017. The municipality estimates that the reduction results from increased use of biofuel, an upgraded car park, and an increased share of electric cars in recent years. In a survey performed by Urbanet, half of the respondents state that they "most likely" or "certainly" will change cars in the next three years, of which 32 percent state that the next car will most likely be electric (Oslo Kommune, 2019). The share of electric cars in the Norwegian car fleet has increased from 3.6 percent in 2016 to 12.69 percent in 2021; however, the percentage of cars that run on diesel or fuel is still the most dominant, with 77 percent in total (Norsk Elbilforening, 2021). Furthermore, over half of the new passenger cars registered in 2020 were electric (Andreasen, 2021).

The environmental drivers are also seen in the private sector. A measure called environmental, social, and governance (ESG) criteria are a set of standards for a company's operations that socially conscious investors use to screen potential investments (J. Chen, 2021). The environmental criteria consider how a company performs as a steward of nature. The social criteria examine how it manages relationships with employees, suppliers, customers, and the communities where it operates. The governance deals with the company's leadership, executive pay, audits, internal controls, and shareholder rights. By fulfilling these criteria, companies might become more attractive to their stakeholders, and by failing at some of the criteria, they might face reputational damage (Holbrook, 2021). Among Norwegian businesses, the financial sector has the highest share of companies reporting on their sustainability (Sleire & Schjetlein, 2020). In November 2019, a regulation on sustainable reporting in the financial sector was passed in the EU and imposed a set of duties to report information related to sustainable risk, investments, and counseling on the market players in the sector (Finanstilsynet, 2020).

## 2.3 Sharing economy in the mobility sector

The growth of companies that have sharing economy at their core has been significant in the last years (Barland, 2015). Although the concept is not new, it has gained more attention in recent years. In the internal market strategy of 2015 of the European Commission, the challenges and possibilities of sharing economy were addressed amongst other subjects (Stortinget, 2015). The new business models that emerge with the growth of sharing economy challenge national rules for taxation, competition, working conditions, and consumer rights. Institutions and countries are working to find standard guidelines. In 2014, the UK Government performed an independent review of sharing economy to become a global center for this fast-growing sector. The forewords of the UK Minister of State for Business, Enterprise, and Energy in the report was «Where other countries and cities are closing down consumer choice, and limiting people’s freedom to make better use of their possessions, we are embracing it.» (Woskow, 2014). The government is, amongst other initiatives, piloting a sharing city where residents are encouraged to share as part of their daily lives, through transport, shared office space, accommodation, and skills networks are joined together.

The challenges and opportunities for sharing economy have also been addressed in Norway, and in 2017 the Norwegian Government Security and Service Organization published a report about the subject (DSS, 2017). The organization states that sharing economy companies can contribute to more efficient use of existing resources, contribute to lower production, and have a positive effect on the environment and the market in terms of increased competition, better products and services, and innovation. Some of the most popular sectors that can be seen in sharing services are housing and property, mobility, and services (DSS, 2017, p. 36). According to trend expert Ståle Økland (2017), shared services have grown in Norway because we live denser in the cities than before. He states that “More people move into the cities and we don’t have enough space for all our things anymore, such as a car or tools. As a result of this, we share”. In addition, the Ministry of Transportation and Communications claims that digitization has changed the business models in many industries, and they see a clear trend where it is becoming more common to rent than to own, to pay for access rather than ownership (Samferdselsdepartementet, 2021a).

One of the main drivers of the sharing economy has been identified as the evolution of the internet and digital platforms, which have made resources and new solutions available for a broader range of people (Bardhi & Eckhardt, 2012; Barland, 2015). As a result, it is easier for companies and consumers to interact without any intermediary. The sharing economy represents a disruptive innovation by adding new products and services through innovative business models (DSS, 2017). The car industry and mobility sector has also been affected by the sharing economy, and many services allow consumers to use cars in new ways. The traditional form of renting a car by physically going to a rental provider is being challenged by car sharing services, where the cars are parked in the neighborhood and can be rented through an app. In the report “Foresight 2050” published by KPMG (2018), one of the predictions is that ownership of cars will decrease over time and be replaced by mobility services delivered by professional market players. The report argues that the increased urbanization contributes to changing transportation needs and that new technology may facilitate holistic mobility systems where everything is connected.

Car sharing services have been identified as a contributor to reducing the carbon footprint stemming from traffic, with its high use of low- and zero emission-technology such as electric vehicles and the natural decrease in transportation by not owning a car (Sørensen, 2019). According to Nenseth (2016), one shared car replaces ten privately-owned passenger cars. Even though sharing services provide access to users who previously did not own a car, this is outweighed by the reduction in kilometers driven for the car sharing users who previously owned a car (TØI, 2019). Moreover, the car use among those who previously did not have access is significantly lower than it would have been if they owned a car; car sharers use the car about a third less than car owners, and more often use public transport, walk or bike (Nenseth, 2019). However, some criticize car sharing for being an ideology that is not as environmentally friendly as promoted, as it depends on, for example, proved reduction in driven kilometers in total by all users and how long the car is used before it is wrecked (Rystad, 2018). Moreover, car-sharing companies also have cars that use gas and diesel as fuel (Bilkollektivet, 2021; Hyre, 2021; Zipcar, 2021).

Few studies have intended to find the motives, attitudes, loyalty, and actual behavior regarding sharing services from a consumer perspective (Iversen & Hem, 2018). A study performed by Iversen and Hem (2018) showed that despite the sharing economy being on the rise, the actual willingness among respondents to share was low. The study also found that women are more willing to share than men and that an increase in age and salary makes the respondent less inclined to using shared services. Nevertheless, among those who have already tried a shared service, there are many who would like to use it again. When the results were compared to similar studies performed in other countries, they showed that Norwegian respondents were more inclined to sharing services than the others. The strongest drivers for the spread of shared services were trust, utility value, personal sharing motives, knowledge, expectation, and local identity.

## 2.4 Trends and consumer behavior in the mobility market

As previously stated, mobility is undergoing one of the most transformational shifts of a generation, and the sector of mobility is expected to be the most important business area in the world economy by 2030 (Ruter, 2020). In order to understand the market of mobility, the following sections provide theory on driving patterns, car ownership types, information and purchasing platforms, generational differences, and market insight from subject matter experts.

### 2.4.1 Driving patterns and public transportation

For the short travels under 70 kilometers in the biggest cities in Norway, car transport stands for three out of four of the trips and is slowly increasing over time (Samferdselsdepartementet, 2021a). From 2010 to 2018, the total driving length of passenger cars registered in the largest cities in Norway increased by 11 percent, to 11 billion kilometers (Hansen & Wolday, 2019). Of these 11 billion kilometers, 55 percent were driven with privately-owned passenger cars in 2018. The increase in driving length is caused by growth in the population and a growth in car owners. Nevertheless, the average yearly driving length per car owner has decreased and can be seen in relation to an increase in the use of public transportation (Hansen & Wolday, 2019).

Oslo is the largest city in Norway with 697,010 citizens (Oslo Kommune, 2021) and is also the region with the highest number of public transportation travels with 416 travels per citizen in 2019 (SSB, 2021). Of the population in Oslo above the age of 18 years, 89 percent have access to a bus, tram, or subway station with at least four departures per hour within a 500-meter radius from their home (Hansen & Wolday, 2019). However, the data does not say whether there is a direct route between the start and stop location of the journey or whether there is easy access to the stop. Therefore, some will spend a disproportionate amount of time on public transport compared to a car, even if the stop is close to both home and work (Hansen & Wolday, 2019). Moreover, Oslo has a broad range of alternative offers of transportation in addition to public transportation and privately owned cars with Bysykkel, electric scooters, sharing services, and more (Statens Vegvesen, 2018).

#### 2.4.2 Trends in car ownership types

The “Car survey” is a survey performed by Norstat on behalf of Finn.no and Schibsted every year (Finn.no, 2020). It surveys people who have acquired a private car during the past 12 months or are planning to acquire a private car through leasing, purchase, or subscription in the upcoming 12 months. The “Car survey” of 2021 found that the number of leasing agreements had doubled among the youngest contestants compared to last years’ results (Finn.no, 2020). The fact that leasing has increased in popularity can be seen from the Motor Vehicle Register. The number of private cars owned by leasing- and rental companies doubled from 2008 to 2017. However, when looking at the share of private cars owned by leasing companies in the total car fleet, it was only 5% in 2017 (Fjørtoft & Hansen, 2018).

Seventy-five percent of the respondents stated that they would most probably own their next car and not choose leasing or subscription. However, when the respondents of Finn’s survey were presented with more details about the different ownership structures, the attractiveness of subscriptions increased (Finn.no, 2020). Moreover, subscription is a phenomenon on the rise, and Volvo predicts that car subscriptions, which can be seen as a “Netflix for cars,” will be the most significant contributor to their car distribution in 2025 (Solheimnes, 2019).

New mobility services are no longer seen as a niche market, with over 300,000 Norwegians expected to be using car sharing services in 2025 (Hoffmann, 2020). Fleks, one of the providers of car subscription in Oslo, has increased their car fleet from 150 cars in 2019 to 900 cars in 2021, and continue to grow and expand to other Norwegian cities (Fleks, personal communication, 2021). They express that their typical users chooses subscription due to 1) the possibility of changing cars according to the users’ need, and 2) the experience of a simplified car ownership where all administrative responsibility related to service, insurance, and more is cared for by Fleks. Their experience is that their service covers different needs, such as a vacation car for a short period or as a replacement for leasing or owning in a more extended period. iMove, another provider of car subscriptions, stated that during Covid-19, their customers have started to appreciate their non-binding, all-digital and straightforward solution, which has led to solid growth (Hoffmann, 2020).

The transportation sector has had a growth of new services such as car sharing, bicycle sharing, micro-mobility (such as electric scooters), carpooling, and taxi services (Samferdselsdepartementet, 2021a).

According to the Institute of Transport Economics, there were over 7,000 cars used for car sharing in Norway in 2019, and the market is snowballing. By the end of 2018, there were altogether 11 companies offering car sharing in the country, and these companies have 200,000 registered users or members (TØI, 2019). Still, only 5% of the Norwegian driver's licenses are registered in one or more services (Sørensen, 2019).

Hyre, one of the providers of car sharing in Oslo, was launched in 2018. From 2019 to 2021, they doubled their car fleet (Hyre, personal communication, 2021). They currently have 60,000 users in Oslo and plan on expanding to Trondheim and Bergen. Their users are usually young (35 or younger) and live in the city center. Hyre experience that the customers' motivations for using their services are flexibility, simple car ownership, and reduced costs (Hyre, personal communication, 2021)

### 2.4.3 Information and purchasing platforms

Today, consumers can acquire a car through both digital and physical platforms. In the "Car survey of 2021", more than 8 out of 10 respondents stated that they prefer a physical dealership rather than an online one (Finn.no, 2020). However, among those who had bought a car online, there was an increase in the number of respondents who said they would buy online again.

A research performed on car buyers in Germany, the US, Brazil, and China, show that only one-third of customers who bought a new car in the past five years would do so again from a standard dealership in the future (A. Schmidt et al., 2016). Most of them preferred the option of using different purchasing platforms, such as dealerships, showrooms, and online platforms, regardless of whether they are premium or volume customers. The research also reveals that early adopters of new technologies, the so-called "digital natives," visit car dealerships more often than the "digital laggards." Their specific reasons for visiting a store, making their decision online in advance, are the excitement of the showroom and to be properly listened to and understood (A. Schmidt et al., 2016). The trend can be seen in companies such as Tesla and Polestar, where the purchase journeys are primarily digital, and showrooms are available for customers to become inspired (Hoffmann, 2020). Moreover, the customer has the possibility of ordering a test drive directly to their front door (Hoffmann, 2020).

According to Cox Automotive (2020) car buyers nowadays spend 64 percent of their time researching and shopping online, while only 19 percent is spent at dealerships. Furthermore, in a survey performed by Wunderman Thompson, two-thirds of consumers under the age of 35 years are expected to increase their use of digital channels in the future, compared to less than half of over-55s (Fletcher, 2019). Moreover, a study performed by PWC (2015) found that a fast end-to-end process was the most significant differentiator in car financing and that consumers look for loans that provide product comparison tools, financial literacy tools, and loan status updates.

### 2.4.4 Generation shift

To make any good solution or company, one must understand how the core users think and what they prefer and categorize them in an appropriate way (Baird, 2020). According to Kasasa (2021), generational trends can unveil similar attitudes and behaviors among consumers because they have

experienced world events at the same life stage. Nevertheless, one should keep in mind that every generation grows up and is constantly evolving so that what categorizes them today might change tomorrow. Therefore, understanding the characteristics of each generation can be a valuable tool to understand the market. However, it is vital to question if generations are the best way to categorize consumer behavior.

First, the “Baby Boomers” or “Boomers” are the generation born between 1946 and 1964. Second, generation X was born between 1965 and 1979/80. Third, generation Y, or Millennials, were born between 1981 and 1996. Fourth, Gen Z categorizes those born between 1997 and 2010, and lastly, generation Alpha is those born between 2010 to 2024 (Kasasa, 2021; McCrindle, 2019).

A research article posted by Kasasa (2021), an American financial technology and marketing services company, explains the main differences between the generation cohorts and their economic behavior, and their media consumption and technological preferences. The research shows that Millennials have less brand loyalty than previous generations and have very little patience for ineffective or insufficient service. In addition to that, Millennials are delaying major purchases, and they choose access over ownership, which can be seen through their preference for on-demand services. In a study made by T. Fortunato (2019) in Portugal, it was found that most Millennials do not relate ownership with status or high self-esteem. For example, the respondents considered it an old-fashioned concept and no longer a decisive factor when presented with the statement: “I think my possessions are a relevant indicator of who I am.”. The three main characteristics of Millennials found in the study were that they prefer a minimalistic lifestyle, convenience, and experience over possession. Younger generations look at the car as a means of transportation and far less as a status symbol than the older generations (Hoffmann, 2020). In addition, it should be environmentally friendly (Hoffmann, 2020). Popular culture is moving away from dependence on asset ownership and from the use of ownership to define self-identity (Killeen, 2015).

#### 2.4.5 Insights from subject matter experts

In addition to the theoretical study performed with secondary sources, insight was collected through direct conversations with subject matter experts (SMEs) in the mobility market.

##### *Car dealership*

Conversations were held with two SMEs from a car dealership in Norway. The first SME stated that the consumer’s need for guidance has evolved. Before, they would come unprepared and ask about a car that suited their intended use. They now come well-prepared to the dealership after having researched online and ask for guidance on the technology and specifications of a car. Furthermore, the sales process in the past could take from two weeks to a month, whereas today, it can be done in just a few days up to a few weeks. Therefore, the attitude and behavior of the consumer have changed. Nevertheless, as this car dealership sold cars in an expensive price segment, they experienced that consumers still seek guidance and a “second opinion” due to the size of the investment that is made. The SME also explained that the dealership offers financing to consumers through selected partners.



Another SME from the same car dealership explained how consumers seek guidance on the development in the market, specifically concerning electric cars and the technological advancements made for batteries. There is insecurity about the re-sale value of these cars due to this. Moreover, many consumers desire a “needs analysis” to map their needs and financial possibilities. The SME said that “Many consumers have an idea about what they need in a car which might be wrong and are therefore in need of a needs analysis.”. The SME expressed that his role as an advisor has increased due to new technologies in cars, even if consumers come more prepared than before.

### *Finn*

In the conversation held with an SME at Finn.no, the behavior of the consumers and the new ownership type subscription were discussed. The SME express that they saw a change in mobility and stated that: “People spend a lot of money on transport, the area is in great development, there is a change in politics and lastly a great focus on the environment.”. Finn.no has explored how the consumers feel and act about cars, and the SME stated that: “People have many challenges related to cars; they know it is expensive, but they don’t know how much it costs them. People are not aware of how much money they spend on a car today, and they are not aware of the value loss over the years. There is generally a reluctance to wanting to know this. And there seems to be a general (mis)conception that one needs to buy a car when one gets children.” (Finn.no, personal communication, 2021)

As for the ownership type subscription, Finn explored an integration of this ownership type among their services and just launched a [feature](#) that invites users to explore car subscriptions through their website. They want to build knowledge about subscriptions and see if they can manage to help their customers grow, and they want to learn about the capability to drive traffic through their website for this type of service. The SME stated that: “There is a trend that people want to own less. We feel like there is something here to explore, but it is still in an early stage. We get a lot of insight from trend analyses and user interviews. The “Car survey” has also shown an increased trust towards car subscriptions. In 2020, 1 percent had used it previously, and 3 percent planned to use it in the future. People react to the high monthly price of car subscriptions before they know what it includes. When they become aware that everything except tolls, fuel, and parking is included, they become more positive, and many perceive it as more appealing than leasing.” Concerning their subscription research, the SME was in contact with an established Spanish subscription provider. They expressed that it was wrong to communicate car subscription as a concept for those who need a car occasionally and believed that everyone should be presented with subscription options due to its versatility.

## 2.5 The psychology of decision-making

In 2001, Ratchford et al. (2001) researched consumer choices with the internet as an information source. They concluded that using the internet as an information source would increase as technical skills and access to computers increased and that it would be used chiefly by younger age groups who invested more in learning how to use the tool. Today, there is a different situation; those who do not use the internet as an information source are seen as the exception, and stores have changed their business models to be present where the consumers are. As Stankevich (2017a) states, the trends in consumer behavior have changed much over the years and are still evolving. In the fast-moving world,

people expect services that involve interacting with all their senses and offer a range of new touchpoints and new experiences. In addition, an increasing desire for diversity and backgrounds are expected to provide more.

Cheyne et al. (2006) investigated the factors that influence travel consumer choices and compared the internet to traditional travel agents. The researchers studied how the internet provided a means for suppliers and consumers to bypass the travel agent and interact directly. The slow change discovered back in 2006 may seem evident to society today. More than 70 percent of travelers research travel on their smartphones, and 83 percent of US adults prefer to book their trip online (Condor, 2020). The recommendations resulting from the study were for travel agents to expand their advisory functions and concentrate on the provision of information and details that are not available on the internet and that the extra service and value to travel consumers was essential for survival. This advice could be transferred to the mobility sector today. As stated in chapter 2.4.3, consumers perform more research online and expect a heightened level of service when coming physically to the dealership. In addition, the trend of acquiring a car or access to a car online or via apps is increasing, and consumers expect seamless and integrated online experiences.

Although it might become more evident how the consumers wish to be met on the different platforms, the factors that influence their decisions might be more challenging to detect. Matzler et al. (2007) write about consumer confusion in internet-based mass customization and state that buyers do not often have well-defined preferences before the buying situation. Instead, the preferences are usually constructed when customers face the need to decide. When customers do not have stable, well-developed preferences, uncertainty about the customers' needs can easily lead the business to include an overwhelming number of attributes and characteristics.

Research suggests that human memory processing capacity is limited to seven blocks (plus or minus two) of information. Suppose a consumer is provided with more, the information processing level decreases (Matzler et al., 2007). Similarly, Kirkebøen's book "What is intuition" (2012) argues that one can only keep an overview of a certain amount of information. For example, one can compare four cars to each other when only considering four aspects of each car, but this is not possible when faced with twelve aspects. At this point, one gets stuck with some aspects and ignores others. Thus, the complexity of the decision influences how well one makes decisions with conscious thinking (Kirkebøen, 2012).

As stated earlier, the statement "the more choices, the better" is questioned in psychological studies, as this may lead to confusion, stress, and sub-optimal decision-making (Iyengar & Lepper, 2001; Matzler et al., 2007). Matzler et al. (2007) draw upon Audi's car configurator as an example, which had 64 decision layers (e.g., engine, wheels, seats) for which there were many options to choose from. The researchers state that there are three dimensions of consumer confusion that can prevent the consumer from making decisions; similarity confusion, unclarity confusion, overload confusion. Similarity confusion is defined as "a lack of understanding and potential alteration of a consumer's choice or an incorrect brand evaluation caused by the perceived physical similarity of products or services.". Overload confusion relates to the fact that consumers are confronted with too much information, and this overload may inhibit the processing of the information and confidence in the purchase situation. Lastly, unclarity confusion is typically the result of ambiguous, unclear, or contradictory information about the products or complex products.

## 2.6 Summary

Core concepts have been presented to provide the background information necessary for contextualizing the modern decision-making process in a period with an increased focus on sustainability goals, sharing economy, and digitalization. The growth of companies that have a sharing economy at their core has been significant in the last years, which causes new opportunities for growth and a need for regulations.

A key market driver for this change is the UN sustainable goals and the Paris Climate Agreement, which has provided countries and communities with incentives for developing new solutions that can reduce national climate gas emissions. This common goal and change in public opinion facilitate a transition that shapes and affects consumer habits. Although the national goals aim to reduce the use of privately-owned passenger cars, car use is increasing. The mobility market is facing a disrupting transformation and leans toward holistic solutions connected by the possibilities that new and innovative technology provides. The shift of generations brings new ways of thinking and new preferences. The reviewed work shows that consumers choose access over ownership, demand reasonable technical solutions, and seek information online. Consumers are faced with more options than ever and are forced to balance their preferences with their needs and ideological opinions. The high number of alternatives provided today can cause consumer confusion, which may prevent the consumer from making decisions.

Therefore, new solutions must facilitate a holistic mobility experience that promotes new ownership types and provides guidance on digital platforms to meet the needs and demands of those entering the mobility and car market. This thesis will explore the challenges that consumers are facing in the car acquisition process today and develop a solution to the identified challenge.

### 3. METHODOLOGY

A thorough methodological approach is about following a path to achieve a goal (Dalland, 2012). This chapter will explain how the thesis was designed to achieve the goals and objectives set and how Action research and Design thinking were used to understand consumers and innovate through phases. The following sections describe the development of the research design and approach, the collection of data through phases, the selected target audience and the sample chosen for the study, and lastly, reflect upon the research quality.

#### 3.1 Research design and approach

This study uses the structure and design of action research. It is a research method that helps produce application-oriented and relevant knowledge (Reason & Bradbury, 2008). The purpose of action research is to have a direct and immediate impact on the area of the research, while the goal is to find solutions to people's practical problems in a real situation (Sander, 2019). Creating profound knowledge and understanding about a particular issue is essential to find ways to improve a situation (Dick, 2001). Action research is a qualitative research methodology option that requires further understanding and consideration (MacDonald, 2012). The difference between qualitative research and action research is explained well by Bradbury-Huang (2010), who states that "qualitative research is research *about* practice, not *with* practitioners", whereas "we argue that only through *action* [research] is legitimate understanding possible; theory without practice is not theory but speculation".

Furthermore, action research can be described as a family of research methodologies which pursue action (or change) and research (or understanding) at the same time (Dick, 2001). By using cyclic processes which alternate between action and critical reflection, data and interpretation is reviewed in the light of the understanding developed in the earlier cycles (Dick, 2001). Action research was applied to the study to explore the market from a consumer perspective, identify challenges together, and find a solution to a challenge. The study is cross-sectional as the data has been collected from the population at a specific point in time.

Design thinking was used as the framework for the study as it supports the practical and cyclical approach of action research. The Design thinking framework is a *non-linear*, iterative process used to understand users, challenge assumptions, redefine problems or pain points, and create innovative solutions to prototype and test (Interaction Design Foundation, 2021). As shown in Figure 3-1, the main steps of a Design thinking process are to empathize, define, ideate, prototype, and test. According to Lockwood (2010), the definition of Design thinking is "a human-centered innovation process that emphasizes observation, collaboration, fast learning, visualization of ideas, rapid concept prototyping, and concurrent business analysis".

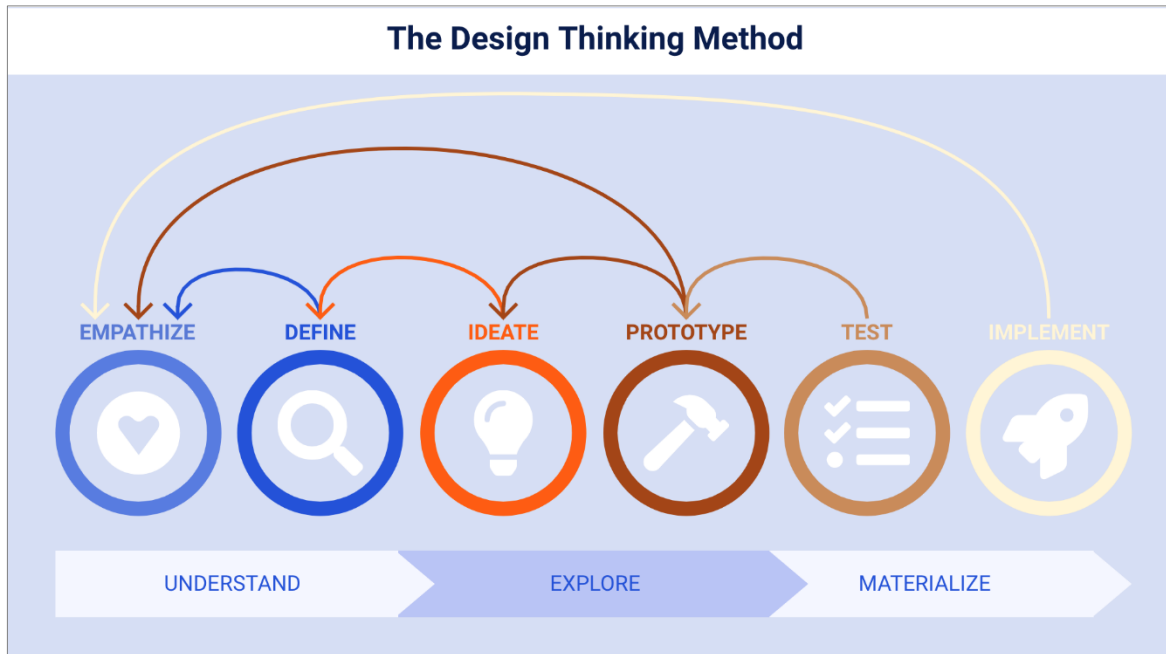


Figure 3-1 A demonstration of the Design thinking process with the six components. Made by the authors.

Understanding the consumer needs, re-framing the problem in human-centric ways, creating multiple ideas in brainstorming sessions, adopting a hands-on approach in prototyping and testing, and then repeating the process while implementing new learning has been at the core of this study. A theoretical literature study and interviews with subject-matter experts and consumers were conducted to *empathize* and *define*. To *ideate*, workshops and post-it-brainstorming sessions were performed. This way, the gathered insight was further implemented and added to the current knowledge while building on new ideas to *prototype* and *test*. The *prototyping* was performed on physical paper and whiteboard and an online whiteboard tool, whereas the final development was conducted with a more sophisticated digital prototyping tool.

### 3.2 Data collection through phases

The data collection methods used were essential to understand the market, identify challenges and create a user-centered and innovative solution. This study process was performed in phases following the Action research methodology and the Design thinking framework. Each phase builds upon the knowledge gained in the preceding phase and marks a new stage in the study.

The process in action research takes shape as understanding increases; it is an iterative process that converges towards a better understanding of what happens (Dick, 2001). Figure 3-2 presents the structure of the work performed in the study and displays how the phases build on each other and eventually enabled the development of a final solution. The methodological choices made in each phase regarding data collection and analysis will be further explained together with the results and discussion of each phase in chapter 4, 5, 6, and 7.

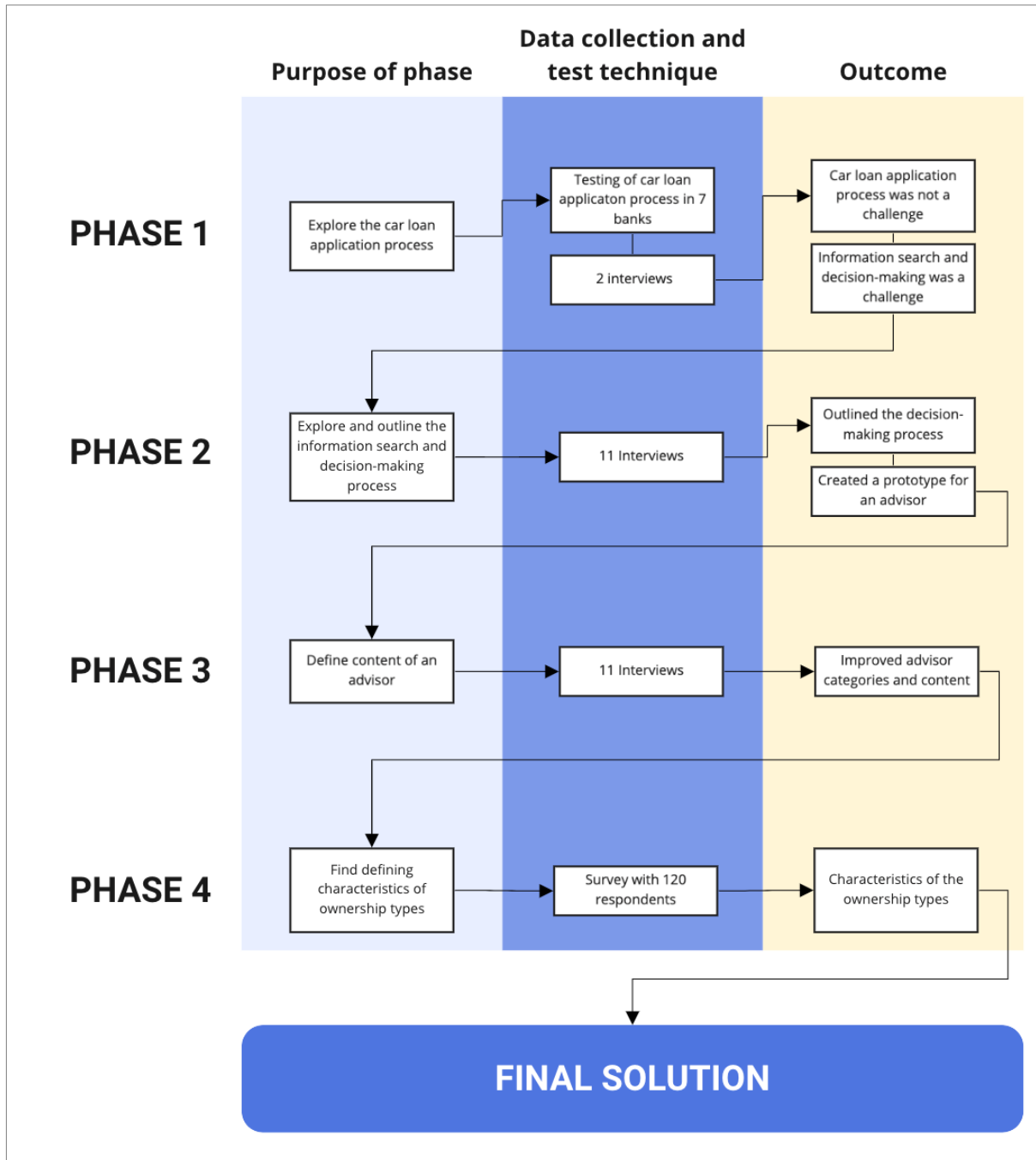


Figure 3-2 Overview of the phases and their purpose, data collection and test techniques and outcome. Each phase builds upon the insight gathered in the previous phase. Made by the authors.

Action research is characterized by being participative and qualitative, and most action research studies are case studies (Dick, 2001). The data collection for a case study is extensive and draws from multiple sources such as direct or participant observations, interviews, archival records or documents, physical artifacts, and audiovisual materials (Webster, 2007, p. 68). The data collection method in this thesis is both qualitative and quantitative, with most weight on the former. According to Dalland (2012), qualitative data collection is characterized by in-depth research, where the goal is to discover feelings, opinions, and experiences that are not easily measured or quantified. Quantitative data collection, on the other hand, is characterized by collecting data without contact with the field and where the goal is

to obtain representative findings and to present an explanation of the data rather than an understanding. The data collection consists of both primary and secondary sources, and will be presented in the chapters below.

### 3.2.1 Primary data

The qualitative data in this study was collected through problem interviews with consumers and interviews with subject matter experts. The interviews were structured as semi-structured interviews with some guides and open-ended questions, as these invite to a discussion rather than strict answers and allowed the discovery of feelings and opinions (C. Schmidt, 2004). The quantitative data was collected through an online survey, where current consumer habits and trends were quantified. The survey enabled the discovery of data about consumers that are not necessarily easy for consumers to express or be aware of in an interview. Combining qualitative and quantitative data collection gave a holistic understanding of the problem, where the in-depth insight of pain points and market patterns were discovered. Moreover, collecting quantitative data through the survey was a means to cross-check whether the qualitative data collected from interviews was representative in the market. The method for collecting and analyzing primary data from interviews with consumers and through the survey will be further explained in each phase in chapter 4, 5, 6, and 7.

#### *Interviews with subject matter experts (SME)*

The study includes background interviews with several stakeholders to get a preliminary understanding of the market and understand the consumer from another perspective than direct consumer insight. The insight obtained was used to add to the knowledge and quality of the work in the four phases.

The first person that was interviewed was the project leader of Bilbanken. He has diverse and long experience in the finance industry, specifically the car industry, and with the use of big data. The interviews were informal and unstructured to explore the area of car finance and car acquisition in-depth and get a thorough understanding of the purpose of Bilbanken.

Moreover, two interviews were conducted with different sales associates at Møller Bil. The interviews were done by phone and were semi-structured to let the experts speak freely about their beliefs. They provided their views on the position of car dealerships in the market today and how it has evolved throughout the years. Furthermore, they explained how the consumers act and what they expect from dealerships.

Finn.no is the leading online marketplace in Norway and plays an essential role in the purchasing- and sales process of vehicles (Andersen & Lome, 2019). In the process of researching different ownership types, it was found that Finn.no had an ongoing project where they conduct experiments to see if car subscriptions can and should be included on their online platform. A semi-structured interview was held with one SME from Finn.no to discuss their findings, and the discussion was performed through an online video-conferencing tool. Interesting information about consumer habits and preferences, and the impact of their project was discovered in the interview.

Lastly, communication with different providers of subscription and car sharing services was performed to obtain data about the companies and their customers. Different providers were contacted by e-mail and some of these provided updated data and allowed for the inclusion of this in the study.

The data gathered from these interviews are presented in Chapters 2.4.2 and 2.4.5.

### 3.2.2 Secondary data

A large quantity of secondary data was collected for this study through a preliminary literature review and theoretical study, which aimed at identifying critical concepts to form the framework for the study. The collection consisted of public information in the form of research articles, government articles and websites, company websites for different car ownership providers, YouTube, databases with statistics on car trends and environmental strategies and impact, books, and news articles published in the media. Various financial institutions' websites were also visited, where the car loan application process was tested to understand car financing.

Most of the secondary data was stored in an online whiteboard tool called Miro. The information was structured through discussions in meetings and workshops to get a thorough overview of the data. Information that was not available in the English language was first translated into English and then analyzed. The sources were reviewed continuously during the data analysis. These were also saved in the referencing tool Zotero. Although most of the data was gathered in the preliminary phase presented in This thesis starts with an overview of the theory relevant for studying today's mobility and car industry and consumer behavior and trends. After that, the methodology is presented to provide an overview of the research design, target audience, and data collection methods. Subsequently, the four phases are presented in chronological order, where data collection and development methods, in addition to a discussion and summary, are presented for each phase. Moreover, the final developed solution is presented. Then, a discussion of the solution and the work performed will be provided, followed by a presentation of the practical implications for Bilbanken. Next, the conclusions of the thesis are presented. Finally, the last section gives recommendations for further development of the solution.

Theory and key concepts, it has also been an essential and natural part of all four phases.

## 3.3 Sample

Sampling is necessary to get good data in a restricted period of time and obtain insight into a population (Glen, 2015). There are many ways of selecting a sample and the sampling for this study is based on a purposive approach. Paul Lavrakas (2008) states that "The main objective of a purposive sample, also referred to as a judgmental or expert sample, is to produce a sample that can be logically assumed to be representative of the population". It is often accomplished by gaining and applying expert knowledge to select a nonrandom sample meant to represent a cross-section of a population. Purposive sampling is applicable in this study to approach the problem statement and goals. The appropriate individuals who have the characteristics that will allow the study to reach the targeted sample quickly and with objective results were targeted (Crossman, 2020). To specify, this sample will fit into the category with



the definition of a homogenous purposive sample, a sample “that is selected for having a shared characteristic or set of characteristics” (Crossman, 2020).

According to Skar and Merg (2018), the average age for buying a *new car* in Norway is 54 years. Furthermore, by 2025 Millennial buyers (ages 25-40 in 2021) are forecasted to account for 75 percent of all new vehicle sales (Automotive World, 2015). Moreover, research shows that individuals that range from 25 to 34 years old are the most likely to be users and providers of sharing economy services (PwC, 2015).

Moreover, since the presence and accessibility of new car ownership types such as car sharing and subscription is more established in the bigger cities, it is more appropriate to target people living in, or in connection to, a big city (Johbraaten, 2019). Oslo is the largest city in Norway with almost 700,000 citizens (Oslo Kommune, 2021) and is also the region with the highest number of public transportation travels per citizen (SSB, 2021a). Moreover, as previously stated, the city has a broad range of alternative offers of transportation (Statens Vegvesen, 2018).

To obtain appropriate data for the study, the target sample for the study was therefore identified to be individuals between the ages of 18 to 60 in the Oslo area.

### 3.4 Research quality

In qualitative studies the researchers have active participation, and this can influence the respondents (Dalland, 2012, p. 113). To ensure quality in action research, it is essential to be transparent about the choices made and the limitations that come as a result of these choices (Bradbury-Huang, 2010, p. 101). The data collection was performed with a target sample in mind, as explained in the previous section. Interviewees for the consumer interviews in phases 1, 2, and 3 were chosen among acquaintances, and the survey in phase 4 was distributed in private and public channels. The choice of participants and distribution channels can have created a biased and socio-economically homogenous group, which again can have impacted the quality of the findings. Nevertheless, the distribution of age and gender of the sample is shown in each phase, and it can be argued that the samples were diverse and captured the target audience.

Moreover, the researchers' background, preferences, and perceptions in this thesis can have influenced the study. Confirmation bias is the tendency to process information by looking for and interpreting information consistent with one's existing beliefs (Casad, 2019). The researchers in this study are two young female students with different geographic backgrounds and different levels of experience with cars. Both are positive towards sharing economy but still have very different perceptions of the researched processes. The Design thinking framework was intentionally used to account for this potential bias by focusing on empathizing with the users, being open-minded, and laying knowledge aside during the interviews. This has contributed to a balance where the researchers have challenged each other on prejudice and opinions. Furthermore, the researchers were able to discuss the interpretations of results through an ongoing dialogue with the project team at Bilbanken.

The quality of a study or research is most often determined by its *validity* and *reliability* (Saunders et al., 2019). *Validity* is usually determined by examining three aspects: construct, internal and external. First, *construct validity* refers to whether the intended variable is measured. Second, *internal validity* refers to whether the research shows a causal relationship. Finally, *external validity* is explained by whether the results can be generalized (Saunders et al., 2019). Moreover, *reliability* addresses whether the outcome of the study would be replicable if they were attempted by a different researcher and whether the results would be likely to occur at other times (Saunders et al., 2019; Svartdal, 2020).

Validity assesses whether the researcher's account of the study can be viewed as reliable and plausible. The research focused on establishing a solid data foundation to develop a sound and user-oriented solution. Working in iterations with insight, testing, and evaluating the outcome has been an essential means of assessing data quality and quickly accepting or rejecting the data input. The consumer behavior and patterns discovered in the study are transferable to other studies about consumer behavior in the mobility sector today. Moreover, how consumers navigate and process information on digital platforms when making decisions can be transferred to different contexts.

It is believed that the same results could occur if the study were attempted by different researchers. Nevertheless, the work performed revealed that opinions differ across generations, and therefore a shift could happen if the same research were to be performed in the future. Moreover, as explained above, the background of the researchers in this thesis can have affected the results, and other researchers may therefore have a different approach in the data collection and analysis work.

### **3.4.1 Ethical considerations**

Research ethics were considered throughout the research process due to their potentially significant impact on research quality (Saunders et al., 2019). The participants were given information about the process in advance and could withdraw their participation at any time. To protect the participants in this study, the data has been anonymized. All the personal names, dates, and locations have been removed or replaced with pseudonyms. Precautions were taken in the storage of data, analysis, and the presentation of the study to ensure that identities are not revealed. All the data has been stored on personal computers and was deleted after the completion of the thesis.

## 4. PHASE 1 – EXPLORE THE CAR LOAN APPLICATION PROCESS

The case company, Bilbanken, wants to build a user-oriented service with automated processes. The business model of Bilbanken, supplemented by initial research and conversations with subject matter experts, led to the belief that the car loan application process was worth investigating. It was desired to explore how this process could be made seamless and automated and test whether this was the desired solution for consumers. A 2019 survey of US consumers found that 91 percent would accept, or at least consider, an instant vehicle loan offer if it meant they could avoid dealing with a bank or doing extra paperwork (Krueger, 2020). Therefore, the purpose of the first phase was to explore the car loan application process and understand the challenges within the process from a consumer perspective.

### 4.1 Data collection: Testing and understanding the car loan application process

To understand and evaluate the car loan application process, seven Norwegian banks, namely DNB, Nordea, Sparebank1, SBanken, Santander, BN Bank, and Danske bank, were studied. This study was done by applying for a car loan in all the respective banks. The application process was tested with a set of input variables and evaluated by the number of steps and time used. The process can be seen in Appendix B.

Moreover, to better understand consumers' needs and pain points, two interviews were conducted. The interview focused on understanding how consumers act in the process of acquiring a car and, specifically, the car loan process. A semi-structured problem interview was chosen to allow the interviewees to lead the conversation to relevant areas. The interview guide format allowed several aspects to be explored in-depth, and at the same time, make sure all aspects of the process that were considered important from the consumers' point of view were covered (see Appendix C). Based on the acquired insight from investigating the car loan application process, statements were formed, conveyed as pain points. This way, the interviewees could easily express if they identified and thereby elaborate on it (Figure 4-1). The interviews were conducted by phone and an online video conferencing tool.

- It is time consuming to apply for car loan. I must do good research in advance on the type of car and ownership type I want, and I have to be well aware of my personal financial situation.
- To provide the great amount of information that is needed in the auto finance application process is an annoyance and a pain point.
- It is difficult to know what it takes to get a loan (equity, income, future promise of income, guarantor, etc.). I feel like one of many applicants and distant from the bank, and the rejection comes abruptly without further explanation.

*Figure 4-1 Statements as pain points in the car loan application process that were tested in the interviews.*

## *Analysis*

Notes were taken during the interviews, and all data was anonymized. The information was structured and analyzed through workshops.

## *Sample*

The interviewees were chosen among acquaintances. They were between 26 and 29 years old, one male and one female, and were selected based on their different experiences with cars. The first of the interviewees had recently acquired a car, and the second was in the process of acquiring a car. The project limitations of performing a preliminary evaluation of the car loan application process and the previously stated target sample in chapter 3.2 were considered a decent sample size.

## 4.2 Results

The insight from testing the car loan application process in the seven banks showed that the process required the applicant to provide much information through many steps. It was found that much of the required information was already available on public sources and could be automatically filled in by using APIs. A structure for collecting data with APIs was outlined and can be seen in Appendix D. The different channels used by the banks for follow-up after the delivery of the application varied between emails, phone calls, text messages, and direct messages on site. None of the processes were evaluated to be seamless and automated, and there was potential for making an improved process for Bilbanken.

The insight from interviewing consumers resulted in a better understanding of the challenges in the car acquisition process. Interviewee 1 had recently bought a car and had been through the research and acquisition process. The main challenge for interviewee 1 was to investigate and compare the different options, both in terms of the type of car and the ownership types with his financing options. He had done an extensive mapping of alternatives at the beginning of the process to evaluate and compare the cost of leasing and purchasing both an electric and a fuel-based car (See Appendix E). The different aspects were thoroughly considered, which made it easier to compare the pros and cons of each alternative. Interviewee 1 expressed that there were many decisions to make and explained how challenging it was to decide which solution was best for his situation.

Interviewee 1 said that the least challenging part of the process was the car loan application; “Once all the other factors were decided, applying for financing was not a problem.”. The challenge was gathering and considering enough information to make a sound decision with which he was satisfied. He also said that: “The biggest problem is that I want to spend my money rationally and therefore I spend a long time looking for a solution where you get a lot for your money and do not get misled or tricked.”. Furthermore, Interviewee 1 collected information about the financing by researching online and phone calling dealerships.

Interviewee 2 was in the process of acquiring a car and was currently researching different ownership types and financing options. The car loan application process was not considered a challenge for interviewee 2. She was very aware of the information needed in an application process and thought of it as a mandatory and final stage. The only concern that was expressed was that she would follow up

closely with the bank to secure a beneficial agreement, as she stated, “I know from experience that the most demanding customers get the best terms”.

Moreover, interviewee 2 wanted an electric car due to the environmental and economic aspects. However, she was uncertain about the type of ownership she should choose due to a concern that the technical development of batteries and software would create insecurity for a future sale. Interviewee 2 stated that: “I do not know much about cars, and I am afraid of being misled and deceived if I buy one. Therefore, it feels safer to commit to a leasing agreement from a professional dealership. In addition, I want an electric car, and I would prefer to avoid the risk of selling it later due to the technological development happening in that area”.

Furthermore, interviewee 2 was confused about what she should choose based on her needs and economic situation. She felt an overwhelming need to do much research to find the best and most economical option but found this process time-consuming and tedious. She stated that, “I feel like I have to do much research on the aspect of ownership type and what I need. I do not know what will suit me in the future because I do not know when my life situation will change. Therefore, it is difficult to know which aspects I should consider, and the only thing I know for certain is how my personal financial situation is today”.

### 4.3 Discussion and summary

The initial data collection led to a test of different car loan applications and interviews with consumers about the challenges in the process. The results showed that the car loan application process was not considered challenging or problematic to either interviewee. The idea about an automated process was only considered a slight improvement and a good “add-on.” The main challenge for the interviewees was to search, navigate and evaluate information and making a final decision about which they felt confident. They were uncertain about which ownership type to choose based on their needs and ability to finance the car. The pain points that were tested in the interviews were not confirmed. A need for outlining the process of information searching and decision-making from the consumer perspective arose and laid the foundation for phase 2.

## 5. PHASE 2 – UNDERSTAND AND OUTLINE THE INFORMATION SEARCH AND DECISION-MAKING PROCESS

Based on the insight acquired in phase 1 about the challenges in the car acquisition process, the purpose of phase 2 was to gain a better understanding and outline the information search and decision-making process through interviews with consumers. Moreover, the goal was to ideate and prototype a solution to the pain points and challenges discovered during the interviews.

### 5.1 Data collection: Problem interviews with consumers

The interviews were semi-structured, and interview guides were made (Appendix F). The interviewees were asked how they would proceed when they wanted to acquire a car, where they would search information, how they would evaluate the information, aspects of importance, and how they felt about the different ownership types. The interviews were conducted by phone and online video-conferencing tool.

#### *Analysis*

The information provided by the interviewees was transcribed during the interviews and thereby discussed and analyzed through workshops. In addition to the answers provided, other attributes were analyzed, such as the characteristics of each person, their responses to the questions, and the attitudes they transmitted during the interviews.

#### *Sample*

Table 5-1 presents the sample of interviewees. There were 11 interviewees, with an even spread of males and females, and the largest age group was 25 - 29 years. The interviewees were chosen among acquaintances due to the given timeframe of the thesis.

*Table 5-1 The age segments and gender of the interviewees. Made by the authors.*

<b>Age group</b>	<b>Male</b>	<b>Female</b>	<b>Grand total</b>
18 - 24 years	-	1	1
25 - 29 years	5	4	9
30 - 39 years	-	-	-
40 - 59 years	1	-	1
60 and older	-	-	-
<b>Grand Total</b>	<b>6</b>	<b>5</b>	<b>11</b>

## 5.2 Results

The interviewees were asked how they would proceed if they wanted to acquire a car and where they would find information. Most interviewees stated that they would ask friends, colleagues, or family to advise, and some would see a dealership or salesperson. Nevertheless, all said they would use the internet in some form and mentioned Google search, Finn.no, dealership websites, and forums. One interviewee stated that “I don’t know where to start or where to stop [researching]. I would probably research for ages and then end up not acquiring a car”.

The interviewees had limited knowledge and experience about the financing perspective, which confirmed the conclusion of phase 1. Only one of the interviewees had previously been through a loan application. Some interviewees stated that they imagined the car loan application process as rigid and long and said they would check online and call the bank directly to get good financing terms. Several also said it was hard to scope their economic status and decide how much they could spend on a car for the following years, where one said that “We don’t know how our needs and economy will be in the future.” Another stated that the main challenge was: “Making sure that I need the car and that I have the money for the next three years.” Most of the interviewees were not acquainted with the car acquisition process or the costs of having a car loan.

Even though the interviewees had different opinions about which aspects were most decisive for their decision, they shared the thought that the financial part would always play an important role. The perceptions of the different car ownership types varied much between the interviewees. Still, they shared the opinion that there were many calculations and considerations to make before they could decide. In general, the interviewees expressed that due to the many alternatives of ownership types available today, it was hard to differentiate them and know which option would be a good fit for them. One interviewee stated that “Finding the right ownership type is a challenge – there are so many ways to solve the matter. There is an ocean of information to navigate in “.

## 5.3 Outlining the decision-making process and development of prototype

The interviews revealed that the process was complex and included many elements. As a result, the decision-making process for car acquisition from a consumer perspective was outlined and visualized to understand the different steps (Figure 5-1). The process was designed based on the model of the consumer decision-making process as presented by Stankevich (2017b). It was important to visualize that the process is not necessarily linear and that the steps might be repeated several times. Moreover, psychological factors, such as motives, desired status creation, attitude formation, social influence, and previous experience, can affect the process (Stankevich, 2017b). During the interviews, it was also revealed that preferences were formed by previous experience and social influence.

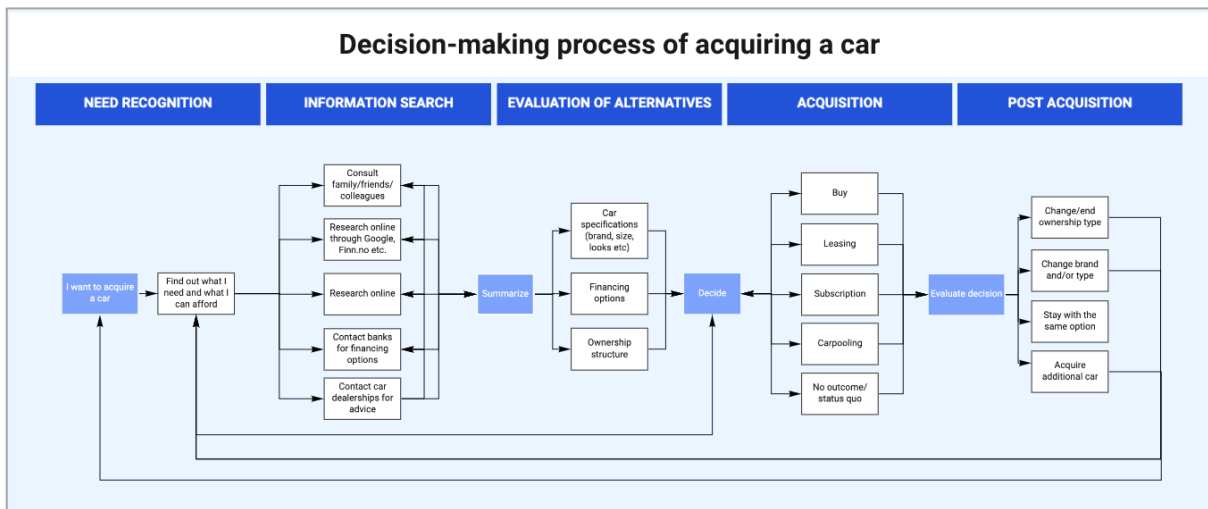


Figure 5-1 The decision-making process for car acquisition from a consumer’s perspective. Made by authors.

To go through the stages “Information search” and “Evaluation of alternatives” and relating these to their personal needs in “Need recognition”, was evaluated as the most challenging part for the interviewees. Based on this insight, the idea emerged to create an advisor to help consumers choose and compare ownership types based on *their personal situation*. A simple prototype of a solution to the identified challenge was created (Figure 5-2).

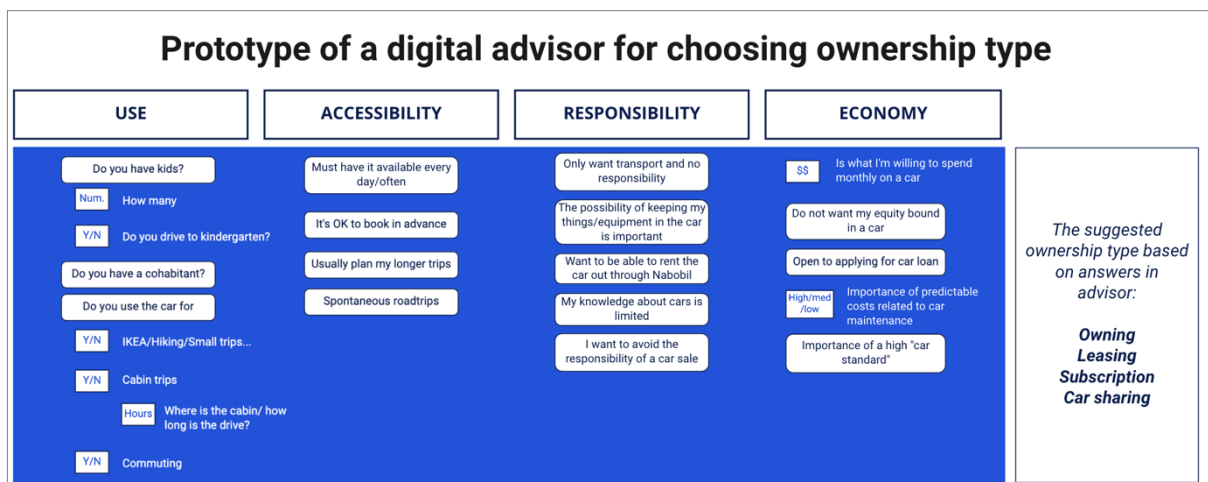


Figure 5-2 The first prototype of a digital advisor for car acquisition and choosing the right ownership type. Made by author.

The prototype was made with the vision that with input on each question in each category, the output would be a recommended car ownership type. Each category and its questions were made based on the insight from the interviews and had the purpose of understanding the importance of different aspects for the consumer. The interviews revealed that there were at least four categories that were important to consider in the process: *Use*, *Accessibility*, *Responsibility*, and *Economy*. The category *Use* has questions that outline how often, and for which type of errands, the consumer would use the car. *Accessibility* was meant to understand how accessible the car must be to the consumer. The purpose was to understand if the user needs to have the car outside their home or can book in advance through



a car sharing service. As for *Responsibility*, its purpose was to understand whether the consumer is willing to take on the responsibility or avoid this by opting for an ownership type where this is taken care of by a third party. Finally, the purpose of *Economy* was to see whether the consumer can and wants to take a loan or if they should go for an ownership type that does not require start-up capital.

## 5.4 Discussion and summary

Phase 2 was focused on understanding and outlining the information search and decision-making process from the consumer perspective. The results revealed that consumers find it challenging to evaluate all the available options based on what they need and can afford. Most consumers consult digital sources for finding information, in addition to family, friends, and colleagues. A decision-making process for car acquisition was outlined and displayed the numerous aspects that consumers consider before acquiring a car. A prototype for a digital advisor that can help consumers choose a car ownership type that suits their situation based on certain input was created. The relevant categories for making the decision were found based on the insight obtained in the interviews.

Several interviewees identified that the costs for each ownership type were challenging to calculate and compare. Despite this finding, it was decided that the prototype should not focus on comparing all types based on their cost, as this was a complex process where offers and prices would need to be collected from many sources. Moreover, each ownership type offers various cars with varying cost levels, which can satisfy different economic situations. It was also decided that the needs and preferences concerning the car ownership were more critical for recommending an ownership type and that the comparison of costs could be made by the consumer afterward. Therefore, the aspect of comparing prices was left out of the scope. The need for testing the advisor prototype, the content, and the usefulness, was the foundation for phase 3.

## 6. PHASE 3 – TEST OF CONTENT AND USEFULNESS OF AN ADVISOR

The purpose of phase 3 was to test the prototype created in phase 2. The goal was to define its content and categories and test whether the solution was useful for consumers.

### 6.1 Data collection: Testing the advisor prototype through interviews with consumers

#### *Analysis*

The testing of the prototype was performed in the form of a semi-structured interview. Questions from the four categories in the prototype were presented, and feedback was registered by coloring the boxes of the prototype and adding comments. Due to a desire of not influencing the interviewees by suggesting a solution at an early stage and avoiding focus on design-oriented matters, the prototype was never shown to them. Nevertheless, Woolery (2020) states that “Sometimes the key to good empathy is sharing or co-creating a prototype with your users and getting feedback. Prototyping helps us learn, solve disagreements, and test hypotheses quickly and with minimal repercussions.”. It was desired that the consumers participate in co-creating the prototype by thinking of solutions to their identified challenges. The respondents were encouraged to give direct feedback on the quality and number of questions they were asked, how relevant the categories were, and if they thought an advisor was helpful in the process of analyzing their needs and preferences. The interviewees were also asked if they had other ideas for questions and categories that they thought would be useful in an advisor. The interviews were conducted by phone and an online video-conferencing tool.

#### *Sample*

The interviewees were the same 11 people as in the second phase (Table 5-1). The information provided by the interviewees was registered directly in the prototype and thereby discussed and analyzed through workshops.

### 6.2 Results

The prototype (Figure 5-2) included four categories (*Use, Accessibility, Responsibility, and Economy*), which were focused on finding and outlining the needs, preferences, and possibilities of the consumer. This result section shows the interviewees' feedback on each category.

#### *Use*

It was challenging for several interviewees to answer questions about their use. Those who had never had access to a car before found it difficult to estimate how often and for which purpose they would use a car. Moreover, as most interviewees were in their mid-twenties, they expressed that they were

in an evolving life stage with uncertainty about the life events that will occur in the following years, such as having children, relocating to another city, and changing jobs. As such, they were uncertain about whether they should answer based on current or foreseen needs and worried that their choices today would not cater to their needs in the future. As one of the interviewees said: "It is a challenge to make sure that I need the car, that I choose the right car and that I have the money for the next three years. It would be frustrating if I bought a small electric car with a low kilometer range now, and then regret it in a year when my life situation changes". Therefore, interviewees suggested that the advisor should state that one should answer about current needs.

### *Accessibility*

Furthermore, the interview revealed that what people say versus what they do might differ. For example, one of the interviewees replied that accessibility to a car was critical. Several years ago, this person had sold his car and used car sharing services nowadays. When asked how he felt about booking the car before using it, he said this was a comfortable process. If there were no cars available in the neighborhood, he usually checked other nearby locations or other car-sharing providers. Another interviewee stated that accessibility was necessary, said that the car should always be accessible outside his home. The two interviewees who expressed that accessibility was critical had different perceptions of which ownership structure would fit this value; the first wanted to own or lease the car and the second was currently using a car sharing service. Due to the two completely different situations and perceptions, a discrepancy was revealed between how the respondents interpret the questions in the guide and on which subjective basis they answered.

### *Responsibility*

A question that was criticized was, "My knowledge about cars is limited." The interviewees stated that it was a very subjective question and might not be decisive for the process. Also, it was hard for them to get a grip on what level of knowledge "limited" was. However, the rest of the responsibility questions were perceived as good and easy to interpret.

### *Economy*

Some of the questions in the economy category were too technical for the interviewees. For example, several interviewees commented on the question "I don't want my equity bound in a car" due to the technical wording "equity" and that this aspect might be a necessary evil for acquiring a car. However, when presented with the statement "I am open to applying for a loan," only 2 out of 11 interviewees agreed. Furthermore, when this aspect was further explored, several interviewees stated that they had limited knowledge of the costs of a car loan, which affected their answers.

### *Review and changes*

All interviewees stated that they were satisfied with the number of questions in the prototype. Several said they would rather have too many questions than too few to feel well-informed and that the recommendation is genuinely based on the input they provide. Furthermore, several interviewees remarked that there were no questions about the desires and feelings related to cars and that this

should be included. One stated that “Car acquisition is not a rational process. If it were, we would just have a few car ownership types”.

According to some interviewees, the type of car and brand, electric/gas/diesel, new/old, and size were also important factors to consider in the process. As some stated, the type and size of the car can affect the price, which again affects the desired ownership type. During the test, it was discovered that the interest in cars was, in fact, more decisive in the process than the knowledge about cars.

Most interviewees said that they wanted to do thorough research as they see the acquisition of a car as a significant investment. They also expressed that an advisor would be a helpful tool in the process of research and car acquisition.

### 6.3 Discussion and summary

The prototype test confirmed that there are many aspects to consider in the decision-making process and that the considered aspects might differ between consumers. The lack of knowledge and experience, and subjective opinions, made some of the questions challenging for the interviewees. For instance, few interviewees desired responsibility, but several were ready to take it upon them if required. Likewise, the aspect of accessibility was considered differently by the interviewees as their subjective opinion of the word affected their answers. The test also revealed that some questions were more challenging to understand and answer than others, which lead to a varying degree of quality of the input.

One important finding was that the consumers' needs and possibilities might not be directly linked with their feelings and desires towards the car acquisition. Therefore, the ownership type that suits the consumer based on their input from the four categories might not be what the consumer wants.

The results gave valuable insight into the content and usefulness of the advisor. The interviewees requested a category about feelings and preferences, that could cover their car interest. Furthermore, the analysis of the results revealed that the life stage of the interviewees had an impact on their choices and preferences. For example, the life stage could be defined by the consumer's age and whether they are a parent. Another finding was that the interviewees' view ideological opinions regarding the environment impacted the evaluations and decisions made in the process. As such, it was desired to include this as a category.

The categories *Use*, *Accessibility*, *Responsibility*, and *Economy* were confirmed to be useful, and the categories *Feelings and preferences*, *Life stage*, and *Ideology* were added.

Due to insight about the consumers' difficulties of evaluating their current needs against their future needs, it was also decided that the advisor should only focus on current needs.

All interviewees expressed positivity about an advisor that could recommend an ownership type. However, there was a need to collect more data to detect exactly which aspects were decisive for recommending the different ownership types. Moreover, finding the right balance between advising

an ownership type based on the consumers' pre-defined preferences and educating on the best option based on the consumers' needs, became an important issue to address in the next phase.

## 7. PHASE 4 – DETECT THE DEFINING CHARACTERISTICS OF THE OWNERSHIP TYPES

Phase 3 discovered the aspects that were considered helpful to include in an advisor from a consumers' perspective. The purpose of phase 4 was to define each ownership type's characteristics to find the specific categories and questions that were of importance to assign a recommended ownership type to the consumer.

### 7.1 Data collection: Online survey

An online (and anonymous) survey was chosen as the method to collect a large amount of quantitative data about consumer behavior and preferences. According to Sue & Ritter (2012), preliminary research with focus group discussions or personal interviews with target audience members can help decide on the questionnaire type to employ. The data collected through the three previous phases laid the foundation for the sections included in the survey.

#### *Creation of survey*

The survey was created in Google forms, and it was divided into five sections with a purpose for each part, as shown in Table 7-1.

*Table 7-1 Structure, purpose and content of the online survey. Made by the authors.*

	<b>Section</b>	<b>Purpose</b>	<b>Content</b>
1	Life stage	Obtain demographic information	Age, gender, previous and current ownership type.
2	Statements regarding the aspects <i>Use, Accessibility, Responsibility, Economy, Feelings and preferences, Life stage, Ideology and Information and knowledge.</i>	Obtain information about how the market evaluates each aspect	Statements based on insight from interviews
3	About the acquisition process	Obtain specific response to every question in the digital prototype	Questions from the digital prototype
4	View on different car ownership types	Investigate which aspects of each ownership type the consumer considers attractive and if they change their mind after being presented with different benefits of each ownership type	Question about preferred ownership type before and after being asked to pick the 3 most attractive benefits of each ownership type

The feedback method for the survey was created based on the Likert scale (Tullis & Albert, 2013), with a range of 1 to 5. To guide the respondents on this scale, the phrase *“The value 1 = Disagree, 2 = Somewhat disagree, 3 = Do not know, 4 = Somewhat agree, 5 = Agree”* was repeated for every question.

The survey aspired neutrality with an equal weight of positive and negative questions towards different aspects. Accordingly, several statements were formulated with opposite annotations to extract the

nuances of their opinions. An example is a notion of having an ownership type that is managed by a third party, such as subscription, leasing, and car sharing:

*“Being accountable to a third party (subscription, leasing, car sharing) limits my freedom and independence.”*

*“Knowing that a third party manages my car/car use (subscription, leasing, car sharing) offers me security and reduces my stress.”*

The survey respondents were also provided with information about the meaning of important terms used throughout the survey, such as “car ownership type,” “car acquisition,” and “third party.”

A pre-testing was performed on five acquaintances to test if consumers understood the terminology and questions to ensure a high quality of the survey and input. The survey was modified based on the given feedback.

#### *Dividing respondents into ownership type “groups”*

The fourth section of the survey was intended to group the respondents into one of the four ownership types to define the characteristics of the ownership types. The goal was to analyze the survey data according to which ownership type group the respondents had chosen. Furthermore, it was to see how these “groups” attitudes towards the covered aspects.

The process for forming the four ownership type groups is shown in Figure 7-1. The respondents were first asked to pick their current preferred ownership type. They were then presented with six advantages regarding each type formulated with the acquired knowledge from Chapter 2 and asked to select the three advantages they considered the most attractive. Finally, respondents were again asked to choose their preferred ownership type with their newly acquired knowledge about each ownership type. The ownership type they chose at the end of the survey formed the basis for placing the respondents into an ownership type group, and the results of the survey were analyzed based on these groups. Moreover, it was a means to see whether the respondents changed their minds from their original response after being acquainted with the different options.

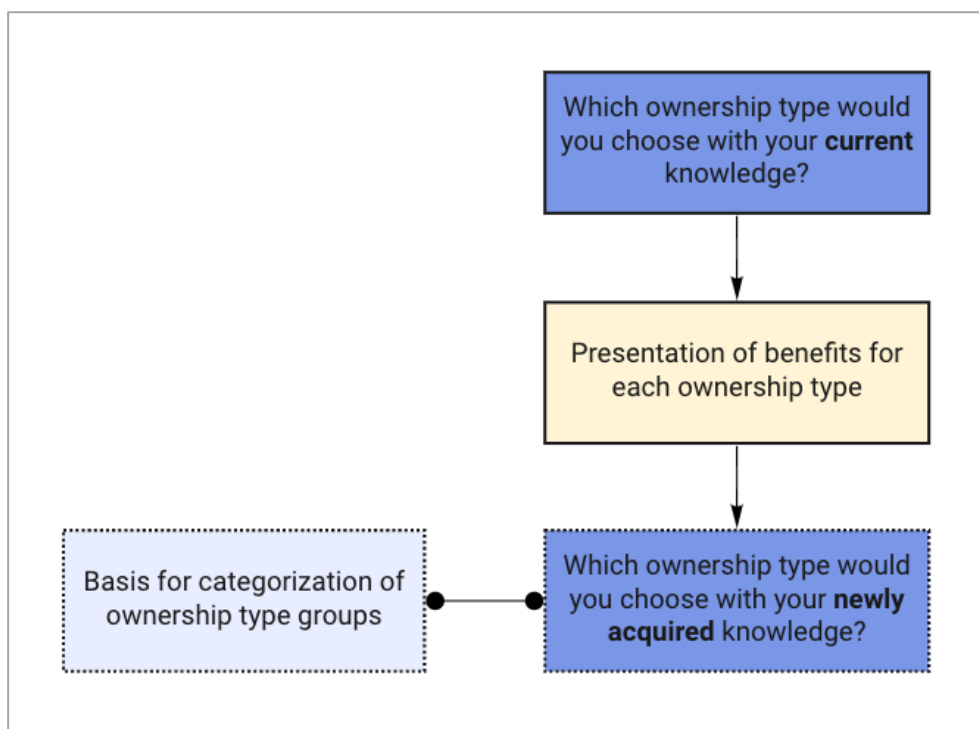


Figure 7-1 Visualization of how the respondents were divided into the ownership type groups that later formed the basis for the survey analysis. Made by the authors.

### Sample

The survey was spread on several platforms, namely LinkedIn, Facebook, Messenger, Snapchat, and e-mail. The survey had 120 respondents in total, and the distribution of age and gender of the respondents is displayed in Table 7-2. The male respondents accounted for 55 percent of the total, while the female respondents accounted for 45 percent. The age segments with the highest number of respondents were 25 - 29 years and 40 - 59 years.

Table 7-2 Overview of the distribution of the survey respondents divided in age and gender showing the percentage based on the total number of respondents. Made by authors.

Age segment	Male count	Male % of tot.	Female Count	Female % of tot.	Grand total count	Grand total %
18 - 24 years	2	2%	9	7%	11	9%
25 - 29 years	17	14%	25	21%	42	35%
30 - 39 years	6	5%	8	7%	14	12%
40 - 59 years	36	30%	11	9%	47	39%
60 and older	5	4%	1	1%	6	5%
<b>Grand Total</b>	<b>66</b>	<b>55%</b>	<b>54</b>	<b>45%</b>	<b>120</b>	<b>100%</b>

The demographic distribution in Figure 7-2 shows that 83 percent of the respondents live in Oslo or Viken, which was the targeted area, as explained in Chapter 0.



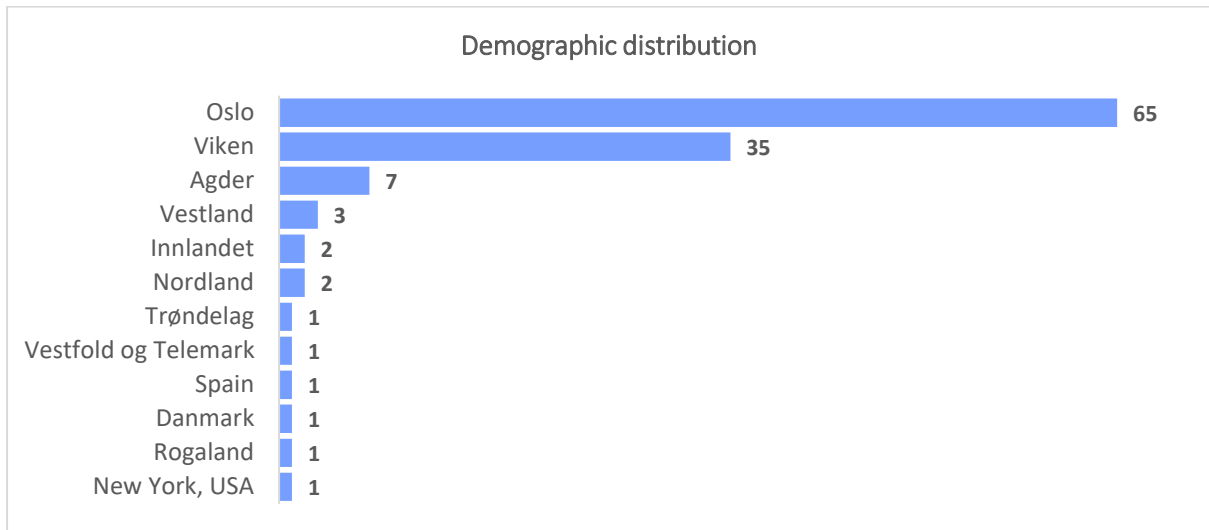


Figure 7-2 Demographic distribution of respondents that participated in the survey. Made by the authors.

### Analysis

Microsoft Excel and Tableau were used for analyzing the data. Pivot tables and figures were made in Microsoft Excel to extract findings from the survey data and to make comprehensive charts and figures.

## 7.2 Results

The results show figures of how the different ownership type groups have answered the questions in the survey. The groups are *Owning*, *Leasing*, *Subscription*, and *Car sharing* and, as explained in Chapter 6.1, the groups were created based on the respondents' selected ownership type at the end of the survey.

The following sections will first present the results of the analysis of each category in the digital advisor. Second, the most attractive aspects of each ownership type are presented. Lastly, the results regarding the usefulness of the advisor, information search, and quotes are shown.

### 7.2.1 Questions from the categories in the digital advisor

#### Life stage

Age is an indicator for a person's life stage, and to get an overview of what ownership type the different age segments use and prefer, the respondents were asked to place themselves in an age segment at the beginning of the survey (Figure 7-3). The *Owning* group has the most significant number of respondents with 55 percent. The largest age segment of the survey is *40 - 59 years*, which is also the largest age segment within *Owning*. Within the *Car sharing* group, the largest number of respondents are in the age segment *25 – 29 years*. The age segment *60 and older* and *30 – 39 years* are not represented in the *Subscription* group, only in *Leasing* and *Owning*.

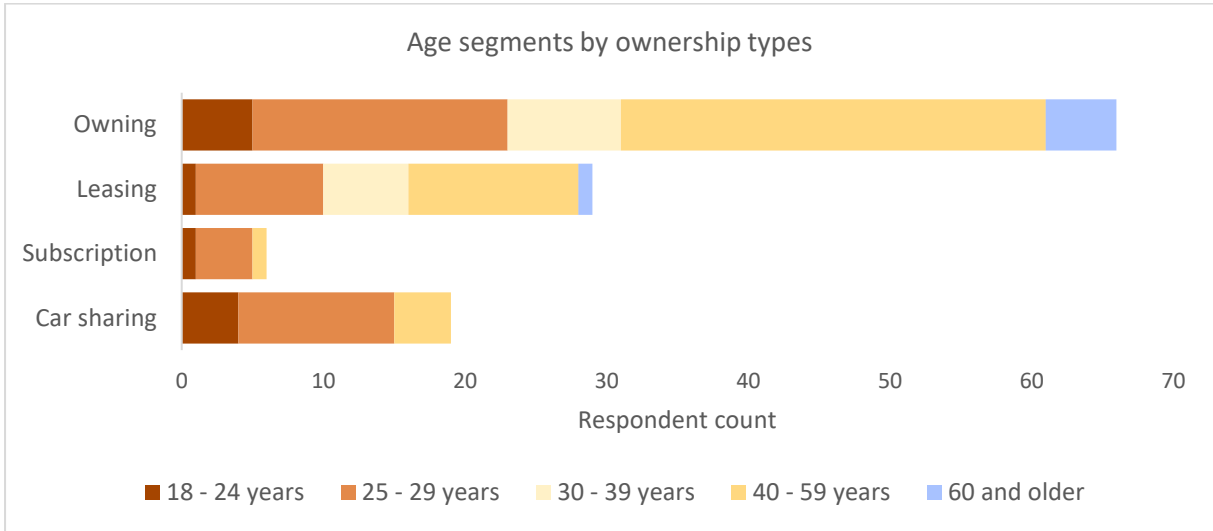


Figure 7-3 Distribution of age segments within the four ownership types. Made by the authors.

Another indicator of a person’s life stage is whether they have children or not. In total, 52 percent of the respondents answered “Yes” to the question “Do you have children?”. Figure 7-4 displays the distribution of respondents with and without children within each ownership type group. *Subscription* and *Car sharing* had the smallest representation of respondents with children, with a share of 17 percent and 21 percent, respectively. *Leasing* has the largest share of parents with 62 percent, followed by *Owning* with 59 percent.

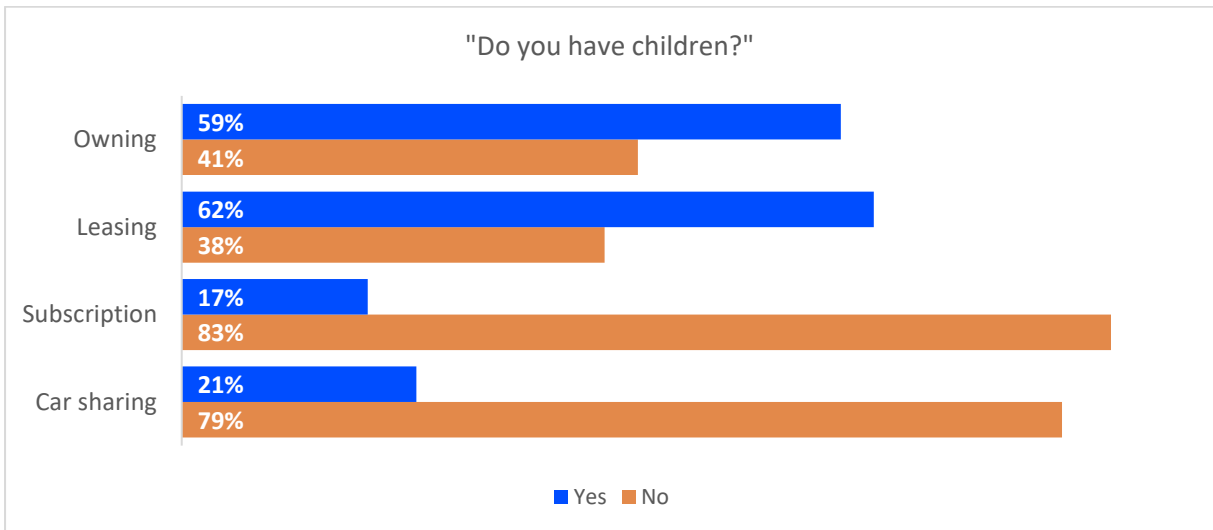


Figure 7-4 Respondents answering “Yes” and “No” to having children, sorted by ownership type. Results shown as percentages of ownership type total. Made by the authors.

In the optional section at the end of the survey where respondents could explain their choice of ownership type, one respondent with children explained the reason for choosing *Owning* with: “We have kids, which demands more flexibility and makes it harder to plan the use of the car.” While another stated that the reason was: “Flexibility, needs for child seats and gear. Changing circumstances and growing children”. Furthermore, an analysis of the results shows that 92 percent of the respondents having children chose *Owning* or *Leasing*. The assumed need for flexibility is also shown in Figure 7-5.

The need for accessibility and flexibility for some respondents with children was further investigated with the statement, “It is important to me that the car is outside my home and available at all times”. Figure 7-5 shows the results, which are divided into two groups: respondents with children and respondents without children. Of all the respondents in the survey, 51 percent “Agree” to the statement, and 65 percent of these had children. Among all respondents who “Somewhat agree” or “Agree,” only six respondents were 40 years or younger, and only one person between 25-29 answered this. Of the respondents with children, 89 percent stated that they “Agree” or “Somewhat agree,” compared to 55 percent for those without children. Moreover, among those without children, 33 percent stated they “Disagree” or “Somewhat disagree,” whereas only 2 percent of those with children said that they “Disagree.” These results confirmed the importance of accessibility among the respondents with children.

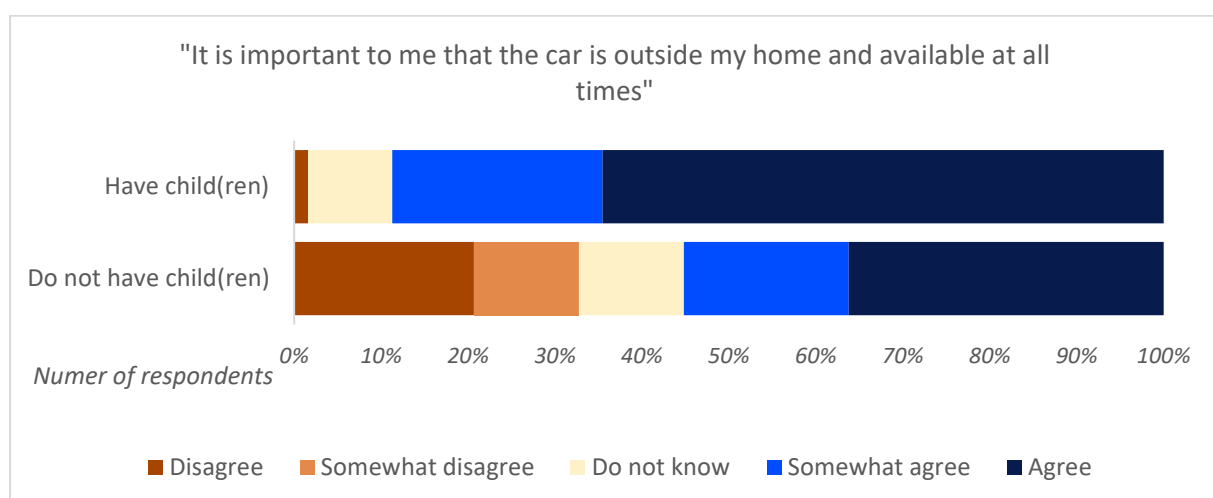


Figure 7-5 How the respondents answered to a statement about availability, divided by respondents who have/ do not have children. Made by the authors.

### Use and responsibility

Figure 7-6 displays how the groups answered to “How many kilometers would you estimate that you drive in one year?”. The average yearly driven kilometers for passenger cars in Norway is 11 152 kilometers (SSB, 2021b). In *Subscription* and *Car sharing*, 33 and 32 percent of the respondents estimate a total of driven kilometers of up to 5,000 in one year. In *Owning* and *Leasing*, 3 percent of the respondents in both categories drive the same length. Furthermore, 27 percent in the *Owning* category estimate over 17,000 driven kilometers in one year and 38 percent in the *Leasing* category estimates the same. No respondents estimated over 17,000 kilometers in *Car sharing*, whereas 17 percent of respondents *Subscription* stated this. The two latter categories have the most respondents answering “Do not know” to the question (21 percent from *Car sharing* and 17 percent from *Subscription*). In comparison, only 5 percent in *Owning* and 3 percent in *Leasing* answered this, and none of the respondents stated “Do not know” currently owned or leased a car.

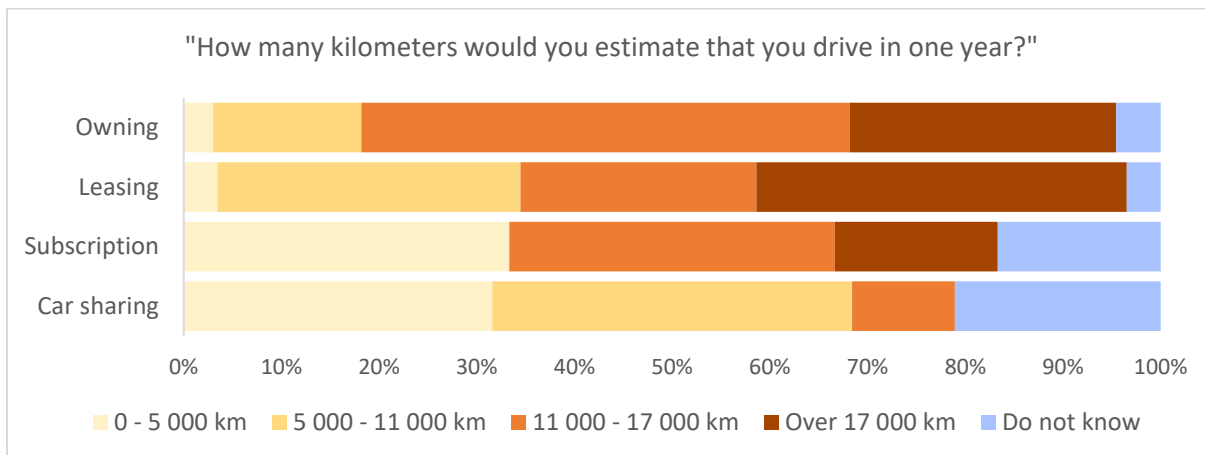


Figure 7-6 Responses to the question "How many kilometers would you estimate that you drive in one year?" by each ownership type. The scale is filled to 100 percent for each ownership type to show the distribution within each type.

Figure 7-7 displays how the groups answered to "I just want a means of transportation that takes me from A to B and would rather avoid responsibilities related to having a car." Car sharing has the largest share of respondents that replied "Agree" or "Somewhat agree." Owning had the most significant percentage of respondents who chose "Disagree" and "Somewhat disagree," with 65 percent in total. In the Leasing category, 21 percent chose "Do not know," compared to Owning with 11 percent. Subscription is divided in half, with 33 percent of the respondents choosing "Somewhat disagree" and 17 percent "Do not know."

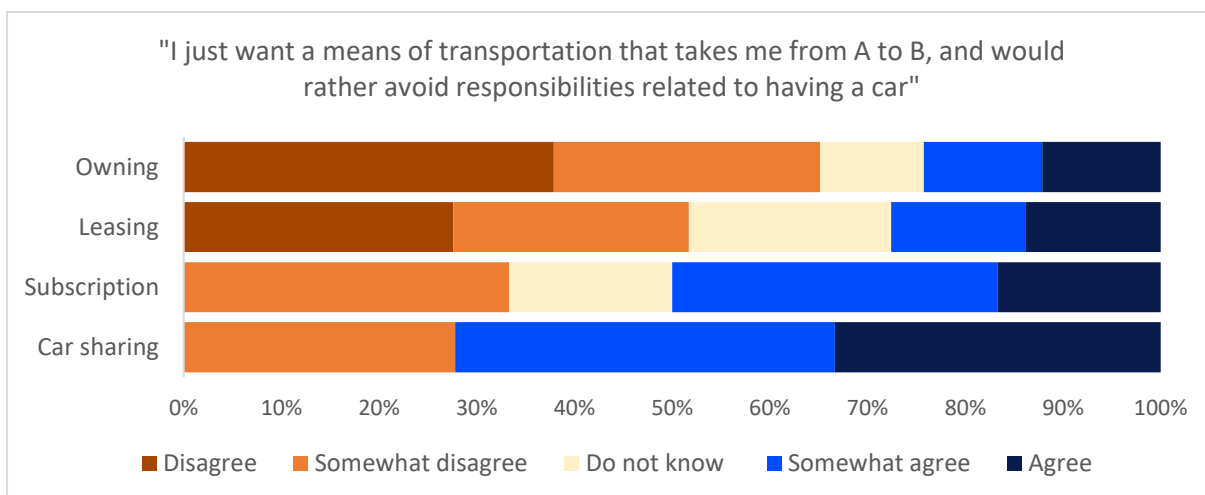


Figure 7-7 Show responses to the statement "I just want a means of transportation that takes me from A to B, and would rather avoid responsibilities related to having a car", distributed by ownership type. Made by the authors.

### Accessibility

Figure 7-8 displays how the groups answered to "It is important to me that the car is outside my home and available at all times." Owning and Leasing have the most significant number of respondents that stated: "Agree." 90 percent of these already own or lease a car, and only eight respondents do not currently have access to a car.

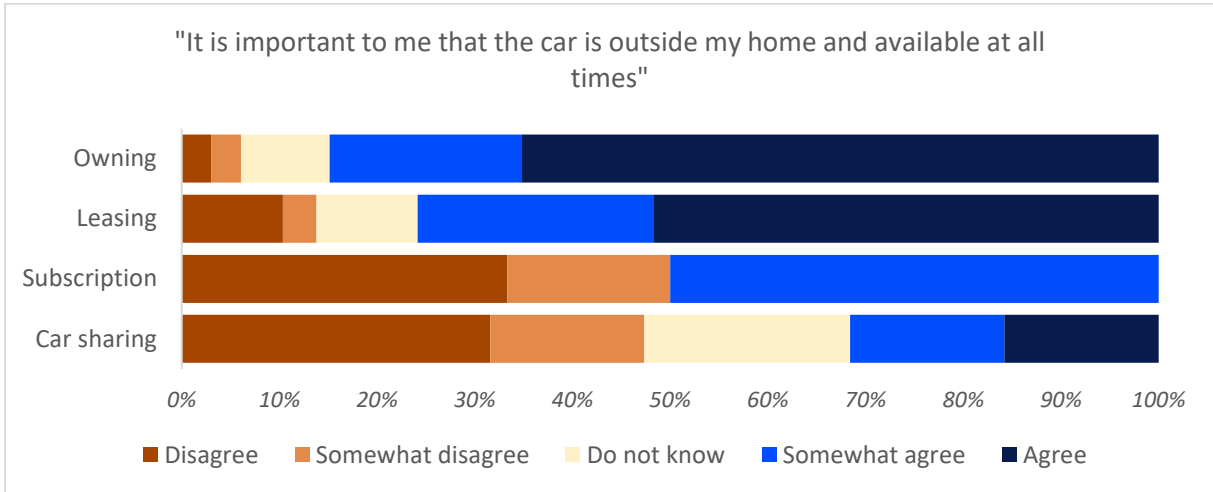


Figure 7-8 Show how the four ownership type groups responded to the statement "It is important to me that the car is outside my home and available at all times". Made by the authors.

### Economy

Figure 7-9 displays how the groups answered to "It is important for me to keep the expenses related to my car use/car access low (financing, insurance, tolls, service, parking, etc.)." In total, 78 percent answered "Agree" or "Somewhat agree." Only 8 percent "Disagree" or "Somewhat disagree" to the statement. All the respondents who disagree currently own a car themselves and are in the age segment 40 - 59 years.

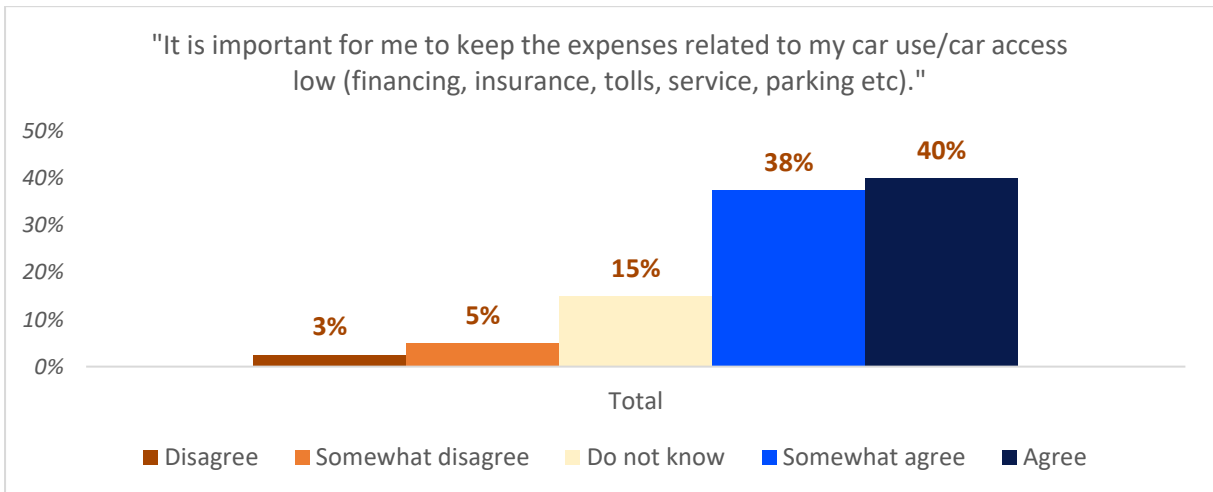


Figure 7-9 Show the distribution of responses on the statement "It is important for me to keep the expenses related to my car use/car access low". 78 percent agreed with this. Made by the authors.

Figure 7-10 displays how the groups answered to "I am open to apply for a loan to buy my own car." Almost 76 percent of respondents in *Owning* and 59 percent of respondents in *Leasing* chose "Agree" or "Somewhat agree." In contrast, 32 percent of respondents in *Car sharing* answered the same. The largest group of respondents that chose "Disagree" and "Somewhat disagree" is seen in *Car sharing*, and *subscription* has the largest share of respondents that replied, "Do not know."

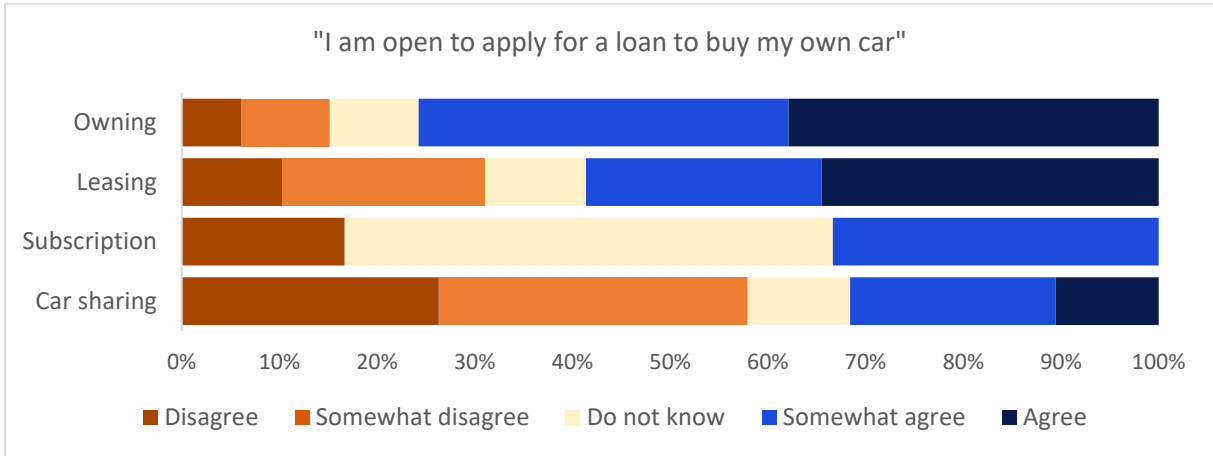


Figure 7-10 Show responses to the statement "I am open to apply for a loan to buy my own car" distributed by ownership type. Made by the authors.

Figure 7-11 displays how the groups answered to "I would rather lease or subscribe than buy a car if that allows me to avoid having a car loan." Leasing, Subscription, and Car sharing have 65, 84, and 74 percent of respondents who "Agree" or "Somewhat agree" the statement, in contrast to Owing with 17 percent. Moreover, Owing has 59 percent that "Disagree" or "Somewhat disagree" to the statement.

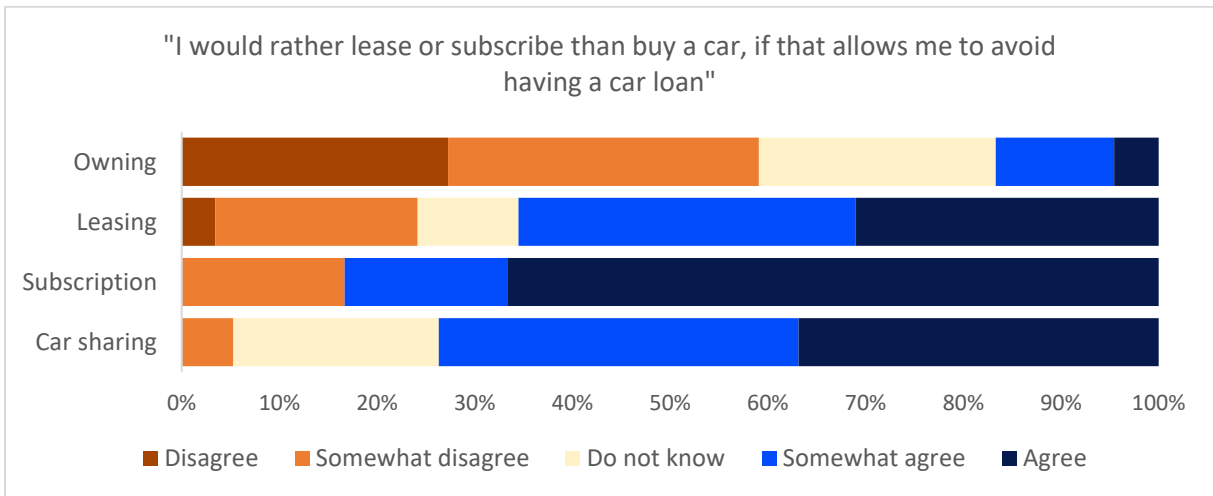


Figure 7-11 Show responses to the statement "I would rather lease or subscribe than buy a car, if that allows me to avoid having a car loan" distributed by ownership type. Made by the authors.

### Feelings and preferences

Figure 7-12 show how the groups answered when asked to range their interest in cars from low to high. Leasing and Owing were the groups with the most significant proportion of respondents choosing "High." However, in Subscription and Car sharing, over half the respondents state that their interest is "Low."

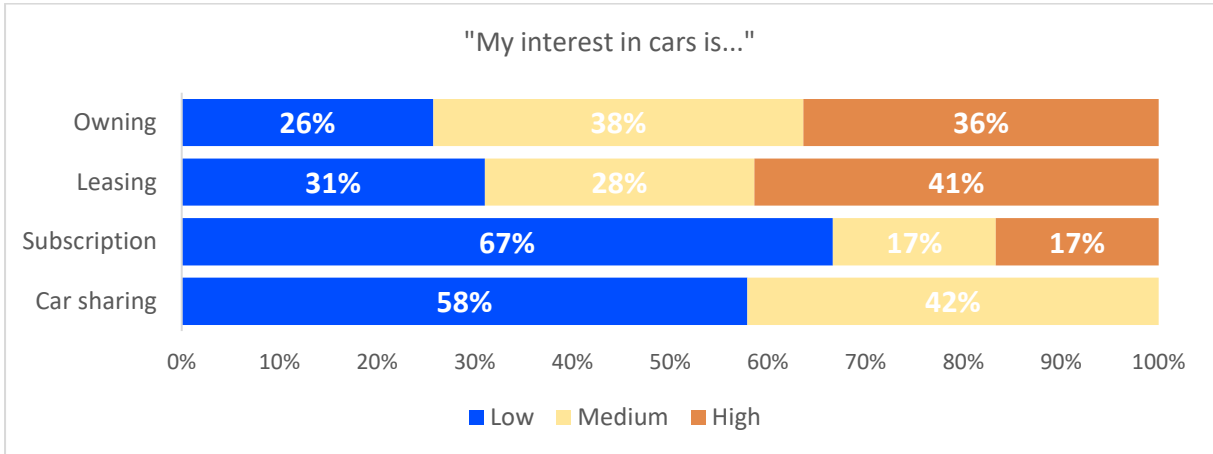


Figure 7-12 Show the respondents interest in car distributed by ownership type groups. Made by the authors.

### Ideology

One of the most dividing statements in the Ideology category was "I believe people will prefer buying and owning their own car in the future, despite the entrance of new/alternative services", as shown in Figure 7-13. Three out of four respondents in the *Owning* category chose "Somewhat agree" or "Agree". The share of respondents that choose "Somewhat agree" or "Agree" decreases in *Leasing*, and even more for *Subscription* and *Car sharing*. In the latter two groups, 83 and 68 percent respectively chose "Disagree" or "Somewhat disagree".

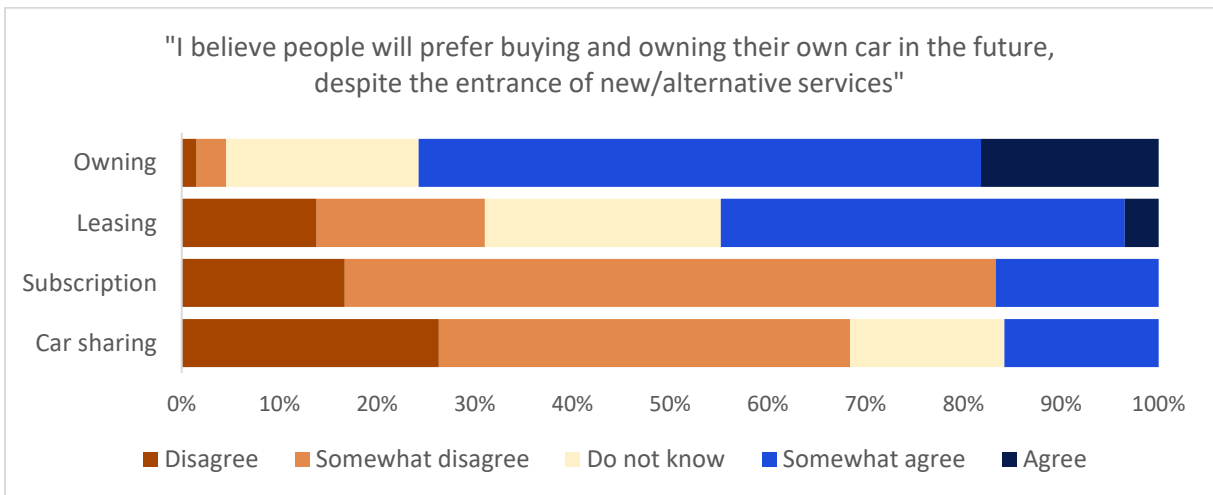


Figure 7-13 Show responses to the statement "I believe people will prefer buying and owning their own car in the future, despite the entrance of new/alternative services" distributed by ownership type groups. Made by the authors.

Another finding in the Ideology category was that the statement "I believe that private ownership of cars will disappear in the future, and that everything will be shared when it comes to transport" was dividing, as shown in Figure 7-14. The proportion of respondents that state they "Somewhat agree" or "Agree" is highest in *Car sharing* and *Subscription*, with over half of the respondents answering this. In *Car sharing* there are almost 26 percent who "Disagree" or "Somewhat disagree", whereas the share of respondents who state the same is 55 and 75 percent in *Leasing* and *Owning*.

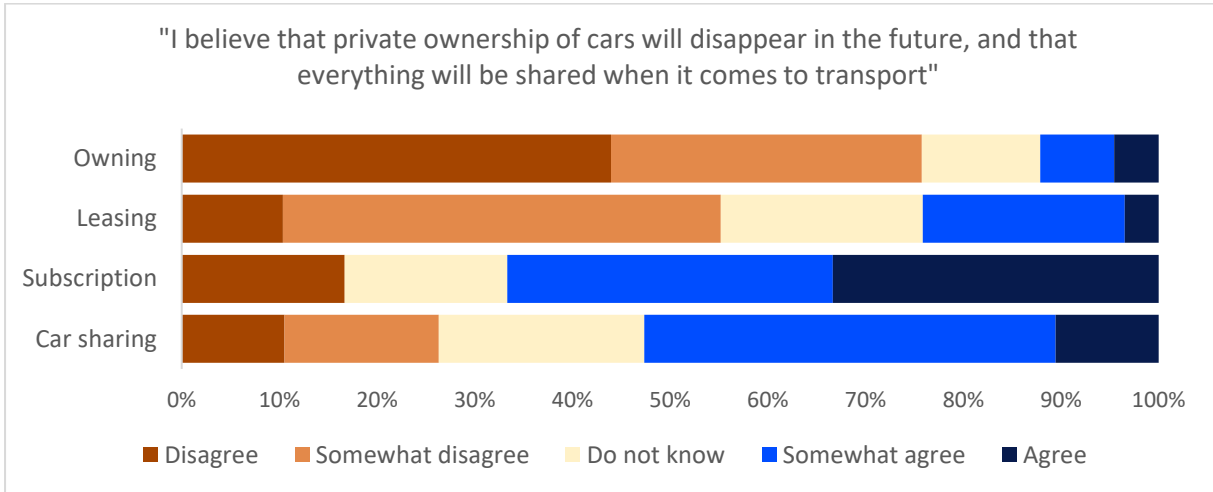


Figure 7-14 Show responses to the statement "I believe that private ownership of cars will disappear in the future, and that everything will be shared when it comes to transport" distributed by ownership type groups. Made by the authors.

The third and last dividing statement was "I believe sharing economy is a good idea in theory, but not feasible/suitable for me", as shown in Figure 7-15. The only groups with respondents that chose "Agree" are *Owning* and *Leasing*. In *Car sharing* 21 percent chose "Somewhat agree", and 5 percent "Do not know". The largest share of respondents who chose "Disagree" is seen in *Car sharing* with 47 percent, followed by *Subscription* with 33 percent.

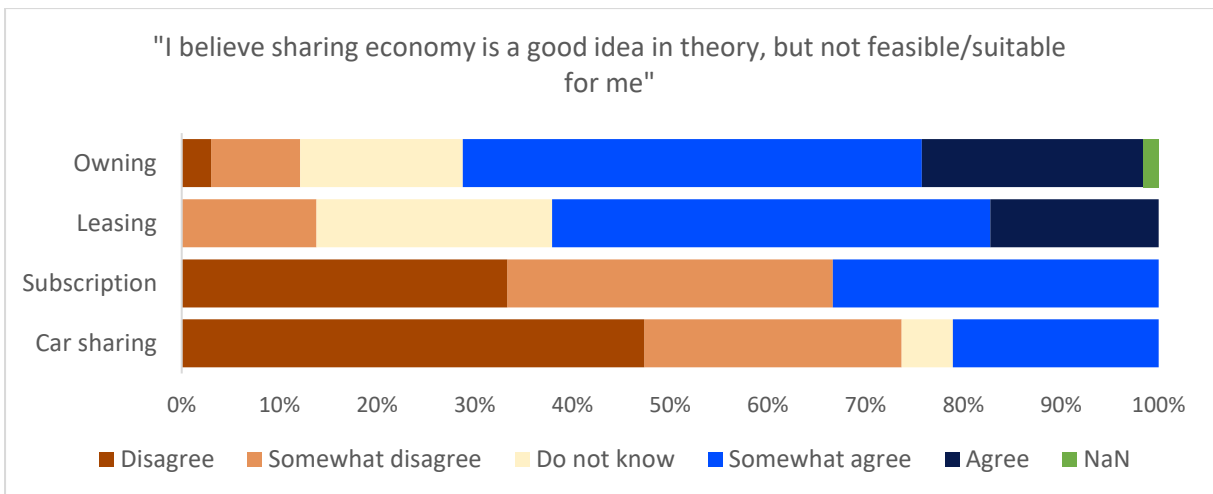


Figure 7-15 Show responses to the statement "I believe sharing economy is a good idea in theory, but not feasible/suitable for me" distributed by ownership type group. Made by the author.

## 7.2.2 Ownership types

Figure 7-12 displays the change in preferred ownership type and is based on the ownership types that respondents chose before and after being presented with the benefits of each type (as explained in Figure 7-1). The column "Grand total before" represents the ownership type the respondents chose the first time, and the column "Grand total after" represents the ownership type the respondents chose the last time. The figure below illustrates how 16 percent of the respondents (19 in total) picked a



different ownership type after comparing the aspects of each type. In total, *Subscription* was the only group that had a larger total after the changes and received new entrants from all the other ownership types. *Owning* and *Car sharing* lost one respondent each. *Leasing* stayed with the same number of respondents despite losing and receiving respondents.

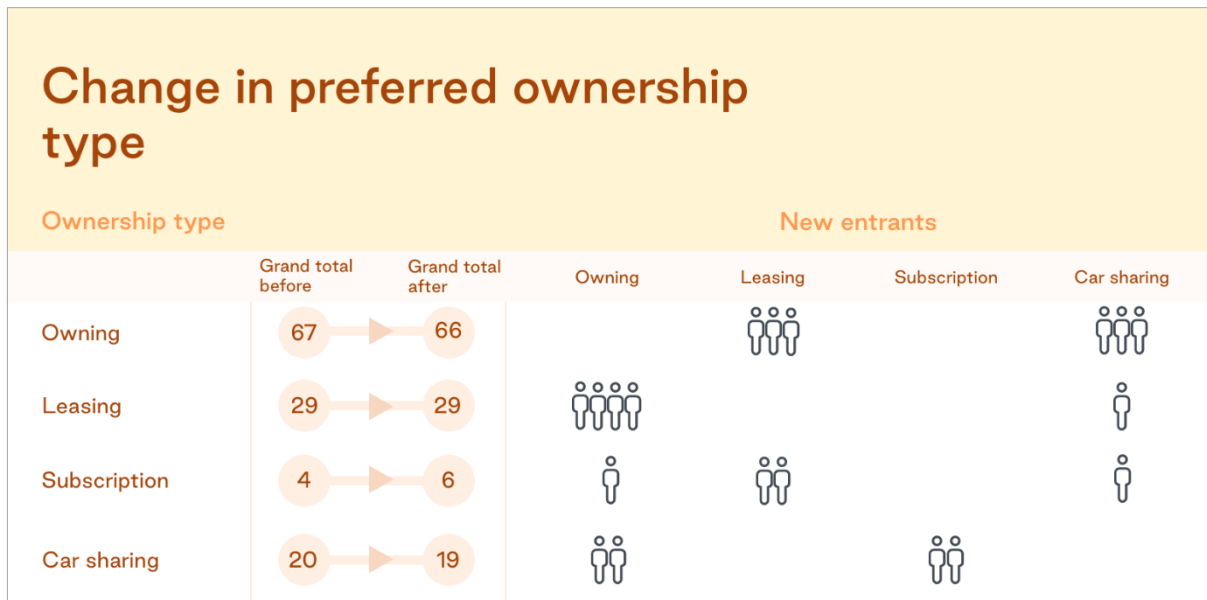


Figure 7-16 The change in preferred ownership type before and after being introduced to the benefits of each ownership type, and the new entrants of respondents that each of the ownership type groups get. Made by the authors.

Respondents were also asked to pick the top three benefits of each ownership type from a list where several were listed. The most popular benefits are presented below, with the percentage of respondents that picked the benefit in parentheses. Respondents were also given the option of adding other aspects they considered attractive for each ownership type, in addition to having a field for commenting on their choice of ownership type, which is also presented below. For an overview of all the benefits that were presented to the respondents and their results, see Appendix G.

### Owning

According to the survey, the three most attractive aspects of owning a car are:

1. I have the car available at all times (90%)
2. It gives me full flexibility and I am only responsible to myself (86.7%)
3. I can use the car as much as I want (knowing that the more I drive it, the less value it will have when I sell it) (67.5%)

Aspects that were added from respondents were “To not walk to the bus during winter,” “I prefer to sit in my own germs,” and “It’s most economical because I need to get to work. Train and bus take 2 hours, driving a car take 50 minutes. I chose an electric car because I have a charger at home and at work. I rented a car for a month, but it was still more expensive than buying one”.

## *Leasing*

According to the survey, the three most attractive aspects of leasing a car are:

- I have the car available at all times (67.5%)
- I can have a new car without taking a loan (68%)
- It gives me a predictable monthly cost (72%)

One of the respondents that chose *Leasing* as their preferred ownership type at the end of the survey said the reason for the choice was: "It is almost like owning a car, but with less risk." Another said: "No loan, available at all times, can have personal gear in the car and it's a new car."

## *Subscription*

According to the survey, the three most attractive aspects of subscribing to a car are:

- I can have a new car without taking a loan (56%)
- It gives me a predictable monthly cost (57%)
- The subscription includes service, insurance, tire change etc. (64%)

One of the respondents that chose *Subscription* as their preferred ownership type at the end of the survey said, "The car is available for me at all times - but seems cheaper than leasing and owning it."

## *Car sharing*

According to the survey, the three most attractive aspects of car sharing are:

- I can book a car when I want to use it (53%)
- I pay only for what I use, which can keep the cost low (84%)
- I can choose between different sizes, types and brands when I book a car (58%)

The three aspects that were added by some respondents state: "Lower cost relative to owning/leasing x3", "If I could share my car with my neighbors in the street and access by phone," and "I can get a car where I need it (and not only from my garage)."

One respondent said the reason for them choosing car sharing at the end of the survey is: "Since I live in Oslo, it is easier for me just to rent a car short term. With short term rental I would not have to think about parking, and it will also keep the cost low.", another says "I do not need a car now and will not need a car in the next 3 years. Whether I live in Norway (Oslo) or New York, I do not want a car yet. I see it as an unnecessary expense. Of course, when I have children in the future, I will have a greater need for a car. Still, even then, I want to limit the costs as much as possible by living centrally and using some form of sharing alternative whenever possible - primarily to limit expenses and secondarily for ideological reasons. It may be unrealistic, but I hope I will never have to own a car".

### 7.2.3 Information search and desire for an advisor

#### Information search

The respondents were asked where they seek information in the car acquisition process. They were presented with different alternatives and could pick the relevant ones. As shown in Figure 7-9, “Google” was chosen by 85 percent of the respondents and was the most popular information source, followed by “Friends” with 77.5 percent and “Finn.no” with 58 percent. “Car dealerships” and “My bank” were the least popular choices with only 38 percent and 7 percent, respectively.

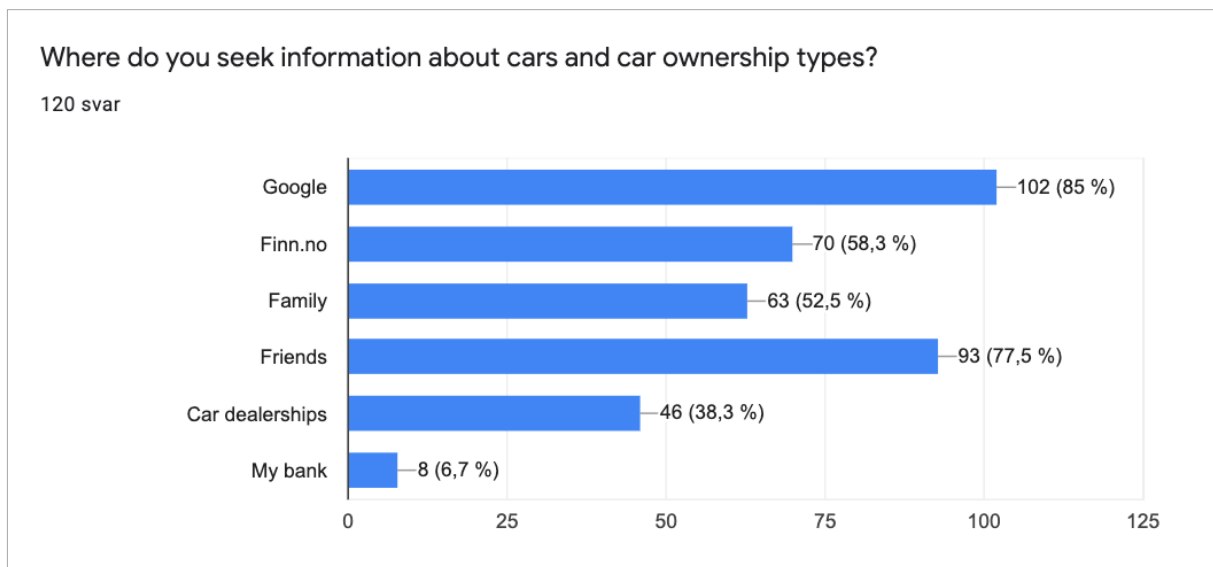


Figure 7-17 The information sources of the respondents in the car acquisitions process. From survey results in Google forms.

To understand the process of information search not only by where consumers sought information but also the quantity of it, they were presented with the statement, “I believe there is enough information available online to guide me on which ownership type I should choose” (Figure 7-18). In all the groups, “Do not know” was the most chosen answer. *Subscription* had the largest share of respondents that chose “Do not know” with 50 percent, closely followed by *Leasing* with 45 percent. On the other hand, *Owning* has the most significant number of respondents that answered “Agree” (24 percent) and “Somewhat agree” (35 percent). One reason more respondents in *Subscription* did not know where to seek information would be because *Car sharing* and *Subscription* are newer alternatives than *Owning* and *Leasing*, and therefore there is less information available. To exemplify this, one gets 857 million results on Google when searching for “Car Subscription”, in contrast to 10.7 billion results when searching for “Buy car” (as of May 19<sup>th</sup> 2021).

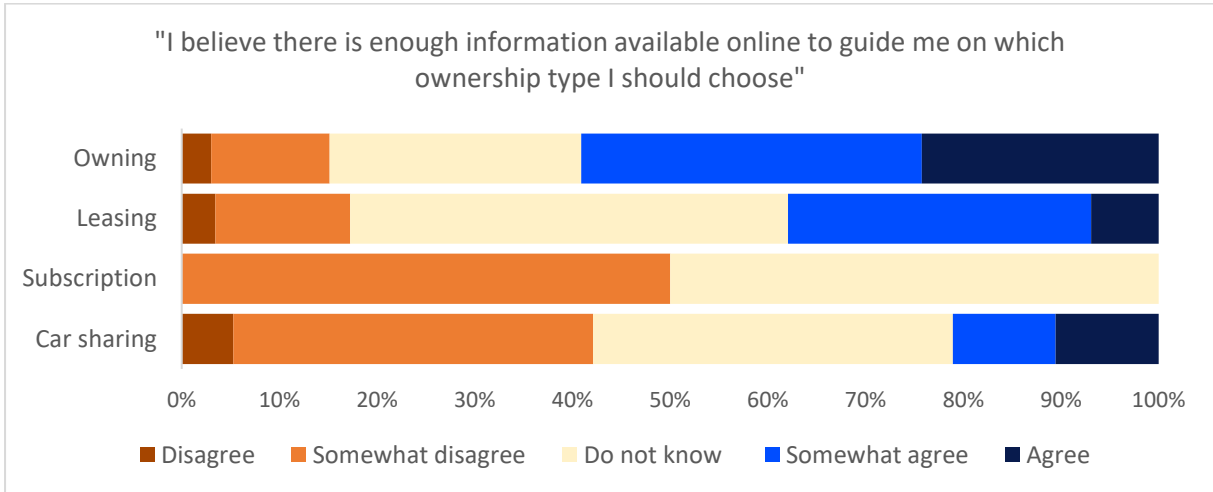


Figure 7-18 Show responses to the statement "I believe there is enough information available online to guide me on which ownership type I should choose" distributed by ownership type groups. Made by the authors.

Respondents were asked to answer the statement, "I get confused by all the information and offers that are available online" (Figure 7-19), to get a proper understanding of how consumers perceive the quality of the information on digital sources. The results show that over half the respondents in *Leasing*, *Subscription*, and *Car sharing* chose "Agree" or "Somewhat agree" to the statement, whereas less than 25 percent in *Owning* chose this. *Owning* had the largest share of respondents whose response was "Disagree" or "Somewhat disagree." *Subscription* and *Car sharing* have the largest number of respondents who answered "Do not know."

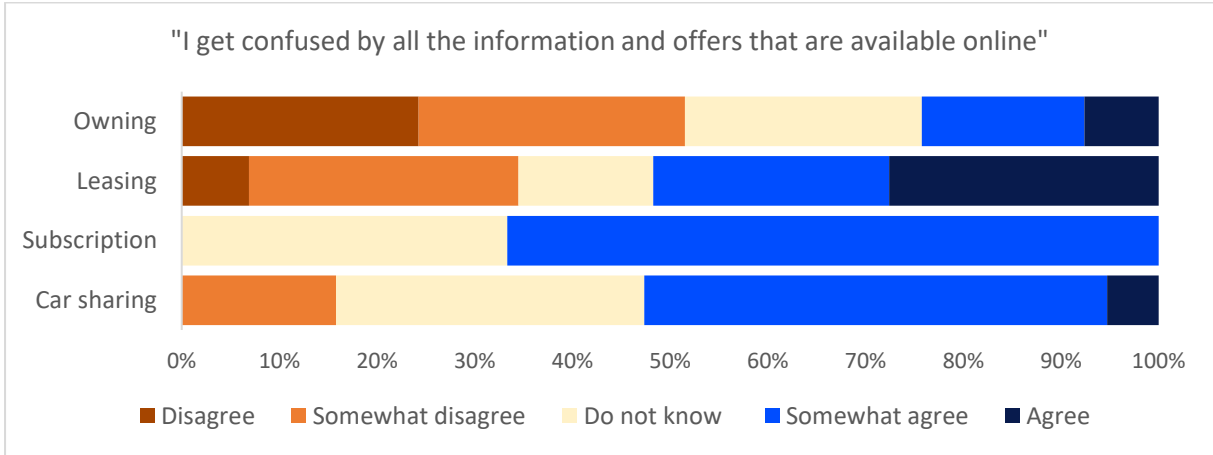


Figure 7-19 Show the responses to the statement "I get confused by all the information and offers that are available online" distributed by ownership type groups. Made by the authors.

Figure 7-20 displays how the groups answered to "I think it is easy to choose the right ownership type for me and my needs", which was formulated in the opposite way of the previous statement. "Do not know" was the most common answer and was chosen by 28 percent of the respondents, whereas "Agree" was only chosen by 18 percent. Closely linked to the results from the previous statement, *Subscription* and *Car sharing* have the highest share of respondents who "Disagree" or "Somewhat disagree", with it being easy to choose the right ownership type. Conversely, *Owning* has the highest share of respondents who "Agree" or "Somewhat agree."

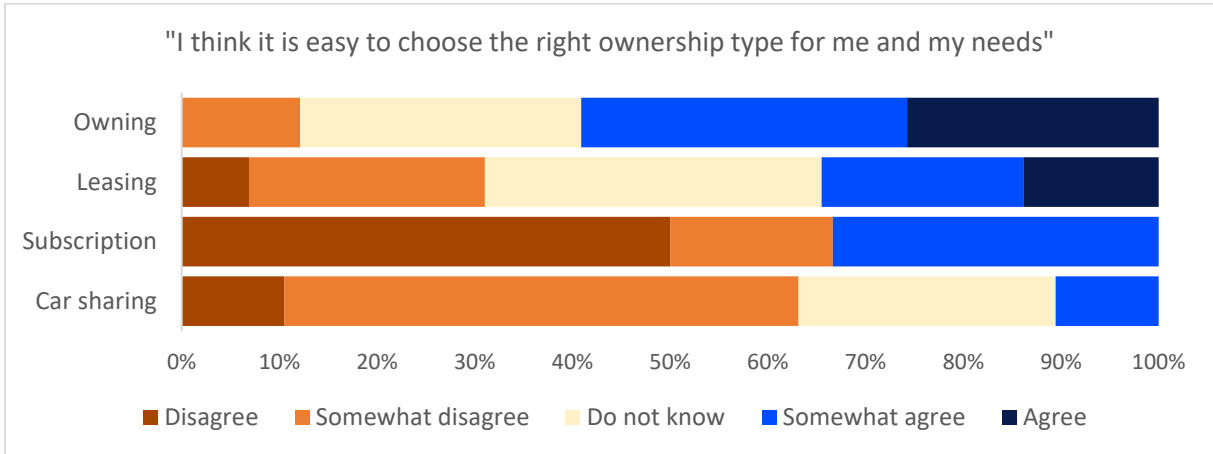


Figure 7-20 Show the response to the statement "I think it is easy to choose the right ownership type for me and my needs" distributed by ownership type groups. Made by the authors.

### Usefulness of the advisor

Only 96 of the 120 respondents answered the question, "Would an advisor on choosing the right car ownership structure be useful to you?". Of the respondents that answered, 54 percent chose "Yes", 30 percent chose "Maybe", and 16 percent chose "No". Figure 7-21 displays how many of the respondents within each group answered "Yes". The *Owning* group has the lowest rate, with only 44 percent responding "Yes", and 36 percent "Maybe". Of those answering "Yes" in *Owning*, 92 percent had previously answered that they already owned a car. None of the respondents in *Car sharing* and *Subscription* answered "No", whereas 20 and 17 percent of the respondents in *Owning* and *Leasing* did.

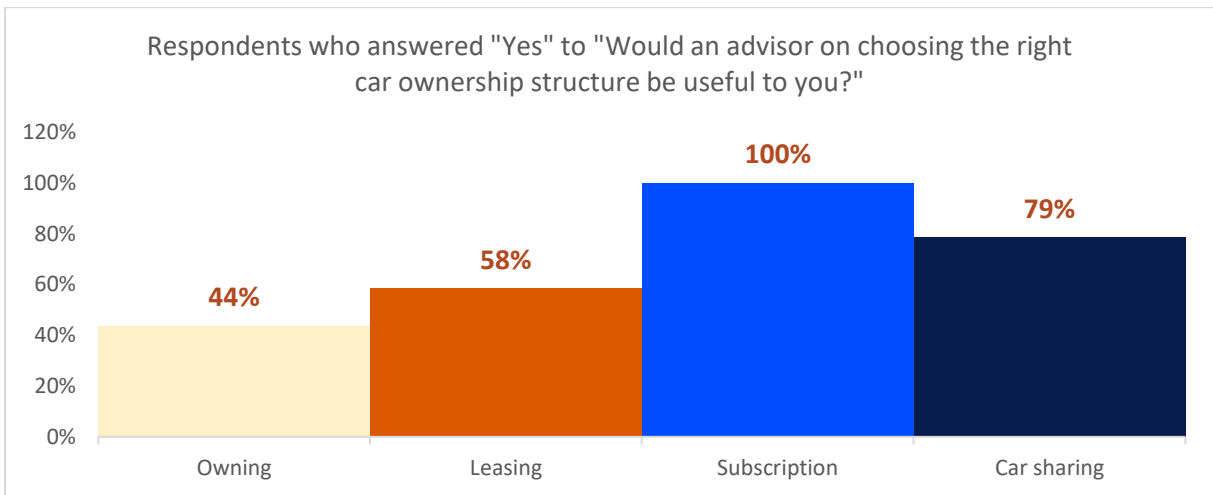


Figure 7-21 Show the respondents who answered "Yes" to "Would an advisor on choosing the right car ownership structure be useful to you?" and what ownership type group they represented. Made by the authors.

## 7.3 Discussion and development

The following section discuss the different categories of the advisor.

### *Life stage*

The Life stage is a sum of many aspects of the current life situation, and the results showed that this category impacts the choices consumers make. For example, the older age segments had a more significant representation in the *Owning* and *Leasing* category, which could be due to a higher level of economic freedom and the parent role, facilitating and creating a higher demand for availability and convenience of the selected car ownership type. Moreover, results show that respondents are more likely to choose *Owning* or *Leasing* when they respond “Yes” to having children. Likewise, the respondents were more likely to choose *Subscription* and *Car sharing* if they answered “No” to having children.

Life stage was considered an important aspect to include in the advisor.

### *Use and responsibility*

The most dividing question in the category “Use” was the question “How many kilometers would you estimate that you drive in one year?”. Results show that the estimated yearly driven kilometers are lower for those who choose *Car sharing* and *Subscription* and that many respondents in these groups also reply, “Do not know”. It could be that when one subscribes to a car or buys access through a car sharing platform, one has a distanced relation to the distance driven in a year. Whereas when one owns or leases a car and has the responsibility that comes with this ownership type, one might have a more conscious relationship to the car use. A more relatable way to address the use perspective in the advisor could be only to ask how many times a week a person thinks they would use the car.

In the category “Responsibility”, the most dividing question was “I just want a means of transportation that takes me from A to B, and would rather avoid responsibilities related to having a car”. The most significant share of respondents that disagreed with the statement was found in *Owning* and *Leasing*, and those who were most in agreeance were in *Car sharing* and *Subscription*. The question is composed of two parts, where one addresses how a person relates to the experience of using the car and the other addresses the responsibility of the car, and it is therefore uncertain which part the respondents put the most emphasis on. Nevertheless, the results show a difference of opinion within each group and an overall trend that can divide the ownership types.

Use and responsibility were considered essential aspects to include in the advisor.

### *Accessibility*

Results show that the category “Accessibility” is essential to over 70 percent of the respondents who chose *Owning* and *Leasing*. It is also essential for less than half of the respondents in *Subscription* and *Car sharing*. Since over half of the respondents in *Owning* and *Leasing* have children as seen in Figure 7-4, this could affect this opinion. Interestingly, there are respondents in *Owning* and *Leasing* who do not find the aspect important. Conversations with subject matter experts and findings in earlier phases

showed that the perception of accessibility was very subjective, which is also shown in results from the survey, where there are different perceptions within each ownership type group. It was decided not to include this aspect in further work with the advisor due to its risk of wrongly affecting the recommendation. Since having children seemed to be more decisive for the need of accessibility, this was prioritized.

Accessibility was not considered an important aspect to include in the advisor due to being too subjective.

### *Economy*

The results showed that almost 8 out of 10 respondents wanted to keep expenses low. These previously confirmed findings of the economy being an essential but very subjective aspect of the process. For the statement “*I am open to apply for a loan to buy my own car*”, every group except *Subscription* had respondents that agreed and disagreed. The results showed that even respondents in the *Car sharing* group were open to apply for a loan. One possible reason can be that the respondents in *Car sharing* are in an establishing phase and use the service as a temporary solution. Moreover, results show that young age segments, which might have less economic freedom than older age segments, are highly represented in *Car sharing* and that their preference for avoiding a car loan could be affected by this.

Results also showed that more respondents in *Leasing* agreed or somewhat agreed to be open to applying for a loan than those who disagreed or somewhat disagreed. Nevertheless, when presented with the statement “*I would rather lease or subscribe than buy a car if that allows me to avoid having a car loan*”, the results showed a clear division between the groups. *Leasing*, *Subscription*, and *Car sharing* had over 65 percent that chose “Agree” or “Somewhat agree” to the statement. The finding led to the reflection that “*being open to*” apply for a loan does not mean the respondents “*want*” to take a car loan. Therefore, a new question that combined the two statements was created; “*Would you rather avoid taking a car loan?*”, as it was believed to be less misleading and better at categorizing the groups.

Economy was considered an important aspect to include in the advisor.

### *Ideology and feelings*

*Owning* and *Leasing* had the highest share of respondents that expressed a medium or high interest in cars (almost 70%), compared to less than half the respondents in *Subscription* and *Car sharing*. One reason could be that those in *Owning* and *Leasing* feel a greater sense of responsibility and interest in their cars. Another could be that those with a high interest in cars desire to try a new car every 3-4 years and choose *Leasing*. On the other hand, none of the respondents in *Car sharing* expressed a high interest in cars, and over half of the respondents expressed a low interest.

The respondents’ feelings around sharing economy show that the ideology is shared within the group and that it is descriptive for the ownership type. However, it is uncertain if the respondents chose what they genuinely believe in, or if they are affected by a confirmation bias and thereby choose the ideological view that supports the decision they have made. The results show that the belief in sharing economy is more present in *Subscription* and *Car sharing* than in *Owning* and *Leasing*. Common for *Subscription* and *Car sharing* is that there is a belief that private ownership will decrease in the future

and that sharing economy suits them. Whereas in *Owning* and *Leasing*, respondents are prone to think the opposite. The results show that ideological views were important for dividing the characteristics of the ownership types.

Ideology was considered an important aspect to include in the advisor.

### 7.3.1 Development of ownership type characteristics as “personas”

Based on the analysis of the survey results, one “persona” with specific characteristics was made for each ownership type. Personas are fictional characters created based on research to represent the different user types that might use the service (Dam & Siang, 2021). Creating personas helps to understand the users’ needs, experiences, behaviors, and goals (Dam & Siang, 2021).

The survey analysis brought forth a set of aspects that characterized (groups of respondents in) the different ownership types. As such, personas were made to illustrate how a typical user of each ownership type behaves. These are displayed in Figure 7-22. The characteristics are representative based on the results and analyses made; however, since a persona is an archetype of a user, they are not suited for describing every single user within an ownership type (Plantenberg & Pesot, n.d.).

The characteristics of *Owning* and *Leasing* are similar in many ways. For example, if a person appears to be in the age segment 35 - 60, this is typically when the person is a parent and uses the car many days per week and has a medium to high interest in cars. The main difference between the two is the desire to avoid taking a car loan, where *Leasing* would rather avoid it, and *Owning* does not want to avoid it. Moreover, as the results found that respondents in *Leasing* had the highest interest for cars, the persona for *Leasing* has a higher interest for cars than that of *Owning*.

Furthermore, the personas created for *Subscription* and *Car sharing* are similar in several aspects. The typical user sees the car as means of transportation and is prone to want to avoid responsibility, has a low to medium interest in cars, wants to avoid a loan, has faith in sharing economy, and cares about the environment. The differences can be seen in how many days per week they use the car, the age, and the role of being a parent.



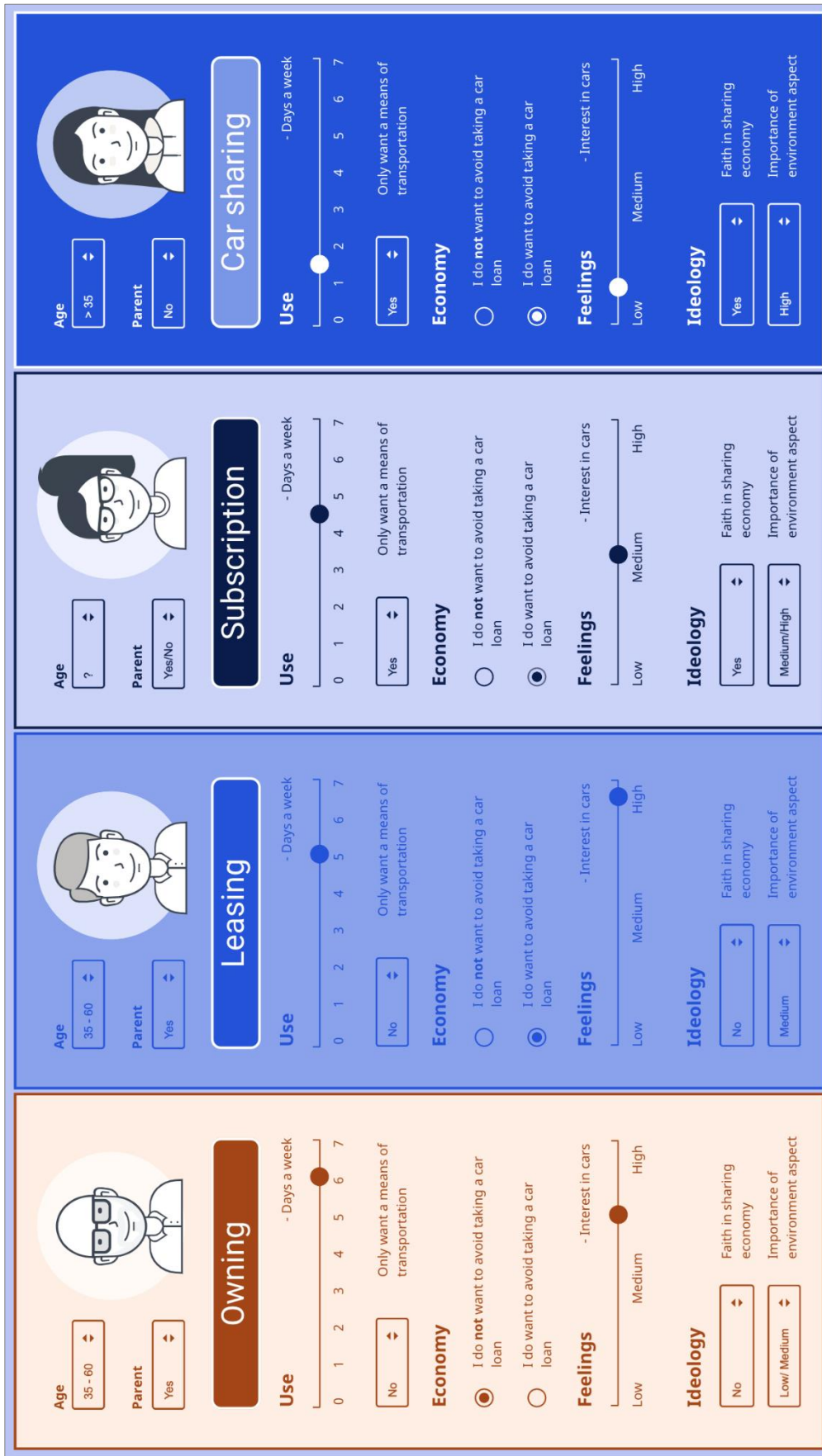


Figure 7-22 The four personas of the ownership types; Owning, Leasing, Subscription and Car sharing. Made by the authors.

## 7.4 Summary

The purpose of the fourth phase was to define each ownership type's characteristics to find the exact categories and questions that were of importance to assign a recommended ownership type to the consumer. The results confirmed that the car acquisition process is complex and determined by several factors. To categorize consumers in an ownership type is generally challenging, as consumers' preferences in the same ownership group vary. Nevertheless, the data collected from the survey allowed for an analysis of many aspects, and the strongest characteristics of each ownership type were identified and structured in four personas. The characteristics were categorized into the aspects Life stage, Economy, Use and Responsibility, Feelings and Ideology, which were also identified as the categories that the final development of the advisor should include.

Moreover, the results showed that over half the respondents stated that an advisor on choosing the right ownership type could be useful. Among these, 40 percent already owned a car, indicating that the advisor is useful to a broader audience than expected. Nevertheless, 16 percent of the respondents did not think an advisor would be useful, and these were from the groups *Leasing* and *Owning*, which could be due to their age and experience, that they already have an ownership type that they are satisfied with, and do not seek other options. Furthermore, the results showed that 16 percent of the respondents changed their preferred ownership type after being presented with the benefits of each type. It is unknown what this change was caused by, but it could have been due to little knowledge about other ownership types or that they were on the verge of trying something new.

Finally, the discoveries and development made in the fourth phase allowed for the final development of the digital advisor, which is presented in the next chapter.

## 8. FINAL DEVELOPMENT - DIGITAL ADVISOR FOR CAR ACQUISITION

Based on the insight acquired and the work performed in the four phases, a final concept was developed; a digital advisor for car acquisition. The development of the final concept is divided into front- and back-end. The back-end is the weighted system that calculates a recommendation based on input from the end-user. The front-end is a visual model that shows how the digital guide will look and function.

### 8.1 Weighted model for the digital advisor (back-end)

To create a digital advisor that would give the end-user decision support in the car acquisition process, a similar model to a political party guide used during political campaigns (“Valgomat” in Norwegian) was chosen as a template. To choose which statements and questions to include in the advisor, theory on the matter was studied. The selection process is a very important part of constructing an advisor, the theme, the exact words used, and the formulation of statements can produce different results. (Sand et al., 2015). This is confirmed by the results of phase 4, which showed that some questions have a clear trend and division of the ownership types, whereas others do not. Only the statements and questions with the clearest trends were selected and included in the final development of the advisor.

The interactive data visualization tool Tableau was used to visualize the statements based on the Likert scale and the results were divided into the ownership type groups created in phase 4. Then the mean of responses was extracted and used to evaluate how the different questions and statements had an impact on the different ownership type groups. The categories and number of questions included in the advisor were *Life stage* with two questions, *Economy* with two questions, *Use and responsibility* with two questions, *Feelings* with one question and lastly *Ideology* with two questions. The weighting system is shown in Table 8-1. By using a scale for answer (low, medium, high) rather than two alternative answers (yes, no) will give the advisor a more accurate and nuanced result. The advisor is built with a combination of both because some of the questions and statements only have two outcomes, while others are in need of a more nuanced picture. The scale -1 to 1 was chosen to be able to give each statement and response a negative, neutral or positive relation to each ownership. This way one can use the results from phase 4 and the characteristics description a selected value. When all the questions have been answered, the sum of weights is calculated and the two ownership types with the highest scores are presented to the end-user. It was chosen to present two ownership types and not only one, because of the complexity of the process that has been identified in the previous phases. By presenting two alternatives, the end-user can evaluate the alternatives against each other. If three ownership types have the same score, then all three of them are presented. In this case it is considered that it is best the end-user gets a chance to evaluate the alternatives or go through the advisor again.

Table 8-1 The digital advisor categories, questions and the distributed weights of each. Made by the authors.

Category	Question	Answer	Owning	Leasing	Subscription	Car sharing
Life stage	Are you a parent of a child between 0-20 years of age?	Yes	1	1	1	0
		No	0	0	1	1
Life stage	How old are you?	<35 years	0	0	1	1
		[35-60] years	1	1	1	0
		>60 years	0	0	1	1
Economy	Would you rather avoid taking a car loan?	Yes	0	1	1	1
		No	1	0	0	0
Economy	If "Yes" in question above: Which payment plan would you prefer?	All at once	1	0	0	0
		Medium/ large one-time payment and less during the period	0	1	0	0
		No one-time payment. Higher monthly cost	0	0	1	0
		Yearly small fee plus pay per time the car is used	0	0	0	1
		No preference	0	0	0	0
Use and Responsibility	How often do you/would you use your car in a week?	0-3 days	-1	-1	-1	1
		4-5 days	1	1	1	0
		>5 days	1	1	1	-1
Use and Responsibility	Do you only want a means of transportation from A to B, and would rather avoid the responsibility related to having a car?	Yes	0	0	1	1
		No	1	1	0	0
Feelings	How is your interest in cars?	Low	0	0	0	1
		Medium	1	1	1	1
		High	1	1	1	0
Ideology	In what degree is the environmental aspect important to you?	Low	1	1	0	0
		Medium	1	1	1	1
		High	0	0	1	1
Ideology	Do you believe that there will be more sharing economy and less private ownership in the future?	Yes	0	0	1	1
		No	1	1	0	0
<b>Total sum of weights</b>			<b>11</b>	<b>11</b>	<b>14</b>	<b>11</b>

The sum of weights in the different ownership types are almost equal. *Owning*, *Leasing* and *Car sharing* have a sum of 11, while *Subscription* has a sum of 14. The first reason for the higher sum of weights in *Subscription* is because it is an option that can suit many end-users due to its versatility and flexibility. The second reason is that the end-user will always be recommended two ownership types, and *Subscription* is one that can be paired with the other ownership types.

An example of how the weighting system works is that when the end-user gives the answer “Yes” on the question “Are you a parent?” would mean that *Car sharing* is assigned the weight of 0, whereas *Owning*, *Leasing* and *Subscription* are assigned the weight of 1. The weighting is based on the results shown in phase 4, however some of the weights are created to have an educational purpose. Respondents with children were more prone to choose *Owning* and *Leasing*, and so they are assigned the weight of 1. *Subscription* is also relevant due to the versatile utilization and therefore it is also assigned the weight of 1. *Car sharing* is assigned the neutral weight of 0, because results showed that respondents were less likely to use a car sharing if they had children. Nevertheless, if the end-users live in the city center of Oslo where the access to car sharing services is high, it should still be an alternative.

Another example is use per week. The end-user is given three alternatives: “0-3 days”, “4-5 days” and “>5 days”. If the end-user chooses the alternative “0-3 days” per week, *Owning*, *Leasing* and *Subscription* will get a weight of -1, whereas *Car Sharing* gets a weight of 1. The reason for the negative weights is the educational aspect, as mentioned in the previous paragraph. When the end-user does not need the car more than a couple days a week, then the most environmental and economical ownership type is not *Owning*, *Leasing* or *Subscription*. Moreover, if the end-user chooses the alternative “>5 days”, *Owning*, *Leasing* and *Subscription* will get a weight of 1, whereas *Car Sharing* gets a weight of -1. Again, the advisor seeks to educate the end-user, and suggest an alternative that best suits their needs for accessibility.

## 8.2 Design and looks of the digital advisor (front-end)

The design and looks of the digital advisor were made in the online software Figma, which allows for a visual user experience with clickable buttons without any back-end programming.

The prototype of the digital advisor can be accessed and tested [here](#).

The first page of the prototype is shown in Figure 8-1 and introduces the end-user to the different options of applying for a car loan, applying for a financing certificate, or getting guidance on which ownership type to choose.

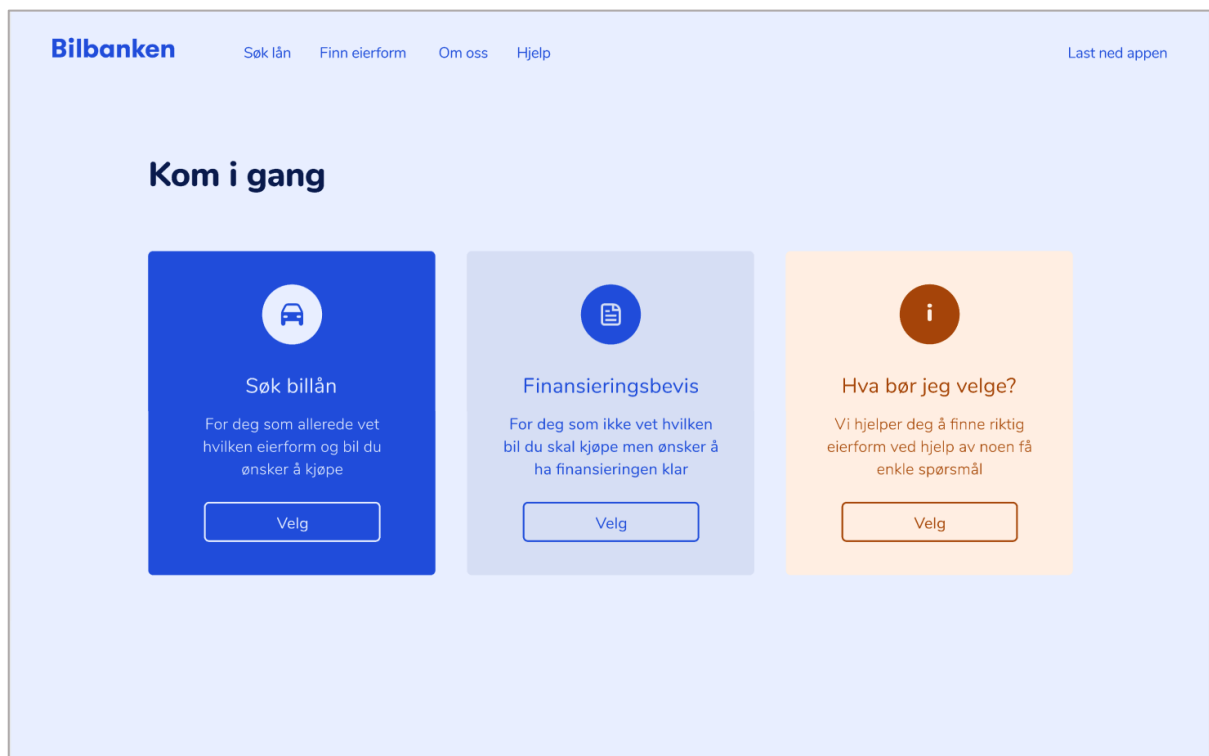


Figure 8-1 The page showing when the user has clicked on the "get started" button from landing page.

When choosing the yellow box to the right in Figure 8-1, the end-user is introduced to a summary of the advisor in order to get an overview of the content and prepare for the questions to come (Figure 8-2).

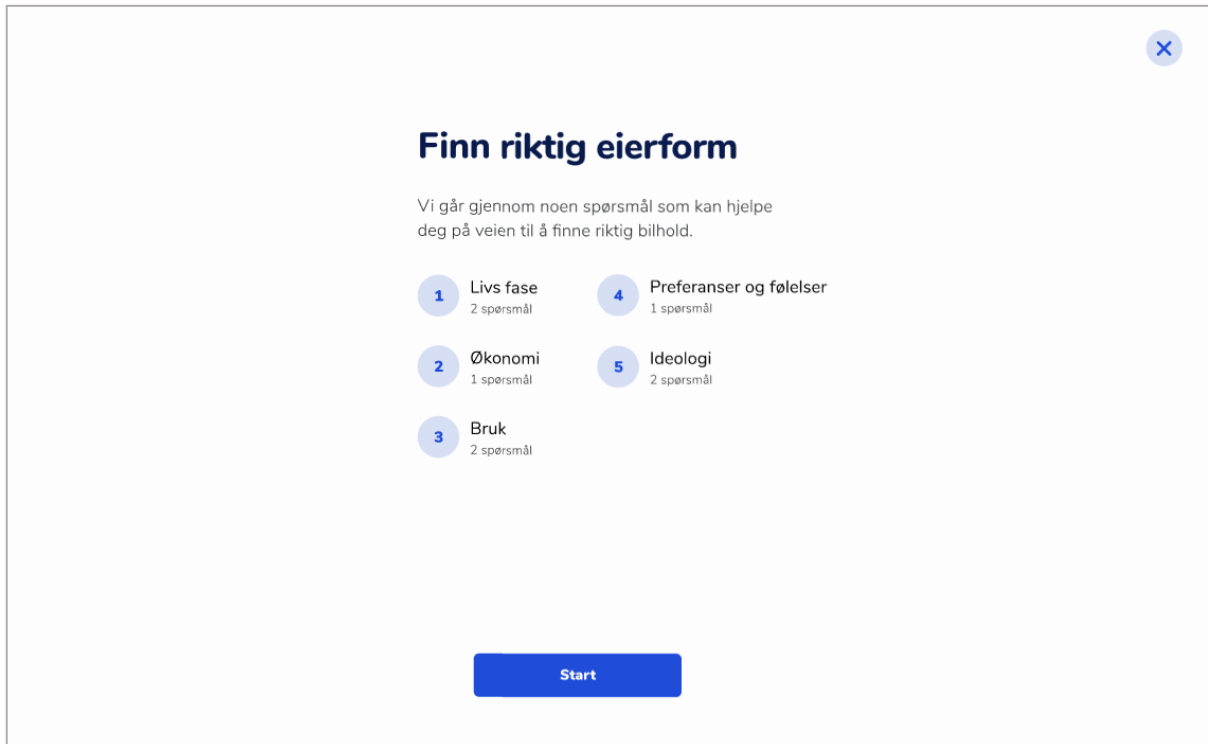


Figure 8-2 The overview page at the beginning of the digital advisor where all categories are presented and the number of questions in each of them. Made by the authors.

Then the end-user starts the advisor. In Figure 8-3, the first two questions from the category “Life stage” of the person are presented along with the answer alternatives. After answering, the user is to click the “Neste” button to get to the next page.

**Din livssituasjon**

1 Livs fase  
2 spørsmål

2 Økonomi  
1 spørsmål

3 Bruk  
2 spørsmål

4 Preferanser og følelser  
1 spørsmål

5 Ideologi  
2 spørsmål

2/3 spørsmål

Er du en forelder til et barn som er mellom 0 og 20 år gammel?

Ja  Nei

Hvor gammel er du?

Under 35 år

Mellom 35 og 60 år

Over 60 år

Tilbake Neste

Figure 8-3 The first page of the advisor with the category “Life phase” containing two questions about parenthood and age of the user.



Next, the three questions from the categories “Economy” and “Use and responsibility” of the car are presented to the user (Figure 8-4).

The screenshot shows a web-based advisor interface. On the left is a vertical sidebar with five numbered steps: 1. Livs fase (2 spørsmål), 2. Økonomi (1 spørsmål), 3. Bruk (2 spørsmål), 4. Preferanser og følelser (1 spørsmål), and 5. Ideologi (2 spørsmål). A progress bar below the sidebar shows 5/8 spørsmål completed. The main content area is titled "Hva er din livssituasjon og hva bruker du bilen til?" and contains two sections: "Økonomi" with the question "Vil du helst unngå å ta opp lån?" and radio buttons for "Ja" (selected) and "Nei"; and "Bruk" with the question "Ønsker du å kun benytte bilen som et transportmiddel og slippe alt ansvaret som følger med det å ha en bil?" and radio buttons for "Ja" (selected) and "Nei". Below this is a frequency question: "Hvor mange ganger i uka vil du bruke bilen?" with a slider set to "4.gang/uken". At the bottom are "Tilbake" and "Neste" buttons.

Figure 8-4 The second page of the advisor with the category "Economy" and "Use" containing questions about the economic situation of the user and the intended use of the car.

On the third page of the advisor, the last three questions from the categories “Feelings” and “Ideology” are presented.

The screenshot shows a user interface for an advisor. On the left is a vertical sidebar with a progress indicator. It lists five categories: 1. Livs fase (2 spørsmål), 2. Økonomi (1 spørsmål), 3. Bruk (2 spørsmål), 4. Preferanser og følelser (1 spørsmål), and 5. Ideologi (2 spørsmål). A blue bar below the list indicates the current progress, with '8/8 spørsmål' shown at the bottom. The main content area is titled 'Interesse og delingsøkonomi' and contains two sections: 'Interesse' and 'Ideologi'. The 'Interesse' section asks 'Hvor stor er din interesse for bil?' with three buttons: 'Liten', 'Medium' (selected), and 'Stor'. The 'Ideologi' section asks 'I hvor stor grad er miljø og bærekraft viktig for deg?' with three buttons: 'Liten', 'Medium', and 'Stor' (selected). Below this, it asks 'Tror du det vil være mer delingsøkonomi og mindre privat eierskap i fremtiden?' with two radio buttons: 'Ja' (selected) and 'Nei'. At the bottom of the main area are two buttons: 'Tilbake' and 'Neste'.

Figure 8-5 The third page of the advisor with the category "Feelings" and "Ideology" containing questions about the users interest in cars and environmental engagement.

Lastly the results are calculated, and the user is presented with two personalized recommendations. Figure 8-6 shows a scenario where the end-user is recommended the car ownership types *Subscription* and *Car sharing* based on the answers given in the advisor. The listed benefits of each ownership type are based on insight gathered from respondents in phase 4, where they were asked to pick the three most attractive aspects of each ownership type. The aspects chosen by the most respondents have been added as the benefits in the solution. The end-user then has three alternatives; to go through the advisor again, to change their given answers, or to look further into the recommended ownership types.

The screenshot shows the Bilbanken website interface. At the top, there is a navigation bar with the logo 'Bilbanken' and links for 'Søk lån', 'Finn eierform', 'Om oss', and 'Hjelp'. A 'Last ned appen' link is also present in the top right corner. The main heading reads 'Basert på dine svar tror vi disse alternativene vil passe deg'. Below this, two alternative ownership types are presented in separate boxes. The first box, 'Bilabonnement', lists benefits such as 'Forutsigbar månedskostnad', 'Ny bil', 'Slipper å ta opp lån', 'Dekkbytte og forsikring inkludert', and 'Service inkludert'. The second box, 'Bilkollektiv', lists benefits like 'Ingen bindingstid', 'Betaler kun for det du bruker', 'Billig bruk av bil', 'Slipper å tenke på parkering', and 'Stort utvalg av biltyper og størrelser'. Each box has a corresponding 'Velg' button. At the bottom, there are links for 'Endre svarene mine' and a prominent blue button labeled 'Ta testen på nytt'.

Figure 8-6 The results page containing two alternative ownership types for the user to explore. Attractive aspects are listed below each ownership type, based on insight from phase 4.

## 9. DISCUSSION

This thesis has performed four phases where insight from consumers about the car acquisition process and its challenges has been gathered, and ideas and concepts have been tested. The solution to the identified consumer challenges was a digital advisor that provides the end-user with two recommended ownership types, based on their input about needs and preferences. This chapter will present a discussion of the development and viability of the advisor and whether the goal of the thesis was achieved. Moreover, it will present the practical implications for the case company and discuss the limitations of the research.

### 9.1 Development of the digital advisor

The combination of aspects that are important to consumers when choosing a car ownership type, is an intricate combination and based on subjective opinions. The categories Life stage, Economy, Use and responsibility, Feelings and Ideology, in the advisor were formed based on feedback from consumers in phase 2 and 3 on which aspects they evaluated in the process and on the analysis of the results in phase 4. Although it is a complex matter and not easy to specify exactly what makes people choose one alternative over the other, several aspects were found to be useful for forming a recommendation.

The advisor strives to have a balance between recommending an ownership type based on what the end-user prefers and what the end-user needs. It educates end-users on which ownership type suits their need for mobility, while at the same time evaluating the alternatives based on their pre-defined preferences. This allows them to understand and evaluate several relevant options based on their personal situation.

In order to avoid consumer confusion in the advisor, a balance of the right number of questions to not confuse the end-users and having enough questions to give a good recommendation, was important. For several of the categories and questions that were tested, it was found that the consumers' subjectivity caused a risk of poor quality of the input. These findings accentuated the importance of creating precise and useful questions. The weighting on the questions were made based on analyses throughout the four phases and were focused on not giving the ownership types too much of a benefit or punishment. The scale of answer alternatives to each question and the scale of weighting of -1, 0, 1, was used to give a nuanced weighting and outcome. The suggested weighting structure is believed to be representative for the market patterns that were discovered in the study, but further testing of its accuracy will be recommended for the case company in Chapter 9.3.

Although there are only four ownership types that could be recommended, the advisor provides the end-user with two recommended types instead of only one. The intention is that this will give end-users a better basis for comparing the relevant alternatives with each other and applying the insight to their situation and thereby making a conscious decision. There is a risk that the questions asked in the advisor are not sufficient for covering all the characteristics of an end-user and that the recommendations can be perceived as irrelevant. The act of providing two alternatives can cater for this risk.

It should be noted that the advisor is targeted at end-users in Oslo and other big cities, since smaller cities might not have car sharing or subscription options. If the advisor is expanded to target end-users in other cities in the future, it should either include questions about the place of residence or remove the irrelevant ownership types. Another chosen limitation of the advisor is that it does not include a price calculator and comparison of cost of the different ownership types, although the financial aspect was found to be important for many consumers. This is due to two reasons; the perception of low and high cost is subjective, and each ownership type offers several pricing levels that the consumer can consider.

## 9.2 Viability of the digital advisor

The mobility sector is currently undergoing a tremendous change and consumers are faced with more options than ever. Consumers who want to have access to a car today can choose between the ownership types *Owning*, *Leasing*, *Subscription*, and *Car sharing*. Consumer confusion in the process of evaluating information and choosing one of the many alternatives in the market, was identified as the main challenge for consumers through the work performed in the thesis. Although consumers mainly seek information on digital platforms in the process, and there is much information available about each ownership type, most consumers find it hard to evaluate these against their needs. The outlined decision-making process (Figure 5-1) shows the high number of elements the consumers assess and the number of steps they go through before acquiring a car.

The thesis found that the decision-making process for car acquisition is constructed by many evaluations. Each consumer has a set of aspects, needs, and preferences that make them choose different ownership types. The developed digital advisor uses input values from end-users within a set of categories and evaluates each ownership type *on behalf of* the end-users based on their input. The advisor includes questions in several categories to advise based on a well-founded set of factors. The recommendation is calculated with a weighting system where each answer is assigned a weight, and the outcome is a personalized recommendation that simplifies the decision-making process. Moreover, by allowing the end-users to go through a set of questions where they reflect on their situation, they can become more adept at choosing a suitable ownership type.

The advisor provides the end-users with an unbiased decision-support as it evaluates the four main categories of current car ownership types, and the probability of being recommended either type is close to equal. The ownership type *Subscription* can potentially reach three more points than the other ownership groups due to its attributes being relevant for many people. However, since the advisor provides two recommendations at the end, this difference in weighting points will not necessarily have a significant impact. Furthermore, the unbiasedness is accentuated by the fact that Bilbanken can recommend its end-users on alternatives other than those that might be most profitable for the business.

Insight gathered in phase 4 showed that only 18 percent of respondents stated that it was easy to choose an ownership type based on their needs, and over half of the respondents expressed that an advisor for choosing the right ownership type would be useful. Among the respondents in *Subscription* and *Car sharing*, 100 and 79 percent, respectively, stated that an ownership guide could be useful.

Moreover, almost half the respondents in *Owning* and *Leasing* stated the same. Insight also found that there are consumers who do not find it difficult to find and evaluate information and choose an ownership type. Therefore, the advisor might not be suitable for everyone in the market, but it does provide guidance to those who want it.

Finally, the solution does not cover all aspects that every end-user evaluates in the process and has been slightly generalized to advise a broad audience. With two recommended ownership types, end-users can make their comparisons and reflections. To summarize, the advisor provides the end-user with an unbiased decision-support for acquiring a car.

### 9.3 Practical implications for the case company

The developed digital advisor should be included on the front page of Bilbanken's website or app. The advisor can attract new potential customers who need guidance in the acquisition process and work as a funnel into other procedures, such as applying for a car loan or receiving offers from relevant car dealerships and subscription and car sharing providers.

Moreover, it is an excellent way for Bilbanken to get to know its customers and their preferences. Data about customers can help the company develop new business strategies, as it allows them to analyze market trends and see which services they should offer to the relevant segments. An unbiased advisor can also create a trustful relationship between the company and its customers. Independent of how satisfied end-users are with the advisor's outcome, it can educate the market about different car ownership types and become aware of new environmentally friendly alternatives. Furthermore, it can send consumers into an acquisition process with relevant partners that provide the different ownership types. These relevant business leads could be a potential income source for Bilbanken. A list of potential partners has been outlined and is attached in Appendix A.

A significant amount of insight about market trends has been collected and confirmed through the four phases of interviews and testing. The work performed provides Bilbanken with the critical finding that many aspects affect consumer behavior in the car acquisition process, which states the importance of understanding the current and future trends in the market. Furthermore, the study has confirmed that *Owning* and *Leasing* are still the most dominant car ownership types today. Yet, it has also shown that the sharing economy is growing and becoming more popular especially for young, but also older, age segments. As stated previously, Millennials will account for a big part of the car acquisition in the next decade. Therefore, it is essential to understand their behavior to make valuable products and solutions.

Moreover, the study found that many consumers wish to be guided in their decision-making process. The digital advisor can give the case company an advantage as they answer one of the main challenges of today's consumers; evaluating information and alternatives and making a decision. By providing a service that consumers desire, Bilbanken can differentiate itself from other institutions and aid in its goal to be a consumer-oriented bank.

## 9.4 Limitations of the study

Although the results of all four phases show that the developed digital advisor has potential and that it is a wanted solution, there are limiting factors to the advisor's value. The first limitation is the lack of testing with unbiased interviewees and a small range of age segments in the first three phases. Another element that could have been done differently is the method of the interviews and testing. For example, using transcription- and analysis tools to avoid taking notes during the qualitative interviews could have given a more fluent conversation. Moreover, this could have affected how the interviewees responded and experienced the situation.

As for the survey in phase 4, several aspects could have given different results. Firstly, if respondents did not have enough knowledge about the various ownership types, it could have affected the quality of their answers. One example of this is the relatively new alternative *Subscription*, with which consumers have limited experience. This can have impacted all the results concerning the subscription group and the interpretation of the characteristics. Secondly, the order of the questions can have impacted the characterization of behavior within the ownership types. Questions about preferred ownership type were asked in the last part of the survey, and if the respondents were uncertain about their opinions or changed their attitudes throughout the survey, their previous answers might not have been representative for that ownership type. The relation between the behavior they had shown throughout the survey could thereby wrongly affect the average behavior and characteristics within the ownership type group they were assigned.

Moreover, respondents might have responded based on which ownership type they believe they can afford now, and not what they could afford if they knew about all the possibilities and the actual cost of each ownership type. Another limitation of the survey is that it was intended to research the consumer behavior in the acquisition process of a "primary" car. However, the survey was not specific on whether the respondents were meant to think of their primary or secondary car. For example, respondents might have considered the options differently if they thought of the acquisition of a second car.

In this thesis, consumers who were interviewed and surveyed were not asked to provide information about their socioeconomic status. Outlining this factor could have improved the quality of the analysis and development of the advisor, as a person's socioeconomic status can affect the willingness to participate in sharing economy (Iversen & Hem, 2018). Nevertheless, most of the age segments were represented in each ownership type groups, and this confirmed that the different alternatives could suit many different types of consumers.

Lastly, the researchers could have included Bilbanken to a greater extent in the development phase to benefit from their resources and new perspectives.

## 10. CONCLUSION

The goal of this thesis was to develop a digital advisor that would provide the end-user with unbiased decision support for acquiring a private car. The performed work and results of the study clearly show that car acquisition is a complex process where consumers consider many aspects, are faced with numerous alternatives, and find it challenging to make decisions.

To achieve the described goal, the Design thinking framework was used to collect data, reflect, and develop in phases. First, a preliminary understanding of the market was achieved through performing a literature review about trends in the mobility market, environmental drivers, sharing economy, and the psychology of the decision-making processes. Moreover, interviews were held with consumer matter experts to understand market trends and consumers from another perspective than direct consumer insight. The findings in the preliminary research formed the framework of the study. The study was then performed in four phases, where each phase built upon the insight acquired and the concepts tested in the precedent phase.

The first phase was focused on understanding and exploring the car loan application process by testing current solutions and interviewing consumers. The results showed the car loan application process was not considered problematic for consumers. The main challenge was searching, navigating, and evaluating information, and thereby deciding on an ownership type that suited their needs and preferences.

The second phase was focused on gaining a better understanding of the consumer information search and decision-making process. Based on the acquired insight into how consumers acted, the decision-making process was outlined. A simple prototype for a digital advisor was created as a suggested solution to the identified challenges in the process.

The purpose of the third phase was to test the prototype and define the content of a digital advisor. The testing resulted in the discovery of new categories and questions to include and modifications of the initial content.

The fourth and last phase was used to detect the defining characteristics of the four ownership types *Owning*, *Leasing*, *Subscription*, and *Car sharing*. Based on the data and statistics collected through a survey, the characteristics were defined. Finally, four personas were made to illustrate the characteristics of a typical consumer in each ownership type.

The final solution was developed based on the performed work throughout the four phases: a digital advisor with front- and back-end specifications. The developed back-end solution is a weighting system that assigns weights to the answers in the advisor. Based on the answers the end-user gives through nine questions in the categories *Life stage*, *Economy*, *Use and responsibility*, *Feelings* and *Ideology*, the digital advisor recommends two ownership types based on the weighting system. The clickable front-end solution visualizes and simulates how the digital advisor will look and work.

The developed digital advisor answers the goal of the thesis as it provides the end-user with an unbiased decision support. The advisor can contribute in solving the challenge of consumer confusion in the



acquisition process, as it provides end-users with the possibility of evaluating and deciding on alternatives based on *their* situation, in contrast to assessing general advice available online. Even if the advisor should not give end-users precisely what they expect, it contributes to teaching them about the different options available and reflecting upon their needs. Furthermore, with the increasing number of new services and information, this is a place where all alternatives can be evaluated on an unbiased basis.

# 11. RECOMMENDATIONS FOR FURTHER DEVELOPMENT AT THE CASE COMPANY

## 11.1 Test solution and weighting

The weighting system of the developed solution should be tested with several end-users to fine-tune the weights according to the desired output. It should also be evaluated if the questions in the advisor are suitable for gathering enough information to provide valuable recommendations or if it should be extended with more questions and categories. A decisive aspect for the development of the advisor was to avoid consumer confusion by not giving the end-user too many aspects to consider, and therefore only 9 questions were included in the final solution. It is recommended that an extension with additional questions can be created for the end-users who want a more thorough process. It is also imperative to test how satisfied the end-users are with the recommendations from the advisor.

## 11.2 Suggested extensions to improve the digital advisor

To further improve the digital advisor, collecting data through a layer of APIs is recommended. An API structure can retrieve data about end-users from other sources and consequently reduce the amount of information that end-users must provide. One example is to use geo-tracking to give end-users better insight into how frequently they use different means of transportation such as car, public transport, bike, and more. The suggested APIs can be seen in Appendix H, and the API architecture is shown in Figure 11-1 below. By making end-users log in with BankID, they can grant permission for the advisor to collect data through APIs. This information can be used together with the input from the questions in the advisor to provide improved recommendations. Moreover, a data storage layer is suggested to store the (anonymized) user data collected in the advisor, as this can give valuable insight into potential customers. This insight can ensure that the relevant products and solutions are shown to the right customer segments.

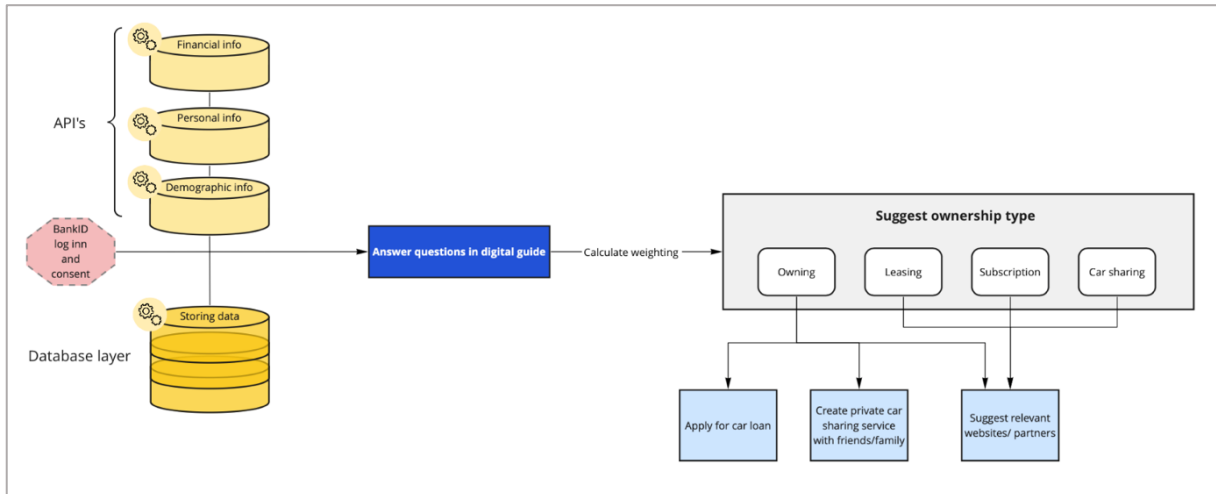


Figure 11-1 API architecture as a suggestion for further development of the digital advisor. It has a BankID log in, suggested APIs, database layer and how the process flow from the advisor to the outcome and suggested further path to Bilbanken's products.

It is recommended that a feature of comparing prices of different car ownership types is explored and potentially included in the advisor. By using the above outlined API structure, information about the end-user's private economy could be retrieved automatically and thereby facilitate the integration of the feature.

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## APPENDIX

### A. Examples of providers of the different ownership types

<i>Car ownership type</i>	<i>Examples of providers</i>
<i>Owning (New and used)</i>	Møller bil, Bertel O. Steen, Bilia, Nettbil.no, Auksjonen.no, Finn.no
<i>Leasing</i>	Motor Forum, Bertel O. Steen, Møller Bil, Leaseplan, Autolease.no, Privatelease.no
<i>Subscription</i>	Volvo Care, Carflex, Flex, Kinto, Turo, Swapacar, iMove
<i>Car sharing</i>	<b>Carpooling:</b> Bilkollektivet (Oslo), Bildeleringen (Bergen), HertzBilpool (Storbyer), Move about (Oslo), <b>Residential carpooling:</b> Otto. <b>Short/medium/long-term rental from professional:</b> Nabobil, Hyre, Vy bybil (Oslo), Hertz, Avis, Zipcar, Rentawreck. <b>Short/medium/long-term rental from private:</b> Nabobil

### B. Car loan application process test

The car loan application processes in Chapter 4.2 were evaluated with the input values below, and the factors considered were the number of information fields required in an average loan case, the number of times we had to log in with “Bank-ID” or similar, the number of days it took to get a first response and the nature of the first response, the number of days it took to get the final result, and if it was possible to apply for financing together with another person.

<i>Required fields</i>	<i>Input value</i>
<i>Yearly income</i>	Maximum 100 000 NOK
<i>Debt</i>	600 000 NOK
<i>Equity amount</i>	50 000 NOK
<i>Loan amount</i>	450 000 NOK
<i>Total</i>	500 000 NOK
<i>Civil status</i>	Married
<i>Job situation</i>	Student
<i>Car model applied for</i>	Polestar 2020

The results from the test are shown in the table below. Danske bank was not analyzed due to restrictions in which you needed to become a customer to apply for car loan.

Bank name	No. Of data fields	Personal info	Car info	Other	No. Of logins	Start	End	Activity	Time
<i>Dnb</i>	<b>21</b>	13	5	3	0	28.01.21	29.01.21	Phone	24 h
<i>Nordea</i>	<b>9</b>	5	Optional	4	1	28.01.21	29.01.21	Mail	IMM
<i>Sparebank 1</i>	<b>16</b>	10	Optional	6	1	28.01.21	28.01.21	Phone	30'
<i>Sbanken</i>	<b>20</b>	7	13		1	01.02.21	01.02.21	Direct message	IMM
<i>Santander</i>	<b>23</b>	15	Optional	8	1	01.02.21	01.02.21	Mail + SMS	IMM
<i>Bn bank</i>	<b>18</b>	12	2	4	0	01.02.21	None	None	None
<i>Danske bank</i>	<b>NaN</b>	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

The results show that there is a difference in the total amount of fields required, varying from 9 to 23 fields. Nordea had only 9 required fields whereas Santander have 23, and the median ones are SBanken and BN bank with 20 and 18 fields respectively. Another finding is that SBanken had 13 of the total 20 required fields dedicated to information about the car, while Nordea, Sparebanken1 and Santander have car information as an optional field. Nordea had only 5 fields of personal information and used BankID to gather the necessary information (API connection to "Altinn" where tax return forms and other personal information is stored).

The size of loan and equity/cash were mandatory fields in all the banks and each had an option to apply together with another person. DNB and BN bank were the only banks that did not provide a login solution to automatically fill information.

The different channels used for follow-up varied between emails, phone calls, SMS, direct message on site and a combination of the respective. Sbanken was the fastest to give a response with a direct message on site with an immediate rejection after the process end. BN Bank is the only bank that has not yet responded (31.06.21). DNB was the slowest bank with over 24 hours in response time.

The aim was to create an application process that used APIs to gather information about consumers, without asking them to write it themselves.

### C. Interview guide phase 1

The interview guide was the framework for our interviews, however several follow-up questions were asked in each interview in order to dig deeper into the problems.

- How do you/would you proceed when you want to acquire a car?
- If it is not relevant for you now - when do you think it will be?
- Who do you approach and consult in relation to acquiring a car? I.e. bank, insurance, car dealership, friends, family, colleagues, internet etc.
- What is the biggest/ smallest challenges related to the process of acquiring a car?
- What is the biggest/ smallest challenges related to having a car/ access to a car?
- How do proceed with financing the car acquisition? Are there any challenges in this process?

- Do you think your situation will change in the next 5-10 years? How do you believe your needs in relation to mobility will change?
- How would you like to be guided on car acquisition when your life situation changes?
- Range these problem statements and comment
  1. It is time consuming to apply for car loan. I must do good research in advance on the type of car and ownership type I want, and I have to be well aware of my personal financial situation.
  2. To provide the great amount of information that is needed in the auto finance application process is an annoyance and a pain point.
  3. It is difficult to know what it takes to get a loan (equity, income, future promise of income, guarantor, joint venture, etc.). I feel like one of many applicants and distant from the bank, and the rejection comes abruptly without further explanation.

## D. Suggested API structure for car loan/onboarding process at Bilbanken

<i>Bank name</i>	<i>No. Of data fields</i>	<i>Personal info</i>
<i>KYC</i>	Personal information	<a href="#">Altinn</a>
	KYC information	<a href="#">Signicat</a>
<i>Credit scoring</i>	Credit information	<a href="#">Bisnode</a>
	Updated data on debt	Banks with APIs Horde
	Property data	<a href="#">Lånekassen</a> <a href="#">Ambita</a>
<i>Car</i>	Information about previous/current/future car	<a href="#">Finn.no</a> <a href="#">Statens Vegvesen</a> <a href="#">Motorvognregisteret</a>

## E. Example of the calculations done by an interviewee in the process of acquiring a car

Nr	Pris	Årsmodell	Km stand	Gjenv. garanti (Mnd)	Sted	Link:	Kommentar
1	NOK 208,000.00	2017	61,500	30	Son	<a href="https://www.finn.no/car/used/ad.html?finnkode=146386327">https://www.finn.no/car/used/ad.html?finnkode=146386327</a>	
2	NOK 215,000.00	2017	76,400	34	Askim	<a href="https://www.finn.no/car/used/ad.html?finnkode=147918541">https://www.finn.no/car/used/ad.html?finnkode=147918541</a>	
3	NOK 215,000.00	2017	55,000	30	Frogner (Aker.H)	<a href="https://www.finn.no/car/used/ad.html?finnkode=146735993">https://www.finn.no/car/used/ad.html?finnkode=146735993</a>	
4	NOK 219,000.00	2017	72,000	29	Kjeller	<a href="https://www.finn.no/car/used/ad.html?finnkode=147591505">https://www.finn.no/car/used/ad.html?finnkode=147591505</a>	
Gjennomsnitt	NOK 214,250.00	2017	66,225	31			
5	NOK 227,000.00	2017	40,300	40	Askim	<a href="https://www.finn.no/car/used/ad.html?finnkode=146708613">https://www.finn.no/car/used/ad.html?finnkode=146708613</a>	Ser meget bra ut
6	NOK 229,000.00	2017	43,300	36	Frogner (Aker.H)	<a href="https://www.finn.no/car/used/ad.html?finnkode=148215867">https://www.finn.no/car/used/ad.html?finnkode=148215867</a>	Vinterdekk? Forhandler
8	NOK 229,000.00	2017	41,000	40	Ås	<a href="https://www.finn.no/car/used/ad.html?finnkode=147232113">https://www.finn.no/car/used/ad.html?finnkode=147232113</a>	
Gjennomsnitt	NOK 228,333.33	2017	41,533	39			

Her har jeg søkt på Hyundai Ioniq for Østfold, Vestfold, Akershus og Oslo. Dette er per dags dato de eldste bilene som ligger ute. Bilene kom i 2017 og kostet ca 280 000 ny med teknikkpakke og vinterdekk. En 2019 modell koster i dag 340 000 kr. Litt usikker på hvorfor prisen har økt, men det kan ha med at bilen har blitt svært populær.

Av tabellen over ser vi 6 mulige bilkjøp. Det interessante med disse tallene er at differansen mellom gruppe nr 2 og gruppe nr 1 er ca 25 000 km i km stand og 8 måneder gjenværende garanti. Det er omtrent akkurat den perioden det ville vært aktuelt for meg å eie en Ioniq. Faktor nr 2 er at jeg da antar at et kjøp i gruppe to er det mest fornuftige da bilen fortsatt vil ha 2 års full garanti igjen ved et salg.

**Verditapet på en slik periode er gitt per i dag til kun 14 000 kr, noe som er svært bra.**  
Så vidt jeg klarer å regne meg frem har det årlige verditapet vært på gjennomsnittlig 280000-215000/2,5 = #\*\*\*\*\*

Jeg tror denne bilen holder seg på dette prisnivået av noen grunner:  
Den går moderat langt (240 sommer og 160 vinter).  
Den lader klart raskere av alle biler ute nå (Bortsett fra Tesla) 100 kw i timen, mot 50 kw i som er normalt.  
Elbilforeningen har kåret Hyundai sin garanti til den beste av alle merkene.  
Den er en relativt billig elbil, gitt lengde og utstyr.  
Teknikkpakken som alle disse bilene har svært omfattende, den passer godt på batteriene, gir god kjørekomfort og det ivaretar hastighet på lading mye bedre enn konkurrentene.

**Andre faktorer kan virke inn**  
Elbilmarkedet er i stor endring. Det kommer stadig nye modeller, ny teknologi og andre forbedringer. Lansering og levering av nye modeller kan påvirke brukmarkedet betraktelig og gjøre store utslag i verdifall. Dette var tilfellet nå i vår da Tesla plutselig klarte å levere 3000 modell 3 på ca 2 måneder. Dette er dog unormalt, men man må prøve å være obs.

**Modeller som kan påvirke prisen ekstra i høst er:**  
Levering av ca 1500 E-niro med rekkevidde på 280-400 km. Pris 350 000 kr.  
Levering av ca 2000 Mercedes EQC. Pris 700 000 kr.  
Levering av ca 1000 DS 3 Crossback E-Tense. pris 350 000 kr.  
Mulig levering og bestilling av enda en billigversjon av Tesla 3 til rundt 300 000. Antall er svært usikkert.

Så vidt jeg klarer å lete meg frem er dette de bilene som skal helt sikkert bli levert for første gang denne høsten.  
Det er ikke det samme volumet som Tesla M3 i vår. Det er heller ikke over en så kort periode. Men at dette kan påvirke et verdifall ekstra på mellom 10 og 30 000 kr. Det kan man ikke utelukke.  
Dette da fordol folk selger sin nåværende Ioniq for å endelig få en dyrere og bedre bil de har ventet på.

Et annet element som definitivt kan påvirke prisen er at Hyundai skal lansere en Ioniq med 80 km lenger rekkevidde i oktober. Det er usikkert å si hvor mye det betyr på en da 3 år gammel bil. Men det kan absolutt gjøre at færre har lyst på en slik bil.

**Videresalg**  
Et viktig moment ved å selge bilen, tror jeg er å selge den i desember eller tidlig i januar 2020. (Med mindre dere på Bisseberg ønsker bilen permanent). Dette i hovedsak pga 2 grunner:  
I 2020 kommer det mange nye bilyshyer (Melder bransjen om) og de vil ha lenger rekkevidde og forbedret teknologi. Levering av blant annet Kia E-soul, muligens Kia Niro. Hyundai Kona, forbedret Hyundai Ioniq, Volkswagen Neo, Mini electric osv. Det er også meldt at reglene for produksjon av El-bil i EU vil endres i 2020, slik at produksjonen hos de ulike merkene vil øke og leveringene da vil være mye større.

Hyundai Ioniq er blitt en svært populær bil å leise. Leasingtid er ofte 3 eller 4 år. Bilen ble nå lansert for 2 år siden, som gjør at det er naturlig å tenke at en god del leasingbiler på 3 år vil bli lagt ut for salg rundt da. Om disse kommer i desember, tidlig januar eller januar og februar, det er uvist. Men jeg antar at prisene da vil påvirkes en god del.

Hvis man klarer å selge bilen før de to ovennevnte faktorene inntrer så tror jeg definitivt det vil minimere risikoen for verdifall betraktelig, men det er klart man aldri helt kan forutsi slike ting.

**Konklusjon:**  
Viktige momenter for meg i høst er en bil som er relativt billig i drift og er driftssikker. Det er også en bonus at bilen er godt å kjøre siden det desverre må bli en god del km på meg i høst med jobb og kamilla. Det er alltid en risiko ved kjøp av bil, bruktbil og den type ting. Det er heller ikke spesielt gunstig å sitte på masse lån, og en potensiell posisjon med to biler for en periode, men kostnaden og risikoen knyttet til en gammel bil er i mine øyne enda større.

☰ **Drifning Ioniq og markedet**   Drift Bensinbil   Drift Elbil   Drift Elbil lenger kjørelengde   Drift leasing   Oppsummering ulike alternativer   Kostnader Bil A og K   +

Kjørelengde ukentlig		Antall arbeidsdager/pendler-uker 2019		Parkering	
Dag	Hva	Antall	År	Betalbar	Østfold
Mandag	Sørp-dagernes	80	3	4	2
Tirsdag	Sørp-dagernes og trening	100	4	4	220
Onsdag	Sørp-dagernes og Oslo	122	4	4	4386
Torsdag	Sørp-dagernes og trening	100	4	4	2
Fredag	Sørp Oslo	124	4	4	20000
Lørdag	-	0	17	4	5000
Søndag	Oslo - Sørp	120	17	4	5000
Sum		646	10982	4	371
Totalt antall km		10982		Forlæring 6 måneder	
Antall turer til Oslo per uke		Antall litr per ml		2226	
Pris som per litr (forboret)		1		37918.1	
Sum bomsgeger 2020		4384		Pris per måned	
		17023.1		6319.683333	
		4095.2			
Dette er muligens den billigste leasingen, men ikke komfortabel og ikke langkjøp. Man sitter også i situasjonen hvor vi må skaffe oss en annen bil til kamilla i feb-mars.					
Kjørelengde ukentlig		Pris ny bil		Totalt lån	
Totale km	10982	350000	275000	antall perioder	
Kw forbruk per km	1.34	Innskudd EK	75000	Effektive rente	
Antall kw	14715.88			Annuitet	
50 % ledet i hurtiglader	7357.94			2	
Pris 2.5 kr per 35 kw	NOK 525.57			3	
Kost hurtiglading per måned	NOK 87.59			4	
Kostnad forsikring basisk måned	NOK 1095.00			5	
Parkering (over gratis Oslo dag)	NOK -			6	
Rent	30 kr inn og ut av Oslo H19			7	
Sum per måned	NOK 1103.37			8	
Andreag (Som er lik verditap første år)	NOK 4097.00			9	
Alternativt kost uk	NOK 487.50			10	
Sum kost måned	#*****				
Her sitter man igjen med restverdi og en god bil i hvert fall 4-5 år.					
Kommentar restverdi: Leaf som så er 4 år gamle har kun solgt 80-100 000 verdi. Dette er en del, men på samme tid utgår det kun 20-25 000 i løst og 2 000 i måneden, slik at faktisk kostnad per måned ikke er 7000 med 5000, siden man kan anta 2000 som sparing på sikt.					
Leasing ny elbil		Pris ny bil		Totalt lån	
Kjørelengde ukentlig	788	0	275000	antall perioder	
Totale km	10982	Innskudd EK	75000	Effektive rente	
Kw forbruk per km	1.34			Annuitet	
Antall kw	14715.88			2	
50 % ledet i hurtiglader	7357.94			3	
Pris 2.5 kr per 35 kw	NOK 525.57			4	
Kost hurtiglading per måned	NOK 87.59			5	
Kostnad forsikring basisk måned	NOK 1095.00			6	
Parkering (over gratis Oslo dag)	NOK -			7	
Rent	30 kr inn og ut av Oslo H19			8	
Sum per måned	NOK 1103.37			9	
Andreag (Som er lik verditap første år)	NOK 4097.00			10	
Alternativt kost uk	NOK 487.50				
Sum kost måned	#*****				
Her sitter man igjen med restverdi etter de tre årene avtalen varer.					

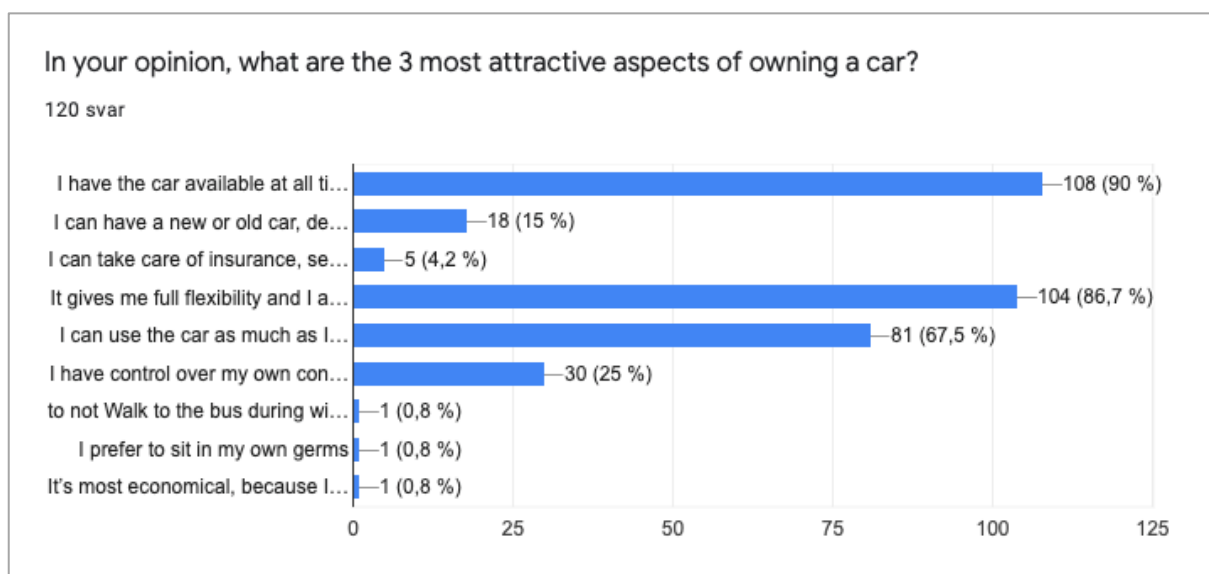
## F. Interview guide phase 2

- How do you/would you proceed when you want to acquire a car?
- If it is not relevant for you now - when do you think it will be?
- How do you feel about the different aspects; accessibility, use, responsibility, and economy, in relation to having a car/access to a car?
  - What is important to you within each aspect?
- Who do you approach and consult in relation to acquiring a car?
  - I.e. bank, insurance, car dealership, friends, family, colleagues, internet etc.
- What is the biggest/ smallest challenges related to the process of acquiring a car?
- What is the biggest/ smallest challenges related to having a car/ access to a car?
- Do you think your situation will change in the next 5-10 years? How do you believe your needs in relation to mobility will change?
- How do you feel about the following ownership types?
  - Owning, leasing, subscription and car sharing services.
- How would you like to be guided on car acquisition when your life situation changes?

## G. Most attractive aspects of the ownership types – Results from survey in phase 4

This appendix contains figures from the results of the survey in Phase 4, where respondents were asked to pick three of the most attractive aspects of each ownership type. The figures are extracted from Google Forms.

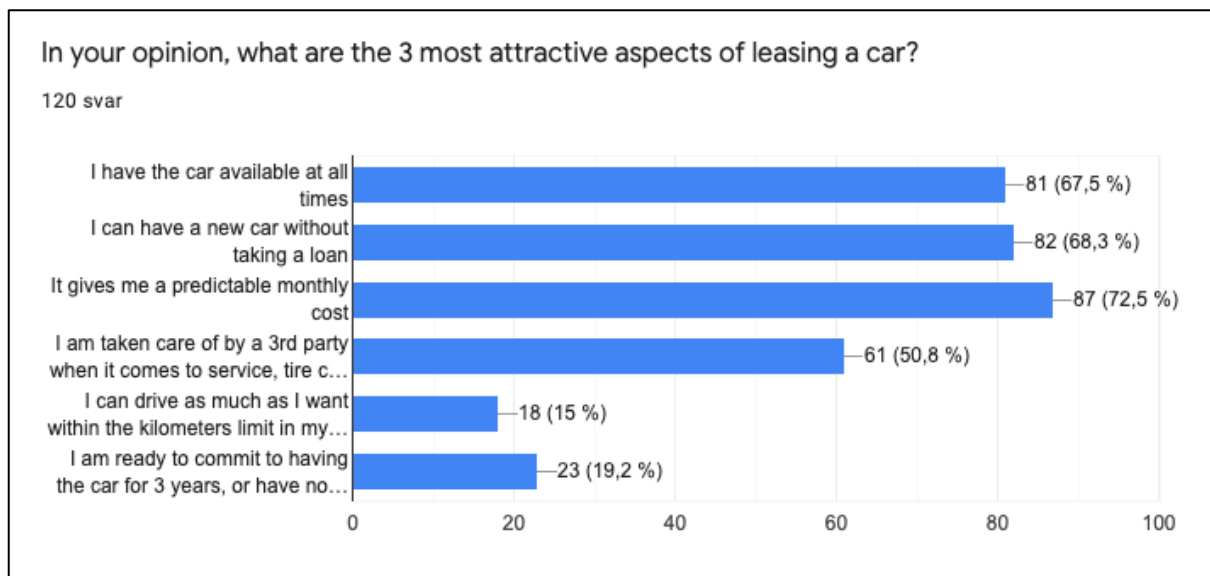
### *Owning*



The six aspects of *Owning* in full text:

- I have the car available at all times
- I can have a new or old car, depending on how much equity I have/ how much loan I can take
- I can take care of insurance, service, etc. myself
- It gives me full flexibility and I am only responsible to myself
- I can use the car as much as I want (knowing that the more I drive it, the less value it will have when I sell it)
- I have control over my own consumption

### Leasing

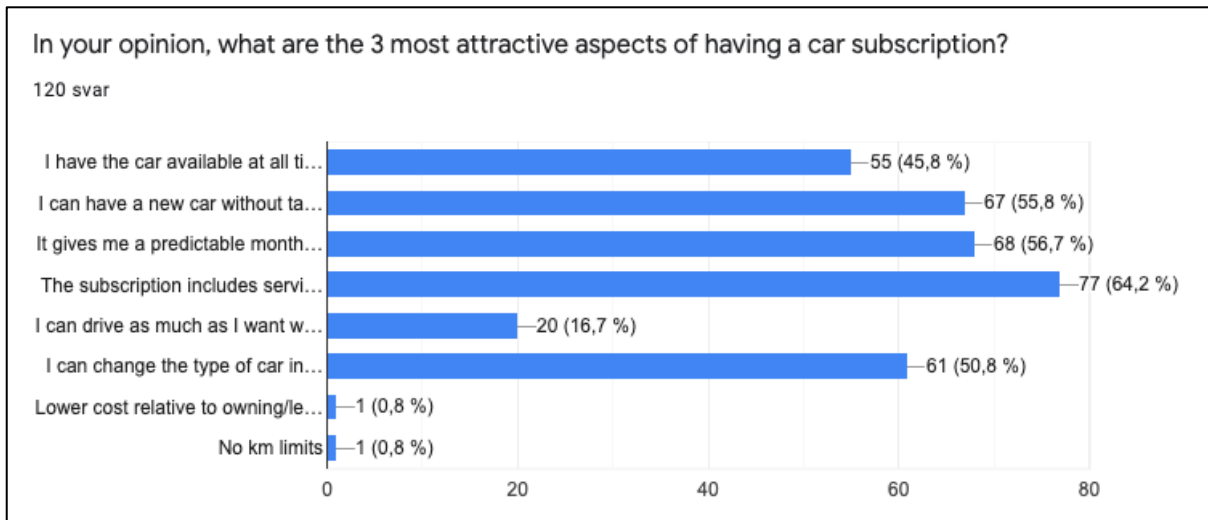


The six aspects of *Leasing* in full text:

- I have the car available at all times
- I can have a new car without taking a loan
- It gives me a predictable monthly cost
- I am taken care of by a 3rd party when it comes to service, tire changes, etc.
- I can drive as much as I want within the kilometers limit in my deal or pay more to extend the number of kilometers per year.
- I am ready to commit to having the car for 3 years, or have no problems paying an amount to get out of the deal/selling the agreement on to another private person.



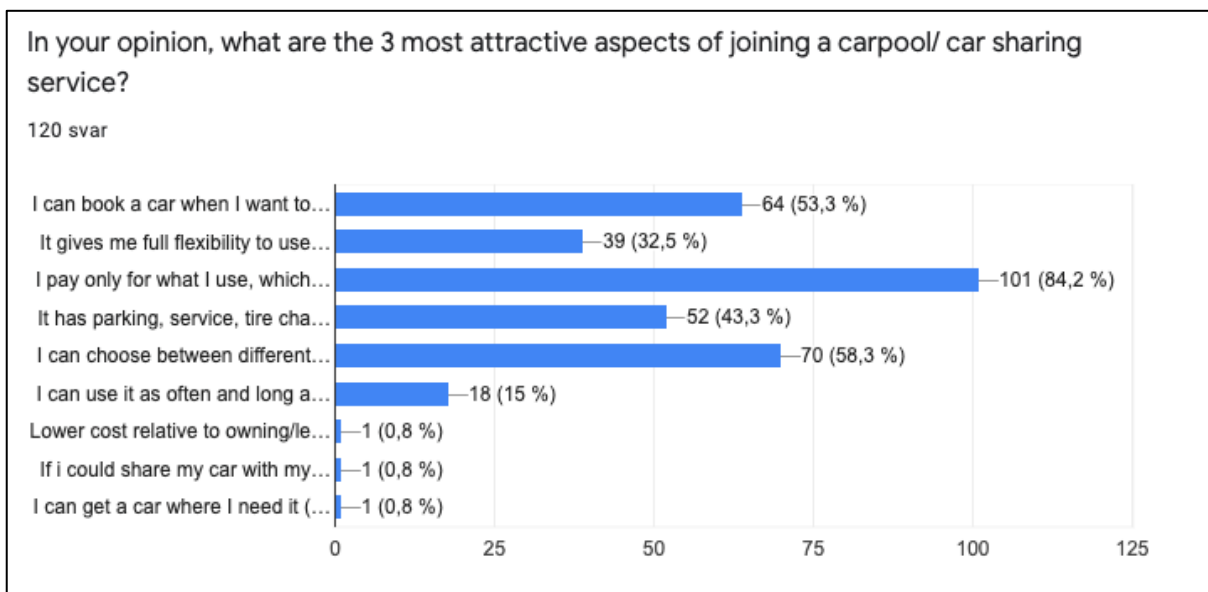
## Subscription



The six aspects of *Subscription* in full text:

- I have the car available at all times
- I can have a new car without taking a loan
- It gives me a predictable monthly cost
- The subscription includes service, insurance, tire change etc.
- I can drive as much as I want within the limit set/ choose a deal that has no limits on the kilometers per month/year
- I can change the type of car in my subscription when I need or end my subscription whenever I want at no charge if my needs should change.

## Car sharing



The six aspects of *Car sharing* in full text:

- I can book a car when I want to use it

- It gives me full flexibility to use a car when I need it
- I pay only for what I use, which can keep the cost low
- It has parking, service, tire changes and other costs related to the car included
- I can choose between different sizes, types and brands when I book a car.
- I can use it as often and long as I want, as long as there are cars available.

## H. Suggested API structure for digital advisor

<i>Incentive</i>	<i>Type of data</i>	<i>Sources</i>
<i>Tailored recommendations and UX</i>	Consumer interests and preferences	<a href="#">Norstat</a> Facebook and Instagram
	Demographic data and trends	<a href="#">SSB</a> <a href="#">OFV</a> <a href="#">Google analytics</a>





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