



ENABLE VEHICLE Centred MOBILITY IN VEHICLE FREE CITIES

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GRADUATION THESIS

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The LeasePlan logo is a large, stylized, wavy graphic in shades of orange and pink. The word "LeasePlan" is written in white, sans-serif font across the middle of the graphic.

LeasePlan

PREFACE

Acknowledgements

This thesis is the final deliverable of my graduation project for my master degree in strategic product design at the faculty of industrial design at the university of technology in Delft. During the last 6 months I had the privilege and honour to work at LeasePlan, the biggest fleet manager within the Netherlands. At present, the mobility market is in a flux of change providing companies like LeasePlan many opportunities and challenges. Within my project I aimed to tackle one of those challenges and hereafter proudly present the results in doing so. But before diving into my project I would first like to thank several people.

First of all, I would like to thank my mentors Wopke, Gerard and Jan from LeasePlan. Without your expertise, support, the weekly meet-ups, discussions and your connections I would not have been able to accomplish this master project.

Secondly, I would like to thank Lianne and Bart, my supervisory team of the university. You have greatly helped me in setting reasonable goals for myself and my work. Additionally, I would like to thank you for your willingness, enthusiasm and support throughout my graduation project.

And finally, I would like to thank my friends, family and anyone else who contributed to the process and results of my graduation project in any form or kind.

Enjoy reading my thesis,

Pepijn van Dalen

EXECUTIVE SUMMARY

The goal of this graduation project was to develop an innovation strategy for LeasePlan in relation to mobility as a service (MaaS). Before being able to determine a feasible, viable and desirable innovation strategy a comprehensive MaaS future mobility scenario was sketched out. This scenario was based on the insights gathered from the market, technological and MaaS research. Thereafter, the business context of LeasePlan was analysed in order for us to determine a LeasePlan specific positioning within this future mobility scenario.

Based on the MaaS research insights we can conclude that MaaS could challenge the value proposition of long-term vehicle leasing. Therefore, this thesis instead delivers a solution that strengthens and takes away several of the pain points along the current vehicle centred journey of LeasePlan customers, while using the principles and characteristics of MaaS. More specifically, in a future where cities become free of personally driver driven vehicles this thesis provides a solution to the first and last mile mobility gap along the journey of urban LeasePlan customers. It does so by creating mobility hubs at the outskirts of the city, which combine physical parking with a digital MaaS mobility hub application. By doing so, customers are able to make seamless transitions between their regular car journeys and flexible & convenient first and last mile inner city mobility solutions. Ultimately, this solution would enable LeasePlan to deliver upon the set vision for this project which is “Providing careless mobility to our customers.”

LeasePlan is able to obtain several benefits by building an extensive network of strategically located mobility hubs spread across the key cities within the Netherlands: 1) LeasePlan is able to strengthen its current value proposition by filling in the first and last mile mobility gap with seamless multimodal vehicle centred journeys; 2) LeasePlan is able to generate additional revenue by offering new vehicle centred mobility services, such as the inter hub micro transit solutions. Additionally, LeasePlan could profit from re-selling first and last mile solutions from their partners; 3) At these mobility hubs LeasePlan services can be offered such as maintenance and commercial activities. This would reduce the costs of such activities and increase the brand awareness of LeasePlan.

To support and enable the development and realization of the concept both a strategic and tactical roadmap have been created. These roadmaps explain the necessary steps leading towards the desired future mobility hub concept in great detail. The roadmap is divided into three horizons, spanning from short term developments to long term developments. The short-term solution aims to increase the flexibility and convenience of the current CaaS solution, this in order to fulfil the changing customer needs. While the long-term solution aims to fill in the future first and last mile mobility gap and strengthen the current vehicle centred value proposition of LeasePlan.

Finally, the concept and roadmap have been validated through internal and external sessions with LeasePlan employees and the municipality of Amsterdam. These sessions indicated that the mobility hub concept is desirable, feasible and viable from both the perspective of LeasePlan and the Municipality. The concept and proposed roadmap enables LeasePlan to focus and strengthen their vehicle centred core business. Additionally, the mobility hub concept supports the goal of the municipality and its citizens in making the city more accessible and livable by making it free of personally driver driven vehicles.

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1.0 INTRODUCTION

Graduation assignment LeasePlan

The way people move from point A to B is changing as a result of a variety of societal, economic and technological developments (Corwin & Pankratz, 2017). At present, customer mobility needs change on a more regular basis, which requires more flexible mobility solutions with no strings attached. This development is spurred by the rise of millennials, which demand more convenient and flexible mobility solutions, as opposed to the “car-centric” baby boomer generation.

At the forefront of these flexible mobility solutions lies Mobility as a service (MaaS). MaaS aims to combine and integrate a wide variety of mobility services on one single mobility platform allowing the customer to plan, book and pay for their entire trip, across multiple modes of transportation, at once (Hietanen, 2014). As a result, it is expected that MaaS will be able to compete with the car, as multipurpose vehicle, challenging traditional and established vehicle centred mobility companies.

One such company is LeasePlan, a Dutch car leasing company with over 50 years of experience. They operate in over 30 countries and manage a fleet of over 1,8 million vehicles (LeasePlan, 2017). LeasePlan delivers end-to-end car leasing services to a wide customer base ranging from big corporates to individuals. Their vehicle leasing solutions consist of a variety of services including maintenance, fuel costs, fleet management etc.

PROBLEM DEFINITION:

Due to the above-mentioned developments it is expected that the traditional and successful car leasing value proposition of LeasePlan will lose its value on the long term. At present, LeasePlan provides inflexible and long-term leasing contracts which do not fulfil the rapidly changing mobility needs of the current and future generations. One main driver behind this change is mobility as a service, as mentioned above.

To remain relevant and competitive in the future of Mobility LeasePlan has to anticipate and embrace these market changes and innovate their current offerings accordingly. This requires substantial changes to the way they currently do business, which can be a challenging task for a company like LeasePlan. The service that LeasePlan currently provides is still very successful and popular, therefore the company has no incentive/priority attached to innovation beyond the first horizon: meaning that they focus on short-term goals (sales, revenue etc.) and incremental changes that can be achieved quickly.

To create sustainable future growth a vision, innovation strategy and compelling roadmap is required. This roadmap addresses the required steps leading towards the desired future vision. This thesis will therefore aim to establish this around the subject of MaaS and specified to the context of LeasePlan Netherlands.

This in turn requires a thorough understanding of LeasePlan, MaaS and the Dutch mobility industry developments.

1; What does the future of mobility look like, in relation to MaaS?

2; What will be the role of LeasePlan in this future, based on their current position?

3; How can LeasePlan get there?

THE RESULT:

The final deliverables of this graduation project will be two roadmaps. One highly detailed tactical roadmap for internal usage and one visual strategic roadamp for external communication. These roadmaps show a step by step process, which enables the company to gradually work towards the desired future vision and capture sustainable future growth.

THE PROCESS

Within this master thesis the double diamond process is applied (Design council, 2015). This model consists of 2 consecutive diverging and converging phases (diamonds). Within the first diamond the goal is to find the right problem or opportunity by diverging (discover) and converging (define).

Within the second diamond the goal is to develop the right solution fit to the previously defined problem/opportunity. This will again be done by first diverging (develop) and thereafter converging (deliver).

An overview of the different stages of this project and the applied methods can be viewed in figure 1.

PHASE ONE: DISCOVER

Within the discover phase the context of the project is clarified. This phase consists of two separate parts:

- 1) **What will the future of mobility look like, in relation to MaaS?**
- 2) **What is the current situation of LeasePlan?**

Within this phase focus is put on answering the first question. Additionally, before we are able to answer the second question, we need to uncover the current position of LeasePlan.

PHASE TWO: DEFINE

Within the define phase focus is put on answering the second question. This can be done by aligning the threats and opportunities of the future mobility landscape with the strengths and weaknesses of LeasePlan. The deliverables within this phase are a future vision (Project specific), strategic direction and a design brief. The vision and strategic direction are used as input for the design brief. Within this design brief the objective of the project is made more concrete. This objective is divided into long and short-term problems and opportunities.

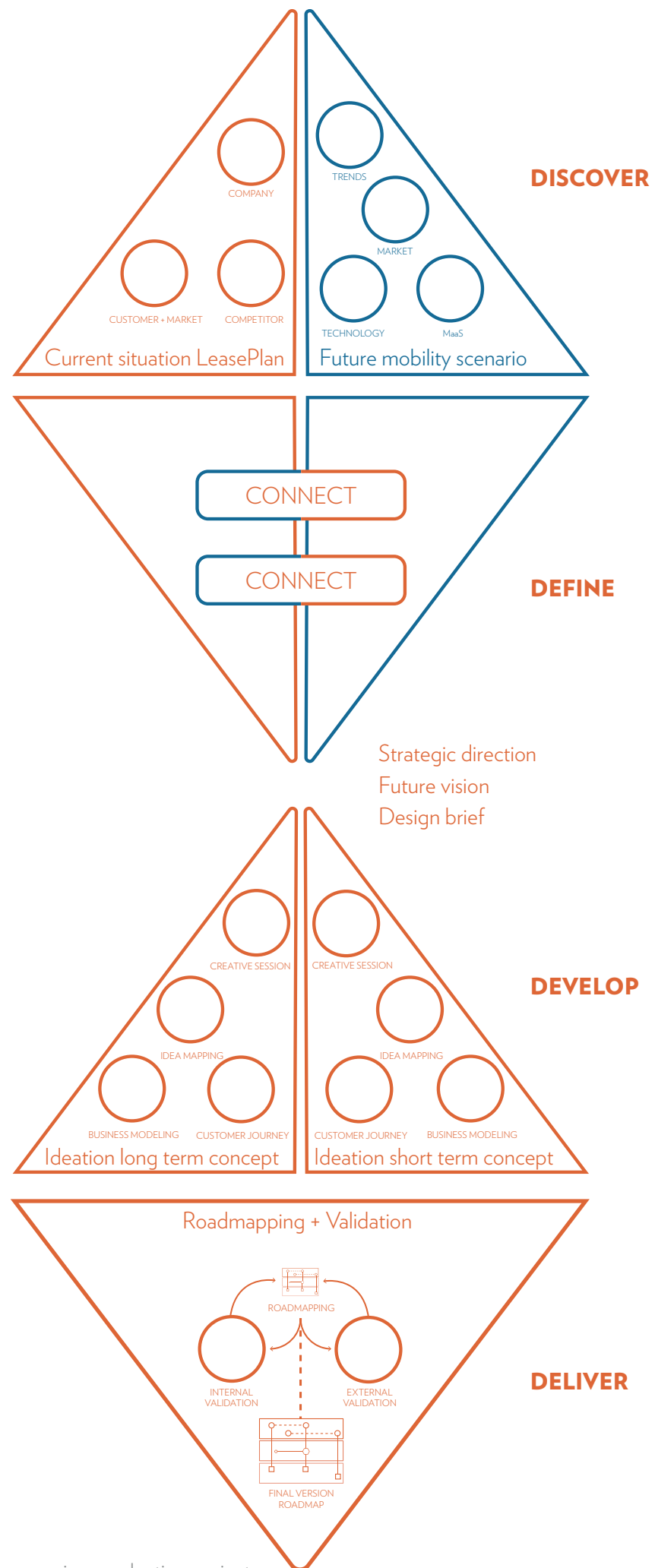
PHASE THREE: DEVELOP

Within the development phase the long- and short-term problems and opportunities will be used as input to initiate two separate ideation/conceptualization phases. While doing so the goal is to develop two ideal concepts, one for the short-term success of LeasePlan and one for the long-term success. Within both phases a variety of methods will be used to develop a final concept. These methods include; Facilitation of creative sessions, Individual & group idea generation and mapping, sessions, service design, business modelling etc.

PHASE FOUR: DELIVER

Within the deliver phase the focus is put on pathway mapping, in which the concepts are plotted on the innovation roadmap. By creating this step by step roadmap LeasePlan is better able to align its current developments with potential future growth opportunities. This would ultimately increase the innovative capabilities of LeasePlan and enable them to gradually work towards a desired future vision and obtain sustainable future growth.

Secondly, several validation sessions will be facilitated to validate the concepts and roadmap. Both internally, with LeasePlan employees and externally with the mobility department of the municipality of Amsterdam.



2.0 DISCOVER

2.1 DISCOVER:

Future of mobility in relation to MaaS

INTRODUCTION

Within the first part of the discover phase the goal is to answer the first question: What will the future of mobility look like within the Netherlands in relation to MaaS.

This part can be divided in four separate blocks:

- 2.1.1 Trend research: Identify the user value drivers within the future mobility landscape, based on ongoing trends
- 2.1.2 Market developments: What will the mobility market within the Netherlands look like, in numbers
- 2.1.3 Technological developments: Identify the main technological drivers that will change the future of mobility within the Netherlands
- 2.1.4 MaaS: What is MaaS? Definition, characteristics, players, requirements, values, challenges etc.

Additionally, industry experts on the different topics have been interviewed to get a more in depth view on the future mobility market.

Based on this information a future mobility scenario will be sketched, in relation to MaaS.

2.1.1 TREND RESEARCH

What trends drive the mobility industry

INTRODUCTION

The first part of the discover phase starts with trend research, specified to the context of mobility and its users. Within this trend research focus is put on uncovering the main drivers of change within the mobility industry, from a user perspective. This would allow us to sketch a future scenario and identify the different user value drivers of this scenario.

A distinction can be made between key-trends, their subsequent sub-trends, and regular trends. The trend analysis created the below depicted trend map (Fig 2).

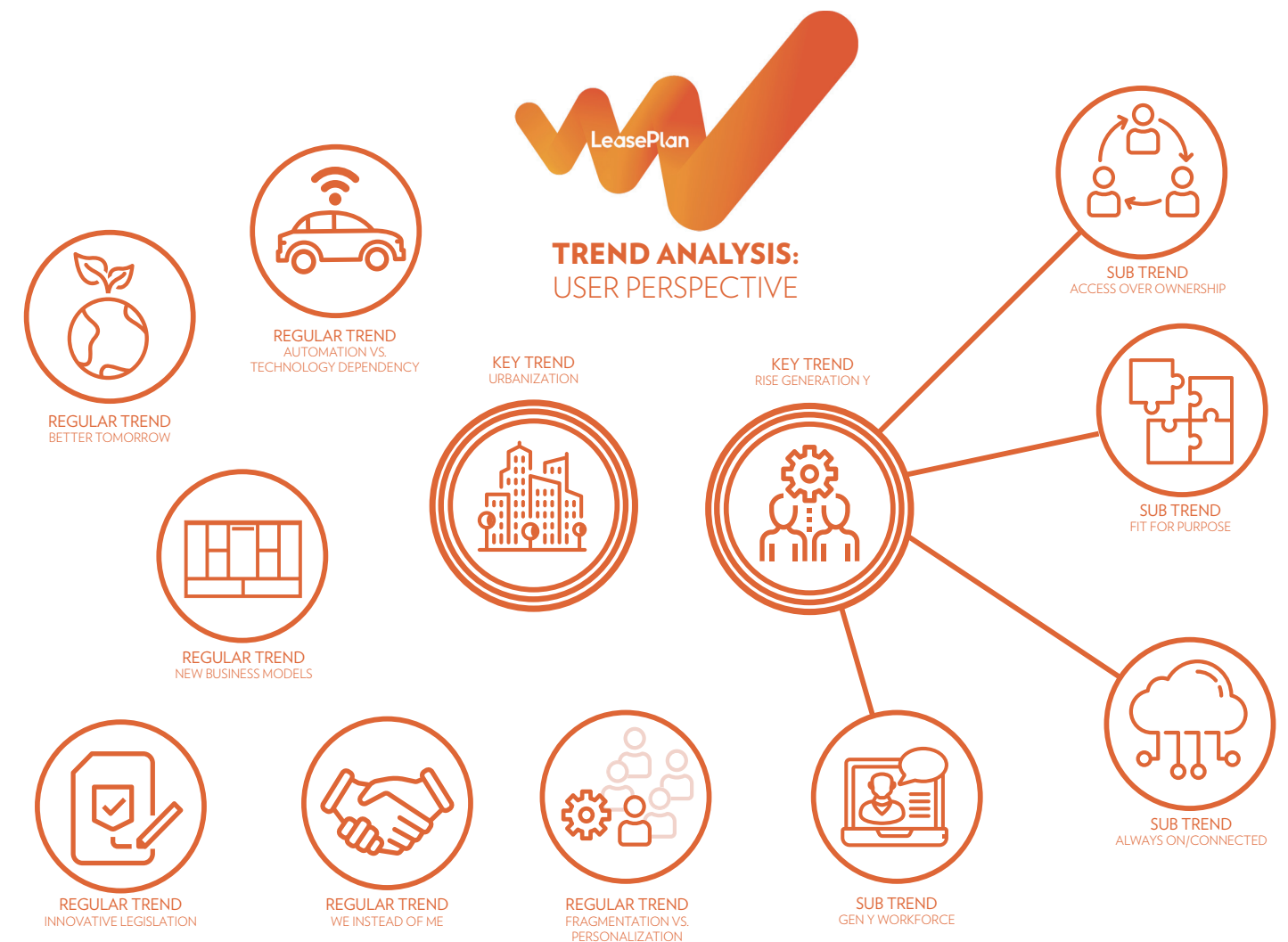


Fig 2: Mobility trend map



KEY TREND 1

Rapid urbanization

The last decade people increasingly moved towards urban areas, this demographic trend is also called “urbanization”. In 2018, 14% (2.4 million people) of the Dutch population was living in the 4 biggest cities Amsterdam, Rotterdam, Den Haag and Utrecht (CBS, 2018). This number is expected to increase from 2,3 in 2015 up to 2,8 million people in 2040 (Kooijman et al., 2016). This stands for an increase of 23%, which is significantly higher than the expected population increase of 5% for the rest of the Netherlands.

Secondly, according to the united nations expectations are that 60% of the worldwide population will be living in urban areas by 2030 (United nations, 2014).

MIGRATION EFFECTS AS A RESULT OF VEHICLES

The introduction and development of vehicles allowed people to travel at higher speed, which in turn made distant sub-urban and rural areas more accessible. As a result, people increasingly moved and settled in these distant places. Daily commutes from and to these places required long trips, which in turn significantly increased the amount of traffic and travelled kilometres. This continuous growth in mobility demand triggered the above-mentioned traffic congestion and accessibility problems.

At present, we see an opposing development in which people (especially younger generations) move back to urban areas, in close proximity of their work and leisure activities. This reversed migration trend can be attributed to people's need for accessibility, described above.

ECONOMIC & SOCIETAL BENEFIT OF URBANIZATION

From an economic perspective urbanization is a good development. On average a 100% increase in population density leads a 2-10% increase in businesses and social productivity (CPB, 2015). Secondly, cities account for 80% of the global GDP (World bank, 2016). The economic and social prosperity of cities can be attributed to advantages in sharing, matching and learning (Duranton & Puga, 2014). Sharing refers to the scalability advantages stemming from high population density. High population density results in a large and concentrated market, which makes certain facilities and business models more viable. Matching refers to the ability to find a job and company fit to peoples' personal skillset and preferences. Since the job market is generally bigger within cities this is easier to do, both for employees and companies. Similar matching effects can also be identified within the leisure and recreational market. Within cities knowledge is widely available due educational, cultural and business resources. In addition, ideas and knowledge spread more easily throughout cities enabling people to quickly learn from one another.

(Rosenthal & Strange, 2004). But this continuous growth of the urban population simultaneously challenges the available resources, including mobility.

IMPACT ON MOBILITY

From a societal and economic perspective urbanization is beneficial for the Netherlands. Therefore, municipalities should look for ways to enable urbanization and the subsequent increases in mobility demand. The available infrastructure within Dutch cities is not designed for the high number and ever-increasing amount of personally driver driven vehicle transportations. In addition, most of the inner cities within the Netherlands are UNESCO protected making it difficult to build additional infrastructure. As a result, we see severe gridlock and congestion problems within these cities, which worsen the accessibility and liveability of these urban areas. Consequently, the urban population is increasingly switching to more efficient and alternative modes of transportation, such as public transport, (e) bikes, scooters etc. In addition, the CO2 emissions stemming from the current car-centred mobility landscape significantly pollutes air quality of these urban areas. Dutch government, together with municipalities, are now actively looking for solutions that make these urban areas more accessible and liveable (Mobiliteitsbeeld 2030, 2013). This would require a change in the current car-centred mobility landscape of these areas, towards alternative modes of transportation or more efficient and effective vehicle usage. This in turn poses a major threat to LeasePlans' current value proposition, which builds on personal driver driven vehicles. For LeasePlan it therefore becomes pivotal to collaborate with these municipalities in finding solutions to the problems of the current car-centred urban mobility landscape. Especially, if you consider that 60% of the population will be living in urban areas by 2030 (united nations).



EXPERT INTERVIEW

Diederik Basta, CTO innovation team gemeente Amsterdam, was interviewed to better understand the effects and impact of urbanization on mobility (19-12-2018)(Appendix A). Diederik Basta believes urban mobility is on the verge of radical change, as the severity of the experienced mobility problems from the current car-centred mobility landscape are increasing. Amsterdam is currently facing major gridlock, congestion and pollution problems as a result of the high mobility demand in and around the city.

Key findings interview:

Diederik Basta expects Amsterdam to become free of personally driver driven vehicles. This can be attributed to the increased mobility demand within Amsterdam and the subsequent congestion, gridlock and pollution problems. He believes the municipality will create policies and regulations that create unfavourable conditions for personally driver driven vehicles. As such, Amsterdam will become more and more free of personally driver driven vehicles.

Secondly, Diederik Basta mentions that the inner city of Amsterdam is UNESCO protected. This makes it difficult/impossible to build additional infrastructure. Therefore, he believes mobility solutions should utilize existing infrastructure better.

Thirdly, according to Diederik Basta Amsterdam faces a parking shortage. As a result, people have to park their cars outside of the city and enter the city by alternative mobility solutions.

Diederik Basta sees the transition to and from urban areas as a major challenge and opportunity for urban mobility. He believes that services that connect public transport and regular car journeys with efficient first and last mile solutions could prevent the need for vehicles in the city. This could be established by strategically building mobility hubs that enable this transition in the most convenient and seamless matter. Diederik Basta mentions that the current P + R solutions are not very successful in doing so, as they are costly and do not offer the desired convenience and flexibility.



KEY TREND 2: Rise of generation Y

Generation y (Born 1977-1994) increasingly replaces the baby boomer generation as most influential and dominant segment both in the consumer and business market. Currently generation y almost accounts for a quarter of the world's population, with 2 billion strong (economist intelligence unit, 2014). The characteristics and needs of this younger generation are fundamentally different from the older baby boomer generation. To capture sustainable future growth companies and businesses have to anticipate this upcoming generation and adapt their current products and services according to characteristics and needs of this younger generation.

Impact on mobility

The mobility industry is not an exception. Within this fast, dynamic and vibrant society the mobility needs of this younger generation change on a more regular basis. As a result, younger generations select mobility solutions based on the specific circumstances at hand, level of customer experience and at the lowest possible price. This requires mobility solutions which are more flexible, convenient and with no strings attached (Giffi et al., 2014).



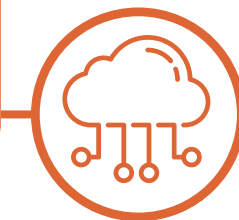
SUB TREND 1: Generation y wants better work life balance

Within the workforce generation y is increasingly replacing the baby boomer generation. Expectations are that two-thirds of the workforce will consist of millennials in 2025 (EY, 2015). This younger generation has different work ethics and values from the baby boomers. Baby boomers saw long work days and 50+ hour workweeks as prerequisites for successful careers. Generation y values a better balance between their private and professional life. In addition, their work ethics can be characterized by flexibility, job hopping and freelancing. The next gen workforce increasingly embraces "flex work", which stands for the ability to work from different and preferred locations as opposed to the office. This development is driven by digital innovations (Skype, Slack etc.) that allow

co-workers to connect and collaborate online almost immediately. Secondly, the next gen workforce switches jobs on a more regular basis and is able to work for multiple companies in the timespan of one week.

IMPACT ON MOBILITY

Because this younger generation works on more flexible terms their mobility needs change on a more regular basis. Within the timespan of one-week this younger generation might require a variety of transportation modes, fit to the trip at hand. Additionally, working from home becomes more and more common practice for this younger generation, as such no mobility is required at all. The personally owned/leased vehicle does not offer the required flexibility for these everchanging mobility needs. As such overall usage of these personally driver driven vehicles will go down, making them inefficient and overly expensive. Therefore, expectations are that the personally driver driven vehicles solution becomes less valuable in the future. Employers instead have to offer employees more flexible and convenient solutions, which enable them to select their required modes of transportation based on the trip at hand.



SUB TREND 2: Always on/ connected

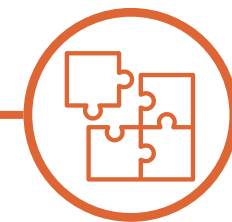
Generation y is the first digital native generation, they can be characterized by their level of connectivity throughout their daily live. Throughout their daily activities they increasingly use smart and connected devices. These connected devices give immediate access to a wide variety of applications, services and information. As such, daily activities become increasingly efficient and convenient.

One such online services is E and M commerce. Generation y increasingly use E and M commerce as a way to shop online (Thuiswinkel waarborg, 2018). This allows them to shop whenever, however and wherever they desire. The popularity of online shopping offered many new companies the opportunity to enter traditional markets, while selling products at lower digital cost levels. One example is picnic, which is a rapidly growing online Dutch supermarket. Via the picnic application customers can easily order their groceries online which thereafter get delivered at your doorstep. This ultimately saves customers time, money and the hassle of moving groceries.

Everything has gotten less expensive. Digitalization has made content, whether it's print or music, less costly. Today, anyone can read the news for free online. -Hubert Burda, German art historian and publisher

IMPACT ON MOBILITY

First of all, customer expectations towards traditional services change as a result of the high levels of convenience experienced while using these services. As a result, customers come to expect these digital services, at digital cost levels, in any given industry. Secondly, some of these digital innovations prevent the need to physically move from A to B. Such is the case for PicNic, skype, slack etc. In addition, when groceries and products get delivered to your doorstep there is no need to have a big car to move stuff around. This challenges the need for the traditional vehicle types and mobility in general. On the other hand, it offers fleet managers new transportation service opportunities.



SUB TREND 3: Fit for purpose

From observations and research, we can identify a change in mobility behaviour where customers increasingly select their transportation modes based on personal preferences and the circumstances at hand. Let's take Dirk for example; Dirk does not own a car and usually bikes to his work. But when it rains Dirk does not want to bike to his work and takes the access based Car2go service. This allows him to get to his work dry and comfortable.

This need for purpose specific vehicles lead to the entrance of multiple alternative mobility service providers. Each specifically focussed at fulfilling specific transportation needs in a convenient and flexible manner. In addition, these services enabled people to move from A to B using multiple transportation modes, where they would otherwise need the car. Subsequently, the traditional view of the car as "multi-purpose" vehicle is increasingly being challenged by the scenario at hand (McKinsey & company, 2016). McKinsey (2016) expects that commuters will demand more flexible and integrated mobility solution aimed at fulfilling customer and circumstance specific mobility needs.

MOBILITY INDUSTRY SIGNS

As mentioned previously a variety of mobility service start-ups entered the market. One such example is Bird, a free-floating shared electric scooter service, which I met during the Accenture innovation Summit. These lightweight, portable and electric scooters are perfect for short urban commutes. You can easily carry these scooters around and avoid the gridlock and congestion problems of vehicle centred urban

transportation.

Another example is Greenwheels. Greenwheels is an access based mobility service, which offers different size and types of vehicles. This allows the customer to select a vehicle based on his or her needs/circumstances at hand.



SUB TREND 4: Access over ownership/as a Service

Generation Y sees asset ownership as a burden instead of an added value. As a result, they look for services that take away the hassle of ownership and still provide the value of use. These services are generally offered for a short amount of time and at a lower cost, compared to traditional ownership based products. According to Bardhi and Eckhardt (2012) the popularity of such access-based services can be attributed to the increased flexibility they offer, both in terms of lifestyle and identity.

This ongoing trend lead to the entrance of various startups, one of which is Peerby. Peerby offers its customers a peer 2 peer platform on which people can rent tools from one another. As such, people can get temporary access to a wide variety of tools, without having the need to buy/own and maintain them.

IMPACT ON MOBILITY

Vehicle maintenance and ownership can be time consuming and costly (maintenance, service, insurance etc.). As a result, customers increasingly look for services, which temporarily fulfil their mobility needs. The increased demand for such services lead to the creation and market introduction of various "as a service" mobility providers. A distinction can be made between the service levels of the different providers: First of all, **Subscription based** vehicle leasing has been around for quite a while now, but currently different modes of transportation are offered as a subscription. One such example is Swapfiets, which offers end to end bicycle services similar to LeasePlan.

Secondly, **temporary access-based mobility services** (car2go) give customers access to vehicles at a rate of 0,21 per minute.

Thirdly, **shared ride hailing services** such as ViaVan allow commuters to share certain legs of their trip and by doing so significantly reduce trip costs.

Fourthly, **Peer 2 Peer mobility services** such as Uber allow vehicle owners to provide ride hailing services to their peers. This enables drivers to generate some additional revenue, which can reduce the total cost of vehicle ownership.

Uber passengers on the other hand can enjoy ride-hailing services at a lower price, compared to traditional ride hailing services.



REGULAR TREND 1: Fragmentation vs. personalization

Consumers become increasingly aware of the amount of data, which companies and organizations gather from them. In return they expect these organizations to deliver them personalized and customized offers based on their needs, circumstances and preferences (Harvard business review, 2018). This implies: Giving the customer exactly what he wants whenever, however and wherever he wants it, as opposed to offering an abundance of products and services from which the customer can choose. This requires customer centric products and services, which are responsive to the current needs and conditions of customers.

IMPACT ON MOBILITY

If we look at the current mobility landscape, we can observe the number of products, services and applications increase fast. Each of these services individually aim to fulfil the changing customer needs. This created a very fragmented mobility landscape, which prevents customers from getting truly best option/personalized mobility offers. Instead customers have to use multiple applications to search for the right mobility solution for the trip at hand.

To deliver personalized/best option mobility solutions the different services need to be integrated and combined on one overarching mobility platform. By combining and integrating these services the system is able to select the best mobility solution(s) fit to the trip and circumstances at hand.



REGULAR TREND 2: New business models

The above described societal and technological developments offer new business model propositions, allowing new entrants to challenge big and established companies. One popular example is the above mentioned platform business model. This business model gathers offerings from multiple vendors and integrates these on one single platform. On the customer side this platform offers a wide variety of product and service offerings from which a selection can be made. The vendor gets orders due to the amount of traffic on the overarching platform. And finally, the platform owner takes a small part of the transaction/order between the customer and the vendor. One well known Dutch example is Thuisbezorgd.nl, this platform offers meals from a wide variety of pick-up and delivery restaurants. By doing so the customer gets a clear overview of the available vendors and meals, which in turn enables him to easily select and order his desired meal.

IMPACT ON MOBILITY

One platform example within the mobility industry is Uber, a peer to peer ride hailing scheme. This platform allows car owners to generate revenue by offering ride-hailing services to commuters in need. Uber is the mediator within this concept, they match supply and demand. At the supply side Uber offers a platform, which drivers can easily connect to. On the demand side Uber offers a user friendly and convenient application, which allows customers to access ride-hailing services. As a result, Uber carries no responsibility over the vehicles but is still able to make revenue from the commissions they take from the rides.



REGULAR TREND 3: Innovative legislation

The drivers of change within society pose some regulatory challenges. A recent survey by Forbes indicated that 400 CEOs saw the current regulatory system as a major issue, which already is and will significantly impact their company (Forbes, 2014). To solve this regulatory problem governments and the private sector should collaborate in creating policies, which monitor the societal/environmental goals on one hand and stimulate progress and innovation on the other.

IMPACT ON MOBILITY

The rapid developments within the mobility industry and the complexity and scale of the current and future mobility problems cannot be solved by individual entities (Accenture, 2018). This requires intensive collaborations between knowledge institutes, the business community, public transport operators, governments and the end user.

Government should lead this cooperation by balancing the development of an efficient mobility network, preserving the environment and creating an equal level playing field.

To do so government should reassess their current legislation and create policies which enable and stimulate promising innovations. One example of traditional legislation versus innovation is the case of Uber. When Uber entered the market, it offered customers convenient low cost p2p ride hailing services, which challenged the traditional cab industry. But the business model of Uber posed many tax, labour and insurance law issues as opposed to the regulated cab industry. Earlier collaborations between Uber and the industry could positively influence the industry and offer them the ability to share knowledge.



REGULAR TREND 4: Better tomorrow

At present, environmental awareness is at an all-time high. This increased awareness is driven by an increase in social activism via physical and digital channels. 63% of all consumers encourage peers to buy more responsible and sustainable products, according to a survey done by BBMG (2016). As a result, the general population, policy makers and countries work more actively towards creating a better world for the generations to come. This requires active nature preservation and drastic reductions in ecological footprint.

IMPACT ON MOBILITY

The transportation industry accounts for 27% of the total CO2 emissions in Europe, 41% of the transportation emissions can be attributed to passenger vehicles (EEA, 2016). Consequently, there is a real demand for change within the passenger vehicle industry both from the customer and governmental perspective. We can already observe changes, in which people increasingly move towards more sustainable products and services. Electric vehicles become increasingly popular due to the development in battery capacity and the charging infrastructure. Additionally, sustainable electric vehicle sharing services (Car2go, amber etc.) are more and more popular. This in turn reduces the need for personally owned fossil fuelled vehicles

Secondly, more and more organizations and businesses engrave sustainability in their operations. Take LeasePlan for example: LeasePlan demands their employees to switch to EV's instead of fossil fuel driven vehicles. By doing so they try to set an example for their clients, stimulating them to create more sustainable vehicle fleets.

Thirdly, politics are also increasingly focussing on actively reducing the environmental footprint. One example is the Paris agreement (European commission, 2015), which is a combined effort between multiple countries to drastically and actively reduce the environmental footprint.



REGULAR TREND 5: Automation vs. tech dependency

AI powered devices, product and services gradually take over tasks traditionally done by people (Gartner, 2018). Moreover, a shift can be seen from individual smart devices towards collaborative ecosystems in which smart devices communicate with one another.

The tasks and capabilities of smart devices is growing rapidly due to rapid technological developments. As a result, these AI powered devices take over more and more tasks originally

done by people, which subsequently makes people more dependent on the technology for doing so. Additionally, by taking away these tasks the fear exists that a wide variety of people could lose their jobs. This creates a paradox between people and technology, on one hand people are afraid of the impact and dependency of such technologies but on the other hand it could offer higher convenience and efficiency (Bergstein, 2017). In some cases this paradox holds back the widespread implementation of such technologies despite their proven capabilities.

IMPACT ON MOBILITY

Within the mobility industry this paradox can be identified with the development and implementation of autonomous vehicles and smart infrastructure. Waymo, a self-driving car initiative of google, has already rolled out its first fully autonomous vehicles. Although Waymo technically does not require human interference it still puts a "driver" behind the steering wheel. They do so because of; 1) regulations which require them to do so 2) user acceptance is still low towards driverless vehicles making people hesitant about such vehicles

Widespread adoption of fully autonomous vehicles is not expected to happen before 2030, despite rapid technological developments, high investments and public interest (EY, 2017). This is partly due to regulations, safety concerns, current infrastructure, cybersecurity etc.



REGULAR TREND 6: We instead of me

Partnerships become the standard in our society (World economic forum, 2017). Collaborations happen across industries, between competitors, with public and private organizations and combinations of them. These collaborations enable companies to focus on their core strengths and capabilities, while harnessing the strengths and capabilities of partners for required knowledge and resources. This in turn boosts a company's ability to innovate and develop new products and services.

IMPACT ON MOBILITY

Within the mobility industry OEMs increasingly collaborate with technology and service companies. Automotive OEMs have very specialized experience in the development of vehicles, making them product and technology focussed. But the mobility landscape is increasingly driven by mobility services instead of vehicle ownership. This requires more customer driven, and service focussed solutions. As a result, we see more and more collaborations between OEMs and service design agencies (IDEO, 2016). The collaboration between IDEO and Ford is one such examples. IDEO's challenge is to transform ford from a product/car focussed company towards a mobility service provider.



2.1.2 TECHNOLOGY SCOUTING:

How and at what rate will technology develop?

INTRODUCTION

After identifying the user and market value drivers, this phase will aim to uncover current and expected technological developments within the mobility industry. The car, in its current state, has not significantly changed since the introduction of the combustion engine and the Ford Model T. The functionalities of the car remained similar despite developments and improvements in speed, convenience, comfort, safety etc. But current technological developments in digitalization, automation, IOT etc. are expected to significantly change the way people and goods move from A to B (Kuhnert & Sturmer, 2018; Corwin et al., 2015).

Because the core business of LeasePlan is built on vehicles it is pivotal for them to anticipate these technological developments. The insights gathered within this process can be used within the idea mapping phase and innovation road mapping process, ultimately enabling LeasePlan to remain competitive, relevant and obtain sustainable future growth.

PWC's latest automotive trend study (2018) reports 5 key automotive trends which will play a pivotal role within the future of mobility. Namely;

- 1 Electrification
- 2 Autonomous vehicles
- 3 Connected vehicles
- 4 Shared vehicles
- 5 Yearly updated

Moreover, PWC believes that the combination of these trends could significantly impact the mobility industry. This combination could significantly increase transport efficiency, reduce congestion, gridlock and pollution. PWC expects that this combination could reduce the total number of vehicles from 280 million in 2017 to 200 million in 2030 (PWC, 2018).

Finally, the different technologies are plotted on a timeline allowing us to correctly anticipate the developments within the innovation roadmap. This has been done by using existing research and by interviewing Elmer van Grondelle, who is assistant professor automotive design at IO.

KEYFINDINGS

Rapid urbanization will be an ongoing trend due to the societal and economic benefits it offers. This can be attributed to the sharing, matching and learning benefits, which high density areas offer.

As a result, urban areas will face severe congestion, gridlock and pollution problems due to the ongoing urbanization. Municipalities and the government will increasingly drive vehicles out of the city to keep urban areas liveable and accessible.

In the future, generation Y will replace the baby boomer generation as biggest and most dominant consumer segment. Their differences in characteristics and needs will significantly change the current mobility landscape. As such mobility players should anticipate the needs and characteristics of this newer generation.

Value drivers generation y:

Flexibility

- o Freedom to choose mobility based on the needs and circumstances at hand
- o Ability to work from the location they see fit, flex work

Convenience

- o Mobility solution fit to the scenario at hand
- o Immediate access to digital mobility solutions
- o Personalized services, fit to customer specific preferences

Value drivers mobility:

- Autonomous processes will take over basic mobility features and needs
- We instead of me: partnerships will enable radical innovation, by utilizing one another strengths

1.0 ELECTRIFICATION

The adoption of electric vehicles is getting traction within the Netherlands. In 2018 8.200 EVs were sold, which is double the number of vehicles of the year before (CBS, 2018). According to Hertzke et al., (2018) several reasons for this growth can be identified. First of all, the EV charging infrastructure within the Netherlands is rapidly growing both in numbers and charging capacity. Secondly, battery development led to an increase in capacity and range on one hand and cost reduction of 80% on the other, making EVs more attractive and affordable. Thirdly, consumer demand and regulatory forces attach key priority to reducing environmental footprint. Subsequently, consumers are willing to switch to EVs and new governmental regulations stimulate EVs by setting stricter emission and fuel economy targets.

From a business perspective EVs offer the mobility industry both opportunities and challenges. EVs would require less maintenance costs since they have fewer moving parts, as opposed to fossil fuel powered vehicles. Additionally, they do not need mandatory oil checks etc. But new business cases can be built around EV infrastructure, spanning across different modes of transportation.

Future developments EV:

- Wireless charging
- Vehicle to grid technology

Benefits EVs:

- Significant reduction of CO2 emissions
- Increase in liveability due to significant noise reductions
- Lower usage costs

2.0 AUTONOMOUS VEHICLES

When the development of autonomous vehicles reaches implementation, they will offer a variety of use cases and business opportunities, while challenging existing ones. As a result, many automotive OEMs and technology companies invest heavily in the development of autonomous vehicles. At present Waymo (Owned by Alphabet) is ahead of its competition in autonomous vehicle development. Waymo was the first company to develop and pilot level 4 autonomous cars.

The Society of Automotive Engineers (SAE) introduced 5 levels of automation to guide and distinct the development of autonomous vehicles (SAE, 2018).

- Level 0 - No autonomy: Driver is in full control over the car
- Level 1 – Driver assistance: Driver is still in full control, but systems assist the driver while driving.
- Level 2 - Partly automated: Basic function (Braking, accelerating etc) can be controlled by the car in specific situations. Driver is still responsible for most of the ride.
- Level 3 – Highly automated: Combination and automation of several driving functions allows the vehicle to take control for extended periods of time. Driver should still watch the road and be able to take control when necessary.
- Level 4 – Fully automated: The car is in control of the vehicle most of the time. This allows the driver to disengage from driving and take a nap for example. However, the driver should still be able to drive if necessary.
- Level 5 – Full automation: The car is in full control of all the driving functions at any given time. People in the car can be seen as passengers

Potential benefits autonomous vehicles:

- Less traffic congestion due to the vehicles ability to closely follow one another and their ability to fluidly cross complex intersections (Tachet et al., 2016)
- Less need for parking due to the constant movement of vehicles, opening up public space for other purposes (Tachet et al., 2017)
- Potential reduction of traffic casualties by 90%, normally caused by human errors (NHTSA, 2015)
- Improve social inclusion by providing disabled and elderly people with accessible and convenient mobility solutions (Hull & Hymowitz, 2016)
- Reduction in the amount of stressful/nervous commutes, which negatively influences the feeling of happiness (). In addition people could spend their time commuting time to better use.
- Potential cost reduction as a result of lower insurance and financing cost and time better spent (Corwin et al., 2017)

3.0 CONNECTED VEHICLES

The impact of technology megatrend “the internet of things” is starting to get noticed in many industries, including the automotive industry. At present cars get equipped with digital and connected technologies, which connects the car with its passenger, other cars, the infrastructure and its surroundings.

Vehicle 2 Infrastructure (V2I):

New vehicles are increasingly equipped with sensors, which can analyse the infrastructure and detect signages. In addition, the infrastructure is increasingly equipped with smart technology itself.

This allows vehicles to communicate with the infrastructure and act upon the acquired and analysed data. In turn this would make commutes safer and smoother. One current technological development is ADAS systems, such as adaptive lane assist. Adaptive lane assist analyses road line and corrects the steering and direction of the car accordingly.

Vehicle 2 Vehicle (V2V):

V2V technology allows vehicles to communicate with one another. Through a locally created network vehicles will be able to share data such as speed, road conditions, accidents etc. By rapidly processing this data vehicles can better anticipate dangerous situations, prevent accidents, improve vehicle usage and lower the amount of traffic congestion.

Telematics:

At present vehicles are equipped with telematic technology, which generate data on vehicle usage and location. This data can be used to monitor driving behaviour and vehicle utilization. This information could in turn enhance and support the services of many mobility service providers such as insurers, garages etc. Fleet managers could for instance use this data to predict vehicle maintenance before major break downs occur. Secondly, this data could offer fleet managers and insurers the ability to consult drivers on their driving behaviour.

Thirdly, usage data would enable shared mobility service providers to increase and improve vehicle utilization. This could be done by continuously matching supply and demand.

In vehicle experience:

Next to improvements in driving related services, connected technology could also significantly enhance in vehicle experience. Example in vehicle technologies could include voice recognition and augmented reality. By providing voice recognition connected vehicle features could be commanded by voice, making the journey more convenient. Secondly, Augmented reality could provide additional layers of information to the current in vehicle experience.

4.0 SHARED VEHICLES

Many industries already experienced the effects of the sharing economy trend, including the mobility industry. Alternative shared mobility services such as Car2Go and snappcar increasingly challenge vehicle ownership, especially within dense urban areas.

These new mobility services pose both a threat and opportunity for the mobility industry. They could significantly reduce the number of vehicles by increasing the usage and efficiency of the vehicle (PWC, 2018).

Expectations are that the efficiency and usage of these shared mobility services will only further increase in the future. This can be attributed to the increase in available data and the improvements in smart technologies and vehicle algorithms. As a result, usage costs will go down for the end customer.

5.0 YEARLY UPDATED

Since the introduction of the combustion engine in 1900 the automotive industry has not seen significant changes. Despite significant drive-train, safety and comfort improvements the way people move from A to B remained similar. As a result, vehicle models were updated once every 5-10 years to include the latest feature improvements.

At present the mobility industry is on the verge of major change due to technological, societal and economic trends. The development pace of the above-mentioned technologies and their potential impact is so high that vehicles will be outdated faster. To enable and unleash the value of these development models will be updated on a more regular yearly basis. Since fleet managers continuously renew their vehicle fleets, once every 3-4 years, they fleet is equipped with the latest technologies and capabilities.

6.0 DIGITIZATION

Increased digitization changes society as a whole and nearly every industry in it. People have instant access to an endless amount of services through their smartphones. This ongoing technological development already significantly changed the mobility industry, via the market entrance of several highly convenient and low-cost mobility service providers and additional mobility services.

One such example is Uber, which allows customers to choose, book and pay for a cab via their mobile phone. Secondly, journey planning apps are better able to use real-time travel data to pro-actively advise commuters before and during their trips. At the flip side of the coin, these developments and digital innovation has significantly increased customer expectations towards mobility solutions. They expect more convenient, flexible and personalized solutions fit to the needs and circumstances at hand.

To map the different technologies and to assess their potential impact Elmer van Grondelle was interviewed (14-11-2018) (Appendix B). Elmer van Grondelle is assistant professor at the Tu Delft, his expertise covers automotive design and strategic automotive.

Elmer van Grondelle believes that the technological developments will mainly contribute to vehicle functionalities such as in-vehicle experience, connectivity, drivetrain advancements and autonomy. These innovations would enable new and more effective ways of mobility, based on customer specific preferences. This in turn would challenge current mobility value propositions and business models, including the fleet management business model.

Elmer van Grondelle believes that fleet managers should start to focus on selling mobility (kilometres, usage), rather than the asset itself. Currently, cars stand idle for 95% of the time. He believes this number will go down as shared, connected and autonomous technologies mature. This in turn will make pay per use business models more viable, as vehicle usage will significantly increase.

ELECTRIFICATION

Elmer van Grondelle believes EVs will become widely used in the near future, as the battery capacity and loading infrastructure improves. In addition, the public perception on EVs improves with the introduction of popular models such as the Tesla.

AUTONOMOUS VEHICLES

Secondly, Elmer Grondelle believes the first autonomous vehicles will hit the Dutch Roads around 2020. At present policies and regulations prevent the widespread implementation of such vehicles, as the technology is already there. This implementation process will happen gradually, with first pilots happening in dedicated lanes with limited context factors. He believes a large amount of the newly sold vehicles in 2030 will be autonomous.

Contrary to Elmer van grondelle, Jacco Lammers believes that the widespread adoption of autonomous vehicles will not occur before 2030. Jacco Lammers (interviewed – 22/10) doubts if autonomous vehicles will ever be able to process all the situational factors of urban mobility in cities such as Amsterdam

CONNECTED VEHICLES

At present Elmer already sees the impact of connected vehicle technology both on in-vehicle and driving experience. He believes this technology will further develop rapidly on the short term, in line with the rapid development and increased capabilities of AI.

SHARED:

The rapid technological developments and the ongoing sharing economy trend will only further intensify the demand for and availability of shared mobility services. As such expectations are that these services will become widely available in the near future, especially in and around urban areas at first. Thereafter, solutions will spread to the less populated sub-urban and rural areas.

The following technological roadmap (fig 3) was created by combining the insights of Elmer van Grondelle with the insights of the center of automotive research (2017).

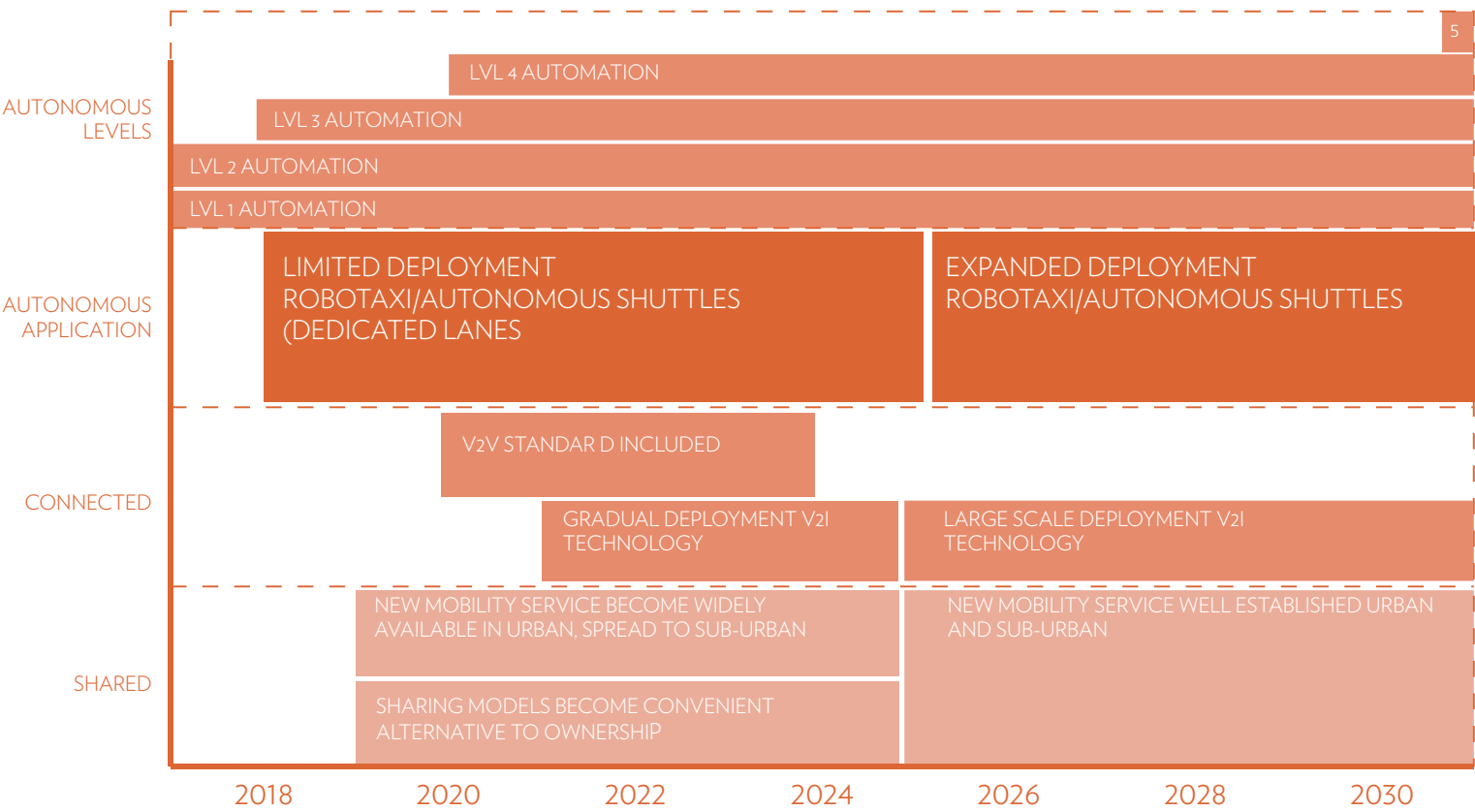


Fig 3: technology scouting map

KEY FINDINGS

- Based on the technology scouting phase several key findings could be identified.
- Technological development will significantly change the current vehicle centred mobility landscape.
 - The combination of shared and autonomous vehicles could significantly reduce the total amount of vehicle from 280 million in 2017 to 300 in 2030 (PWC, 2018)
 - Shared vehicle solution will challenge vehicle ownership/long term lease on the short term
 - Dedicated autonomous vehicles could be implemented in 2020

2.1.3 MARKET DEVELOPMENTS:

Based on the insights gathered from the trend analysis and technological developments we can conclude that the Dutch mobility market is on the verge of change. This can be attributed to several opportunities and problems. Within this part of the thesis we will dive in the problems, which the current Dutch mobility landscape is facing. Additionally, mobility forecasts of the KIM will be assessed to get a good view on the future impact of these ongoing mobility problems.

INTRODUCTION

The purpose of personal mobility has always been centred around moving people from A to B. In the past people, businesses and society relied on horse carriers and boats for doing so. This changed since the introduction of the combustion engine and the automobile. The popularity of the automobile took flight after the introduction of the Ford model T, the first mass produced vehicle. This popularity can be mainly attributed to the speed, flexibility, convenience and comfort it offers (Blijenberg A., 2015). At present, current infrastructure is not capable of handling the rapid increases in mobility demand, resulting in major gridlock and congestion problems. Additionally, both the increase in vehicle usage and loss in travel time, as a result of congestion and gridlock problems, significantly increases CO2 emissions.

Within the Netherlands vehicles account for 70% of the total travelled kilometres (CBS, 2018). Secondly, the number of vehicles is growing year by year. Between 2017 and 2018 the number of cars increased by 2%, reaching a total of 8,2 million cars (CBS, 2018).

To solve the above mentioned and ongoing mobility problems a change in the current mobility landscape is required. Consequently, the role and position of the personally driver driven vehicle is expected to change in the near future (Corwin et al., 2015). This paradigm shift is strengthened by several societal, economic and technological developments, will be addressed hereafter.

THE MOBILITY PROBLEM IN NUMBERS

In 1950 the car took over the place of most used vehicle from bicycles and public transport within the Netherlands. Since then the yearly travelled car kilometres increased to 108 milliards in 2018 (CBS, 2018). This continuous growth in travelled kilometres and number of cars causes major traffic flow problems, especially during rush hours and around urban areas where mobility demand is the highest.

According to KIM (2018) traffic congestion grew by 5,1% between 2017 and 2018. Moreover, they believe that travel loss hours, as a result of congestion, will further increase by 35% between 2017 and 2023 (fig 4). This expected increase can be attributed to an increase in traffic (8%) and kilometres (10%) (KiM, 2018). This loss in travelling time costs Dutch society between 2,7 and 3,8 milliard euros on a yearly basis (KiM, 2017). To prevent these problems from further intensifying

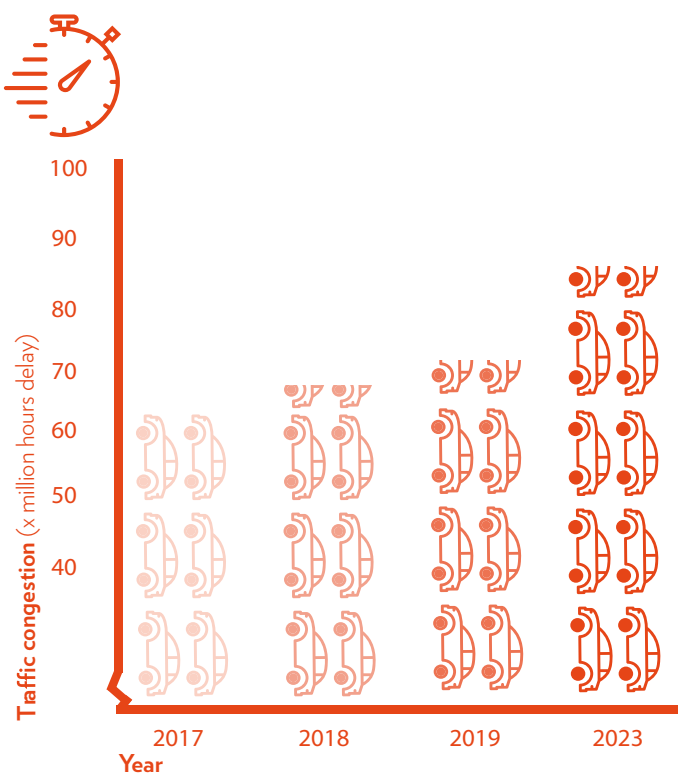


fig 4: Expected vehicle travel loss time increase

Dutch government and municipalities attach increased priority to new mobility policies, regulations and innovation.

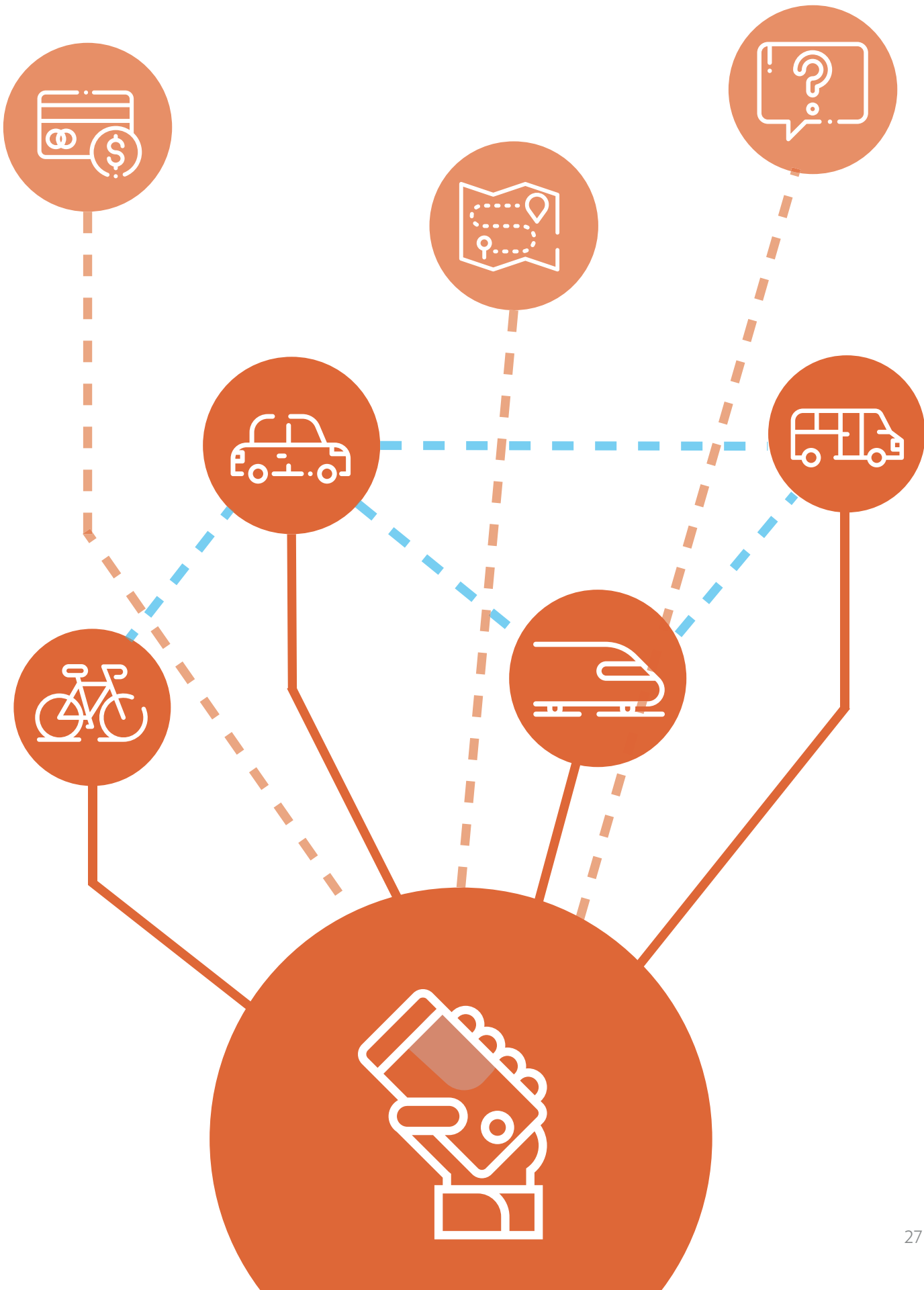
NEED FOR ACCESSIBILITY

Building additional infrastructure is the traditional way in which the Dutch government tries to solve this mobility problem. But several researchers (Duranton, & Turner, 2011) found that an increase in road capacity leads to an equal increase in traffic, which preserves the traffic flow problems. According to Blijenberg (2015), this can be attributed to society's need for accessibility. Accessibility is dependent on speed and travel distance. If the amount of traffic remains the same but capacity increases, congestion would be reduced, and travel speed would increase, in theory. But accessible places attract businesses and people because of economic and societal advantages, which in turn increases mobility demand and traffic. This vicious circle preserves the gridlock and congestion problems, as such the Dutch mobility landscape requires different mobility solutions.

KEY FINDINGS

Vehicle travel loss time is expected to increase with 35% between 2017 and 2030 (KIM, 2018). This costs the Dutch society 2,7-3.8 milliard euros on a yearly basis. Building additional infrastructure maintains the congestion problem. This can be attributed to the fact that accessible places attract people and business.

2.1.4 MOBILITY AS A SERVICE



2.1.4 MOBILITY AS A SERVICE

Up until now research focused on identifying the drivers of value and change within the mobility industry in general. But the scope of this thesis is dedicated to Mobility as a service, as it is expected to challenge the current value proposition of established mobility players and be a big part of the future of mobility. In order for us to sketch the potential impact, challenges and opportunities of MaaS more information on the service is required. Together with the previous insights this would allow us to sketch a future mobility scenario. To do so existing literature on MaaS has been analysed and reviewed. Additionally, several experts on MaaS have been interviewed to gather some in depth knowledge on the topic.

Within this part the of the thesis the following chapters will be discussed:

- 1 What is mobility as a service/defining MaaS
- 2 MaaS roles & stakeholders
- 3 MaaS value chain
- 4 MaaS benefits
- 5 Who is the MaaS customer
- 6 Benchmark existing MaaS providers
- 7 Requirements, value drivers and challenges of MaaS
- 8 Expert interviews
- 9 Future scenario

1. WHAT IS MOBILITY AS A SERVICE?

The ongoing population growth and rapid urbanization trend increasingly challenge the available infrastructure. As mentioned previously this results in traffic congestion, gridlock problems, pollution and traffic incidents, which in turn causes tremendous societal and economic costs. Society is increasingly looking for more sustainable and efficient mobility solutions that utilize existing infrastructure better. These solutions span across different modes of transport and go beyond the common vehicle centred mobility landscape. Current rapid technological developments already lead to the creation of several innovative mobility solutions, which offer customers more flexible and convenient ways of transportation, Example companies include felyx, a free-floating shared electric scooter service in Amsterdam and uber the well-known peer 2 peer ride-hailing service.

Most of these services operate within the boundaries of their own company and mode of transportation. This silo'ed approach creates multiple mobility ecosystems, which are not able to communicate with one another. This disables customers from findings the best fitting mobility solution at once and via one application. This requires the combination and integration of the different mobility services onto one overarching mobility ecosystem (Goodall et al., 2017). By combining the different data streams municipalities and city planners get a better view on mobility consumption and as such pinpoint and solve

specific mobility problems. Customers could benefit from this ecosystem by getting real-time, customer and scenario specific mobility advice at a higher level of convenience, flexibility and at a lower cost (Arup, 2018). This ecosystem is also referred to as Mobility as a service (MaaS). Industry expectations are that this integrated, flexible and convenient mobility service could (partially) solve the mobility problems, which society currently faces.

Although MaaS is becoming common language within the mobility industry a lot of misconceptions still exist on what the service entails and what not. To clarify and set a definition for this project existing MaaS definitions are first analysed. One of the first and in depth MaaS definitions is put forward by Hietanen (2014). He classifies Maas as a mobility distribution service which fulfils user transportation needs through one single digital interface. It does so by integrating and combining different transportation modes and services into mobility packages. From this definition we can already identify several core characteristics of MaaS. First and foremost, the MaaS propositions consists of a variety of combined and integrated mobility services and transportation modes (fig 5). This requires cooperation and bundling of different mobility services from multiple mobility service providers. Secondly, from this definition we can conclude that the value proposition of MaaS gets delivered via one single digital interface, which in turn requires interconnectivity between the different MaaS stakeholders. Thirdly, MaaS aims to deliver a solution fit to the transportation needs of its customer, making it a very user centred mobility solution.

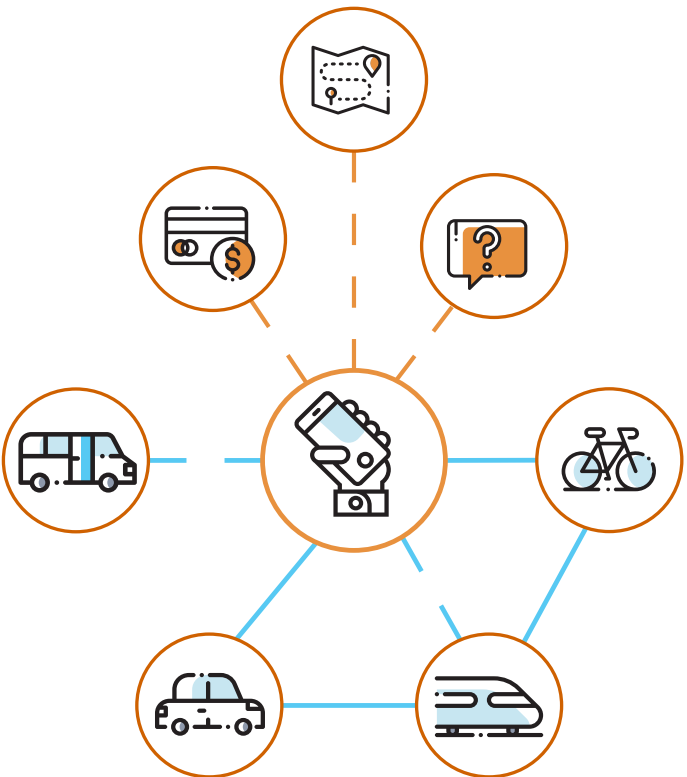


Fig 5: MaaS service overview

Although this definition gives a good indication of MaaS, it lacks some specific information on components, features and functionalities. Therefore, we dove into several additional definitions, which gave more insight into specific MaaS functionalities. Kamargianni et al, (2016) state that “MaaS should include intermodal planning, booking and payment functionalities, as well as multiple transport modes and mobility packages”. This definition builds on the previous definition but adds specific functionalities, which the service should be capable of. It should offer customers the ability to plan, book and pay for their entire trip and across the different modes at once. This integrated planning, booking and payment service requires the integration of the individual functionalities of the different mobility services which in turn requires interconnectivity and data sharing.



Fig 6: MaaS integration levels

Several researchers distinguish between MaaS based on the level of integration. The different levels each contain different integrated functionalities and their corresponding customer value. These different integration levels allow for the varying MaaS propositions, based on their delivered functionalities. Sochor et al. (2017) defined the following 5 integration levels (fig 6). We can assume that the higher the level of integration gets, the more attractive the service becomes for customers.

MAAS CHARACTERISTICS

To further clarify MaaS Jittrapirom et al. (2017) analysed previous and currently existing MaaS Schemes worldwide. This led to the following 9 overarching characteristics, which every MaaS scheme should have (fig 7).

- **Transport mode integration**
- **Tariff option:** MaaS solutions can offer subscription based mobility packages or pay as you go schemes.
- **One platform:** MaaS operates on one digital platform, which offer customers the ability to plan, book, pay and get access to travel information.
- **Multiple actors:** MaaS requires cooperation between different stakeholders, both mobility stakeholders and

technology companies.

- **Use of technologies:** MaaS needs several technologies to function (3G/4G, mobile phones, platforms etc.)
- **Demand orientation:** MaaS aims to deliver solutions fit to the needs of its customers not vice versa
- **Registration requirement:** Customer are required to register to get access to vehicles. This facilitates MaaS usage and enables personalized travel experiences.
- **Personalization:** MaaS should deliver personalized travel experiences based on previous experiences and personal preferences.
- **Customization:** The proposed mobility solutions should be customizable to the customer specific preferences.

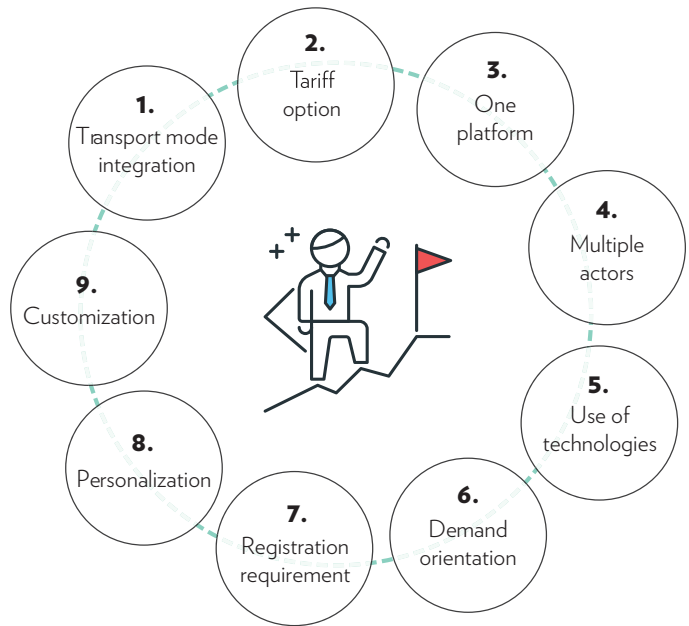


Fig 7: MaaS service characteristics

DEFINITION FOR THIS PROJECT

For this master thesis we will adopt the definitions of Hietanen (2014) and include specific functionalities and characteristics. As such MaaS can be defined as:

“A customer centric mobility platform, which integrates and combines mobility services from multiple mobility providers. This platform enables:

- 1) the system to pro-actively advice customers on current and future trips based on real time travel information and customer specific preferences.**
- 2) the customer to plan book and pay for their entire trip, across multiple modes of transportation, at once.”**

2.0 MAAS STAKEHOLDERS/ROLES

Based on our definition we can conclude that a succesful MaaS proposition requires collaborations and commitment from a variety of stakeholders. The role, contributions and commitments can be clearly presented in a business ecosystem overview.

Kamargianni et al., (2017) created one such business ecosystem (Fig 8) by using findings from several focus groups, in which MaaS stakeholder and experts took part.

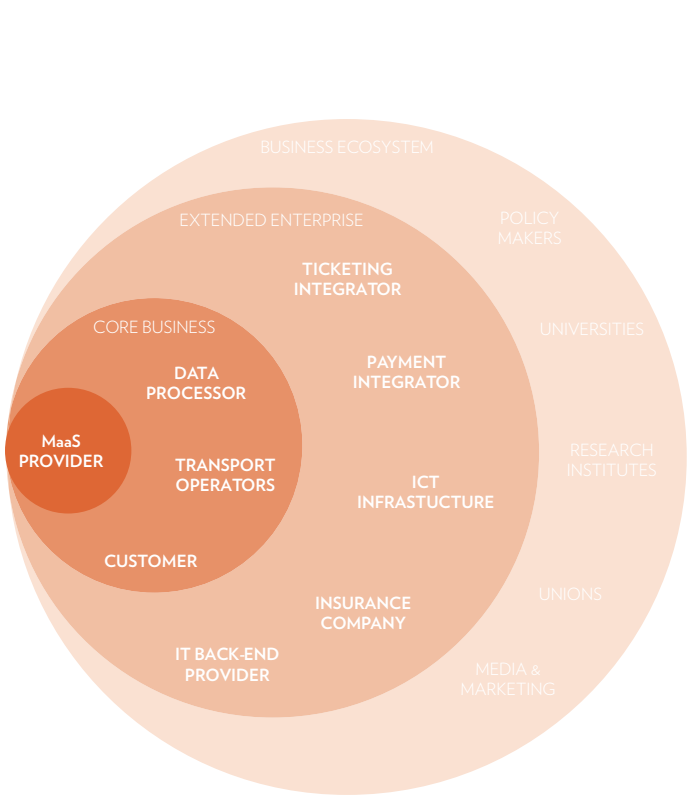


Fig 8: MaaS business ecosystem

This business ecosystem is divided in several layers, each layer corresponds with the level of commitment which the stakeholders have towards the MaaS provider. The core business layer contains the most important stakeholders, which deliver the primary functions to the customer.

The stakeholders in the core business layer include:

- 1) MaaS provider
- 2) Data Provider
- 3) Transport operator
- 4) The customer

From the MaaS business ecosystem (2017) we can conclude that MaaS requires various inputs from technological partners. These partners deliver specific features and functionalities which enable the MaaS system to work. This would not be any different for LeasePlan if they want to deliver a MaaS proposition. At present, LeasePlan does not have the technological and innovative capabilities to deliver such a service themselves.

1.MaaS provider (MSP):

The MSP is positioned at the core of concept, their responsibility is the delivery of the value proposition to the customer. They do so by connecting the customer with the different mobility providers through the digital interface, matching the customer requirements with the service delivery. Moreover, the MSP is responsible for the development and maintenance of the customer interface and the back end of the platform.

2. Data providers (DP):

The role of the data provider is pivotal for MaaS because data availability is of critical importance for MaaS to work. The DP enables data exchange between the different mobility operators and the back-end of the MaaS platform. To enable MaaS and its integrated functionalities a common data language has to be created between the MSP and the transport operators. The DP therefore processes and repackages the varying data formats from the transport operators into one common data stream.

This data exchange is done via the APIs of the different transport operators. These APIs usually contain data on planning, real time vehicle information etc. The different data streams from these APIs are exchanged with the API gateway of the DP. This API gateway collects, processes and exchanges the required data with the back-end systems of the service provider.

3.Transport operator (TO):

MaaS uses the available mobility services of multiple transport operators. The service is able to provide flexible and convenient multi-modal transportation solutions by combing and integrating the different services of the TOs. The main TOs within MaaS are public transport, shared vehicles, shared bikes, ride hailing and shared ride hailing (Kuik, 2017). In addition, mobility service providers also include supportive mobility services such as parking, charging etc.

4. Customers:

The customer is at the end of the MaaS value chain, he or she uses the different mobility services via the MaaS interface. These customers can be individuals (B2C) or companies (B2B). More on the MaaS customer can be found in the customer section

3.0 VALUE CHAIN

Based on the above-mentioned stakeholders a simplified value flow model (fig 9) can be designed. This model shows the different value streams within the ecosystem.

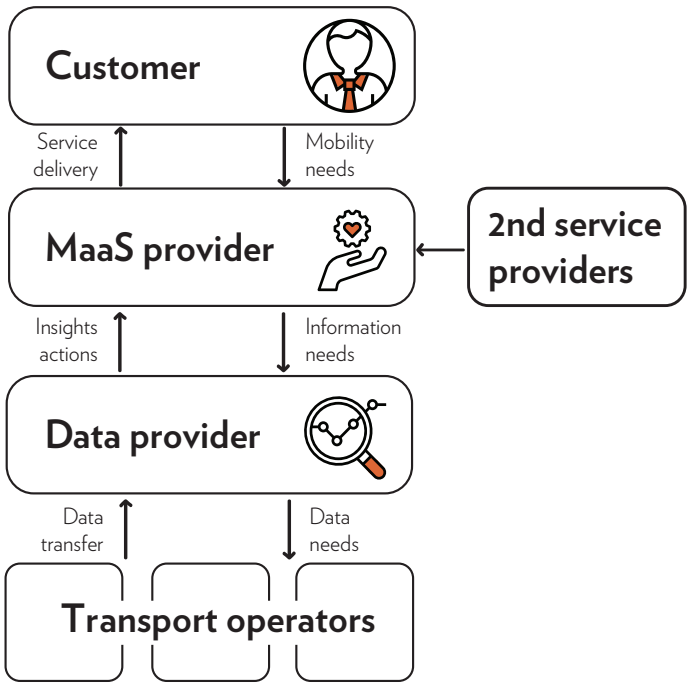


Fig 9: Simplified value chain MaaS solution

4.0 MAAS BENEFITS FOR THE DIFFERENT STAKEHOLDERS

Based on existing literature and research we can conclude that MaaS could lead to a more flexible, inclusive, affordable and connected mobility landscape (Sochor et al, 2016). This can be mainly attributed to the personalized and pay as you go mobility solutions, spanning across multiple modes of transportation. In addition, MaaS ultimately aims to prevent single vehicle travelling by making more sustainable alternatives readily available. This would ultimately lead to less congestion and a reduction in environmental footprint.

Arup (2017) recently did 14 expert interviews to uncover the expected benefits of MaaS. They specifically divided these benefits per role within the ecosystem (table 1).

The Core business layer of MaaS consists of 4 key stakeholder:

- MaaS provider
- Data provider
- Transport operators
- Customer

The development of MaaS requires an extensive parnetship network, spanning across multiple industries.

MaaS offers a variety of benefits including:

- Ability to reduce/prevent vehicle ownership
- Ability to target specific customer and trip segments
- Deliver lower cost, convenient and flexible mobility solutions

KEY FINDINGS

Mobility operators

- Ability to enter mobility service market
- Decentralize responsibility
- Ability to target certain customers/trip segments

Consumers

- Freedom of choice, based on personal preferences
- Cost saving, pay per use
- Convenience, ease of access
- Flexibility: Route choice, travel time, shared or individual

Transit agency

- First & last mile solutions
- Off-peak provision
- Demand orientated routing
- Redundancy/ reliability

Government

- Reduction vehicle ownership, congestion, environment
- Urban connectivity
- Freeing up of urban space
- Social equity, more population segments can get access to mobility

Table 1: MaaS benefits per stakeholder

5.0 WHO IS THE MAAS CUSTOMER

MaaS = URBAN

While clarifying the potential MaaS customer several segmentation strategies can be applied. First of all, both Jacco Lammers and Henk Meurs (expert interviews) stated that a clear geographical distinction can be made between urban, sub-urban and rural areas. According to them rural areas are less interesting at the moment, this can be attributed to little available transit and non-existing/little experienced mobility problems. In addition, expectations are that the ongoing urbanization trend will increasingly stimulate people to move towards urban areas decreasing the population of rural areas. These three findings make the desirability and potential viability of a MaaS propositions less strong in rural areas. Urban areas show the most potential for MaaS solutions. This can be attributed to the rapidly growing population density and the subsequent congestion, gridlock and pollution problems stemming from the current vehicle centred mobility landscape. Secondly, within urban areas the availability of innovative mobility service providers is rapidly increasing. By combining these different services on one MaaS platform the desirability, availability and reliability of the service gets better. In addition, the high mobility demand within urban areas makes the utilization of shared mobility services better which in turn would reduce the costs and enable lower prices for the customer.

SOCIO DEMOGRAPHICS

Further segmentation can be done based on social demographic characteristics. Influential social demographic factors include age, work, family, income, health etc. Within several studies it was found that households with 2+ young children were less likely to adopt MaaS (Karlsson et al., 2017). This can be attributed to the need for flexible mobility cg. Bringing kids to school, friends, sports etc. Age also plays a significant role in the adoption of MaaS. Industry experts believe millennials will be more likely to adopt MaaS (Jittrapirom et al., 2018). This can be attributed to the high level of connectivity and technological adoption of these younger generations (Goodall et al., 2017). Work related factors significantly influence people's willingness to adopt MaaS. These factors include set/flexible work locations, presence at the office (not being bound to PT timeslots) regular commutes vs. working at home (Spierings, 2018). Health can also play a role in people's willingness and ability to use MaaS. Disabled people have certain physical requirements, which cannot be met by all the available modes of transportation. This would require specific and additional service levels.

CURRENT TRAVEL Behaviour

Previous studies identified influence of current and past travel Behavioural on the adoption of MaaS. People who use cars on a regular basis, more than 4 times a week, are less likely to change their travel Behaviour towards MaaS (Ho et al., 2017; jittrapirom, 2018). This requires behavioural change, which is a

complex matter. In contrast, people who travel felxibly or use public transport on a regular basis are more willing to adopt MaaS (Jittrapirom, 2018).

ANNA



Anna lives in Amsterdam, together with her husband and dog. She is freelance project manager and works at a varying companies in the timespan of one week. Whenever she can she work from home. Via digital communication mediums she is able to conveniently connect with her clients. Because of her varying mobility needs she would like to have a flexible mobility solution fit to circumstances at hand.

The MaaS customer

- Urban centred, either living or working within the urban areas
- Millenial, high connectivity + used to technology
- No children
- No current vehicle centred travelling Behaviour

6.0 EXISTING MaaS SCHEMES

If we look at the different integration levels proposed by Sochor (2017) we can conclude that no level 2 (+) MaaS services exist within the Netherlands. The most well-known forms of MaaS within the Netherlands are business travel cards (NS business cars, Mobility Mix etc). These cards give people access to multiple modes of transportation, but they do not provide integrated planning and booking services. So, they are partially level 2 integrated without having integrated information services (level 1 MaaS). Several Dutch pilot experiences, such as the MaaS Zuidas experience, offered customers the opportunity to temporarily switch from their vehicles and get a mobility budget in return. This mobility budget could be spent at several alternative mobility service providers. But no well-integrated and widely available MaaS service currently exists within the Netherlands. Therefore, our benchmark spans beyond the context of the Netherlands to include findings of notable level 2 (+) MaaS schemes.

LEVEL 2 INTEGRATION

Austrian Smile MaaS pilot project is a well-known and researched level 2 MaaS service (Smile mobility, 2015). Within this project several transport operators and technology companies created a service, which allowed users to plan and book multiple transportation modes to complete one trip. In the application bicycle & car sharing, taxi, public transport and parking services were included. This Ultimately offered users the ability to make flexible and convenient multi-modal journeys. The project was discontinued after 1 year but got re-introduced in 2017 as Wien Mobil. Globally multiple MaaS providers deliver level 2 integration.

LEVEL 3 INTEGRATION

Worldwide only 2 MaaS providers successfully adopted level 3 MaaS integration. The Swedish pilot Ubigo, run in Stockholm between 2013 and 2014 (Karlsson, 2016). And whim, a successful Finnish MaaS provider operational since 2016 (MaaS global oy, 2016) . The Ubigo pilot developed household specific prepaid MaaS mobility bundles, for their 70 participating households. The service allowed households to plan book and pay for their entire trip, spanning across multiple modes of transportation, via one application. In addition, they stimulated more sustainable modes of transportation by offering bonus points. Whim offers similar services as Ubigo but distinguishes itself by offering 3 usage schemes; whim to go, whim urban and whim unlimited. With whim to go users do not have to pay a monthly fee but rather pay for actual usage. Whim urban offers unlimited urban transport and city bikes at 49 euros a month. In addition, customers can get access to additional services and separately pay for use. Whim unlimited is a monthly subscription of 499 euros, which gives customers unlimited access to all the included services.

NAME	LOCATION	OPERATIONAL	MOBILITY SERVICES	INTERGRATION LVL
BUSINESS CARDS (NS BUSINESS CARD, MOBILITY MIXX, RADIUSZ etc.)	The Netherlands	Operational	Carsharing, parking, fuel, charging, cabs, rental, Public transport	Level 2, no level 1 (Integration of modes and payments no information)
SMILE	Austria	2014-2015	Bike/car sharing, cabs, public transport, parking	Level 2
UBIGO	Sweden	2013-2014	Bike/car sharing, car rental, cabs, public transport	Level 3
WHIM	Finland	Operational	Car/bike sharing, rental, cabs, public transport	Level 3
MOOVEL	Germany	Operational	Car sharing, cabs, Public transport	Payment integration
WIENMOBIL	Austria	Operational	Bike/car sharing, cabs, public transport, parking	Level 2

Table 2: MaaS Bench Mark

MaaS PILOTS WITHIN THE NETHERLANDS

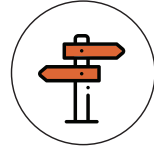
To identify the potential of MaaS within the Netherlands 7 MaaS pilots have been initiated by the government (KiM, 2018). With these pilots the government aims to look for mobility solutions for specific mobility pain-points. One example is the MaaS Zuidas pilot, which is the most popular business district of Amsterdam. As such it attracts a very high number of commuters on a daily basis, which in turn leads to parking, congestion and gridlock problems. I attended several of the market consultations to get a view on the current development of MaaS within the Netherlands. Within these meetings key players of a variety of industries participated, spanning across mobility, technology, infrastructure and manufacturing. Based on the consultations we can conclude that the market wants to deliver MaaS, but there is no equal level playing field for doing so. The different key mobility operators are hesitant in collaborating, since it could challenge their own market position. Additionally, several mobility operators brought the current mobility policy challenges forward. At present, the corporate vehicle is taxed more favourable as opposed to the mobility budget. As a result, mobility operators were concerned about the potential MaaS market if policies remained favourable for corporate/owned vehicles. Within this discussion the municipality of Amsterdam admitted that they were collaborating with the government to change these policies. If we look at other countries and big cities such policies are already existing. One example is London, which adapted congestion/rush hour fees and low emmission zones (TfL, 2019). People who want to commute by car during rush hours have to pay an additional congestion fee. These kinds of regulations are aimed at reducing mobility demand during rush hours and spread mobility better during the day.

7.0 USER RESEARCH

The qualitative and quantitative studies of the above mentioned MaaS pilots were analysed, to gain a better understanding of the; 1) user requirements; 2) value drivers and; 3) challenges of MaaS.

7.1 USER REQUIREMENTS

AUTONOMY AND FLEXIBILITY



Based on customer research findings from the Ubigo, smile and Zuidas experience pilots we can conclude that MaaS customers require autonomy and flexibility (Ideate, 2018; Karlsson et al., 2016; Sochor et al., 2016). During these pilots' users noted that they demand "just in case" solutions, whenever sudden mobility needs occur. In addition, people want to be able to choose from multiple trip set-ups to complete the same journey. This could also entail the selection of multiple mobility service provider delivering the same mode of transportation. Secondly, it was found that commuters felt more flexible while using hourly rate car sharing services, as opposed to renting a vehicle for the full day. Not being attached to the rental car, for a whole day, gave these customers more sense of freedom. Thirdly, Ubigo participants indicated that they preferred pay per use schemes based on money instead of credits. Offering credits gave these customers the idea that they were confined in their ability to choose their mobility solutions.

RELIABILITY



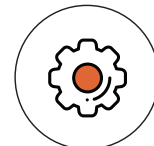
MaaS services need to be reliable in a variety of ways. Focus groups performed by Harms et al. (2018) identified the need for reliable technology. Participants indicated that they felt more dependent on their mobile phones for their mobility, while using MaaS. As such they demanded reliable systems at all times. Additionally, Participants also indicated that they wanted some sort of insurance when unexpected occurrences happen along the commute. This could either be a last-minute solution or a financial compensation.

AVAILABILITY



The results of the focus groups done by Harms et al., (2018) indicated a need for mobility availability both in terms of geography and time. Customers expect mobility solutions to be widely available on different locations, enabling transportation whenever and wherever they are. Moreover, Ubigo participants demanded car sharing solutions in the direct neighbourhood of their current location (Karlsson et al., 2016) Secondly, customers expect solutions to be available on any given time during rush hour and off-peak hours and which do not require long in advance bookings (Ho et al., 2017)

EASE OF USE



Research findings indicated that the application should be easy to use, especially during first usage (Ideate, 2016). Ease of use translates to; 1) Available explanation and support of the service; 2) Self-explanatory service; 3) Ability to present a lot of information in a structured and clear way; 4) Supportive functions (example: Map which shows location and route to mode of transportation); 5) Get pro-actively informed when problems occur, including services.

The easier the usage of the application is the more it facilitates and stimulates behavioural change (Karlsson et al., 2016). In addition, Kamargianni et al. (2018) noted that participants were more committed to an application and service, which was well thought out in terms of usability.

7.2 CUSTOMER (added) VALUE DRIVER

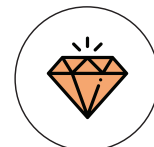
Based on customer research findings from previous pilots the following customer benefits could be identified.

FREEDOM OF CHOICE



Ubigo users appreciated the variety of available transportation modes and services offered on the platform (Sochor et al., 2016). Moreover, participants attached added value to different types of a specific mode of transportation such as a regular bike versus an e-bike or a smart-car versus a family sedan. According to Spickerman (2014), this choice within and across different modes of transportation is pivotal for the disposal of personally owned cars. In addition, giving people a wide variety of choice enables and stimulates them to try alternative modes of transportation, potentially convincing them of the added value of MaaS (Stromberg et al., 2015)

CONVENIENCE HIGH LEVELS OF INTEGRATION



The all-inclusive proposition of Ubigo, gave participants a higher feeling of convenience. This feeling could be attributed to the variety of mobility services and the service levels at which they were offered (Sochor et al., 2016). This abundance of choice also created a feeling of trust towards MaaS, as they were able to select from a variety of alternatives. Secondly, the Smile pilot offered participants the ability to plan and book multiple transportation modes to complete one trip. This triggered them to try and use different modes of transportation to complete one trip if the solution was faster and more convenient (Smile mobility, 2015).

TAILORED OFFER



Participants of the Ubigo pilot valued the personalized mobility bundles. These bundles were designed according to the needs of the individual or their complete households (Sochor et al., 2016). They noted that the personalized offers enabled and stimulated them to change their travel behaviour and use more alternative modes of transportation (Karlsson et al., 2016). Customer research indicated that participants of the previous pilots replicated their current travel behaviour while customizing and personalizing their own MaaS bundle (Ho et al., 2017). Similar to this, Matyas and Kamargianni (2018) found that public transport users would generally use public transport more often as well. The same could be said for bicycles, taxis etc. Research indicated that for MaaS providers to deliver fully personalized services data is required on: current mobility patterns, social economic statistics and attitude (Kamargianni et al., 2015)

7.3 MaaS CHALLENGES

At present, MaaS is facing several challenges which inhibit the successful implementation of such a service within the Netherlands.

PRICE COMPARISON



Car owners typically do not include initial/fixed costs while evaluating their current mobility expenditure (Turrentine & Kurani, 2007). As such their expenditure is solely based on the running costs of the car, which is significantly lower than the total costs of vehicle ownership. Within MaaS propositions the fixed costs of the assets are shared and integrated within the running costs of the service. This creates a distorted comparison between the two options, which stimulates people to stay with their cars. To create awareness about the total cost of vehicle ownership customers could be provided with a null measurement, which takes both fixed and running costs into account.

IMPLEMENTATION



Findings from the MaaS Zuidas experience pilot indicated that the implementation of MaaS can be challenging (Spiering, 2018). Several reasons were mentioned by Spierings: First and foremost, MaaS requires customers to significantly change the way they commute, as opposed to traditional mobility solutions. This requires a thorough understanding of the new services, functionalities and features of the MaaS service, which demands time. Spierings developed a four-step learning

process, which supports this process.

Additionally, the survey found that people want to experience and try the service before they commit themselves to MaaS. This need for trialability was shared by participants of the Ubigo pilot (Stromberg et al., 2016). Furthermore, they found that trialability offered customers the ability to try alternative modes of transportation without commitments. This could ultimately allow MaaS users to change their current transportation behaviour.

Implementation steps, as defined by Spierings (2016):

Consciousness by experiences discomfort

Learn how to travel with MaaS

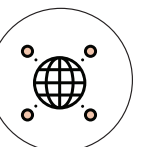
- Getting used to correctly planning a trip
- Learn how to work with the new technologies offered by MaaS
- Getting to know the available mobility service and their respective advantages and disadvantages
- Incorporate the different services in your daily routine

PARTNERSHIPS



Since the current mobility markets is highly profitable for key players, no incentive is attached to partnering with other mobility providers. Moreover, Key mobility players are afraid that partnerships could lead to cannibalization of their own markets and negatively influences customer relationships with their current customers. These above-mentioned partnerships span across varying stakeholder, as shown in the business ecosystem (Pic). Governments should play a leading role in establishing common grounds between the different stakeholders (Goodall et al., 2017). They should create an equal level playing field, from which all stakeholders could benefit. While doing so they should focus on financial viability on one hand and maintaining the public interest on the other. Through innovative regulations and policies, they are capable of guiding and steering the development of MaaS. One such examples is social inclusion, governments could stimulate services to cover areas in which traditional public transport is poorly available. are capable of creating regulations that guide the development of the service in a way that does both. But policy makers should balance the level of regulations in a way which stimulates the innovative capabilities of the private sector and ensures the public interest at the same time.

DATA ACCESSIBILITY:



The different operators need to exchange data for MaaS to conceptualize. This requires them to open up their data systems (APIs) to the MaaS ecosystem and its data provider. One crucial player for MaaS is the public transport operator, as many believe they will be backbone of any successful MaaS (Goodall et al., 2017). But this public private partnership can be challenging as their business objectives vary. Public transport

operators operate with the public interest in mind and receive funds from the government. Private players on the other hand are mostly commercially driven and have responsibilities towards their stakeholders. These views can collide with one another.

One city ahead of its competitors is London, their public transport operators opened up their API to a large amount of companies and developers (TfL, 2018). At present, their data is used in the applications of more than 500 companies.

USER WILLINGNESS



For MaaS to be adopted the service should offer competitive pricing or significant added value, as opposed to current travelling solutions (Karlsson et al., 2017). Customers are willing to pay more for MaaS if it delivers them significant added value over their current mobility offerings. Furthermore, it is believed that willingness would significantly increase if the service delivers added value at lower cost levels, creating long lasting customers.

The participant of the Ubigo pilot noted that the functionalities of the service delivered upon the above-mentioned customer value driver (Freedom of choice/flexibility, convenience and tailored/personalized offers), which could translate to their increased willingness (Sochor et al., 2015).

Regular experience of mobility pain points = MaaS success
If customers regularly experience pain within their current mobility offerings, they are more willing to try alternative mobility solutions (Spierings, 2018). This willingness congruently increases in line with the amount of experienced pain; the more pain commuters experience the more willing they are to try alternatives.

KEY FINDINGS

MaaS customer:

From the customer research findings we can derive several customer segmentation factors and define the potential MaaS Customers.

- Urban centred, either living or working within the urban areas
- Millennial, high connectivity + used to technology
- No children
- No current vehicle centred travelling Behaviour

Additionally MaaS deliver the following value driver:

- Freedom of choice
- convenience
- Tailored offer

MaaS has the following service requirements:

- Autonomy & flexibility
- Reliability
- Availability
- Ease of use

MaaS experiences the following challenges:

- Price comparison
- Implementation
- Partnerships
- Data accessibility
- User willingness

8.0 EXPERT INTERVIEWS MaaS

To get in depth understanding of the current developments of MaaS 5 experts were interviewed. The set-up of these interviews was semi-structured, offering the experts the freedom to dive into parts they found important. The experts were all involved with MaaS, either through their own company or through research. The key highlights of these interview are written down hereafter. A more comprehensive overview of the key highlights from the separate interviews can be found in Appendixes (C-F)

INTERVIEWED EXPERTS

-Paul Rooijmans:	Founder tranzer, partial level 2 MaaS service provider
-Jacco Lammers:	Founder GoAbout, level 2 MaaS service provider
-Onno van der Veen:	Partner ideate
-Niels van Oort:	Assistant professor public transport TuDelft
-Henk Meurs:	Professor spatial development and mobility RU

RESULTS

Added value of MaaS

Jacco Lammers mentions that MaaS solutions should deliver significant added value compared to the current mobility solutions. He mentioned that this can be achieved by providing specific mobility solutions for specific areas with area specific mobility problems.

Onno van der Veen adds on this, by stating that his user research found that the more mobility pain customers experience the more willing they are to switch to MaaS.

Critical Mass

Multiple experts mention that MaaS needs to have critical mass in the number of connected operators and customers.

1) To fulfil the reliability and availability requirements, a wide variety of transport operators need to be connected to the mobility platform. Only then could the MaaS provider deliver tailored mobility solutions whenever, wherever and however the customer desires.

2) To make this service viable for the different involved operators and the MaaS service provider a critical mass of customers is required. This would ensure a certain amount of utilization and ensure enough revenue generation for the service to become viable.

Vehicle ownership versus MaaS

Based on the literature research insights we can already conclude that MaaS is capable of and aims to prevent vehicle ownership/long term lease contracts. In theory this might be so but several experts underline the strong position, which vehicles currently have. Jacco Lammers believes that MaaS would not challenge vehicle ownership on the short-term.

Onno van der Veen on the other hand believes that the current “Vehicle centred” mobility landscape is up for significant change. According to Onno van der Veen society is experiencing significant problems stemming from the

current “vehicle centred” mobility landscape. In line with the insights of the market research, he believes these problems will significantly increase the upcoming 5 years. As a result, the liveability and accessibility of key destinations within the Netherlands will become poor.

Onno van der Veen and Henk Meurs believe that the government will create unfavourable policies and regulations for vehicle ownership and usage to prevent these problems from further intensifying. Additionally, Onno van der Veen believes that the more pain customers experience along their current journey the more willing they become to switch to alternatives, such as MaaS.

Role of LeasePlan

Henk Meurs, Paul Rooijmans and Onno van der Veen believe that MaaS will challenge the current value proposition of LeasePlan and vehicle ownership in general. They recall the above mentioned arguments as reason. Onno van der Veen mentions that this willingness is spurred by the ongoing urbanization trend. Urban mobility demand rapidly increases in line with the increases in population density. This in turn leads to variety of mobility problems, including congestion, gridlock problems, pollution and parking.

“Citizens of Amsterdam have to wait for a long period of time for a parking permit. As a result, they park their cars outside of the city which requires an additional 15 min commute”

Onno van der Veen

In contrary to the above, Jacco Lammers believes that MaaS will not significantly impact LeasePlan, at least not on the short term. He believes the solution is aimed at the consumer market and that vehicle users will be less likely to switch to a MaaS solution. However, he does believe that LeasePlan could use the principles of MaaS to solve specific painpoints along the current vehicle journey. One such painpoint could be the above mentioned parking problem, which was also mentioned by Onno van der Veen. He mentions the transitions from the traditional car journey to first and last mile solution as opportunity.

Change from selling assets to selling KM’s

Both Paul Rooijmans and Elmer van Grondelle believe that the mobility industry is increasingly moving away from selling assets (vehicles) to selling usage (Kilometres). They see this both as a challenge and opportunity for LeasePlan. LeasePlan could for instance offer pay per use solutions instead of selling long term subscription models. This would offer customers the desired financial flexibility and freedom to choose their mobility based on the circumstances and needs at hand.

Personally, owned driver driven vehicles will remain in rural areas

Onno van der Veen and Jacco Lammers believe that the rural population will still be dependent on vehicles in the future. This can be attributed to little available mobility services and little experienced pain around the current vehicle centred mobility landscape.

FUTURE MOBILITY SCENARIO

What will the future of mobility look like in relation to MaaS?

Based on the insights gathered within the trend, technology, market and MaaS research a future scenario can be sketched. This scenario would answer the first research question posed in the project brief:

What will the future of mobility look like in relation to MaaS?

The key findings of the different research phases are visualized in an infographic, which portrays this future mobility scenario. This infographic can be found on the following page.

MARKET DEVELOPMENTS

INCREASING EXPERIENCED MOBILITY PAIN

Vehicle travel loss time within the Netherlands will increase by 35% between 2017 & 2023

WILLINGNESS & USAGE OF ALTERNATIVE MOBILITY SERVICES

Customers become more willing to switch to alternative mobility services such as MaaS while the experience of vehicle mobility pain increases

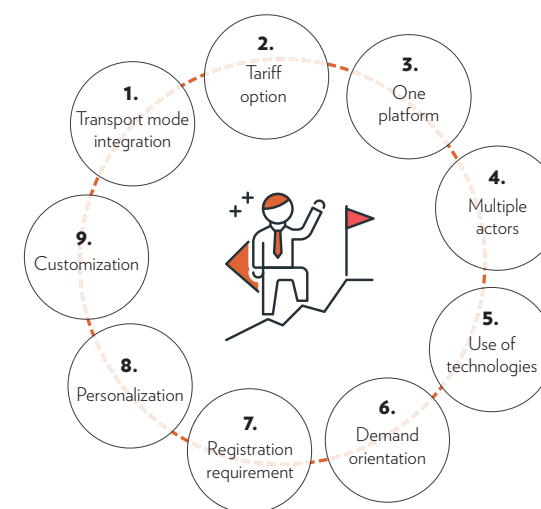
MOBILITY AS A SERVICE (MaaS)

Definition of MaaS

“A customer centric mobility platform, which integrates and combines mobility services from multiple mobility operators.” This platform enables;

- 1) The system to pro-actively advise customers on current and future trips based on real time travel information and customer specific preferences
- 2) The customer to plan book and pay for their entire trip, across multiple modes of transportation, at once.

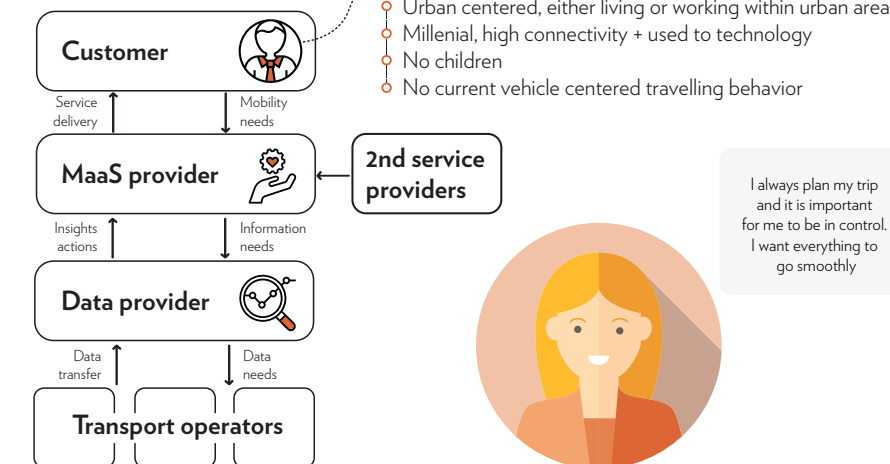
Characteristics



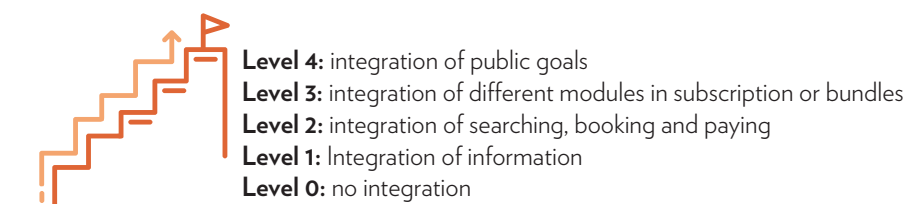
MaaS is able to prevent or reduce vehicle ownership/ long term vehicle lease

With MaaS mobility providers can target specific customers trip segments

Stakeholder ecosystem



The different integration levels and key characteristics of MaaS



AUTONOMOUS VEHICLES

Autonomous level 4 vehicles will be available from 2025 onwards. This offers various business opportunities.



WORK WHILE TRAVELLING

Level 4 automation allows the customer to let go of the steering wheel completely



AUTONOMOUS ROBO TAXI

Autonomous vehicles can be deployed continuously



ENHANCED CUSTOMER EXPERIENCE

In vehicle technology can provide high quality experiences



BETTER VEHICLE UTILIZATION

Connected sensors allow for better vehicle tracking and subsequent utilization



IMPROVE SAFETY

V2I & V2V communication can improve driving safety



INCREASE BATTERY CAPACITY

Battery capacity will significantly increase the upcoming years



IMPROVED CHARGING INFRASTRUCTURE

The availability and capacity of electric vehicle charging will significantly increase

ELECTRIC VEHICLES

the popularity and public perception on electric vehicles will significantly increase while the technology further develops.

FUTURE TRENDS + IMPACT



Benefits

Mobility operators

- Ability to enter mobility service market
- Decentralize responsibility
- Ability to target certain customers/trip segments

Consumers

- Freedom of choice, based on personal preferences
- Cost saving, pay per use
- Convenience, ease of access
- Flexibility: Route choice, travel time, shared or individual

Transit agency

- First & last mile solutions
- Off-peak provision
- Demand orientated routing
- Redundancy/ reliability

Government

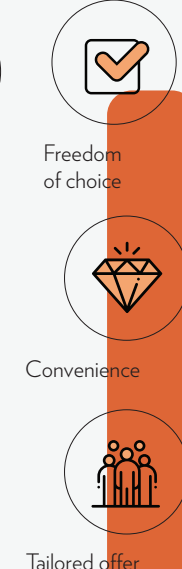
- Reduction vehicle ownership, congestion, environment
- Urban connectivity
- Freeing up of urban space
- Social equity, more population segments can get access to mobility

Requirements, Value drivers and challenges:

1) Requirements



2) Value drivers



3) Challenges



2.2 DISCOVER

Current situation LeasePlan

INTRODUCTION

Within the second part of the discover phase the goal is to clarify the current position of LeasePlan. The insights of this part of the discover phase can be used to answer the second question of the project brief: “What will be the role of LeasePlan in this future, based on their current position? And define a vision, strategic direction and create a design brief.

This part can be divided in four separate blocks:

- 2.2.1 Internal company analysis: Get a clear view on LeasePlan current business and future expectations.
- 2.2.2 Competitor analysis: Identify the competitive forces within the fleet management market
- 2.2.3 Fleet management market developments: Identify market developments within the fleet management market

2.2.1 INTERNAL ANALYSIS

What is LeasePlan?

To get a clear view of the current position of LeasePlan an internal analysis was first performed. While doing so the focus was put on clarifying the current business and future direction of the company.

Within this section of the report the following topics will be addressed:

- 1 Company background
- 2 Value chain
- 3 Customers
- 4 CaaS solutions
- 5 Future direction company
- 6 Key findings

1.0 BACKGROUND INFORMATION

LeasePlan is a Dutch car leasing company originally founded in 1963. LeasePlans’ car leasing services span across the entire lifecycle of the car starting with purchasing until remarketing or leasing second hand (3-4-year-old) lease cars. At present they manage a fleet of 1,8 million cars across 30 countries, making them a global leader in the Car as a service (CaaS) market (LeasePlan, 2018). Within the Netherlands LeasePlan manages a fleet of 150 + thousand vehicles. The customer base of LeasePlan consists of private individuals (3%), Medium sized SMEs (17%), Mobility providers & partners and large corporates (80%). LeasePlan is a proven and trusted fleet manager for its partners, suppliers and customers, with 50 + years of experience.

LeasePlan is an independent fleet management company owned by a group of investors. As a result, they are not bound to products from certain OEMs but are able to offer a wide variety of brands and vehicle types. This is also referred to as multi-brand fleet manager.

LeasePlan ORGANIZATION

LeasePlan has been going through a transition the last couple of years to become one integrated organization instead of a variety of multi-local organizations. This transition/ organizational excellence program is called “power of one LeasePlan”. In the past LeasePlan was managed on a country level, which offered every country the freedom to manage their own operations, use their own IT systems and offer their own leasing solutions. This resulted in 32 different leasing solutions and separate company entities, which subsequently affects the agility and nimbleness of the organization within this rapidly changing mobility market.

Therefore, LeasePlan created one overarching global corporate, which is responsible for creating and maintaining one integrated global operating model. The different departments within the corporate are able to direct and steer the operations and strategies of country-level departments.

This ultimately allows LeasePlan to regain control over their global corporation and implement best practices across the globe. This operational excellence program already saved Leaseplan 130 million euros in 2017 (LeasePlan, 2018)

LeasePlan DIGITAL

The next stage in this transition is the digitalization of LeasePlan, transforming LeasePlan from an analogue business towards a digitally enabled business. To do so LeasePlan created a separate entity called LeasePlan Digital, with the primary objectives to digitize every aspect of the business and the development of new digital services at digital cost levels (LeasePlan, 2018).

They aim to do so by leveraging the capabilities of new digital technologies, such as the internet of things, artificial intelligence and digital ecosystems/platforms. Ultimately enhancing current customer experiences and automation of the current processes.

Across 32 countries LeasePlan provides its customers with end to end car leasing solutions, spanning across the entire usage cycle of the vehicle. While doing so they offer customers a variety of leasing products and service levels. At present LeasePlan focusses on two core markets: 1) The Car as a Service (CaaS) market; 2) Carnext.com. As such they are able to control the entire value chain of the vehicle, from purchasing to re – marketing/leasing of second-hand leasing vehicles.

1. Car as a Service (CaaS)

LeasePlan is global leader within the CaaS market, with a fleet of over 1,8 million cars. By leveraging their size and global scale they are able to purchase and offer services at the most favourable prices. LeasePlan offers its customers and clients a variety of short and long-term subscription-based full-service car leasing solutions.

STEPS OF THE CaaS VALUE CHAIN (Fig 10)

1. PURCHASING & PROCUREMENT

LeasePlan is an independent fleet manager, which allows them to offer multiple vehicle brands and types. Additionally, LeasePlan build an extensive network of preferred (3rd) suppliers through their fleet management experience and global scale. This gives LeasePlan high buying power, which in turn allows them to purchase vehicles at favourable prices.

2. FINANCING OF VEHICLES

One of LeasePlan main revenue streams can be attributed to the financing of vehicles. They offer their customer two financing schemes either financial lease or operational lease. With operational Lease LeasePlan is owner of the vehicle and carries the responsibility of maintenance insurance etc. With financial lease the customer carries the responsibility of maintenance, insurance etc. during the period of the contract.

3. VEHICLE INSURANCE SERVICE

Through Euro insurances DAC, a subsidiary of LeasePlan, LeasePlan is able to give competitive insurance coverage and easier fleet insurance management services. One of their value-added services is 3d coverage, which fully integrates insurance services with fleet management processes.

4. VEHICLE REPAIR AND MAINTENANCE MANAGEMENT

LeasePlan is able to handle every aspect of vehicle maintenance, both corrective and preventive. They do so by leveraging an extensive network of associated maintenance and repair shops. This strong network allows them to get favourable prices and additional services, such as vehicle pick-up and delivery services.

5. FUEL MANAGEMENT

Via Shell and Aral fuel cards LeasePlan customers can obtain fuel cashless. In combination with fuel management software LeasePlan is able to support and consult its clients on fuel

consumption, ultimately resulting in long term cost savings.

6. ACCIDENT MANAGEMENT AND CLAIM HANDLING SERVICES

LeasePlan offers its customer an 24/7 hotline for accident support. Secondly, customers can use LeasePlan fleet management software to report accidents digitally. Finally, LeasePlan is able to ensure quick accident support through its extensive repair shop network.

7. RENTAL MANAGEMENT

LeasePlan build an extensive network of rental companies to enable clients to rent vehicles incidentally or short term, at the most favourable prices.

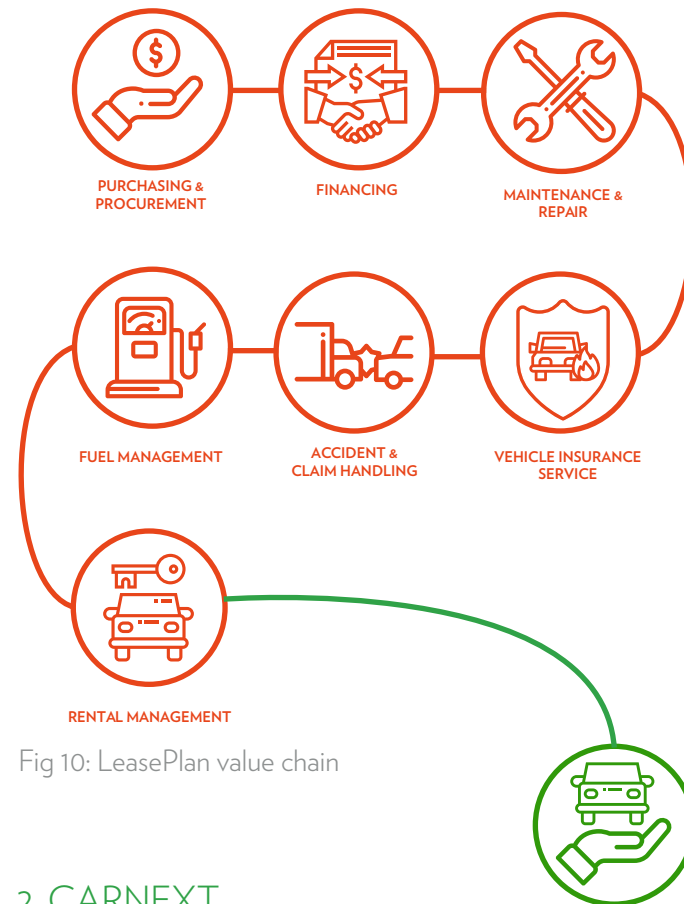


Fig 10: LeasePlan value chain

2. CARNEXT

Carnext.com is a state of the art online digital platform where customers can search, buy or lease their desired pre-leased vehicle. Additionally, LeasePlan built a network of experience stores where customers can experience, test drive and get consultation from sales experts about their selected vehicles. With carnext.com LeasePlan is able to tap into the market of young, 3-4 year old, second-hand high-quality cars. From its corporate segment LeasePlan gets a continuous supply of 250.000 second hand leasing vehicles on a yearly basis. Carnext.com offers these second-hand vehicles both for sale and as a service. These second-hand vehicles are well maintained and still equipped with the latest technologies and features, allowing customers to get more value for money. Due to the global presence of Carnext.com LeasePlan is able to ship and sell specific vehicles in high demand markets, potentially increasing sales results.

3.0 LeasePlan customer Segments

At present LeasePlan provides end to end car leasing services to a wide variety of customer segments. A distinction can be made between the following customer segments, each with their own requirements and fleet sizes:



CORPORATE

Large national and international corporates
Fleet size: 26 -1000 +
Tailored products and services
State of the art fleet reporting and driver support
80% of LeasePlan customer base



SME

Small/medium sized enterprises
Fleet size: 2-25
Easily accessible & quickly delivered products
Standardized products and services
17% of LeasePlan customer base



PRIVATE INDIVIDUALS

Individuals requiring private cars
Standardized products and services
B2C / B2B2C
Growth potential
3% of LeasePlan customer base



MOBILITY PROVIDERS

Innovative mobility providers, such as uber, gomore etc.,
in need of vehicles and fleet management services.
End to end vehicle lease solutions
High potential market
Included in SME %



PARTNERS

-Third party mobility players who deliver LeasePlan services to their customers via their own channels.

4.0 Different CaaS service solutions

The different offered CaaS solutions of LeasePlan have been analysed. An overview of the different available products and services can be found in appendix (A). The differences between the offered CaaS solutions are mainly based on the size of the client company and costs. A choice can be made between basic full-service or full service CaaS solution. Within the full service contracts customers can get access to cost management services and driver interaction services, which is not possible with the basic full service version.

If we zoom into the different CaaS solutions several minor differences can be identified. First of all, contract flexibility is made possible through the flexiplan solution which enable flexibility in contract duration and driven kilometres. Despite the offered flexibility key account managers mention that customers desire higher levels of flexibility. Additionally, they mention that flexible contracts should be priced more competitively. If a customers needs a lease vehicle for 2-3 months he needs to pay a high premium monthly fee. This can be attributed to the current cost structure limitations of LeasePlan. The monthly fees of a lease vehicle are carefully calculated across multiple brackets. Within a long term contract these brackets slowly fill up to pay for maintenance etc. Within short term/flexible CaaS solutions these brackets are emptied with every new contract, as such customers have to pay a significant premium.

CORPORATE CAR SHARING:

At present, LeasePlan started offering corporate car sharing solutions. With this proposition multiple employees of one company can share one corporate vehicle. This gives non-vehicle owners access to vehicles whenever they need one. Currently, this solution is offered as a monthly subscription at a premium price compared to a regular lease vehicle. This premium can be attributed to the required technology and the increased utilization of the vehicle.

5.0 FUTURE DIRECTION

LeasePlan, starting point of the project

The mobility market is on the verge of change as a result of a variety of societal, economic and technological developments. LeasePlan identified some of these developments and as such initiated the “what’s next” strategy (LeasePlan,2018). One identified trend which underlines this movement is the shift away from ownership to usage, based on subscription models or pay as you go. Additionally, from customer research LeasePlan identified the need to deliver more flexible lease solutions not only in contract duration but also in experience and vehicle types.

VISION

Based on these findings LeasePlan set itself the vision to deliver: **Anycar, anytime and anywhere** (LeasePlan, 2018)

MISSION

provide What’s next in mobility via an ‘any car, anytime, anywhere’ service — so our customers can focus on What’s next for them (LeasePlan, 2017).

STRATEGY

LeasePlan aims to enable this mission and vision through five identified strategic pillars:

INCREASE CaaS BUSINESS FOR NEW CAR

LeasePlan aims to strengthen its position as global leader within the 68 billion CaaS market (Roland berger, 2018). They want to do so by extending their current product and service offerings in the areas of maintenance and insurance. Secondly, LeasePlan aims to deliver superior digital and physical customer service and experience at digital cost levels through LeasePlan digital. Thirdly, they see the mobility provider segment (Uber, lyft etc.) and vehicle automation as great business opportunities as these would require sophisticated fleet management capabilities.

CARNEXT.COM

Extend the current carnext.com market by delivering pan European second-hand high-quality car as a service proposition. In addition, LeasePlan would like to extend its offer by integrating high-quality second-hand cars from trusted third-party suppliers.

POWER OF ONE LEASEPLAN

Continue the operational excellence program to enable the implementation of best practices across countries. By leveraging our global scale in digital, IT and procurement LeasePlan will be able to grow, drive down costs and service their customers better.

DIGITAL LEASEPLAN

Transform LeasePlan from a traditional analogue company to a fully integrated digitally enabled business. Secondly, roll out new innovative digital car leasing products and services at digital cost levels by leveraging the latest digital technologies such as artificial intelligence and the internet of things.

SUSTAINABILITY

LeasePlan dedicated itself to achieving net zero emissions for its entire fleet in 2030. This entails active consultation and education of its customer on the opportunities of more sustainable power trains.

MY PROJECT WITHIN THE ORGANIZATION

From the mission and vision statement we can conclude that LeasePlan aims to become a more customer centric mobility provider that delivers innovative vehicle services. More specifically they aim to deliver anycar, anytime and anywhere. From preliminary research findings we identified the need for more all-encompassing mobility solutions, spanning beyond vehicles including a variety of transportation modes. These solutions enable customers to choose their mobility based on the circumstances and needs at hand. For LeasePlan it is pivotal to anticipate such a future mobility scenario as it is expected to be a big part of the future of mobility. For big established companies like LeasePlan it can be complicated to develop and implement such innovative far-future propositions. Traditionally, big established companies focus on short term incremental changes that deliver direct financial benefits. The above described innovations require more disruptive changes, supported with a compelling step by step innovation strategy. Therefore the goal of this thesis is to support the what’s next strategy and enable sustainable future growth by designing and innovations strategy and roadmap around the subject of MaaS.

6.1 KEY FINDINGS
INTERNAL ANALYSIS (SWot)

Based on the internal company analysis several internal strengths and weaknesses of LeasePlan could be identified. These insights are summarized below (fig 11), as part of a SWOT analysis, which can hereafter be used as a method to clarify a desired future strategic direction for LeasePlan.

WEAKNESSES

Limited differentiating business model

The business model of LeasePlan is little different from their direct competitors. These differences will be further highlighted within the competitor analysis.

Limited sense of purpose

LeasePlan does not have a real underlying reason for why they do what they do? what is it that we're trying to achieve?

Cost structure limitations

The cost structure of the current LeasePlan car leasing solution is divided across multiple carefully calculated brackets such as maintenance, fuel etc. This set-up makes it complicated to create honest and flexible car leasing contracts.

Innovation capabilities and priority

The current strategy of LeasePlan is focused on incremental changes without taking far future scenarios and potential growth opportunities into consideration.

In addition, the current legislative systems of LeasePlan disable truly innovative digital service solutions.

Customer centric

Due to societal, technological and societal developments customers desire different mobility solutions, as opposed to the traditional lease vehicle. LeasePlan struggles to provide services that fulfil these changing customer needs and rather focusses on the traditional car leasing propositions.

Inflexibility

LeasePlan offers its customers little degree of flexibility. If the needs of the customer change, LeasePlan is not able to change/adapt their provided solution swiftly and accordingly.

STRENGTHS

Independent multi brand fleet management company

Ability to offer customers a wide variety of vehicle brands and vehicle types within different segments.

Global scale

Ability to negotiate favourable purchasing prices through extended buying power. Remarket/lease second hand vehicles on a global market for better returns Ability to provide fleet management services on a global scale, spanning across borders.

Car as a Service knowledge and experience

With 50 years of experience LeasePlan build an extensive and reliable network of partners and customers, across industries. Secondly, their experience and knowledge in end to end car leasing services allows them to deliver high quality services.

Continuous renewal of vehicle fleet

The contract duration of a LeasePlan car is usually around 3-4 years, as such LeasePlan has a car fleet equipped with the latest technologies. Because of the continuous fleet renewal LeasePlan is able to progress in line with the market and technological developments such as autonomous vehicles and connected cars.

End to end leasing services

LeasePlan provides all services required for the maintenance and usage of personally driver driven lease vehicles. These services span across the entire value chain of the lease vehicles, including remarketing/leasing of second-hand vehicles.

LeasePlan digital:

LeasePlan launched an separate entity called LeasePlan digital, which is dedicated to the development of digital services at digital cost levels.

Sustainability

At present LeasePlan is actively working towards creating a zero-emission fleet for their own employees. In addition, they are building EV consulting expertise allowing them to support their clients in achieving their own sustainability goals.

6.2 KEY FINDINGS
INTERNAL ANALYSIS (BUSINESS MODEL)

Additionally, a business model canvas has been created to summarize the findings of the internal company analysis and to give a clear overview of the company processes (fig 12)(Osterwalder, A. & Pigneur, Y., 2010). Together with the insights of the external analysis this model can be used to identify weak points and opportunities.

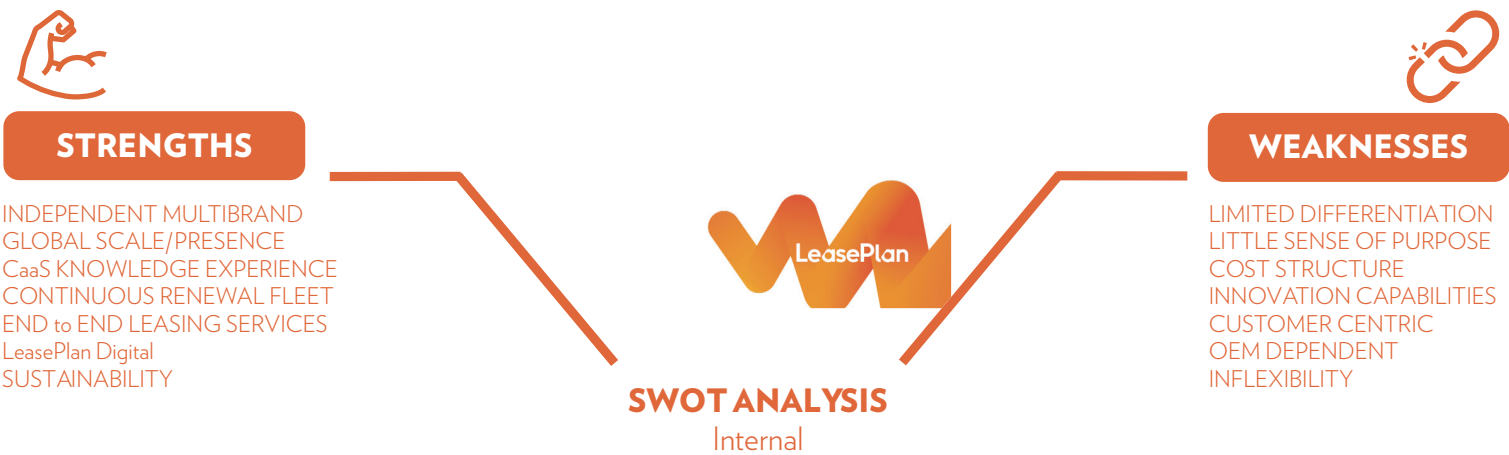
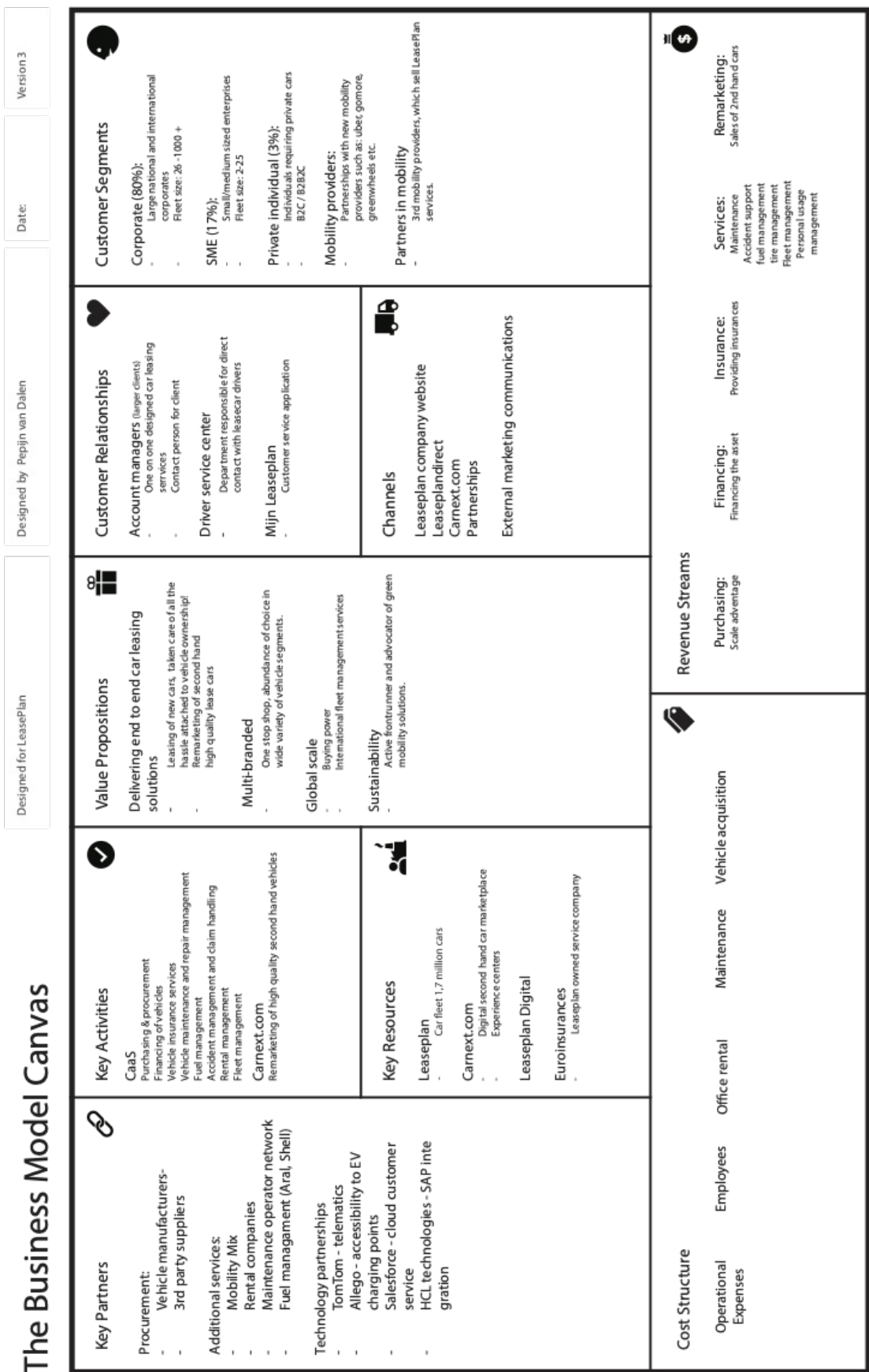


Fig 11: Summary SWot analysis

Fig 12: Current business model LeasePlan



INTERNAL VS. EXTERNAL

Now that we know the current business model, strengths and weaknesses of LeasePlan, it is important to see how this measures up within the fleet management industry.

To do so the following chapters will dive into:

- 2.2.2 Competitor analysis, through porter 5 forces
- 2.2.3 Analysis fleet management market

2.2.2 COMPETITOR ANALYSIS

To get a broad understanding of the competitive forces that drive the fleet management industry the porter 5 forces model is used (M.E. Porter, 1979). Next to direct competitors this model covers supplier and buyer powers and threats of substitutes and new entrants. An overview of the model is given at the end of this paragraph (Fig 13).

The competitor analysis is divided in the following chapters:

- 1 General market information
- 2 Private vs. business lease
- 3 Differentiation vs. commodity
 - Car as a service vs. mobility provider
 - Distinction within fleet management market
- 4 Threat of substitutes
- 5 Supplier power
- 6 Buyer power

1.0 GENERAL MARKET INFORMATION

Within the Netherlands a variety of Car as a Service companies exist. A distinction can be made between car leasing/fleet management companies and service providers such as Greenwheels, Uber, Car2go etc. LeasePlan falls into the first category and is market leader in the Netherlands with a fleet of 162.000 vehicles (Automotive leasemaatschappij top 60, 2018). Within the Dutch fleet management market, the top 10 players account for 70% of the market, making it a very concentrated market. This is the result of ongoing market consolidation, the process in which big global players acquire smaller local lease companies. This rapidly increases the fleet size of those global players, which in turn gives them increased buying power and global scale advantages.

2.0 PRIVATE LEASE VS. BUSINESS MARKET

Within the fleet management market, a clear distinction can be made between private lease and corporate lease. The number of competitors within private lease is considerably higher compared to corporate lease. The corporate market is fairly matured, with several key players controlling most of the market (Roland Berger, 2018). In addition, corporate car fleet (25+ vehicles) management solutions require significantly higher financial investments. For new entrants it therefore becomes difficult to enter the corporate car leasing market, especially if we look at the globally operating corporates. These demand global fleet management solutions, which in turn requires their fleet managers to operate on a global scale (Roland Berger, 2018).

As opposed to the competitive landscape of the private lease market, which is expanding rapidly due its rapid growth and positive expectations (Roland Berger, 2018). Within the Netherlands this segment grew from 36.000 vehicles in 2015 to 103.000 vehicles in 2017 (VNA, 2017). In addition, the private lease market is focused on individuals which requires less extensive fleet management services. Furthermore, financing

individual lease contracts requires less financial investment enabling new entrants to enter the market more easily. These smaller fleet management companies can be more agile and responsive to the rapidly changing mobility markets and customer needs, as opposed to large organizations like LeasePlan. This can be attributed to the legislative systems, global scale/size and structure of LeasePlan. The private car leasing market is mostly dominated by OEM affiliates, who followed the subscription model trend and extended their value proposition from vehicle sales towards vehicle financing and Car as a Service.

3.0 DIFFERENTIATION vs. COMMODITY

If we look at the Dutch corporate fleet management market little differentiation can be identified between offerings of the key players (LeasePlan, Pon, Athlon, Alphabet, ALD). They all provide similar end to end full service corporate and private car leasing solutions. Despite the commoditized market, some distinctions can be made between these key players

Car as a Service vs. MOBILITY PROVIDER

From the market research and expert interviews findings we can conclude that the car as “multipurpose” and personally driver driven vehicle is starting to lose its popularity. Secondly, according to research done by the national corporate car survey (Brouwer et al., 2018) employees attach less importance to a car as employment requirement. This was found to be especially true within the younger generations (Giffi et al., 2017). As a result, companies increasingly offer their employees a flexible mobility budget allowing employees to arrange their own mobility (Brouwer et al., 2018). To fulfil these changing needs and provide solutions fit to these mobility budgets key fleet management players started deploying additional and innovative mobility solutions and services. Shuttel, from PON Volkswagen financial services (#3 fleet size: 96.000), is a good example of such mobility solutions (Shuttel, 2019). Shuttel is a mobility platform, which allows customers to get temporary access to a variety of additional mobility services such as public transport, Greenwheels, OV-fiets etc. As such customers have the freedom to choose their preferred mode of transportation based on the circumstances and needs at hand. In addition, PON acquired a major Dutch bicycle brand, Gazelle, last year. This allowed them to offer (e) bicycle leasing contracts and services next to their car leasing offers.

Secondly, many competitors started offering white label mobility cards (Athlon, ALD, Arval etc.) as a solution to the mobility budget. These mobility cards give employees access to a wide variety of mobility services such as public transport, parking, cabs etc. This gives the employee the freedom to choose his or her preferred way of commuting. Additionally, by using this card both the employee and employer can keep track of their mobility expenditure online.

From internal interviews and the CEO statement (Leaseplan, 2017) we can conclude that LeasePlan's primary focus is centred around its core business, vehicle leasing. As a result, LeasePlan sold Mobility mixx less than a year ago. Mobility Mixx provides mobility cards similar to the ones offered by the competitors of LeasePlan. At present, Mobility Mixx still partners with LeasePlan whenever LeasePlan customers request mobility cars. But LeasePlan fully relies on Mobility Mixx for the development and quality of the services offered through their mobility card.

DISTINCTION WITHIN FLEET MANAGEMENT SERVICES

Within the fleet management market some distinctions can be made between three types of fleet managers; OEM affiliates (Pon Volkswagen financial services), Bank affiliates (ALD) and independent fleet managers (LeasePlan). The differences between the set-up of these organizations affects the way they do business and deliver services. LeasePlan is a global multi-brand independent fleet manager. This allows them to offer a wide variety of vehicle brands and types within different segments., by which they are able to satisfy the needs of more customers and truly delivers a "one stop shop". OEM affiliates mostly deliver the brands within their own consortium, restricting the amount of available vehicle types. One advantage of OEM affiliates is their extensive dealership network, which potential customers can visit to experience and test-drive vehicles.

LeasePlan is ahead of its competitors in terms of contract flexibility. With LeasePlan short lease customers are able to lease vehicles upwards of 1 month, as opposed to the minimal contract length of 12 months from Pon and Athlon. This allows customers to easily scale up or down their mobility fleet based on their current needs, without lengthy leasing contracts. In addition, they have an extensive network of rental companies that can provide short term rental services.

4.0 THREAT OF SUBSTITUTES

The personally owned and driver driven car is losing its popularity, especially within the younger generations (Giffi et al., 2014; Brouwer et al., 2018). Generation Y instead desires more flexible and convenient solutions, fit to their transportation needs at hand (Giffi et al., 2014). Similar to vehicle ownership, this would also challenge long-term vehicle leasing contracts. Within the market this change in customer needs opened the door for a variety of innovative, convenient and flexible mobility services, which are capable of moving people from A to B in similar ways. Consequently, these service providers are able to fulfil the same customer needs, challenging the value proposition of vehicle ownership/leasing. In addition, they do so in a more flexible and convenient manner as most of them operate on a "pay as you go" business model.

SHARED MOBILITY SERVICES

Shared mobility services are getting increasingly popular, especially within dense urban areas. A distinction can be made between peer 2 peer (P2P) and B2C shared mobility services. SnappCar is a P2P mobility service on which peers

can rent vehicles from one another, similar to Airbnb. This enables people to get temporary access to a wide variety of cars whenever and wherever they need one, without the need to own one. On the other hand, people who put their own car up for rent are able to make some additional profit by utilizing their otherwise idle sitting car.

Car2Go and MoBike are examples B2C shared mobility service providers. They offer customers access-based free-floating smart cars and bicycles within major Dutch cities. These companies provide applications on which customers can easily search, book, unlock and pay for their desired mode of transportation online. The above mentioned services all operate on a pay per use business model, offering customers convenience and flexibility without the hassle and costs of vehicle ownership.

RIDE HAILING & SHARING

The traditional ride-hailing cab industry has been drastically challenged by Uber, a P2P ride hailing company founded in 2009. Uber's platform and application connects drivers, regular people who own a car, with peers who need a ride. Uber allows customers to conveniently and easily book and pay for their desired ride online, at a lower price than traditional cab services. The lower these prices get the more they will challenge the need to personally own vehicles.

The combination of ride sharing & hailing is especially interesting, from a customer perspective. These services allow passengers to share trip legs and as such split the overall costs of the trip. One such example is ViaVan, a shared ride hailing company owned by Mercedes. Via the Viavan application commuters can order a ride, thereafter the service strategically calculates a route which allows the trip to be shared with multiple commuters. As a result, vehicle occupation and utilization increases, which in turn reduces the costs of the trip considerably. By analysing trip data and optimizing the trip algorithm the utilization of these vehicles is expected to increase in the future, driving down costs even further. This will especially hold true within dense urban areas, where mobility demand is high at all times.

PUBLIC TRANSPORT (PT) & LAST MILE SOLUTIONS:

The accessibility and development of public transport in the Netherlands is high compared to other EU countries. PT is capable of transporting masses of people between set locations (Railway/metro stations, bus stops etc.) in a fast and convenient manner. This capacity is expected to further increase with the ongoing developments in digitization, connectivity and automation.

Getting to the station and going from the station to the final destination has always been the problem with PT. This requires convenient and flexible last and first mile mobility solutions. But with the rapid development of the above-mentioned mobility problems these problems will become less.

SERVICE COMBINATIONS & REGULATORY FORCES

The combination and integration of the above-mentioned innovative mobility services poses the real threat to personally

driver driven vehicles. The integration of PT with efficient first and last mile mobility services could challenge long distance travelling otherwise done by personally driver driven vehicles (Arup, 2018).

In addition, governmental institutions pro-actively search for solutions to the growing traffic congestion and environmental problems. This will require more efficient, effective and cleaner ways of transportation. As a result, they could develop regulations and policies which would stimulate the above-mentioned innovative mobility services.

5.0 DIGITIZATION

If we look beyond the mobility market, we can also identify a substitute threat that could prevent the need for transport all together. Digital innovations allow people and co-workers to connect online almost immediately. Enhanced digital work environments, such as Slack, allow employees to co-operate and collaborate online. This in turn allows people to work from any location they see fit.

Secondly, digital innovations such as e-m commerce allow people to order products online. Thereafter the products get delivered at your doorstep, which allows people to stay home. Both these digital innovations already prevent a significant number of journeys now, but this number is only expected to increase in the future.

6.0 SUPPLIER POWER

LeasePlan is the middlemen within the vehicle value chain. They purchase vehicles from OEMs and thereafter finance/lease these vehicles to their customers. As a result, they do not have any vehicle development expenses. Additionally, LeasePlan is able to negotiate favourable prices due to their global scale.

Although these cost savings are pivotal to the profits of LeasePlan they also pose a threat to their business model. LeasePlan completely relies on OEMs for vehicles, if these OEMs decide to cut them out, they cannot provide vehicles to their customers. Since OEMs directly compete with LeasePlan, especially within the private lease market, they increasingly sell vehicles to LeasePlan at unfavourable prices. As a result, OEMs can offer their vehicles to the customer at lower prices, while still making profitable margins. To compete with these prices LeasePlan has to lower their own margins, which in turn negatively influences profits.

But since LeasePlan is a multi-brand global fleet manager with over 50 years of experience, they build an extensive supplier network covering multiple vehicle brands and third-party suppliers. This gives them a strong position within the market.

7.0 BUYER POWER

If we look at the buying power of LeasePlan customers a distinction has to be made between private and corporate lease. Within the mature corporate market, little differentiation exists between the different fleet managers. Despite this, clients are accustomed to the services of LeasePlan and would therefore

not likely switch to competitors. In addition, switching costs to move from one fleet manager to another increases as the size of fleet gets bigger. This would only happen if competitors are able to deliver significant added value or lower priced services. Within the private lease market buying power is higher because customers are able to choose from a wide variety of private lease companies. As a result, customers are not necessarily loyal to one company but rather select a solution fit to their own preferences. They could choose based on cost, comfort, convenience or flexibility criteria for instance.

KEY FINDINGS

Within the fleet management market little differentiation exists. The corporate lease market is strongly consolidated and mature, making it difficult for entrants to enter the market. In addition, switching costs are fairly high making it difficult for existing customers to move to new customers. Within the private lease market competition is higher as the market is growing and new entrants can easily enter the market. Supplier power is considerably high, especially within the private lease market where LeasePlan directly competes with OEMs. This could lead to unfavourable purchasing prices or them being cut out completely, which can be a major problem for LeasePlan because they rely on OEMs and 3rd party suppliers for their vehicles.

From the insights of the competitor analysis we can conclude that the personally owned/leased vehicle will become less popular in the future. This especially holds true for the younger upcoming millennial generation, which demand more convenience and flexibility. Consequently, several fleet managers started offering more flexible and multi-modal mobility services next to their traditional end to end car leasing services. LeasePlan, on the contrary set itself the mission to focus on their core business, end to end vehicle leasing solutions.

Additionally, digital innovation increasingly prevents the need for transportation. E&M commerce allow people to shop online conveniently and communication/collaboration platforms like slack offer employees to work from their home. As a result, the mobility market has seen the entrant of a wide variety of innovative substitute mobility services that compete with the Lease car by fulfilling the same need. In contrary to lease cars these services provide temporary and convenient access to a wide variety of transportation modes. At present these substitutes operate individually but the integration and combination of these services, together with public transport, would challenge the value of the personally driver driven vehicle.

The key findings of the competitor analysis are summarized in the porter 5 forces model below (Fig 13). Within this model a distinction is made between private and corporate lease because these markets are significantly different in term of competition and threats.

2.2.3 CUSTOMER ANALYSIS

Fleet management market developments

After the competitor analysis it is now time to get a better understanding of the developments within the fleet management market. This will be done by reviewing several existing customer surveys and by analysing several research papers.

The market analysis is divided in the following chapters:

- 1 Market developments
- 2 Need for change, employee perspective
- 3 Need for change, employer perspective
- 4 Drivers of change fleet management market

1.0 MARKET DEVELOPMENTS

330.000 new cars were sold in the Netherlands in 2018, until August (NZO, 2018). From these vehicles 57% was registered as a corporate car, as opposed to 27% privately owned vehicles. This percentage represent a significant growth as opposed to a year before (53% corporate vs. 31% private). According to NZO, this growth can be mainly attributed to the increased popularity of private lease. The popularity of private lease in turn is the result of the ongoing access over ownership trend, in which people prefer to pay a monthly/usage fee to get access to certain products/services instead of owning those products.



fig 14: Change factors employee perspective

2.0 NEED FOR CHANGE, EMPLOYEE PERSPECTIVE

To get some insights into the drivers and needs of corporate car leasing customers, the driver survey done by NZO (2018) has been utilized. This online questionnaire was filled in by corporate drivers (n: 5500), who own lease vehicles. The survey indicated that 67% of the respondents were satisfied with the

current mobility solution offered by their company. 28% of the respondents indicated that they would desire different mobility solutions. The following reasons were mentioned for this desire of change (fig 14) ; 1) Freedom to choose between more vehicle types and models (55%); 2) Ability to lease EV (37%); 3) Lower personal contribution (34%) 4) More flexibility to choose between different modes (30%); 5) Working from home more often (25%); 6) Increased value attached to sustainability (28%); 7) Ability to work while travelling.

PERCEPTION ALTERNATIVE MODES OF TRANSPORTATION

The survey indicated that most of the current corporate lease drivers (85%) do not see public transport and other alternative modes of transportation as alternatives for their lease vehicles (NZO, 2018). Despite these significant findings a slight increase in user willingness for alternative modes of transportation was identified, compared to previous years. Especially bikes, e-bikes and corporate pool cars are growing in popularity.



fig 15: Change factors employer perspective

3.0 NEED FOR CHANGE, EMPLOYER PERSPECTIVE

Secondly the NZO (2018) also performed a survey with employers/businesses (N: 763) to find the mobility drivers and needs from an employer perspective. Within this survey 36% of the respondents indicated that they want to offer different mobility solutions (NZO, 2018). This especially holds true for big corporates, from which 66% indicated they wanted to do so.

The NZO (2018) mentions several reasons for this desire of change (Fig 15) : 1) Environmental awareness (63%); 2) Cost reductions (63%); 3) More flexibility for employees (47%); 4) Mobility budget (26%); 5) and safety (21%).

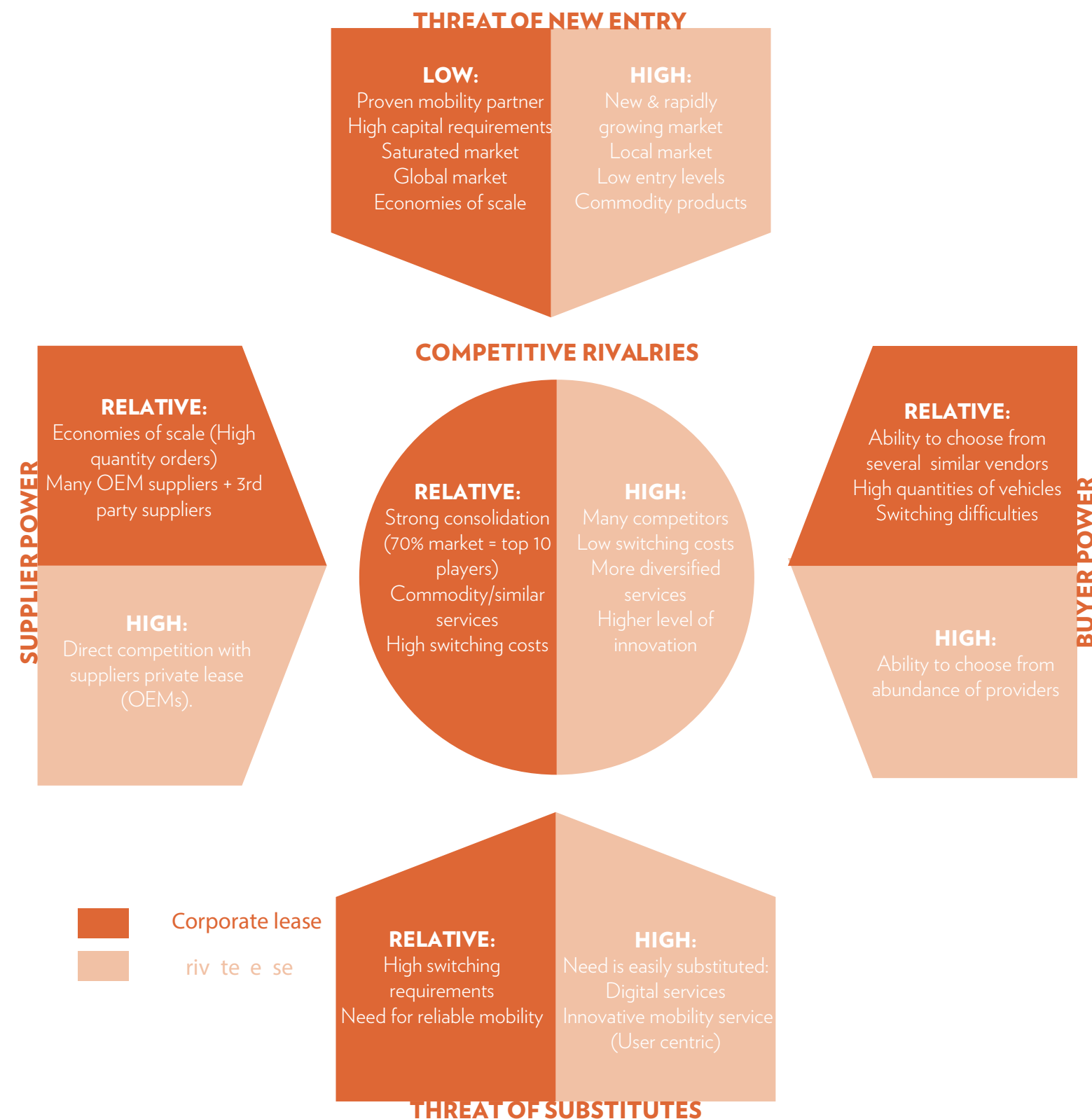


Fig 13: Overview porter 5 forces model LeasePlan

For the first time, the survey indicated that employers picked a well-balanced mobility solution over a corporate lease car, as employee requirement.

EXPECTED CHANGES EMPLOYER PERSPECTIVE

According to the survey employers and business expect the following changes to happen in the upcoming 1-2 years (NZO, 2018):

- Less vehicles are offered to employees
- The next car will be smaller than the previous one
- Vehicle choice is based on safety features
- Employees want vehicle with low additional fees

4.0 DRIVERS OF CHANGE, POLICY PERSPECTIVE

Next to the employee and employer perspective several other drivers of change can be identified within the fleet management market. These have to do with policies and regulations.

GREEN STANDARDS

Worldwide organizations increasingly set strict environmental standards as the concern about the environment is growing. One such organizations is the European union, which set itself the goal to reduce CO2 emissions by 80% in 2050, as opposed to 1990 when this agreement was set. One spearpoint on this political agenda is the reduction of CO2 emissions produced by vehicles. Until 2020 new cars are not allowed to produce more than 95/grams CO2 per kilometr. This restriction is expected to reach a max of 56/grams per kilometr in 2040 (European commission, 2007). Vehicles that do not comply to these rules will face higher tax rates and, in the end, will be banned all together.

These regulations, together with increased environmental concern, have spurred many companies and fleet managers to switch to and stimulate more eco-friendly vehicles (fleets) and modes of transportation.

REGULATIONS

At present, the corporate vehicle option is favoured and stimulated through favourable tax rates, as opposed to mobility budget solution. Consequently, a mobility budget cannot compete with a corporate vehicle in terms of costs. As a result, people and corporates are not willing to change to more sustainable and efficient modes of transportation and rather stick to the cheaper corporate lease vehicles.

But as the mobility problems keep growing the accessibility and liveability of urban areas are worsening. To prevent this from happening, Dutch government is now actively looking for ways to increase mobility efficiency. Adapting current regulations and policies is one such solutions, in which they seek to stimulate more efficient and effective modes of transportation as opposed to personally owned and driver driven vehicles.

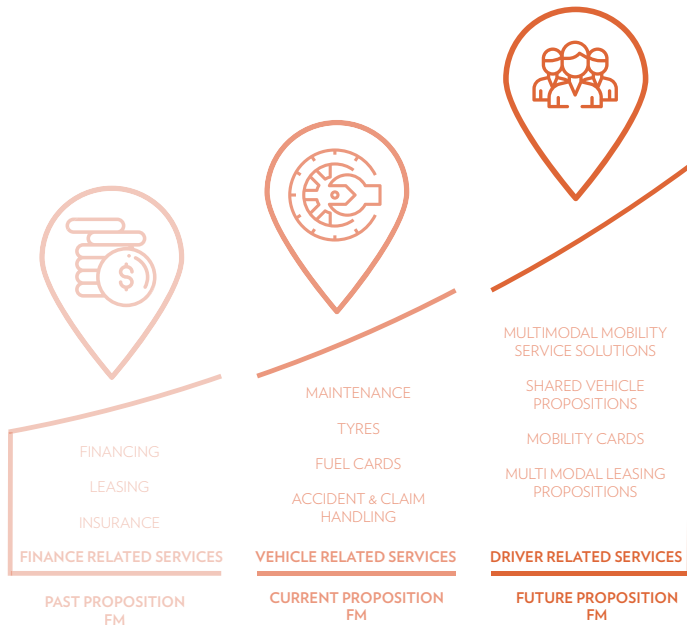


Fig 16: Fleet manager development over time

5.0 DEVELOPMENT FLEET MANAGERS OVER TIME

Historically, fleet managers (FM) only provided vehicle financing related services. As of now most of the FMs added vehicle related services to their product and service portfolio. These services typically include vehicle maintenance, tires, fuel card, accident management etc. These additional services offered FMs new pools of revenues. Currently, the market is increasingly moving beyond vehicle related services and more towards driver related services. These services are aimed at fulfilling the ever-changing needs of customers and drivers. Example services include corporate car-sharing, which offer corporates the ability to utilize existing assets better and create more flexibility for their employees (Fig 16).

Deloitte (2017) expects that the changing mobility landscape and customer Behaviour will trigger FMs to move beyond vehicle related service. They believe that mobility solutions should span across different modes of transportation, for them to fulfil the needs of the current and future customers. Deloitte (2017) sees an opportunity for FMs to become multi-modal travel agencies. Corporate vehicles will be one of many options in the future journeys of commuters.

KEY FINDINGS

The fleet management market is still growing, this development is spurred by the increased popularity of private lease. Despite these developments' expectations are that the fleet management market will significantly change. Employers and employees desire more flexible mobility solutions, as opposed to traditional corporate car solution.

Secondly, employers increasingly want to deliver a mobility budget which enables employees to choose their preferred mobility solution. Additionally, employers expect to offer less cars to employees in the future but rather aim to provide a well-balanced mobility offer. In line with these market changes, deloitte expects fleet managers to become multi-modal mobility providers.

Thirdly, we can see that sustainability and regulations will play a more significant role in the future of mobility. Environmental concern and awareness both stimulate the customer and the government to choose and stimulate more sustainable modes of transportation. These new regulations could create unfavourable conditions for corporate vehicle usage, which in turn would lower customer willingness for such vehicles..

CONCLUSION

CURRENT POSITION LP

By combining the different insights from the analysis several conclusions can be drawn about the current position and value proposition of LeasePlan.

NEED FOR FLEXIBLE VEHICLE SOLUTION

From the market developments insights, we can see a need for more flexibility, both from the perspective of the employee and the employer. In addition, employers want to offer employees a mobility budget, enabling them to select their own preferred mobility solution. From the competitor analysis we can conclude that a variety of competitors aim to fulfil this customer need by providing more flexible and multimodal mobility solutions. In contrary, LeasePlan set itself the goal to focus on its core business, which is end to end vehicle leasing contracts. As a result, LeasePlan is currently not able to provide flexible solutions for the changing needs of their customers and for the upcoming mobility budget. LeasePlan relies on partners, such as mobility mix, for delivering such solutions.

VEHICLE LEASING BECOMES LESS POPULAR

Furthermore, research findings indicate that younger generations (millennials) value vehicle ownership/long term lease less as opposed to the baby boomer generation. Additionally, the survey among employers indicated that employers expect to offer less vehicles to their employees in the future. As such, the current focus and strong position of LeasePlan within the corporate B2B fleet management market is expected to decrease in size. For LeasePlan it therefore becomes pivotal to innovate their current mobility services to enable sustainable future growth.

MOBILITY PROVIDER SEGMENT vs. SUBSTITUTE THREAT

At present LeasePlan provides fleet management services to innovative shared/ride-hailing mobility service providers. Offering these services to those innovative mobility operators provides short-term revenue for LeasePlan. Expectations are that this segment of shared/ride hailing mobility service providers will increase in size, which in turn would increase the potential market of LeasePlan.

But research indicated that one shared vehicle could remove up to 11 owned vehicles from the streets. As such, LeasePlan could cannibalize its current market by enabling and stimulating these services. Additionally, LeasePlan positions itself as intermediary between the OEM and the mobility service providers. Traditionally, LeasePlan is intermediary between the customer and the OEM. But with the expected reductions in vehicle sales OEMs started to look for opportunities to directly finance and lease vehicles to their customers directly, cutting out LeasePlan. OEMs could do so by providing vehicles to LeasePlan at unfavourable rate, which disables them to compete on pricing. This could also happen with the mobility service provider segment, if they buy/lease their vehicles directly from the OEMs at more favourable rates.

DIFFERENTIATION

Based on the internal analysis we can conclude that LeasePlan should look for ways in which they can differentiate from their competitors. Their current and future customers desire more convenient and flexible mobility solutions. Additionally, from the survey we can conclude that employers want to offer less vehicles and switch towards a mobility budget or a well-balanced mobility offer.

As such LeasePlan should aim to facilitate these changing needs of customers and actively look for ways to make their current “vehicle centred” offer more attractive. They could do so by creating more flexible solutions and by tackling several of the mobility pain points their customers currently face.

3.0 DEFINE

Future of mobility in relation to MaaS

INTRODUCTION

Within the discover phase we sketched a future mobility scenario, in relation to MaaS. Thereafter, we established a view on the current position of LeasePlan within the fleet management market. Within the define phase the goal is to bring these two views together in order to answer the second research question: “What will be the role of LeasePlan in this future, based on their current position?”. This will be done by using the insights of the discover phase.

The define phase can be divided into three seperate blocks:

- 3.1 Future visioning: The process starts by analysing the different relevant context factors, which are gathered within the discover phase. These factors are used to sketch an objective future scenario and enables us to create a future vision specified to LeasePlan, which enables them to sustain future growth.
- 3.2 Strategic direction: Thereafter a more concrete strategic direction is developed by using the SWOT matrix. By putting the strengths and weaknesses of LeasePlan opposed to the opportunities and threats of the market (in relation to MaaS) desirable, viable and feasible directions can be pinpointed.
- 3.3 Design brief: Finally, a more concrete and project specific design brief will be developed based on the vision and strategic direction.

3.1 FUTURE VISION

Design of the future vision for LeasePlan

INTRODUCTION

Within the first part of the define phase the goal is to develop a LeasePlan specific future vision, in relation to the MaaS mobility future. This vision can be derived from the gathered context factors, market developments and value drivers from the discover phase. First, we will briefly cover the most relevant and valuable insights and thereafter translate these back to LeasePlans' current position. Based on this assessment a future vision statement can be defined.

RELEVANT CONTEXT FACTORS

Increased mobility problems as a result of the "vehicle centred" mobility landscape:

- Vehicle travel loss time will increase by 35% between 2017 and 2035
- Rapid urbanization results in excessive mobility demand in cities, leading to severe congestion, gridlock and pollution problems.
 - o To make these places accessible and livable regulations and policies will be created that increasingly drive vehicles out of the city
- Few available parking spots in and around urban areas
 - o Expensive parking
 - o Distant from final destination, need for connected mobility solutions

Developments within the mobility industry:

- Autonomous vehicles will be able to transport people and goods more efficiently in the near future. Additionally, new services and business models can be created on the increased capabilities of such vehicles.
- Connected vehicle technology will enable vehicle monitoring, better customer experiences and vehicle utilization.
- Vehicle ownership will significantly decrease and be replaced by more convenient shared and access-based innovative mobility services.

Changing customer needs, spurred by younger generations:

- Customers demand more convenient mobility solutions
 - o Customers want a seamless customer journey
 - o Mobility solutions should fit the purpose of the trip at hand
 - o People want highly convenient digital services at digital cost levels

- Customers desire more flexible mobility solutions
 - o Customers want the freedom to choose their mobility based on the circumstances and preferences at hand
 - o People want financial flexibility, enabling them to pay for what they actually need
- Mobility services should be tailored to the customer:
 - o Provide mobility solutions fit to customer and circumstance specific scenario
 - o Enable customers to customize their mobility solution according to their wishes
- People want responsible mobility solutions
 - o Environmental awareness is at an all-time high, making people willing to change to more sustainable mobility solutions.
 - o People are more conscious about their well-being

CONCLUSION

Based on the above described mobility context factors and value drivers we can assume that the current "vehicle centred" mobility landscape will significantly change. Personally, driver driven vehicle users will experience more and more pain along the traditional vehicle journey. Combined with technological developments this would stimulate them to look for other mobility solutions. Additionally, people want more convenient and flexible mobility solutions fit to their preferences, circumstances and needs at hand, with no strings attached. The increased mobility problems will challenge the desirability of the current LeasePlan products and service solutions. In addition, current solutions do not fulfil the changing customer mobility needs of the future. Therefore, LeasePlan should aim to pro-actively look for ways to make the current vehicle centred mobility landscape more attractive and desirable. This could be done by taking away the pain points along the current journey of their customers, creating seamless journeys and provide more flexible and convenient solutions.

VISION STATEMENT

Based on the identified context factors and LeasePlan specific conclusion a vision statement could be created. This vision statement is represented in the model below

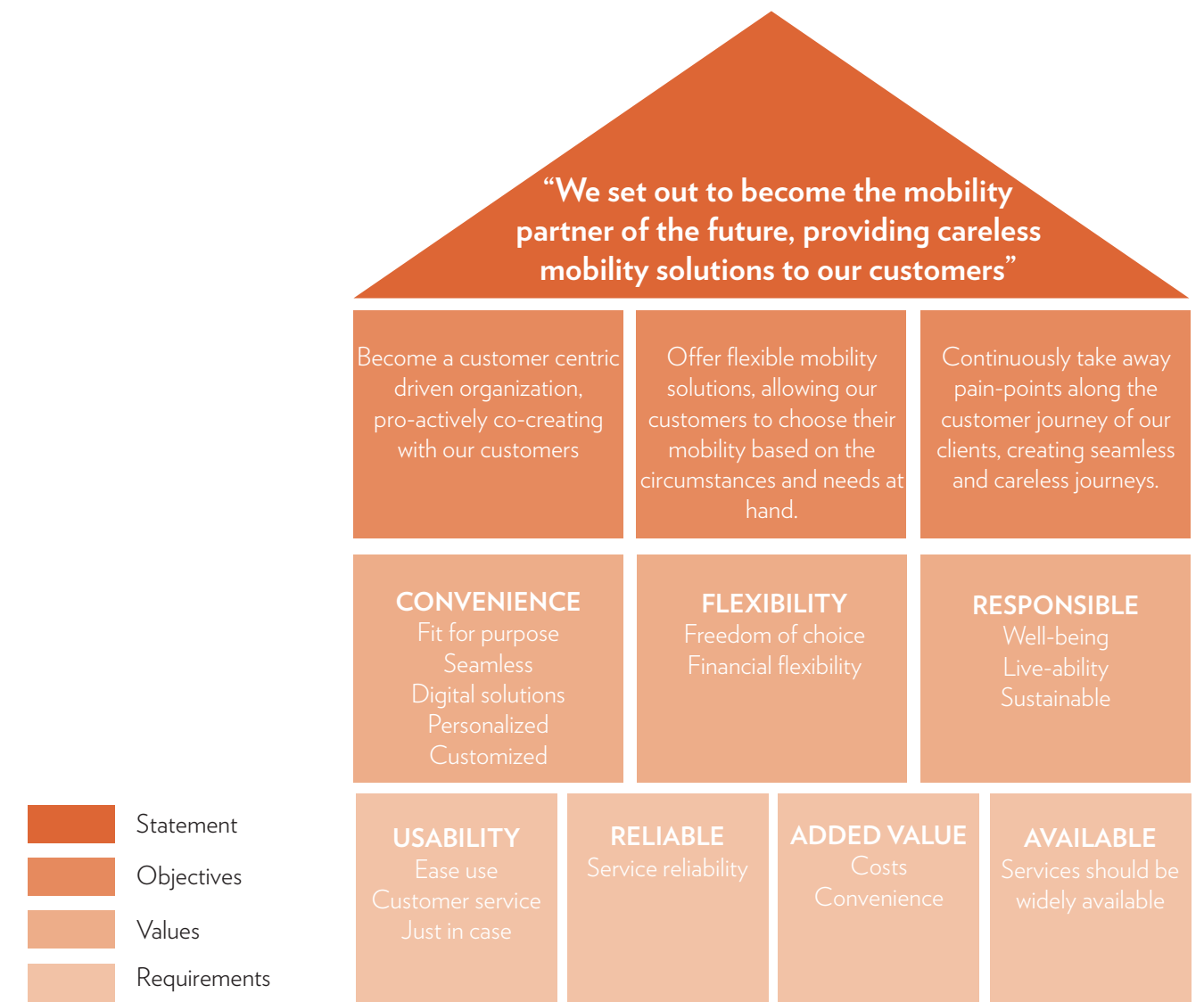


Fig 17: Vision statement infographic

3.1 STRATEGIC DIRECTION

Define concrete strategic direction

INTRODUCTION

After setting a future vision for LeasePlan for this project it is now time to make the road towards this future vision more concrete by creating a strategic direction. By using the insights of the research phase specific painpoints and opportunities can be identified, which either inhibit or could enable careless travelling for our customers. This strategic direction will be drafted by using the SWOT matrix (fig 18). By putting the strengths and weaknesses of LeasePlan opposed to the opportunities and threats of the market (in relation to MaaS) desirable, viable and feasible directions can be pinpointed.

LEASEPLAN INFLEXIBILITY vs. CHANGING CUSTOMER NEEDS

From the insights of the future mobility analysis and customer survey we can conclude that our current customers want more convenient and flexible mobility solutions. This especially holds true for younger generations, which demand mobility solutions fit to the circumstances and needs at hand. LeasePlans' current leasing solutions offer customers little flexibility and convenience. Consequently, with the rise of this younger generation expectations are that LeasePlans' value proposition will increasingly be challenged in the future of mobility. LeasePlan could tap into and further extend their vehicle sharing solutions. By providing such solutions they could offer their customers the freedom to use a vehicle whenever they desire. Additionally, financial flexibility could be offered by providing these services as a pay per use model.

MOBILITY AS A SERVICE vs. LEASEPLAN

At the forefront of convenient and flexible mobility solutions lies MaaS. By combining different mobility services on one overarching mobility platform MaaS is able to provide customers with seamless customer journeys, whenever, however and wherever they are. From the literature and expert interviews insights we can conclude that MaaS is capable of and aims to prevent the need for vehicle ownership/long term lease.

The current value proposition of LeasePlan is built on long term vehicle leasing solutions. By developing or stimulating MaaS LeasePlan could cannibalize its current market and enable other service providers to capitalize on this opportunity. Secondly, if we compare the requirements and challenges of a desirable, feasible and viable MaaS solution with the weaknesses of LeasePlan we can see several pain-points.

If LeasePlan wants to become a MaaS service provider they have to make a transition towards a software, data and service (on a more extensive level than CaaS) company, which is essentially not what they do and are capable of.

In addition, for MaaS to become desirable for the consumer market it has to be reliable and offer available mobility solutions whenever, however and wherever the customer needs it. If the mobility solutions are not widely available customers will not see MaaS as a worthy alternative of the vehicle. Because of these reasons, it is questionable if LeasePlan is capable of and should develop a consumer MaaS proposition.

MOBILITY AS A SERVICE AS AN ENABLER

One threat to the current value proposition of LeasePlan is the ongoing urbanization trend and the subsequent mobility problems within those urban areas. From the interview insights with the municipality of Amsterdam we can conclude that future policies and regulations will increasingly drive personally driver driven vehicles out of the city. This in turn creates a mobility gap in the current journey of LeasePlan customers who live or have to be in cities for work/leisure activities. Consequently, vehicles will increasingly lose their value in these vehicle free future cities if no solutions will be found for this mobility gap. This in turn could affect the current market of LeasePlan, especially if you consider that 60% of the population is expected to live within these urban areas (United Nations, 2014).

According to the expert survey done by Arup (2018) MaaS could offer mobility providers the opportunity to target and provide mobility solutions for specific customers and trip segments. As such MaaS could offer LeasePlan an opportunity to fill in the above mentioned mobility gap, by providing a very specific MaaS solution. This solution would require a seamless integration of first/last mile solutions with the traditional vehicle journey of LeasePlan customers. From the research findings we can conclude that this seamless journey can be established by using the principled and characteristics of MaaS (Arup, 2018). By scoping the MaaS solution down to a specific target group and area the solution can become more concrete, desirable, viable and feasible. Ultimately LeasePlan would be able to deliver upon its vision of careless travelling by creating these seamless journeys for their urban customers. Additionally, by tackling the urban mobility pain-points LeasePlan could differentiate itself from its competitors, which is a current weakness of LeasePlan.

HARNESS PARTNERSHIP NETWORK & MARKET POSITION TO ENABLE MaaS SOLUTION

Currently, LeasePlan is market leader in the Dutch fleet management market with a vehicle fleet of 180.000 vehicles. This strong market positions offers them a variety of benefits. First of all, LeasePlan has a wide customer base spanning across multiple industries. This offers them the opportunity to enter into strategic partnerships, in which they offer fleet management services while they get the expertise of their

customers in return. At present, these partnerships are already happening with a variety of LeasePlan customers such as Microsoft.

Secondly, LeasePlan is an interesting partner for a wide variety of mobility providers due to their large customer base. By collaborating with LeasePlan these mobility providers could potentially increase their own customer base/revenue significantly. LeasePlan could use this strong market position to partner up with desired first and last mile mobility providers and as such enable the LeasePlan MaaS proposition.

TECHNOLOGICAL DEVELOPMENTS & LEASEPLAN

LeasePlan is an independent multi-brand fleet manager, which enables them to partner with multiple OEMs and mobility startups. As such they are able to get access to the latest technological developments within the industry. Additionally, the fleet of LeasePlan is renewed every 3-4 years which enables them to quickly harness the increased capabilities of these technological developments.

From technology research findings we can conclude that

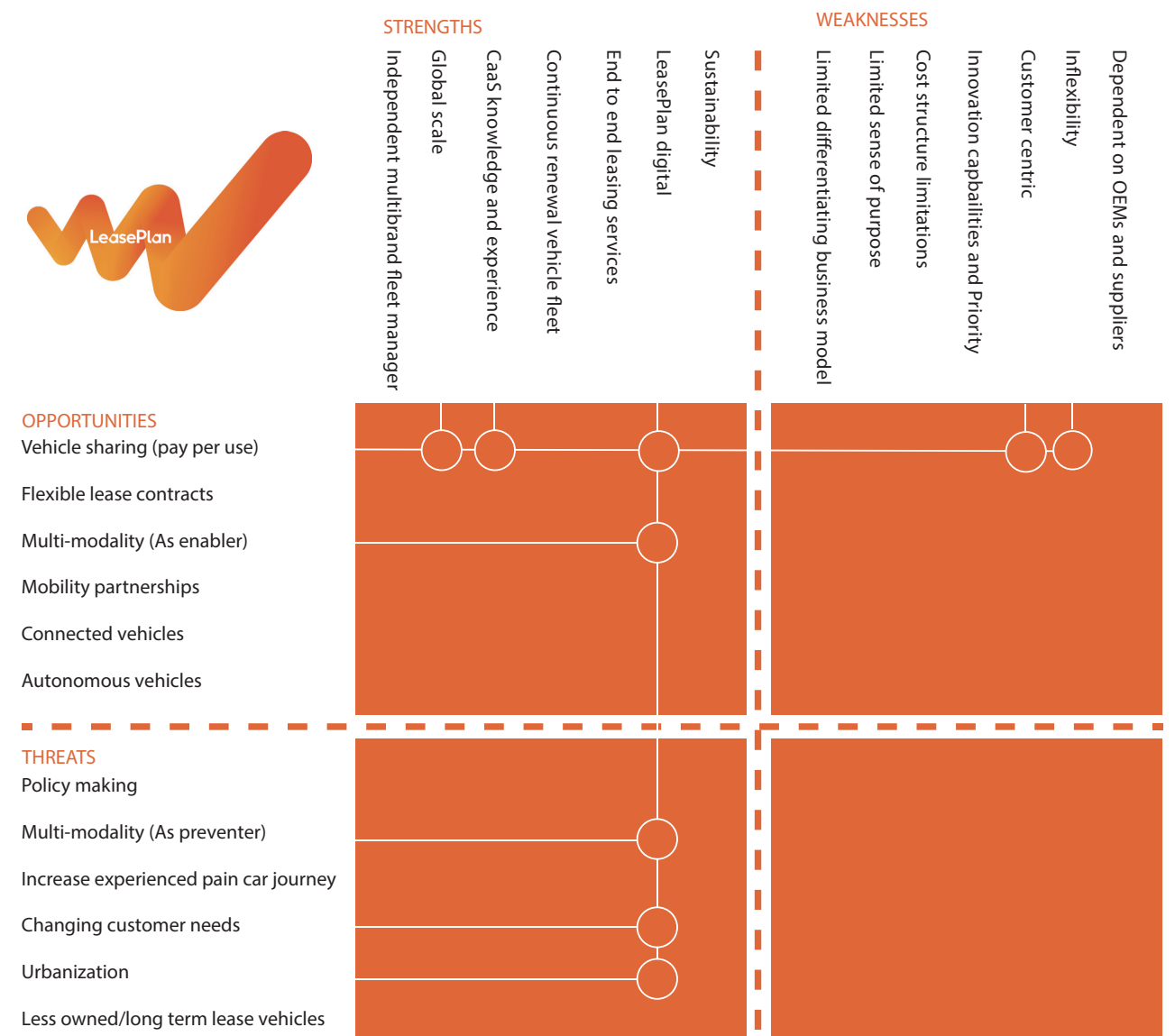


Fig 18: Strategic web of opportunity

DESIGN BRIEF:

What should LeasePlan create?

Based on the set vision and strategic direction a concrete design brief was created. Within this design brief the direction, values, requirements and scope of the development phase are made explicit. Thereafter this design brief will be used as a guideline for the development phase.

Within the strategic direction a clear distinction can be made between short and long term problems and opportunities. Therefore, the development phase is split into two parts:

- 1) Long term ideation:
- 2) Short term ideation:

LONG TERM IDEATION:

One of the problems, which prevents LeasePlan from delivering careless travelling to its customers is urbanization. This ongoing trend will increasingly drive personally driver driven vehicles out of the city, creating a mobility gap in the journeys of current and future LeasePlan customers. From the research insights we can conclude that MaaS could be used as a way to enable the transition from the vehicle to first & last mile solutions in the most convenient and seamless way possible. Therefore, we seek to answer the following question in the long term development phase:

How can LeasePlan enable transportation for their current and future customers, if vehicles are not allowed in the urban centers?

Sub questions:

1. What is necessary for LeasePlan to deliver careless travelling?
2. How can LeasePlan use MaaS to enable urban mobility?

SHORT TERM IDEATION

From the customer survey we can conclude that the current customers of LeasePlan demands more flexible mobility solutions, fit to the circumstances and preferences at hand. From the competitor analysis we can already conclude that direct competition is already ahead in providing such services. For LeasePlan it therefore becomes pivotal to look for ways to make their current CaaS solutions more flexible. Based on the research insights we can conclude that shared vehicle/ride propositions could enable this flexibility. Within the short term ideation phase we therefore seek to answer the following question.

How can LeasePlan adapt its current services to offer its customers more flexibility?

Sub questions:

1. What initiatives are currently already been going on?
How can we use these initiatives in our advantage

CONSIDERATIONS

Current proposition LeasePlan: Within the ideation phase focus should be put on strengthening and taking away the current and expected pain points along the customer journey of LeasePlan customers who live or work in urban areas.

Technology: From the analysis insights we can conclude that the technological developments can significantly change the mobility industry. Therefore, we aim to include the potential capabilities of those technologies within the ideation phase.

Partnership: From MaaS research insights we can conclude that MaaS is dependent on partnership network. Therefore, it should be taken into consideration who, where, what and why we should partner with

Policy making: One driver behind the changes in the current mobility landscape is the policy making of the Government. LeasePlan should harness its strong network to participate in this lobbying process.

REQUIREMENTS

From the analysis phase we can identify the following value drivers and service requirements. Within the developments phase these can be used as input to generate ideas or as criteria to assess and select ideas/concepts.

USER VALUE DRIVERS

- Flexibility
 - o Freedom of choice
 - o Financial flexibility
- Convenience
 - o Fit for purpose
 - o Digital solution
 - o Seamless
 - o Personalized
 - o Customizable
- Responsible
 - o Sustainable
 - o Well-being

SERVICE REQUIREMENTS

- Usability
 - o Ease of use
 - o Quick customer service
 - o Travel guarantee
 - o Best option feature
- Customizable
- Reliable
- Available
- Seamless
- Added value
 - o Costs
 - o Convenience
 - o Environmental impact

LEASEPLAN REQUIREMENTS

- Customer centric
- Viable
- Feasible
- Sustainable
- Intellectual property
- Added value to current business

SCOPE

URBAN

The scope of the development phase can be defined as: “Enabling urban mobility for current and future LeasePlan customers, who live and work in urban areas”. Research findings and expert interviews with the municipality of Amsterdam indicate that cities will increasingly become personally driver driven vehicle free. Consequently, a mobility gap will exist in the customer journey of this target group. For LeasePlan, to remain relevant and competitive in this highly urbanized future solutions need to be developed, which enable transportation for this target group. This would require seamless transitions to and from these urban areas.

GENERATION Y

Generation Y will replace the baby-boomer generation as most dominant customer segment in most industries, including the mobility industry. This younger generation demands more flexible and convenient mobility solutions, fit to circumstances and preferences at hand. LeasePlan currently provides inflexible and long-term leasing contracts, which is contradictory to the needs of this younger generation. From the market research findings we can already see the popularity of vehicles decreasing among this younger generation. For LeasePlan it therefor becomes pivotal to take this upcoming generation into consideration and anticipate their needs and demands. By doing so LeasePlan is able to capture sustainable future growth in a future where this younger generation becomes the most dominant customer segments

MAAS

From the analysis phase and strategic direction, we can conclude that MaaS could enable a seamless transition to and from these urban areas. As such the goal of this project is to use the principles and characteristics of MaaS to develop a specific solution to the future mobility gap of LeasePlan customers. Additionally, the potential benefits of MaaS are very much aligned with the value drivers of the generation y. Providing such a solution could therefore be attractive to future customers of LeasePlan.

4.0 DEVELOPMENT PHASE



4.0 DEVELOP

What would the solution look like?

INTRODUCTION

After defining the vision, strategic direction and setting up the subsequent design brief the development phase can be initiated. Within this development phase the goal is to develop a variety of ideas and turn these ideas into concepts. Within the design brief a distinction is made between long and short term ideation, this separation will also be used within the development phase

The development phase can be divided into two separate blocks:

4.1 Long term: Within the long term development phase the aim is to answer the long term question: "How can LeasePlan enable transportation for their current and future customers, if vehicles are not allowed in urban centers?"

This will be done by applying the following methods:

- 1 Facilitating creative sessions
- 2 Idea mapping
- 3 Service blueprinting
- 4 Business modelling

4.2 Short term: Within the short term development phase the aim is to answer the short term question: "How can LeasePlan adapt its current service to offer its customers more flexibility, enabling them to choose their mobility based on the needs and circumstances at hand?"

This will be done by applying the following methods

- 1 Facilitating creative sessions
- 2 Idea mapping
- 3 Service blueprinting
- 4 Business modelling

4.1 LONG TERM DEVELOPMENT

Enable urban suburban/rural transition

From the analysis phase we can conclude that the long-term viability of LeasePlan will be threatened due to a variety of challenges. These challenges will significantly increase the experienced mobility pain of the current “vehicle centred” mobility landscape. Consequently, they inhibit LeasePlans’ ability to deliver careless travelling to its customers, which in turn affects their value propositions. One of these challenges is rapid urbanization and its subsequent effects on mobility demand, congestion, gridlock and pollution problems. From the interview with the municipality of Amsterdam we can conclude that cities will increasingly drive personally driver driven vehicles out of the city to ensure the accessibility and liveability of those places. In turn, this would create a mobility gap at the first and last mile of the current and future vehicle centred journey of LeasePlan customers. To fill in this gap and enable careless travelling for our customers we therefor aim to answer the following question in the long-term ideation phase:

How can LeasePlan enable transportation for their current and future customers, if vehicles are not allowed in the urban centers?

Sub questions:

1. What is necessary for LeasePlan to deliver careless travelling?
2. How can LeasePlan use MaaS to enable urban mobility?

Methods long term development phase:

4.1.1 Creative sessions:

- Context exploration
- Preliminary idea generation + Conceptualization
- Benefits Idea
- Reasoning selection

4.1.2 Conceptualization

- 4.1.3 Idea mapping
- 4.1.4 Service blueprinting
- 4.1.5 Business modeling

4.1.1 CREATIVE SESSION

GOAL OF THE SESSION

Within the sessions the goal is to generate and map ideas based on the insights and value drivers from the analysis phase./design brief. Additionally, these ideas should be aligned with the set future vision and give answer to the set long term question: How can LeasePlan enable urban transportation for its current and future customers, if cities become vehicle free? By combining the different ideas several preliminary concepts can be created, which can form the basis for the conceptualization phase.

PARTICIPANTS

Within both sessions 4 participants of the potential target group (millennials) participated. As such, the participants were able to draw on their own experiences, while living and using mobility within the urban environment.

SESSION SET-UP

Context exploration: Both sessions started with a thorough exploration of the context, the occurring problems, and opportunities for careless travelling. To do so, a initial H2 was drawn from the analysis insights.

Within the first session participants were asked to do a mindmapping exercise. In the second session participants were asked to fill in a blank customer journey map.

H2 Development: Thereafter the participants were asked to combine and cluster the insights and develop new and more specific H2s.

Ideation: The new H2s formed the starting point of a variety of individual and group ideation sessions. By combining and clustering the most fruitful ideas several preliminary concepts could be created and presented.

RESULTS

CONTEXT EXPLORATION

From the context explorations we could identify two strong clusters of insights; 1) Painpoints of urban mobility (Fig 19); 2) Careless travelling (Fig 20); The main findings are depicted besides.

After exploring the context of urban mobility, the participants were asked to cluster the insights and combine them were possible. Thereafter, participants were asked to create new H2s specified to the previously developed clusters. Within both sessions one of the H2s was focussed on enabling the transition from the first and last mile to the traditional vehicle journey. By using these new H2s several preliminary ideas were generated. By combining the different ideas participants were able to develop presentable preliminary concepts. At the following page the selected preliminary concept is briefly explained and the reasoning behind this selection is clarified. In appendix (F-G) the H2's and other ideas are presented.

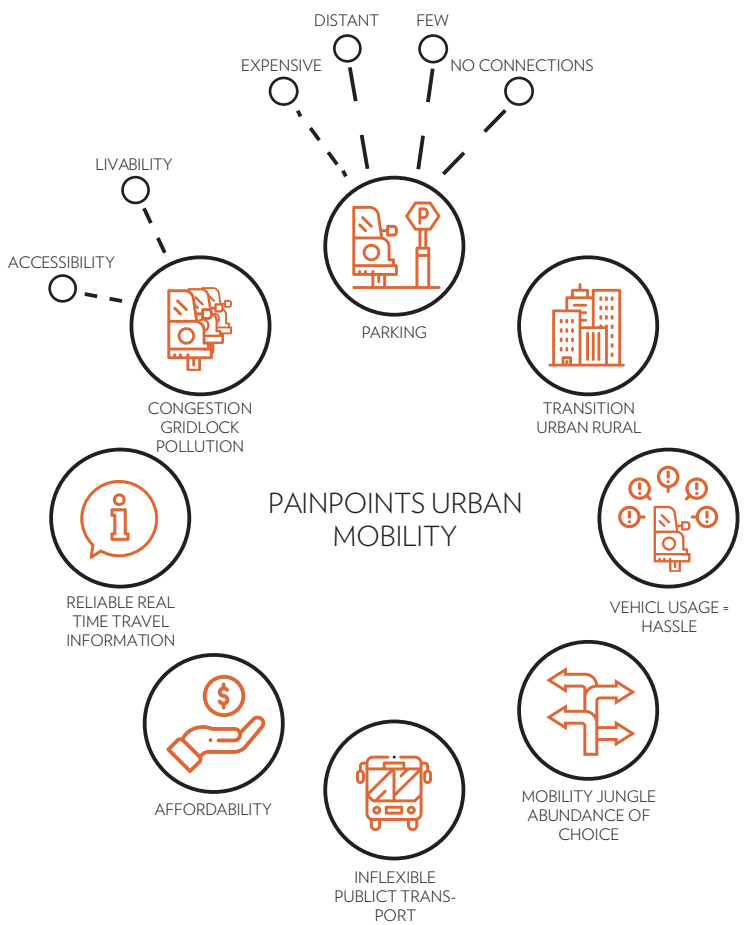


Fig 19: Painpoint urban mobility

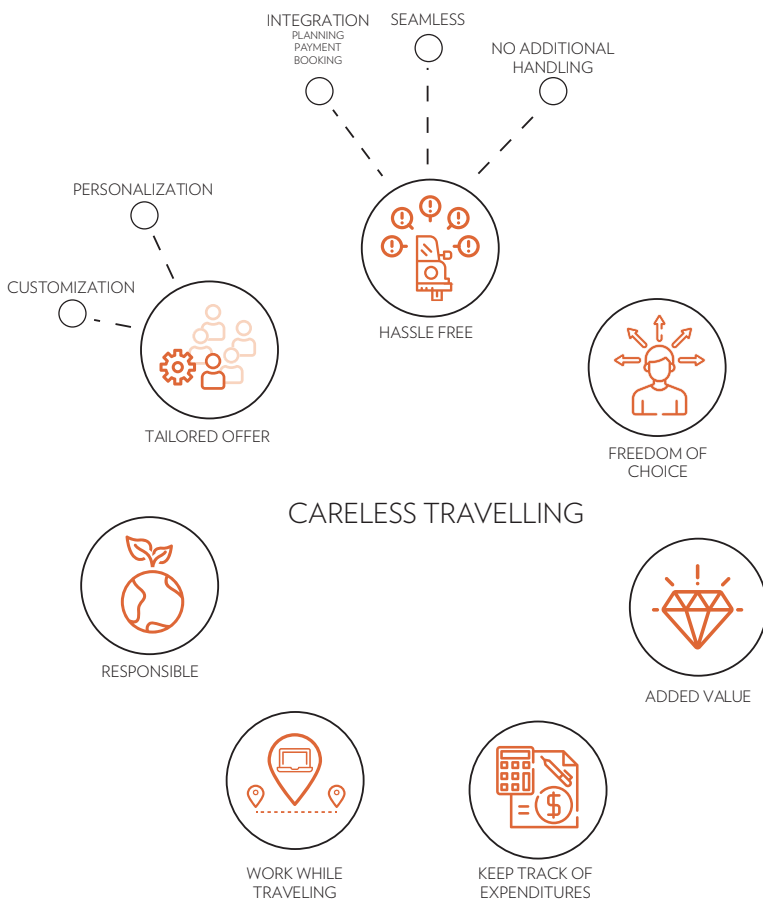


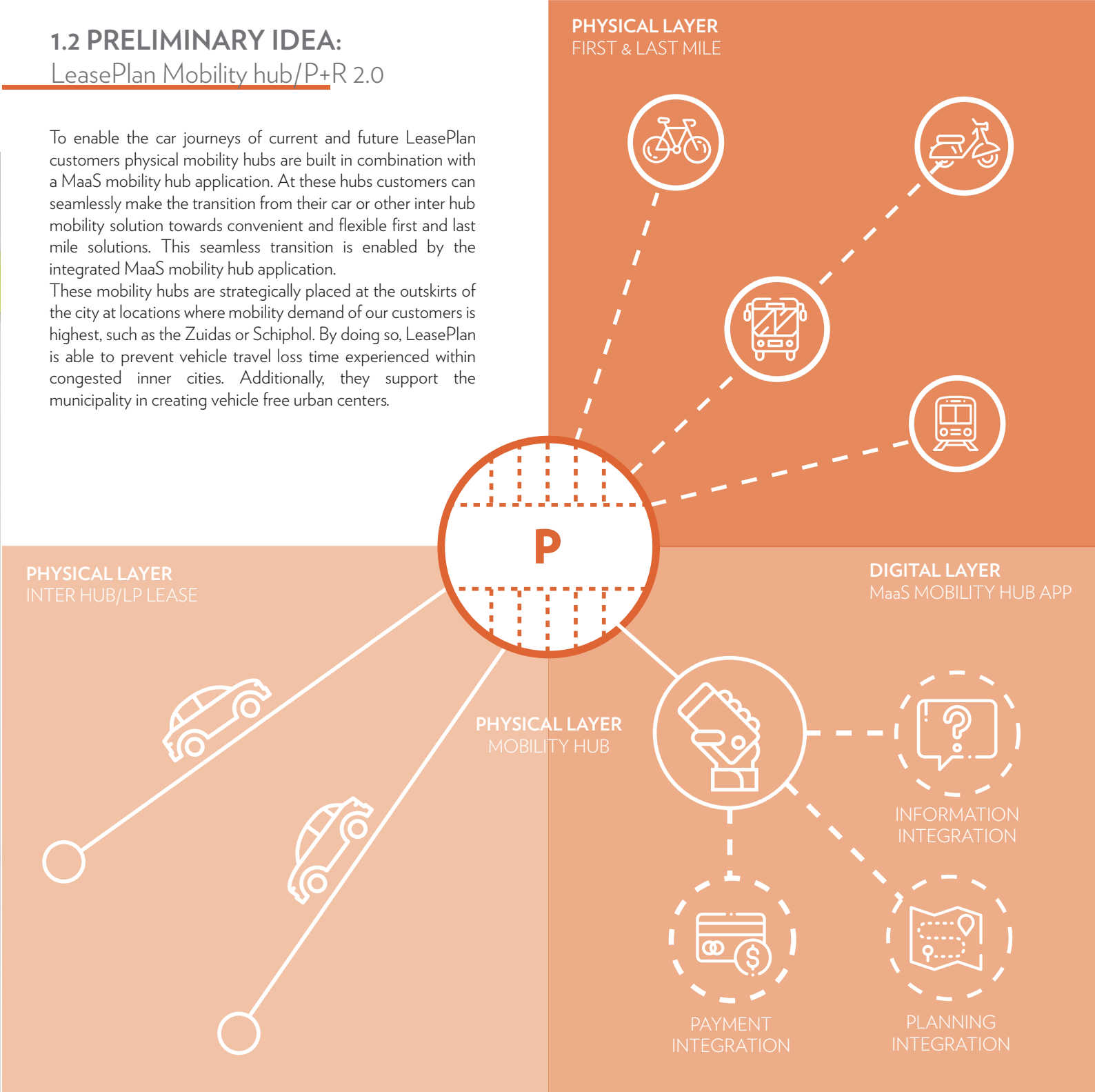
Fig 20: Careless travelling factors

SESSIONS IMPRESSION



1.2 PRELIMINARY IDEA:
LeasePlan Mobility hub/P+R 2.0

To enable the car journeys of current and future LeasePlan customers physical mobility hubs are built in combination with a MaaS mobility hub application. At these hubs customers can seamlessly make the transition from their car or other inter hub mobility solution towards convenient and flexible first and last mile solutions. This seamless transition is enabled by the integrated MaaS mobility hub application. These mobility hubs are strategically placed at the outskirts of the city at locations where mobility demand of our customers is highest, such as the Zuidas or Schiphol. By doing so, LeasePlan is able to prevent vehicle travel loss time experienced within congested inner cities. Additionally, they support the municipality in creating vehicle free urban centers.



1.3 BENEFITS MOBILITY HUB



LEASEPLAN
Enable CaaS for urban target group.
Potential for additional future mobility services
Differentiating factor compared to competitors



CUSTOMERS
Freedom to choose mobility based on need
Tailored and personalized offerings through MaaS application
Hassle free urban mobility



MUNICIPALITY
Less vehicles in the inner city, less congestion, less pollution, less demand for parking (freeing up of public space) = More accessible & livable city



LAST & FIRST MOBILITY OPERATORS
Potential market increase due to the high number of LP customers

PHYSICAL LAYER
FIRST & LAST MILE

DIGITAL LAYER
MaaS MOBILITY HUB APP

1.4 REASONING BEHIND CHOICE

Within both sessions the mobility hub was brought forward as most desirable and beneficial concept, if the scenario of car-free cities plays out. If we compare the idea with the design brief criteria and value drivers, we can see some matching factors. The concept aims to strengthen the current "vehicle centered" value proposition by tackling current and future mobility pain points of our customers. Additionally, the idea shows great potential compared to the value drivers of the users. By giving people access to a variety of convenient and flexible first and last mile solution they are offered the freedom to choose their preferred means of transportation. By using the insights of the MaaS research the supporting mobility hub application could offer customers high quality and convenient customer experiences. Secondly, the idea is very scalable in terms of reach and offered services. A basic mobility hub with 3 modes of transport could already fulfill basic mobility needs of customers but in the future a wide variety of mobility services and additional services could be connected to the mobility hub, making it more attractive for potential customers. To conclude, the mobility hub offers LeasePlan an opportunity to distinguish itself from its competitors by fulfilling the changing needs of their customers.

4.1.2 CONCEPTUALIZATION

What will the mobility hub look like?

Within this part of the development phase the goal is to further conceptualize the preliminary concept from the creative session. Within the conceptualization phase we draw on the insights from the market, MaaS, technology and customer research.

From the preliminary concept a clear distinction can be made between different parts of the concepts; 1) The physical parking space; 2) The digital MaaS mobility hub application; 3) The offered first and last mile solutions; 4) Inter-hub mobility solutions. This distinction will be used within the conceptualization phase to develop more concrete and structured ideas on specific features of the overall concept.

First a brief explanation of the different parts of the mobility hub concept is given to further clarify the concept.

4.1.3 Idea mapping:

To start of the conceptualization phase the idea mapping process was initiated. Within these sessions a combination of individual and group brainstorming sessions took place. Within these sessions the value drivers, design requirements and analysis insights were linked to the different concept parts. This led to a comprehensive overview of ideas on specific parts and features, which the mobility hub concept should include. The different ideas are displayed in an infographic.

4.1.4 Service blueprinting:

Thereafter a service blueprint was designed to make the concept more concrete and understandable, both from a system and user point of view. While doing so the service can be clarified by connecting the different user interactions with specific front end and back end service features (Shostack, 1982).

4.1.5 Business modelling:

Up until now a general view of the desired future mobility hub concept is designed. Within the last part of the conceptualization phase we assess the business model behind the concept and identify the role of LeasePlan in the realization and implementation of the concept. This will be done by using the business model canvas of Osterwalder (2009).

BRIEF EXPLANATION:

Different parts of the mobility hub concept

1. PHYSICAL LAYER MOBILITY HUB



At the outskirts of key cities in the Netherlands LeasePlan will build a network of mobility Hubs. At these hubs first and last mile mobility solutions are integrated and combined with traditional and innovative outer city mobility solutions. As such the mobility hub enables our customers to carelessly and seamlessly travel from A to B, in a future where cities will become free of personally driver driven vehicles.

Seamless

At these hubs smart technology will enable seamless entry/exit. Secondly, the hubs will be equipped with smart charging infrastructure. And finally, specific drop off/hop on zones are built to enable seamless transitions.

Convenience

At the mobility hubs a variety of additional services are offered to the customer, creating more convenient journeys.

Comfortable/Usability

Real time travel information, wayfinding solutions and service points are available at the hub to correctly inform and support the customer.

2. DIGITAL LAYER MaaS MOBILITY HUB APP



To enable careless and seamless travelling the mobility hub is supported with a digital MaaS mobility hub application. On this digital platform the different mobility services are combined and integrated. Via the application customers can plan, book, pay and get access to their preferred modes of transportation seamlessly and conveniently.

Seamless

The application integrates planning, booking and payment of the different transport operators. As such, seamless multimodal journeys are enabled that do not require additional handling.

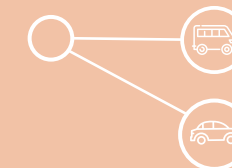
Convenience

The service offers mobility solutions and advice based on real time travel information. Customers are able to select their preferred modes of transportation based on their personal preferences and the trip at hand.

Ease of use:

The mobility platform enables best option mobility planning. Additionally, customers are able to easily get required customer service via the application.

4. PHYSICAL LAYER INTER HUB/LP LEASE



In the future a network of LeasePlan mobility hubs are strategically located throughout the Netherlands. At these hubs LeasePlan customers can park their own lease vehicles and access first and last mile solutions. Secondly, LeasePlan car and ride sharing solutions will be available at these hubs to give non personal vehicle lease customers temporary access to vehicles whenever they are in need. Thirdly, LeasePlan will provide micro transit inter-hub mobility solutions.

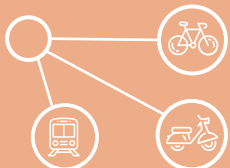
Convenience:

LeasePlan customers have access to various inter-hub and shared vehicle solutions at the hubs. The micro-transit solutions are equipped with high quality work stations, enabling people to work while commuting. Additionally, by transporting masses of people at once LeasePlan is able to reduce the costs of mobility and the required number of cars on the road. This would ultimately reduce congestion and travel loss time.

Usability:

Via the application LeasePlan customers can get easy access to inter hub carpooling and micro transit solutions.

3. PHYSICAL LAYER FIRST & LAST MILE



Within vehicle free future cities a mobility gap exists in the first and last mile of LeasePlan customers who either work or live in these cities. To fill in the mobility gap a variety of first and last mile solutions are offered at the mobility hubs. Via the digital MaaS mobility hub application LeasePlan customers are able to seamlessly complete their journey by using these first and last mile solutions.

Offered solutions

Shared E bike
Shared Rides
Shared scooters
P2P ride hailing
Shared ride-hailing services
City friendly pots
Public transport

1. PHYSICAL MaaS MOBILITY HUB



- MAINTENANCE SERVICES at hub
- COMMERCIAL LP SERVICES at hub
- HUB NETWORK INCREASE
- INNER CITY MICRO HUBS

VIABILITY

- PICK UP POINT
- FOOD/ COFFEE TO GO
- DAY CARE
- HIGH QUALITY FLEX OFFICE

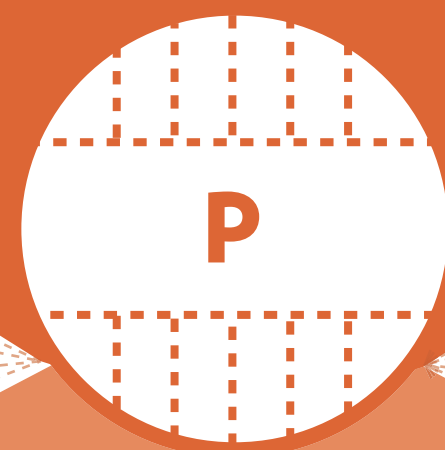
CONVENIENCE Secondary services

- REAL TIME TRAVEL INFO
- DIGITAL WAYFINDING
- SERVICE POINT
- ENHANCED WAITING AREAS
- WIFI CONNECTION
- SAFETY FEATURES
Cameras
Enclosed parking
Security

CONVENIENCE Primary services

- AUTOMATIC ENTRY
- AUTOMATIC PARKING
- CHARGING INFRASTRUCTURE
- DROP ON DROP OFF

SEAMLESS



- SHARED (E) BIKES**
Access-based shared E bikes (Urbee)



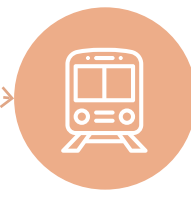
- SHARED RIDEHAILING**
LeasePlan customers who share the similar destinations can share trip legs



- AUTONOMOUS SHARED RIDE-HAILING**



- PUBLIC TRANSPORT**
LP mobility hub is connected to public transport



- SHARED SCOOTERS**
customers who need to enter or leave the city with their Lease vehicle



FIRST & LAST MILE

3.

AVAILABILITY RELIABILITY

- SERVICE OPTIMIZATION
Strategic re-distribution based on usage insights
- ROUTE OPTIMIZATION
Improved data processing capabilities
- CARPOOLING PORTAL
- P2P SHARING PORTAL
Scheduling assistant
- INCREASE AVAILABLE SOLUTIONS

USABILITY

- TARIFF OPTIONS
- PROFILING ENGINE
Personalized offer
- DIGITAL CUSTOMER SERVICE PORTAL
- NAVIGATION SUPPORT
- CONSUMPTION OVERVIEW
Costs
Eco footprint
Kilometers

CONVENIENCE Seamless

- PAYMENT INTEGRATION
- PLANNING INTEGRATION
- DYNAMIC JOURNET PLANNER
Pro active advice
Auto plan & book during trip
Real time travel info
Personalized offers
- BOOKING INTEGRATION

OUTER CITY

4.



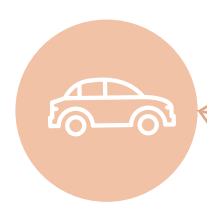
DIGITAL MaaS MOBILITY HUB APPLICATION

2

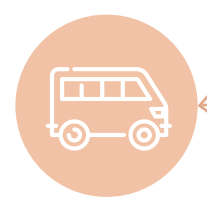
- SHARED LP VEHICLES**
Access-based shared LeasePlan vehicles available at mobility hub



- REGULAR LP LEASE**
customers who need to enter or leave the city with their Lease vehicle



- LP MICROTRANSIT**
mass transit busses driving in between hubs of key cities



- LP CARPOOLING SOLUTION**
LeasePlan customers who share the same destination can share rides



4.1.4 SERVICE BLUEPRINT

What does the service look like?

Within the idea mapping stage, the preliminary LeasePlan mobility hub concept was ideated upon. This process was semi structured by separating the idea generation phases across the different parts/layers of the concept. At the end of the process the different ideas were mapped out creating a comprehensive overview of the different parts and features of the final future mobility hub concept. Up until now the mobility hub concept was only clarified from a conceptual point of view, as a sum of all its parts. Therefore, this part of the development phase focusses on clarifying the concept from a user perspective. This has been done by creating a service blueprint (fig 21). Service blueprinting enables you to clarify the different interactions between the service and the user at specific stages along the customer journey (Shostack, 1982). Additionally, it connects these interactions with the back-end and front-end service processes/features, which enable the delivery of the service.

Within the designed blueprint it is chosen to plot the journey across the following 9 stages. As such, it represent a journey with the most possible service touchpoints. In reality, various trips are possible, changing the number and order of the touchpoints and the subsequent blueprint.

- 1)

Registration
- 2)

Planning
- 3)

Booking
- 4)

First mile
- 6)

Mobility hub
- 6)

Journey
- 7)

Mobility hub
- 8)

Last mile
- 9)

After

Within each stage the journey is described from the user perspective. It describes in detail what the customer does and what he might think. This user perspective is thereafter linked to the service output of the application and the back-end processes, which enable the service.

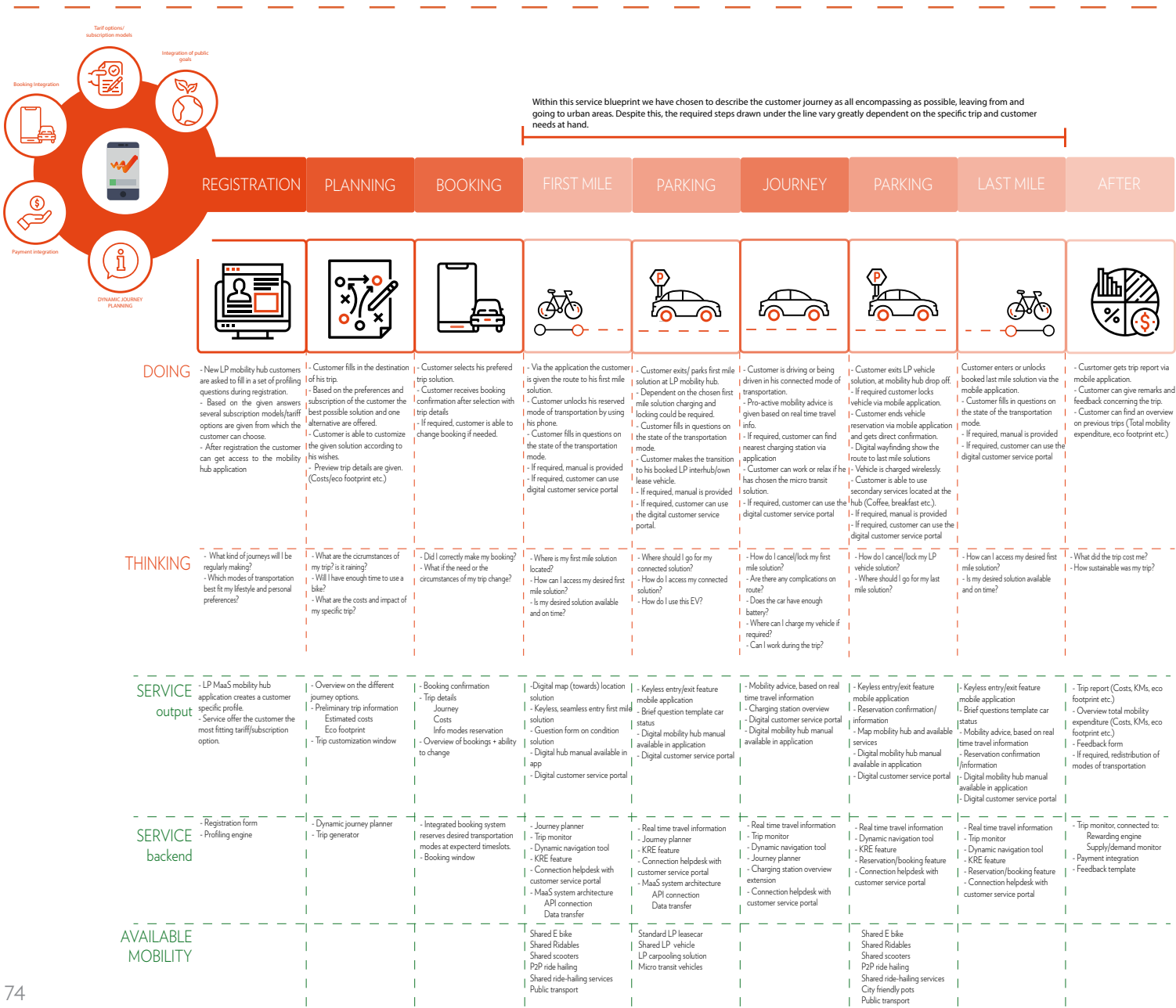


Fig 21 Service blueprint Mobility hub concept

4.1.5 BUSINESS MODEL

What does the business model of the concept look like?

Within the last part of the conceptualization phase the economic relevance and value of the concept is assessed. This will be done by using the business model canvas of Osterwalder and Pigneur(2010). This business model canvas consists of 9 building blocks, which allows us to map out the complete business model of the concept from the perspective of LeasePlan. While doing so the strengths and weaknesses of LeasePlan can be taken into account.

Within this section the most pivotal building blocks of the concept are explained in detail. Thereafter an overview of the canvas can be found.

VALUE PROPOSITION

Within the value proposition building block the value delivery to the different customer segments is clarified. This building block gives answer to the problems or needs, which the concept aims to fulfil. If we look at the concept several value propositions can be identified.

Enable vehicle centred mobility for urban customers:

The mobility hub concept will enable LeasePlan customers to enter or leave the city by car by offering seamless and convenient multimodal mobility solutions.

Financial flexibility

The mobility hub concepts enables financial flexibility. Non-lease vehicle owners are able to use vehicles whenever they desire and pay for the actual usage only. Lease vehicle owners are able to drive down costs by sharing their vehicles and/or rides.

Mode flexibility

At the mobility hub a wide variety of mobility services are offered to the customer. The service pro-actively advises the customer on the best solution for the trip at hand based on his preferences. Additionally, customers still have the freedom to choose a different solution whenever they desire to.

Careless mobility:

The mobility hub concept enables careless travelling by taking away the pain points experienced with urban vehicle centred mobility. Secondly, the service integrates planning, booking and payments from the different service providers onto one single platform. By doing so the platform is able to give tailored mobility solutions fit to needs of the customer and circumstances at hand. Furthermore, the payment integration offers mobility expenditure transparency by giving one overview of the total mobility expenditure. The planning integration enables the service to give best mobility solutions based on real time travel info.

Responsible mobility solutions

The mobility hub concept will reduce the number of vehicles in the city centre, increasing the liveability and accessibility of those places. Secondly, by offering electric, shared and micro transit solutions LeasePlan is able to 1) reduce the total amount of required vehicles 2) the ecological footprint of the utilized vehicles. Thirdly, by offering more active first and last mile solutions LeasePlan is able to offer mobility solutions fit to the ongoing well-being trend.

KEY PARTNERS

From the MaaS research insights we can conclude that MaaS propositions require a strong partnership network. Therefore, LeasePlan has to establish a partnership network in order for them to realize the mobility hub concept. These partnerships will be strategically made based on the strengths and weaknesses of LeasePlan.

Mobility service provider(MSP)

Based on the internal SWOT analysis we can question if LeasePlan is able to and should develop the application for the mobility hub concept. Moreover, if we look at the MaaS benchmark we can see that several MSPs outside of the Netherlands already deliver level 2-3 MaaS solutions. One such companies is Whim, a Scandinavian MSP who delivers level 3 MaaS in multiple countries. Whim has expressed the desire to enter the Dutch market but they have difficulty in finding transport operator partners.

LeasePlan could partner with Whim with the aim to develop a whitelabel MaaS mobility hub concept, based on the already existing MaaS platform of Whim. This would allow LeasePlan to deliver a LeasePlan branded application without having the need for inhouse development, which is a current weakness of LeasePlan.

Transport operators:

From the internal analysis we can conclude that LeasePlan solely focusses on delivering CaaS solutions. Therefore LeasePlan requires partner transport operators which could fill in the first and last mile gap and who can be integrated on the MaaS mobility hub platform. Having a partnership agreement with LeasePlan can be very interesting for transport operators due to the large customer base of LeasePlan within the Netherlands (180.000 vehicles). This could offer transport operators significant increases in market size and revenue.

Government & municipalities

One of the main drivers of change in the Dutch mobility landscape is policy making and regulations. Expectations are that innovative policies will create unfavourable conditions for the vehicle leasing business model and vehicles in general. For LeasePlan it becomes pivotal to anticipate and steer this process by actively participating in the mobility lobby of the Netherlands. At present, LeasePlan is the biggest fleet manager in the Netherlands, giving them a considerable voice.

Parking operators

To enable the urban sub-urban/rural transition the concept needs physical parking lots. Instead of building new parking lots LeasePlan could partner with municipalities and businesses who are responsible for already existing parking solutions. From expert interviews with the municipality we can conclude that the current P+R solutions do not function optimally, this can be attributed to the offered services at those P+Rs by; 1) increasing the available first and last mile solutions; 2) making the transition to and from these first and last mile solutions seamless, convenient and comfortable. This could be achieved by integrating the P+R with the digital MaaS mobility hub concept.

OEMs

Based on the trend analysis and technology scouting insights we can argue that the current “vehicle centred” mobility landscape will significantly change. The capabilities and functionalities of vehicles will significantly change due to technological developments, such as connected and autonomous vehicles. This offers traditional mobility players great opportunities but also threatens the ones that fail to anticipate these technological developments. Additionally, customers desire more purpose-built vehicles fit to the transportation purpose at hand. LeasePlan completely relies on OEMs for the delivery of vehicles. For LeasePlan it therefor becomes pivotal to partner with these OEMs, which would allow them to anticipate the impact and increased capabilities of such technological developments.

Road and infrastructure management companies

The future mobility hub concept anticipates the existence of autonomous vehicles. Using such vehicles requires substantial changes to the currently available infrastructure, which in turn requires commitment and collaboration of the Dutch Rijkswaterstaat. For LeasePlan it therefor becomes pivotal to involve the Rijkswaterstaat in the development of inter-hub autonomous micro-transit solutions. This would ultimately benefit both stakeholders because these micro-transit solutions could significantly reduce the total amount of vehicles.

An overview of the business model canvas with the key findings is presented on the next page (fig 22)

SOLUTION

LeasePlan can benefit from the proposed MaaS mobility hub concept in various ways. A distinction will be made between direct and indirect profit flows;

DIRECT PROFIT MOBILITY HUB CONCEPT:

Enable vehicle centred mobility for urban customers:
By seamlessly connecting first and last mile mobility solutions LeasePlan is able to provide vehicle centred mobility to its customers. As such, they are able to compete in a future where cities become free of driver driven vehicles. Additionally, the benefits and convenience of the service could attract new customers to LeasePlan, which in turn would boost the revenue of LeasePlan.

Generate additional revenue from connected first and last mile solutions:

Within the designed business model LeasePlan buys large mobility bundles from partner mobility operators, allowing them to negotiate favourable prices. In turn, this allows LeasePlan to resell these mobility services via their MaaS mobility hub concept at a slightly higher price offering them a small profit margin.

Additional revenue from interhub mobility services:

LeasePlan could generate additional revenue by offering interhub and shared vehicles at the mobility hub. Additionally, LeasePlan could potentially ask premium prices for the interhub mobility solution as it could provide high quality and convenient mobility services. Especially, if they are given access to the emergency lane during rush hours.

LeasePlan dedicated services at hub:

By providing commercial and maintenance activities at the mobility hub LeasePlan is able to profit in multiple ways. By showrooming new and second-hand vehicles at these locations LeasePlan is able to boost its sales, creating additional revenue. Additionally, by doing so LeasePlan is able to increase it brand awareness. By providing maintenance activities at these strategically positioned locations LeasePlan could potentially safe costs. This can be attributed to the fact that these locations are along the standard commute of customers, as such it would require pick up/delivery or replacement vehicles.

INDIRECT PROFITS

Revenue from secondary services:

At the mobility hub several secondary services will be offered, which are either organized by LeasePlan or partners. In both cases, LeasePlan could generate additional revenue by either renting space or providing these services themselves.

Governmental support:

The mobility hub concept could get funded since it supports the mobility goals of the municipality and the government. This would benefit the customer since the costs of the service would become lower. As such, the solution becomes more attractive to the customer which in turn could increase the number of customers.

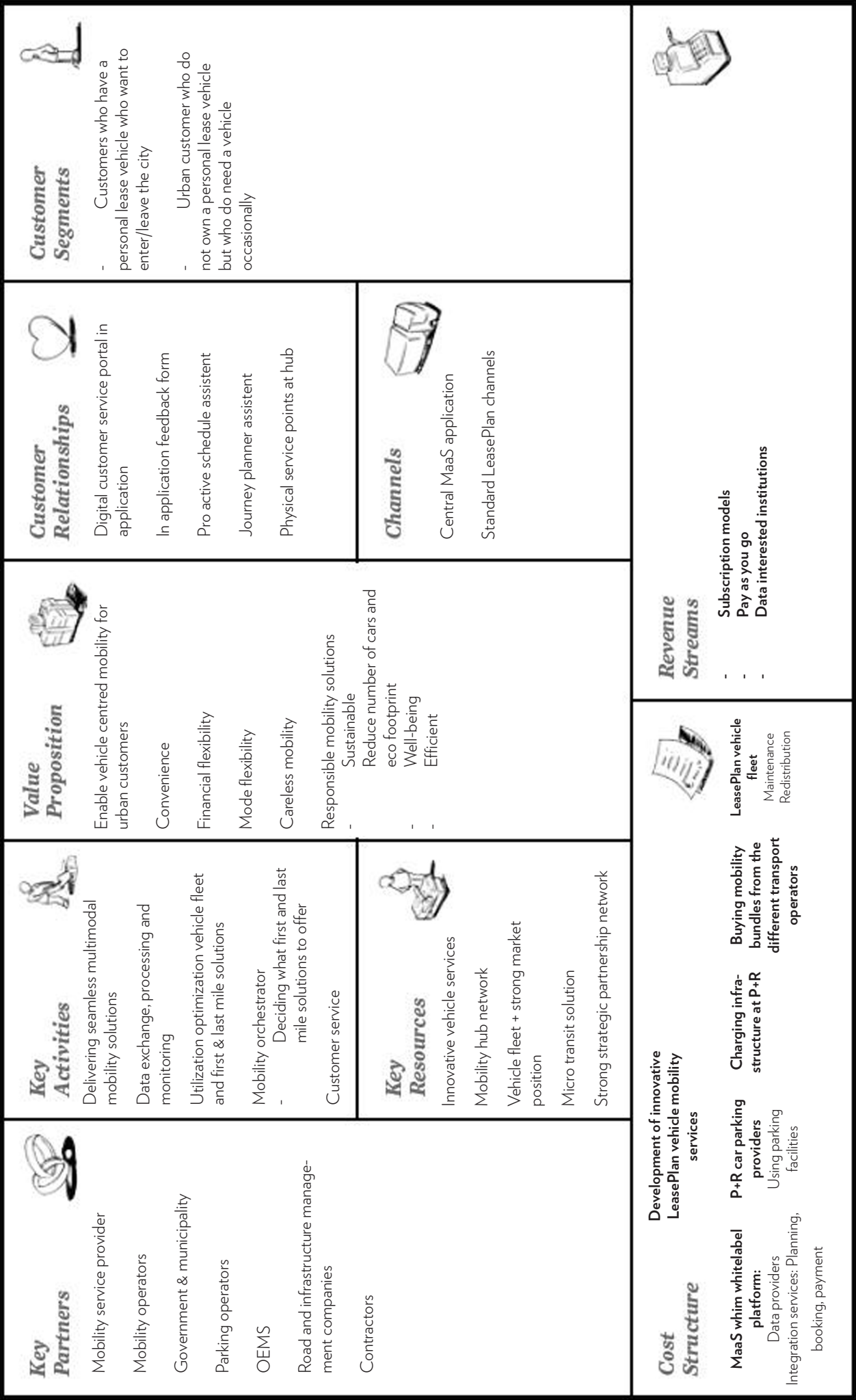


Fig 22 Business model canvas mobility hub

4.2 SHORT TERM DEVELOPMENT

How to increase flexibility of LeasePlan?

From our research findings we can conclude that our current customers are already seeking more flexible and convenient mobility solutions, as opposed to the traditional vehicle leasing model. In addition, expectations are that this need will further increase due to the upcoming millennials and increased vehicle centred mobility problems.

From the competitor analysis insights, we can conclude that several competitors of LeasePlan are already providing more flexible and convenient mobility solutions. Secondly, substitute innovative mobility services increasingly pose a threat to the current vehicle leasing business model as they are to fulfil the same mobility needs under more flexible and convenient conditions. From the market analysis we can see a rapid increase in the amount and popularity of these innovative mobility service providers such as Car2Go, Uber, Snapp car, Amber etc.

For the short-term success of LeasePlan it therefore becomes pivotal to align their current mobility solutions with the changing needs of their customers. Based on the vision statement of LeasePlan “Deliver any car, anytime, anywhere” they also have the desire to do so. Some initiatives have already been initiated into this direction, such as the corporate vehicle sharing solution/application. But compared to their competitors and the above-mentioned innovative mobility providers LeasePlan lacks behind in terms of flexible and convenient CaaS solutions. Therefore, first horizon developments will aim to establish more shared and flexible vehicle mobility solutions fit to the everchanging needs of current and future customers.

Within the first horizon focus is put on answering the first question:

How can LeasePlan adapt its current service to offer its customers more flexibility, enabling them to choose their mobility based on the needs and circumstances at hand?

Sub questions:

1. What initiatives are currently already been going on?
How can we use these initiatives in our advantage?

Methods short term development phase:

4.2.1 Creative sessions:

- Context exploration
- Preliminary idea conceptualization
- Benefits idea
- Reasoning selection

4.2.1 Conceptualization

- Idea mapping
- Customer journey mapping
- Business modeling

4.2.1 CREATIVE SESSION

GOAL OF THE SESSION

The goal of the session was to answer the main question posed in the short-term mobility strategy of LeasePlan: How can LeasePlan adapt its current service to offer its customers more flexibility, enabling them to choose their mobility based on the needs and circumstances at hand?

The final goal of the sessions is a set of ideas that give answer to the main question and is based on the insights gathered during the session.

PARTICIPANTS

The internal session was facilitated with 4 LeasePlan employees with varying background, ranging from marketing to technology/IT. By doing so the participants could draw on their experience working at LeasePlan and draw on their expertise from their own respective fields.

SESSION SET-UP

Context exploration: The session started with a thorough exploration of the context and the occurring problems and potential opportunities. The session started with an initial H2, which was drawn from the research findings. The participants were asked to build a mind map around this H2.

H2 Development: Thereafter the participants were asked to combine and cluster the insights and form new and more specific H2s

Ideation: The new H2s formed the input for a variety of idea generation methods both individually and as a group, which resulted in an abundance of ideas. By combining and clustering the most fruitful ideas several worked out concept could be created and presented.

RESULTS

CONTEXT EXPLORATION

From the context explorations we could identify two strong clusters of insights; 1) Types of flexibility (Fig 23) ; 2) Flexibility enablers (Fig 24); The main findings are depicted besides.

After exploring the context of flexible mobility solutions, from a LeasePlan perspective, the LeasePlan employees were asked to cluster and combine the insights were possible. Similar to the long-term sessions, LeasePlan employees were asked to turn these combinations and clusters into more specific H2s. These H2s were the starting point for the ideation phase, in which preliminary solutions were developed. Underneath, only the selected H2 and subsequent concept is briefly explained.

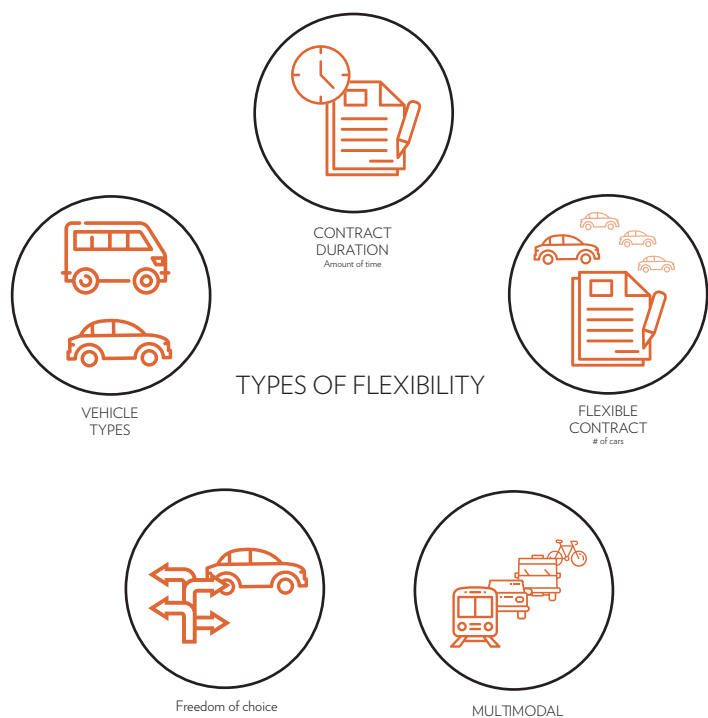


Fig 23: Types of flexibility

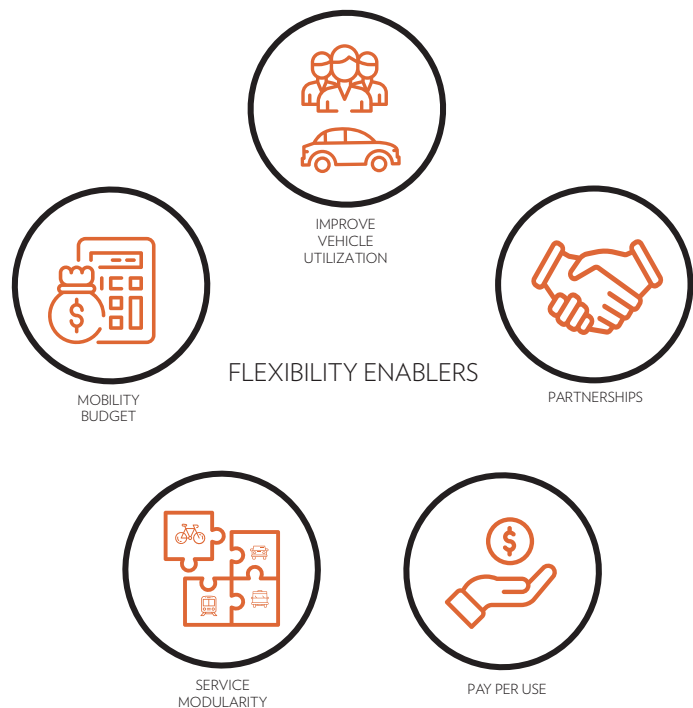


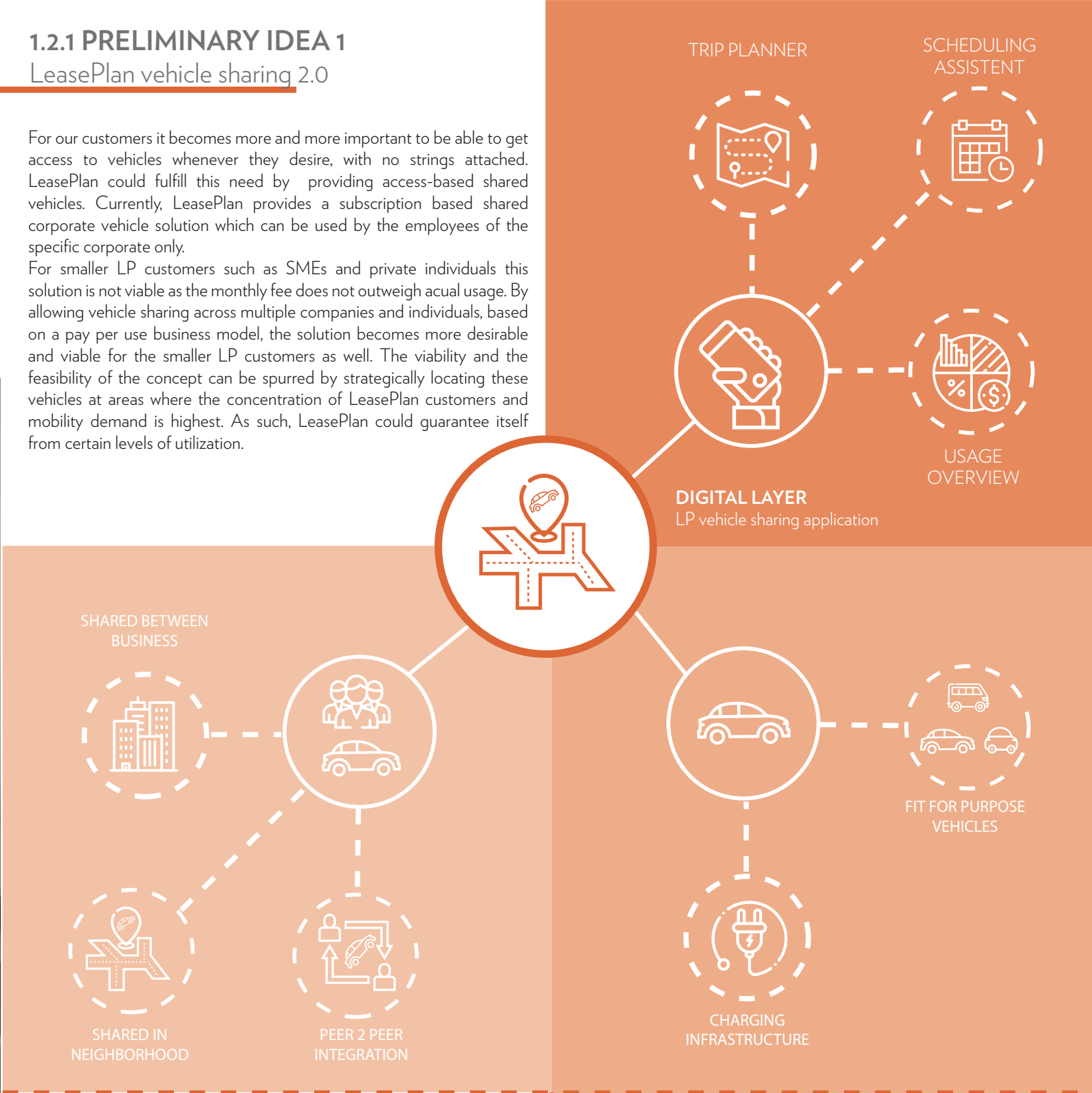
Fig 24: Flexibility enablers

SESSION IMPRESSION



1.2.1 PRELIMINARY IDEA 1
LeasePlan vehicle sharing 2.0

For our customers it becomes more and more important to be able to get access to vehicles whenever they desire, with no strings attached. LeasePlan could fulfill this need by providing access-based shared vehicles. Currently, LeasePlan provides a subscription based shared corporate vehicle solution which can be used by the employees of the specific corporate only. For smaller LP customers such as SMEs and private individuals this solution is not viable as the monthly fee does not outweigh actual usage. By allowing vehicle sharing across multiple companies and individuals, based on a pay per use business model, the solution becomes more desirable and viable for the smaller LP customers as well. The viability and the feasibility of the concept can be spurred by strategically locating these vehicles at areas where the concentration of LeasePlan customers and mobility demand is highest. As such, LeasePlan could guarantee itself from certain levels of utilization.



1.3 BENEFIT PRELIMINARY IDEA



LeasePlan:
Enable CaaS for non lease vehicle owners
Fullfill changing customer needs
Better utilization of current fleet
Increase environmental awareness through stimulation of EV usage
Pay per use business model



Customers:
Freedom to choose vehicle or not (Mode flexibility)
Pay for actual usage (financial flexibility)
Offer employees increased mobility flexibility (Employee flexibility)



Municipality:
Less vehicles in the inner city
Less demand for parking (freeing up of public space) = More accessible & livable city
Reduction pollution through electric vehicles

1.4 REASONING BEHIND CHOICE

Together with the LeasePlan employees a preliminary selection was made for the LeasePlan vehicle sharing concept. This selection was based on the customer value drivers and short-term feasibility and viability of the concept. The feasibility of the concept is high since the solution is built on the already existing corporate car leasing solution, which LeasePlan initiated in 2018. This service can be made more viable and desirable by extending the vehicle sharing capabilities beyond the boundaries of one company, enabling vehicle sharing between multiple companies and individuals. This would ultimately increase vehicle utilization and make pay per use business models more attractive, both for LeasePlan and its customers. While the utilization of the current vehicle fleet goes up the required number of vehicle and their subsequent costs would reduce. If we compare the concept to the design requirements and value drivers, we can see that the concept fulfills several of them. First of all, the concept offers customers the freedom/flexibility to choose whether or not they want to use a vehicle. Secondly, the service offers increased convenience by: 1) strategically positioning the vehicles at locations where occasional mobility demand of our customers is highest; 2) Offering a digital application which makes the planning, booking, payment and the actual vehicle journey as seamless as possible; 3) The offered freedom of choice enables customers to select their preferred modes of transportation based on the trip at hand. Thirdly, LeasePlan is able to increase the sustainability of their customers by providing shared EVs. By doing so LeasePlan could also make their customers more conscious of the capabilities and benefits of EVs. To conclude by providing the vehicle sharing concept LeasePlan is able to fulfill the changing needs of their customers and provide a solution in line with the ongoing sharing economy trend.

4.2.2 CONCEPTUALIZATION

How can LeasePlan deliver vehicle sharing

From the preliminary idea we can derive that most concept development is application driven. Therefore, the conceptualization phase will mainly focus on the development of both applications.

Within the conceptualization phase we draw on the insights from the market, MaaS, technology and customer research.

Idea mapping:

To start of the conceptualization phase the idea mapping process was initiated. Within these sessions a combination of individual and group brainstorming sessions took place. While doing so, the value drivers, design requirements and analysis insights were linked to the different concept layers. This led to an overview of a variety of ideas each building up to the future vehicle sharing proposition. The ideas are visualized in an infographic on the next page.

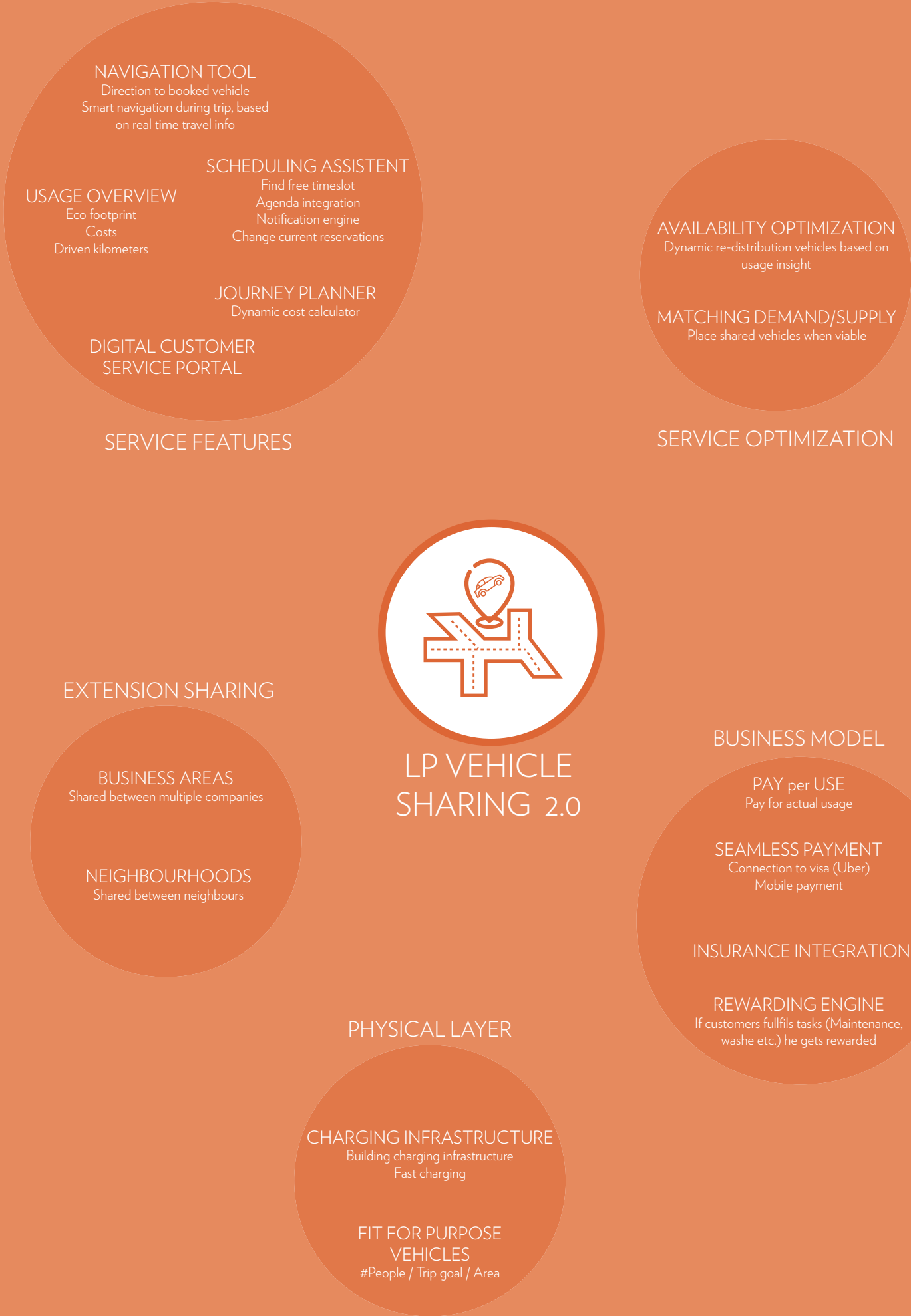
Service blueprinting:

Thereafter a service blueprint was designed to make the sharing concept more concrete and understandable, both from a system and user point of view. While doing so the service can be clarified by connecting the different user interactions with specific front end and back end service features (Shostack, 1982).

Business modelling:

Up until now a general view of the desired future mobility hub concept is designed. Within the last part of the conceptualization phase we assess the business model behind the concept and identify the role of LeasePlan in the realization and implementation of the concept. This will be done by using the business model canvas of Osterwalder (2009).

IDEA MAPPING



SERVICE BLUEPRINT

What does the service look like?

Within the previous short term development stages the LeasePlan shared mobility 2.0 service was ideated upon. This resulted in a comprehensive idea mapping overview divided over the different parts/layers of the concept. Each part of the concept consists of a set of feature ideas that built up the final LeasePlan shared mobility 2.0 service.

This part of the development phase focusses on clarifying the concept from a user perspective. Similar to the long term development phase, this has been done by creating a service blueprint (fig 25).

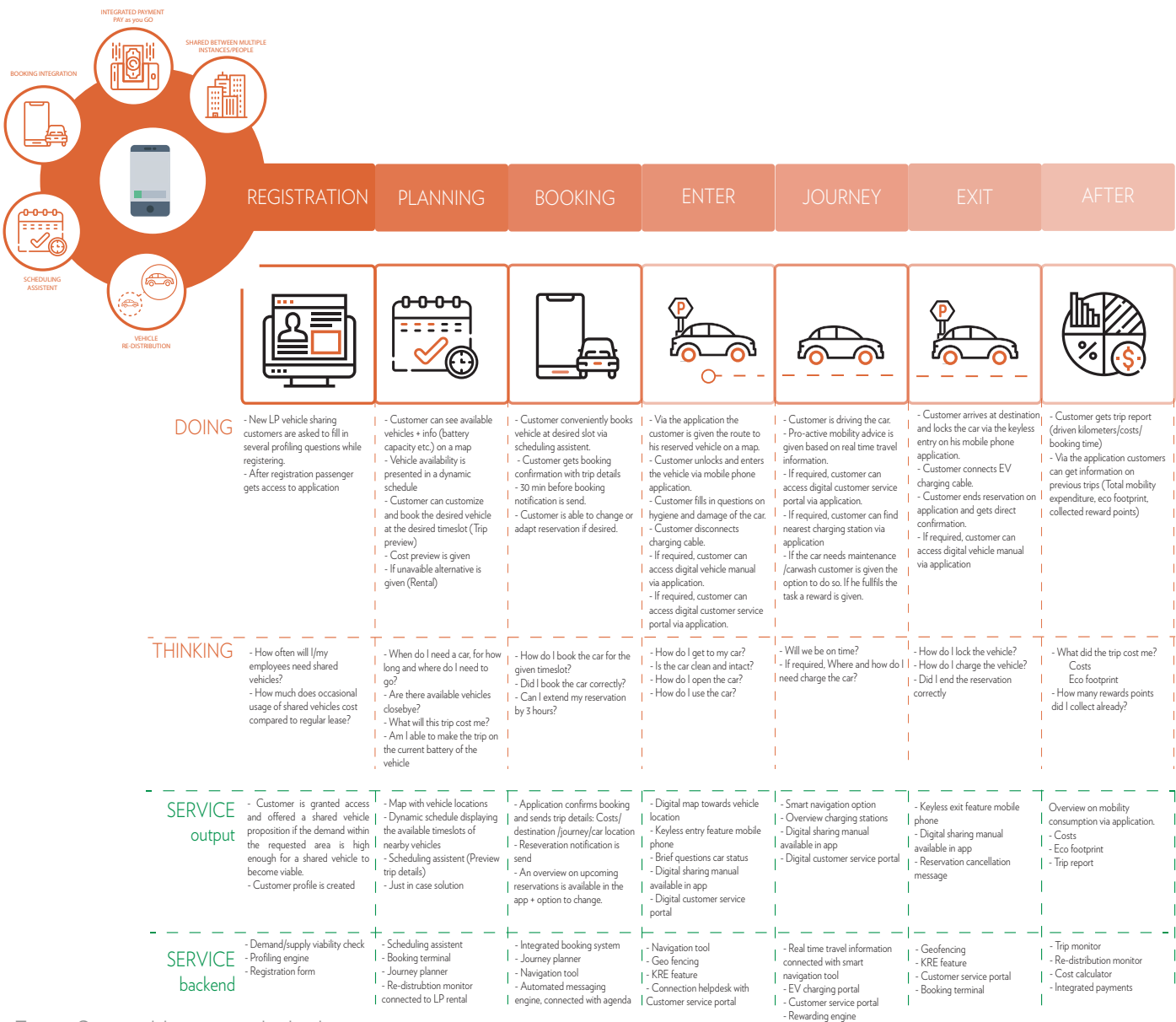
The developed service blueprint consists of the following 7 steps:

- 1) Registratizon
- 2) Planning
- 3) Booking

- 4) Enter
- 5) Journey
- 6) Exit
- 7) After

Within each stage the journey is described from the user perspective. It describes in detail what the customer does and what he might think.

Thereafter this user perspective is linked to the service output of the application and the back-end processes, which enable the service.



BUSINESS MODEL

What does the business model of the concept look like?

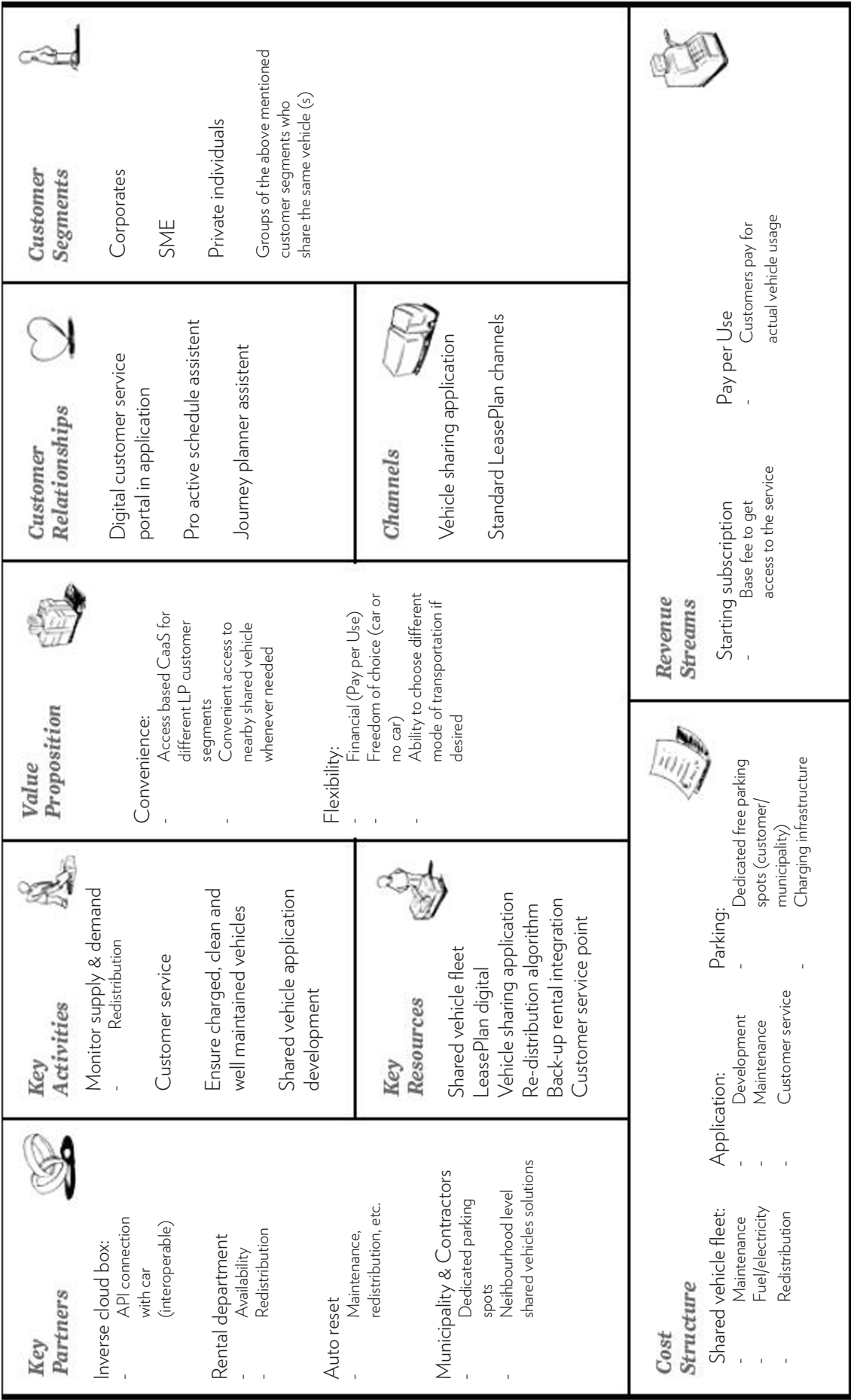


Fig 26 Business model canvas vehicle sharin 2.0

5.1 DELIVER PHASE

ROADMAP TO SUCCEES

From the research, analysis and development phase we now know what the future mobility landscape looks like and what LeasePlan should do in the long and short term to obtain sustainable future growth. Within this chapter an innovation roadmap will be designed to support the realization of the future mobility hub concept. Within this roadmap a step by step process will be sketched out, which enables LeasePlan to direct current and future developments towards the realization of the future mobility hub concept and deliver upon their vision.

The deliver phase consist of the following chapters:

- 5.1.1 LeasePlan and the future of mobility
 - Current situation
 - Future direction
- 5.1.2 Introduction: Three horizons model
- 5.1.3 First Horizon: Mature current business
- 5.1.4 Second horizon: Transition
- 5.1.5 Third horizon: Enable careless traveling
- 5.1.6 Tactical roadmap
- 5.1.7 Strategic roadmap
- 5.2 Evaluation

5.1.1 LEASEPLAN FUTURE MOBILITY

ROADMAP TO SUCCEES

5.1.1 CURRENT SITUATION

LeasePlan is the biggest car leasing company in the Netherlands. Their core business is centred around full service CaaS leasing proposition with typical contract lengths of 4-5 years. Based on the customer survey and trend analysis insights we can conclude that current and future LeasePlan customers demand more flexible and convenient mobility solutions, fit to the circumstances and needs at hand. This can be attributed to the fundamentally different lifestyles and characteristics of the upcoming younger generations and the expected rapid increases in congestion, pollution and vehicle travel loss time. Consequently, in this future the value proposition of LeasePlan will be increasingly challenged

At present, LeasePlan is mainly commercially driven and focused on maximizing financial performance and vehicle sales. Despite this, LeasePlan identified the above-mentioned market developments and initiated the what's next strategy.

FUTURE DIRECTION:

Within this what's next strategy LeasePlan set itself the vision to deliver: "Any car, anytime and anywhere". While doing so they want to be front runner in the ongoing access over ownership trend and deliver their customer CaaS solutions which are completely flexible in vehicle type and duration, with no strings attached.

They want to enable this strategy by focusing on the following key pillars:

- Continue growth within the CaaS market
- The power of one LeasePlan
- Carnext.com
- Go digital, via LeasePlan digital
- Sustainability

At present, some initiatives have already been initiated in this direction. One such examples is the shared corporate vehicle solution, which enables colleagues to share one common vehicle via the LeasePlan carsharing application.

ROADMAPPING PROCESS

5.1.2 THREE HORIZONS MODEL

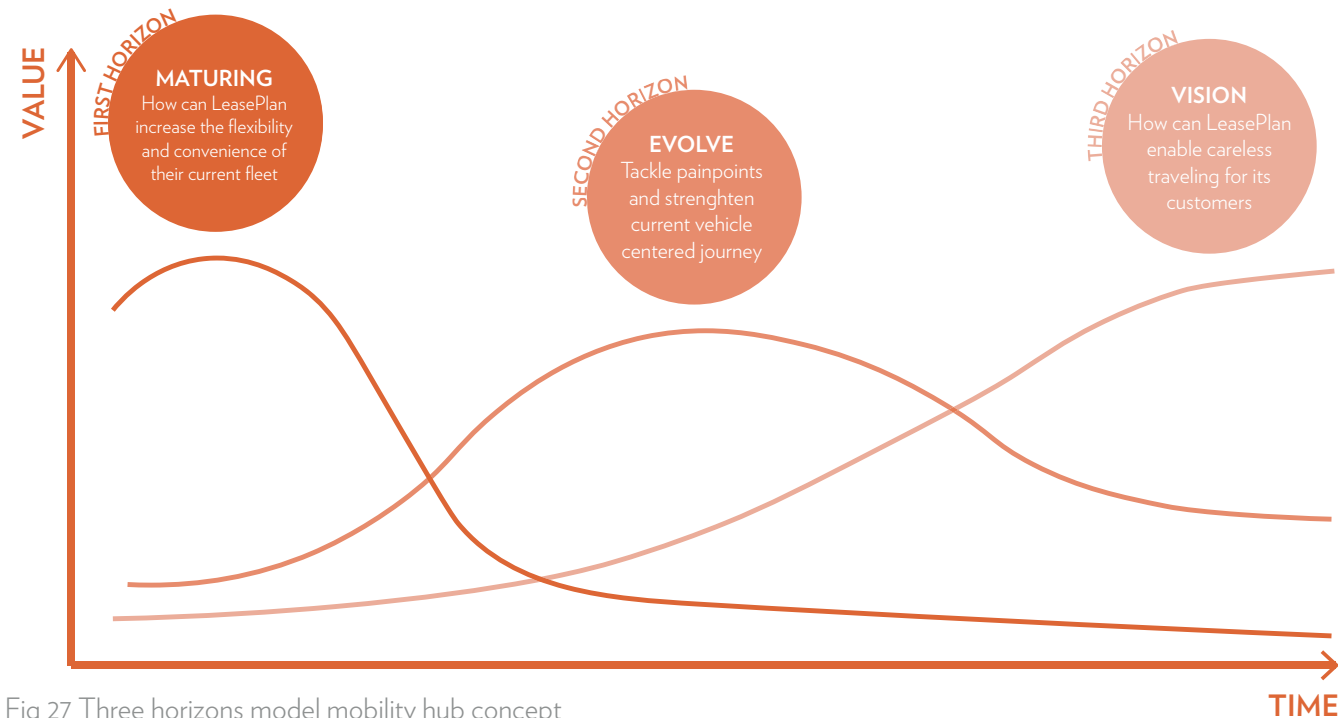


Fig 27 Three horizons model mobility hub concept

INTRODUCTION

To develop this innovation roadmap the three horizons model of Baghai et al. (1991) is used. For big established companies, like LeasePlan, it can be difficult to focus on current business performance and anticipate far future opportunities at the same time. Significant changes and differences can be identified if we compare the current operations of LeasePlan with the operations and requirement of the future mobility hub concept. To enable this transition and changes to the current operations LeasePlan should gradually work towards developing and implementing the proposed solution. The three horizons models support this process by aligning current business processes and developments with far future growth opportunities. The method would ultimately create a step by step innovation process, which enables LeasePlan to gradually realize and deliver upon its future vision.

THE DIFFERENT HORIZONS

Within this three horizons model, each horizon stands for a specific strategic business innovation lifecycle. The overlapping nature of the different lifecycles enable companies to go through continuous innovation (Simonse L.W.L. & Hultink E.J., 2017). Within the first horizon developments focus on maturing the current business and maximizing current business performance. Within the second horizon new features and functions are added to the already existing business, creating new customer value. Moreover, the second horizon marks the transition from the current business to the future vision. The third horizon addresses the future vision of the company and tackles a future growth opportunity, which can be fundamentally different from the current business. This future vision is anticipated throughout the developments of each horizon, which enables the companies to gradually steer towards and realize this future vision.

HOW IS THE MODEL APPLIED

As explained above, first horizon development focus on maturing the current business of LeasePlan and maximizing performance. Based on the market and customer research findings we can conclude that current LeasePlan customers desire more flexible and convenient mobility solutions. To fulfil these changing customer needs a short-term concept was developed that would increase the flexibility and convenience of the current fleet of LeasePlan. This concept is built up from multiple feature and service ideas displayed on the idea map. The different ideas will be used as input for the pathway mapping process of the first horizon.

Within the second and third horizon the goal is to generate and deliver new value to our customers and the business of LeasePlan. Based on the expert interviews and research insights we can conclude that the current vehicle centred journey of LeasePlan customers will become more and more inefficient and painful in the future. This would ultimately increase the willingness of our customers to change to alternative and more convenient and flexible mobility services. To prevent this from happening we set ourselves the vision to enable carefree travelling by taking away the pain points along the vehicle centred journey. Within the long-term development phase, a concept was created that establishes carefree vehicle centred mobility in a future where cities become free of personally driver driven vehicles. This concept is built up from multiple feature and service ideas displayed on the idea map. The different ideas will be used as input for the pathway mapping process of the first horizon.

TIMEPACING STRATEGY:

The final vision of the roadmap is set at 2030, the choice for 2030 can be attributed to several factors. First of all, based on the research insights we can assume that the municipality of Amsterdam aims to significantly reduce the number of personally driver driven vehicles from now until 2030. They aim to do so by reducing the number of parking places, only allowing specific vehicles in the inner city, price inner city vehicle usage etc. (Municipality of Amsterdam, 2013). As such, the proposed mobility hub concept should become more and more desirable from 2025 up to 2030.

Secondly, market and technological developments are expected to significantly change the current vehicle centred mobility landscape by 2030. Expectations are that autonomous vehicle will become more and more available between 2025 and 2030. Additionally, the availability and popularity of shared vehicles is expected to accelerate after 2025 (ING, 2018). Subsequently, this is expected to challenge the need for vehicle ownership and long-term leasing contracts. Despite these expected developments there are still regulatory and political barriers, which inhibit the widespread implementation of such technologies and services.

To conclude, the above-mentioned developments within the mobility industry would all challenge the current value proposition of LeasePlan. Therefore, LeasePlan should provide solution in line with these developments by 2030.

CURRENT TIMEPACING STRATEGY

The history of LeasePlan and its previous product and service launches have been analysed in order for us to determine a feasible development and implementation timing strategy for the proposed roadmap. LeasePlan was originally founded in 1961 within the Netherlands. Since then have grown to become global market leader in the fleet management market. At present, they have a vehicle fleet of over 1,8 million vehicles and are present in 30 countries. If we compare the developments within the mobility industry to the development of LeasePlan we can see that they are a slow mover. Up until recently, the development of LeasePlan was mainly focused on bringing small incremental changes to already existing CaaS solutions, which were mostly financially driven. Compared to competitors LeasePlan lacks behind in the development and implementation of flexible and convenient mobility services.

Since 2017 LeasePlan initiated LeasePlan digital with the goal to deliver more innovative and convenient digital CaaS solutions at digital cost levels. In line with this ambition LeasePlan Nederland started the development of the corporate vehicle sharing application, which was launched in January of 2018. At present, LeasePlan Nederland and LeasePlan digital collectively developed an extension to this service by creating a Leasing service which could be shared among friends. Expectations were that this service would go live in February, but this got prolonged until April. By partnering with technology companies and other mobility industry players LeasePlan is able to develop these services more quickly. Based on this information we can assume that LeasePlan is

able to collectively develop and implement an innovative digital mobility solution within a year, on average. This can vary depending on the size and complexity of the service.

5.1.3 FIRST HORIZON

How to increase flexibility of LeasePlan?

INTRODUCTION

From the analysis phase we can conclude that our current and future customers desire more flexible and convenient mobility solutions, with no strings attached. From the internal analysis we can conclude that the current CaaS solutions of LeasePlan do not meet these desired levels of convenience and flexibility. Additionally, the trend analysis and competitor analysis showed that the mobility market is in a flux of change. Several direct competitors of LeasePlan are already delivering more flexible mobility solutions and the amount and popularity of substitute innovative mobility service providers is increasing rapidly. Based on these findings we can conclude that it becomes pivotal for LeasePlan to deliver solutions fit to the changing needs of their customers on the short-term.

Therefore, the short-term development phase focussed on generating and developing a solution that would increase the flexibility and convenience of the current fleet of LeasePlan. This led to the LeasePlan sharing 2.0 concept. The development and implementation strategy behind the LeasePlan sharing 2.0 concept will be plotted within the first horizon of the concept.

THE STARTING POINT OF THE ROADMAP

The LeasePlan sharing 2.0 concept for the short-term success of LeasePlan is an extension to the already existing shared corporate vehicle solution LeasePlan currently provides. Therefore, the starting point of the roadmap is the already existing shared corporate vehicle solution. Before we start explaining the developments within the first horizon we will first briefly clarify and explain the already existing shared corporate vehicle solution.

The shared corporate vehicle solution is based on a premium monthly subscription. This subscription gives customers one shared vehicle and access to the supporting application. This vehicle can solely be shared among employees of the company that carries the responsibility over the leasing contract.

Features included in the shared corporate vehicle application:

- Keyless entry
- Available cars displayed on map
 - o Navigation option to car location (Maps extension)
- Basic booking terminal
 - o Date/time reservation option
 - o No detailed availability overview/schedule available
- Booking overview
 - o Previous trips and subsequent costs
 - o Ability to change upcoming booking

- Different manuals available in the application
- Customer service available via displayed phone number

Vehicle technology:

- built in keyless entry terminal

IMPROVEMENTS FIRST HORIZON:

After clarifying the existing concept, it is now time to address the first horizon developments of the conceptualized and proposed LeasePlan sharing 2.0 concept.

BUSINESS MODEL DEVELOPMENTS

From premium subscription model to pay per use:

The current corporate car sharing solution is offered as a premium monthly subscription model. As such, vehicle utilization should outweigh the premium monthly fee for the solution to become attractive to customers. Consequently, the service is predominantly used by big corporates who have a bunch of employees with occasional vehicle mobility needs.

The current solution is not attractive for private individuals, SMEs and small corporates because the premium monthly fee significantly outweighs their occasional need for a vehicle. LeasePlan could make the shared vehicle service attractive to its smaller customer segments by enabling pay per use. By doing so customers can get access to shared LeasePlan vehicles whenever needed and pay for actual usage only, with no further strings attached.

Competitor within the industry:

Amber, a small Dutch mobility service start-up is already providing pay per use shared B2B vehicles. Amber charges a usage fee of 0,25 euro a minute. LeasePlan has a significant competitive advantage over Amber due to their existing customer base, global scale and fleet management experience.

Pay per use can be enabled by:

- Payment integration (Visa, Mobile)
- Trip monitor
 - o Calculate trip costs based on actual usage
- Dynamic journey planner
 - o Get before trip cost preview

Rewarding engine:

Within the pay per use solution LeasePlan carries the responsibility of the vehicle. As such, they need to make sure

that the shared vehicles are clean, charged and well maintained at all times. LeasePlan included a rewarding engine which could potentially take away parts of this responsibility and the logistics behind it. Whenever the car needs to be cleaned, charged or undergo maintenance the customer gets the opportunity to fulfil this task and get a reward in return. This is an option, whenever the customer desires not to do so LeasePlan will have to ensure that the car is clean, charged and maintained.

Extension sharing network:

By using a pay per use business model LeasePlan is dependent on actual vehicle usage for revenue generation. Consequently, the viability of the pay per use business model increases when vehicle utilization goes up. LeasePlan could increase the utilization of their shared vehicles by offering the same shared vehicles to multiple companies and customers, as opposed to the current siloed corporate car sharing solution. Secondly, LeasePlan could strategically position these shared vehicles at locations where the concentration of LeasePlan customers is the highest. By doing so they can ensure themselves from a certain level of vehicle utilization. Example areas include business areas, airports, industrial areas etc.

After several pilots and iterations on the new sharing concept have been completed LeasePlan should look for opportunities to expend the availability of their shared vehicles. From the expert interviews with the municipality of Amsterdam we can conclude that the municipality is looking for mobility partners that could deliver shared vehicles for newly built and existing neighbourhoods. LeasePlan could support the municipality by collaborating with contractors and neighbourhoods in the development and provision of shared mobility services. By offering a shared vehicle to multiple neighbours/neighbourhood the required number of vehicles within that specific area could decrease. This could save mobility costs of the customers and free up public space within the neighbourhood which subsequently increases the liveability and accessibility of those neighbourhoods.

To enable this service LeasePlan has to:

- Give multiple companies and customers access to same shared vehicles
- Define and create new sharing groups

To reach potential customers LeasePlan has to:

- Initiate marketing/sales campaign
- Partner with contractors, municipalities and neighbourhoods

SERVICE OPTIMIZATION

Next to extending the availability of the shared vehicle LeasePlan should monitor the supply and demand of the deployed vehicles. Monitoring vehicle and usage data is the key to ensuring both availability and viability of deployed vehicles. By continuously analysing this data LeasePlan is able to match demand and supply of the shared vehicles and re-distribute, scale up or scale down the available vehicles where

needed. If required, LeasePlan could use the existing rental vehicle distribution network to re-distribute the shared vehicles. Furthermore, by analysing demand & supply and previous usage data LeasePlan is able to set a baseline condition for the viability of a shared vehicle. This baseline condition allows LeasePlan to validate whether it would be viable to deploy a shared vehicle at a certain location at a certain demand.

This could be achieved by

- Trip monitoring software: GPS, Telematics (Location, KMs, Fuel consumption, eco footprint etc.)
- Demand & supply monitor
- Demand & supply viability check
- Re-distribution logistics

SERVICE FEATURES

Compared to the current corporate car sharing service several features could be added to enhance the usability and convenience of the service. These features are placed in order of importance

Cost indication: While booking and planning the trip customers get a dynamic indication of the costs of the trip

Journey planner: Within the application customers can get access to a journey planner, which shows them the route to; 1) Their final destination, supported with real time travel advice; 2) The location and route to their shared vehicle

Scheduling assistant: Within the application a dynamic scheduling assistant supports the customer with the planning and booking process. Within this feature the available timeslots and potential vehicles are dynamically and clearly displayed, making the booking process easy and straightforward. This feature can be further developed by; 1) Integrating and connecting the outlook agenda of the users with the scheduling assistant, enabling automated bookings; 2) Adding a notification engine, which notifies the customer before the journey is happening or when any malfunctions/implications occur.

Digital customer service portal: Customers can directly reach out to the digital customer service portal via their application when they experience implications during the trip.

Usage overview: Within the application an overview can be found which displays overall mobility expenditure, ecological footprint and driven kilometres

PHYSICAL LAYER

Next to the development of the application LeasePlan also needs to develop the physical layer of the concept, which enables the trip. This physical layer covers the vehicle and its required utilities for the service to be delivered to the customer.

Parking spots:

The deployment of shared vehicles requires dedicated parking spots. LeasePlan could collaborate with municipalities and existing customers in getting these spots. By using the available parking spots of LeasePlan customers LeasePlan is able to

position their vehicles as near to their customers as possible. Secondly, the municipality would benefit from providing a parking spot for shared vehicles as research indicates that one such vehicles could prevent the need for 11 personally owned vehicles.

Charging infrastructure:

LeasePlan should provide fast charging stations at the strategic home base locations of the shared vehicles. By being able to quickly recharge vehicles their subsequent availability and utilization could potentially increase.

Fit for purpose vehicles:

LeasePlan could fulfil the need for purpose-built vehicles by providing shared vehicles specified to area and user group specific characteristics and needs.

PREPARATION SECOND HORIZON

Based on the mobility hub concept and its subsequent business model we can conclude that the mobility hub concept requires collaborations and partnership between a variety of stakeholders. These partnerships and collaborations should be initiated within the first horizon in order for LeasePlan to be able to deliver a basic version of the mobility hub concept in the second horizon.

Whim white label partnership:

The partnership with whim is the most important partnership for the realization of the mobility hub concept. The goal of this partnership is to develop a white label LeasePlan MaaS mobility hub application based on the already existing MaaS platform of Whim. This application would enable the seamless transitions between the LeasePlan CaaS solutions and the first and last mile solutions. The goal is to establish the partnership in the first horizon and co-develop the application with LeasePlan digital and whim.

Parking operators:

The mobility hub concept is a physical space where all sorts of mobility come together. As such, it requires spaced for parking of vehicles and different first and last mile solutions. Additionally, at the mobility hub there should be room for secondary services such as flex offices, retail spaces, hospitality companies etc. Instead of building these locations themselves LeasePlan could collaborate with municipalities and private companies that are responsible for the current P+R solutions. From the expert interviews and the “mobiletsaanpak 2030” (2013) strategy we can conclude that the municipality of Amsterdam want to enhance and improve the current P+R solutions. LeasePlan could support the municipality in doing so by collaborating with these stakeholders, this would benefit both the municipality and LeasePlan.

IMPLEMENTATION STRATEGY

The LeasePlan shared mobility service 2.0 is an extension to the already existing corporate car sharing solution. Consequently, the development of the concept requires some minor changes to the already existing service and application. The development of the concept will be done iteratively. First, a basic version of the concept will be developed which only incorporates the required features for the new service to run. This basic version would allow LeasePlan to initiate small pilots with existing customers. At first, these pilots will be run at strategic locations in Amsterdam where the concentration and demand for mobility of our customers is the highest. Example locations include The Zuidas, Schiphol, Sloterdijk etc. By going through this iterative piloting process LeasePlan could initiate build, measure learn cycle as described by the lean methodology (Ries, 2011). These pilots would generate preliminary usage data and customer feedback. Based on the gathered insights LeasePlan could continuously validate and iteratively improve and add features to the service.

Pilot features, which have to be included in the basic version:

- Enable pay per use business model
 - 0 Calculate a pay per use rate, which makes the shared vehicle both viable and desirable
 - 0 Connect pay per use rate with trip monitor data
 - 0 Integration of payment (Mobile, Visa)
- Data monitoring
 - 0 Trip monitor through vehicle GPS and Telematics (Location, KMs, fuel consumption, eco footprint etc.)
 - 0 Supply and demand monitor
 - 0 Set viability baseline conditions
- Extended Shared application between companies
- In application feedback form

2nd iteration, increase convenience and desirability:

Within the second iteration focus is put on optimizing the required features and quality of the basic version. Secondly, within the second iteration nice to have service optimizations such as the scheduling assistant, digital customer service portal and comprehensive trip-report/overview could be incorporated. Thirdly, since the application will be made available for private individuals and SMEs it has to compete with consumer focussed innovative substitute mobility providers such as Amber, Car2go etc. Compared to these competitors the current LeasePlan sharing application lacks behind in graphical layout, attractiveness, which subsequently affects the usability of the service. Therefore, an iteration should be made on the graphical layout of the application by using the gathered feedback from the initial basic pilot version.

3rd iteration, extend customer base:

Within the first two iterations focus was put on optimizing and developing the service according to the wishes of the customers. This enabled LeasePlan to create a sharing proposition fit to the needs of its customers, offering the

required level of quality, flexibility and convenience. With this validated service, the goal of the third iteration is to increase the availability of the service beyond the initial strategic locations and pilot groups and move towards multiple other interesting locations and sharing groups. This can be done by using the generated data on supply and demand and by using the calculated baselined viability check.

Additionally, within this iteration partnerships with contractors and municipalities could be established in order to identify feasible and viable neighbourhoods and areas where LeasePlan shared vehicles could be deployed.

4th iteration, fit for purpose vehicles:

Based on the generated usage insights and customer feedback LeasePlan could seek to deploy fit for purpose vehicles. These vehicles could be specified according to the needs of the customers and circumstances of the trip. Within the crowded inner city LeasePlan could for instance seek to deploy light electric vehicles, which can easily be easily parked and manoeuvred.

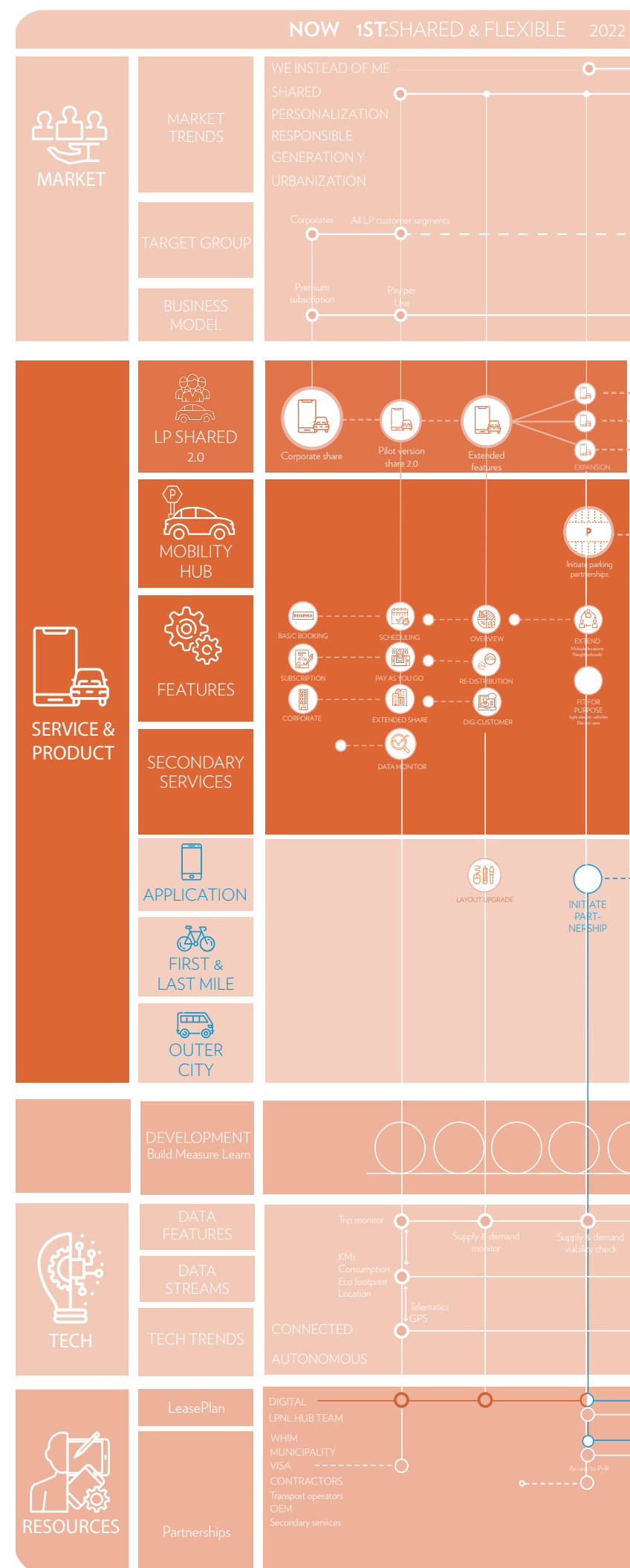
REQUIRED RESOURCES

LeasePlan digital:

For the development of the service and its subsequent features a dedicated development team within LeasePlan digital should be made available.

Marketing & Sales:

In order for LeasePlan to extend the availability of the shared 2.0 proposition partnerships have to be created and marketing and sales campaigns have to be initiated. These campaigns can be initiated within the current customer base of LeasePlan.



5.1.4 SECOND HORIZON

Shared and integrated vehicle centred urban mobility

INTRODUCTION

From the market research insights, we can assume that vehicle travel loss time has significantly increased by now, this especially holds true in and around urban areas. To ensure the accessibility and liveability of these urban areas the Dutch government and municipalities started initiating policies and regulations that drive personally driver driven vehicles out of the city. As a result, LeasePlan customers who live or work in these key cities experience significant mobility problems and a mobility gap at the first and last mile of their vehicle centred journey.

Therefore, the focus of the long-term development phase was to develop solution that takes away these pain points to take away these pain points and enables vehicle centred mobility for urban LeasePlan customers. This led to the mobility hub concept, which seamlessly connects the vehicle journey with convenient and flexible first and last mile solutions. By doing so the mobility gap at the first and last mile is solved in a flexible and convenient matter. Within the second horizon the goal is to develop a basic version of the mobility hub concept and initiate pilots. Based on the gathered insights and customer feedback LeasePlan could iteratively improve the mobility hub concept.

MOBILITY HUB CONCEPT

Based on the conceptualized mobility hub concept we can derive 4 different concept parts. This separation is also used within the conceptualization and idea mapping process. Therefore, this separation is used in the mapping process to structure the roadmap.

MaaS MOBILITY HUB APPLICATION

Continue whitelabel development mobility hub concept: Within the second horizon LeasePlan continues the collaboration with Whim for the development of the whitelabel MaaS mobility hub application. Within this collaboration LeasePlan digital and Whim co-creatively develop a LeasePlan branded MaaS mobility hub application based on the current MaaS platform of Whim. This requires minor adjustments to the current available MaaS application/platform of Whim. The current MaaS platform of Whim already features most of the mapped-out ideas from the MaaS mobility hub application. As such, LeasePlan does not have to develop these features themselves since they will be using the existing technology, experience and expertise of Whim. Within the roadmap we have therefore chosen not to cover the development of the application in depth.

PHYSICAL MOBILITY HUB:

Continue partnership parking operators: The realization of the mobility hub concept requires access to strategically located parking lots. Within the first horizon LeasePlan already entered into partnerships with parking operators and municipalities to develop dedicated parking lots for the shared LeasePlan vehicles. Within the second horizon LeasePlan extends this partnership by tapping into a strategic partnership with P+R parking operators. The goal of this strategic partnership is to create favourable conditions for both involved parties. LeasePlan can make the P+R locations more attractive by providing the digital infrastructure and connected first and last mile solutions, which enable seamless and convenient transitions to and from the city. Secondly, LeasePlan aims to improve the physical space of the P+R locations by improving the existing utilities and by offering additional services. This would increase the convenience and comfort of the experience and the transition. In turn, this would make the current P+Rs more attractive and functional which is the goal of the municipality of Amsterdam according to the "mobilitybeeld 2030" (Gemeente Amsterdam, 2013).

Added mobility hub features in the first horizon:

- Seamless entry/exit: Number plate recognition connected to MaaS mobility hub application
- Providing charging infrastructure for LP vehicles and first and last mile solutions
- Hop-on/hop off location for seamless transition to Shared ride hailing, public transport and interhub solutions
- Safety features: Cameras, enclosed parking, security

Convenient primary services:

- Enhanced waiting areas
- Wifi accessibility
- Digital wayfinding
- Real time travel information displays

FIRST AND LAST MILE SOLUTIONS

First and last mile mobility solutions have to be available at the mobility hub to enable the complete journey of the customer. From the strategy of LeasePlan we can conclude that LeasePlan solely provides CaaS solutions. Therefore, LeasePlan has to partner up with first and last mile mobility operators to ensure the availability of such services. LeasePlan functions as integrator within these partnerships, they buy a large bundle of mobility and in return request for the integration of the APIs of these mobility operators onto

the White label MaaS mobility hub platform. By doing so planning, booking and payment of the different services can be integrated enabling seamless and convenient transitions.

Second horizon first and last mile solutions ranked in importance:

- Public transport (NS, GVB)
- Shared e bikes (Urbee, e-bike to go)
- Shared ride hailing (ViaVan)
- Shared LeasePlan inner city vehicles

OUTER CITY MOBILITY SOLUTIONS

The strategic locations of the P+R parking lots offer LeasePlan various opportunities for outgoing shared vehicle solutions. This can be attributed to the high demand for mobility at and between these locations. Therefore, LeasePlan should offer several outgoing shared vehicle solutions at these locations. By providing these services LeasePlan aims to increase the flexibility and convenience of their current CaaS solutions and fulfil the changing needs of their customers. Furthermore, these shared vehicle solutions could significantly reduce the required number of vehicles on the road and within the city. As such, LeasePlan would support the goals of the municipalities and the government in making the Netherlands more accessible and livable.

LeasePlan shared vehicle 2.0

The LeasePlan shared vehicle solution will be integrated onto the MaaS mobility hub platform. By placing several of these shared vehicles at the mobility hub LeasePlan is able to give non-lease vehicle owners access to vehicles whenever they need to.

Ridesharing

The expected amount of ingoing and outgoing traffic at the mobility hubs is high. LeasePlan should therefore develop a dynamic carpooling solution, which connects drivers and passengers who share the same destination and departure times. By providing ridesharing services LeasePlan is able to reduce the required vehicles and fulfil the customers wish to make mobility more sustainable and cost effective.

Inter hub micro transit

Expectations are that the mobility demand between the mobility hubs of different key cities will be high. By providing micro transit inter hub mobility solutions LeasePlan is able to transport multiple customers at once. Furthermore, because the demand is high the utilization of such vehicles would be high creating a viable business model for LeasePlan. By collaborating with OEMs in the development of such micro transit vans LeasePlan is able to equip these vehicles with high quality work stations. This would ultimately allow LeasePlan to supplement/compete with public transport.

By moving a bunch of passengers at once LeasePlan could potentially reduce the number of vehicles on the road. Less vehicles on the road would reduce the current and future

congestion, gridlock and pollution problems, which is in line with the public goals of the government. This would give LeasePlan leverage for a collaboration with the government in seeking ways to stimulate and make such solutions more attractive to customers. At present, public transit busses Netherlands are already allowed to drive over the emergency lane if they run into traffic jams on the highway (MIW). This can be attributed to the fact they transport an abundance of people at once and as such increase the efficiency of traffic. The LeasePlan micro transit solution would offer similar benefits and could therefore potential be granted the same privileges as the public transit busses. If so, this would significantly increase the attractiveness and convenience of the LeasePlan solution.

IMPLEMENTATION STRATEGY

Similar to the first horizon implementation strategy, LeasePlan should first develop a basic version of the MaaS mobility hub concept. This basic version would incorporate the necessary features and mobility solutions for the service to be delivered. With this basic version LeasePlan could initiate a pilot at a strategic location such as the Zuidas. By piloting this basic version of mobility hub concept LeasePlan is able to generate preliminary usage data and obtain customer feedback. Based on these insights LeasePlan could initiate the build measure learn loop of the lean methodology (Ries, 2011). By going through this continuous and iterative development process LeasePlan is able to add specific features and improve the service based on the generated insights.

To enable these seamless transitions the following features, have to be included in the basic version.

- White label MaaS mobility hub application

Mobility hub features:

- Automatic entry/exit
- Charging infrastructure
- Safety features: Cameras, enclosed parking, security
- LeasePlan customer service point

Connected first and last mile solutions:

- Public transport (NS, GVB etc.)
- Shared e bikes (Urbee, E-bike to go)

Outgoing mobility solutions:

- LeasePlan shared vehicle 2.0

2nd iteration: Optimization plus extended features:

Within the second iteration focus is put on incorporating improvements on the necessary service features of the first iteration, based on the generated preliminary insights.

Secondly, within the first iteration nice to have utilities can be incorporated in the design of the physical mobility hub space. These utilities would increase the quality of the customer experience and offer higher levels of convenience.

Thirdly, additional mobility services will be incorporated onto the MaaS mobility hub platform, based on customer feedback

and usage insights. This would allow LeasePlan to deliver upon the needs of more customers and specific trip circumstances.

Mobility hub features:

- Wifi
- Drop of/ hop on
- Real time travel info
- Wayfinding
- Enhanced waiting
- Areas

Connected first and last mile solutions:

- (Shared) Ride hailing

Outgoing mobility solutions

- Micro transit

3rd iteration: Expansion network plus additional LeasePlan services at location

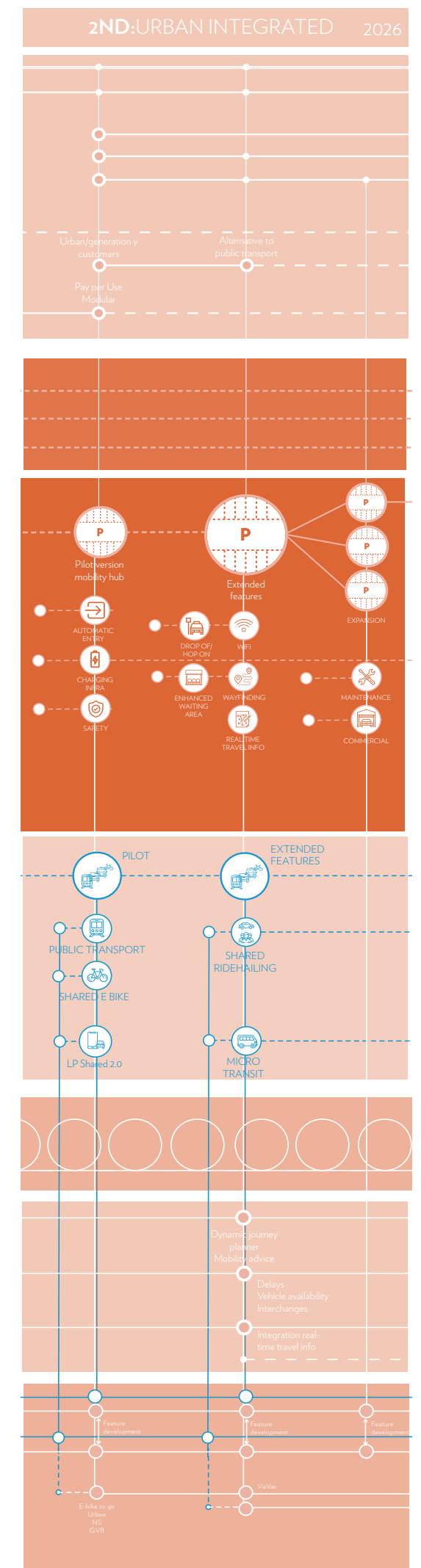
After having completed several pilots LeasePlan has been able to develop a mobility hub concept fit to the needs of its customers. Therefore, the 3rd horizon focusses on the expansion of the network of the validated and improved mobility hub concept. Instead of solely focussing on Amsterdam LeasePlan should seek to build mobility hubs at viable and strategic location throughout the Netherlands.

Secondly, while doing so LeasePlan could use the network of mobility hubs as a way to increase their brand awareness and service delivery. They could do so by offering LeasePlan branded services at these mobility hubs, example services include; 1) Vehicle showroom where current and potential LeasePlan customers can test drive new cars; 2) Maintenance points, where LeasePlan customers can conveniently drop off their vehicles for maintenance and continue their journey with various alternative transportation modes.

Preparation third horizon:

Based on the expert interviews and technology scouting process we can conclude that autonomous robot taxi's will be available from 2020 onwards. The deployment of such vehicles will be limited to dedicated lanes between 2020 and 2025. Thereafter the deployment of such vehicles will expand to regular roads. Additionally, research insights indicated that such vehicles will significantly change the current vehicle centred mobility landscape and challenge the personally driver driven vehicles. Therefore, it becomes pivotal for LeasePlan to anticipate the developments of these vehicles early on in the development process.

Within the idea mapping phase two opportunities were identified for the deployment of autonomous vehicles; 1) autonomous inter-hub micro transit; 2) Autonomous shared ride-hailing. For the realization of both opportunities LeasePlan has to partner with OEMs early on in the development process. This would allow them to anticipate the capabilities and opportunities of the offered technology. At present, LeasePlan completely relies on OEMs for vehicle related technology,



5.1.5 THIRD HORIZON

Shared, integrated and autonomous = careless traveling

Within the first horizon focus was put on creating a more flexible and convenient CaaS solution. This would offer LeasePlan the ability to fulfil the changing needs of the customer. Within the second horizon LeasePlan aimed to pro-actively take away the pain points of vehicle centred urban mobility. They did so by initiating the development process of the mobility hub concept, which lead to a basic version of the concept.

The goal of the third horizon is to further develop and extend the network of these mobility hubs to provide careless mobility to our customers who live or work in urban areas. Similar to the second horizon the different parts of the concept were used as a structure for the mapping process.

PHYSICAL MOBILITY HUB

Expand coverage:

Within the third horizon focus is put on expanding the network of mobility hubs. While doing so LeasePlan is able to increase the efficiency and viability of inter hubs mobility solutions and enable urban mobility for most of its customers.

Additionally, LeasePlan will deliver smaller inner-city mobility hubs instead of solely focussing on building big mobility hubs at the outer border of the city. At these smaller inner-city hubs LeasePlan customers can get access to, charge and store their first and last mile mobility solutions. By delivering these hubs at a neighbourhood level LeasePlan is able to increase its coverage and bring mobility closer to its customers. The development of such hubs again requires collaborations with the municipality of Amsterdam, since such hubs would require public space.

Increase convenience

Within the second horizon only the required technological developments and features were integrated to enable the functionality of the mobility hub concept. Within the third horizon these basic features could be improved due to the technological developments and their subsequent increased capabilities. By incorporating these technological development the journey and customer experience can be made more convenient and comfortable

This can be done by delivering the following utilities:

- Wireless vehicle charging infrastructure: park & charge
- Automatic parking: Exit at parking entrance, car parks itself

Increase attractiveness of mobility hub:

The mobility hub concept can be made more attractive for LeasePlan customers by delivering secondary services, next to functional mobility related services:

-Coffee/breakfast to go: LeasePlan partners with hospitality businesses which can provide high quality food and beverages to go.

-Pick up/drop off point: LeasePlan partners with DHL/PostNL to create parcel pick up/drop off points at the mobility hub. This would allow customer to deliver parcels in a locker. These parcels thereafter can be picked up during commute.

- High quality flex office: At the mobility hub LeasePlan could create high-quality flex offices. By doing so LeasePlan could prevent the need to travel to the inner city or out of the city. Additionally, the mobility hubs can be used as strategic meeting points for colleagues due to their strategic locations.

- Daycare: LeasePlan can partner with local BSOs to provide daycare facilities at the mobility hub. This way parents can conveniently drop off and pick up their children along their commute.

FIRST AND LAST MILE

Within the second horizon only the most beneficial and required first and last mile solutions were integrated on the mobility hub platform. Within the third horizon LeasePlan could integrate additional first and last mile services, giving the customer more freedom to choose based on personal preferences and the trip at hand. Similar to the previous integrations, LeasePlan will deliver these additional first and last mile services by partnering with other mobility operators.

Additional first and last mile solutions:

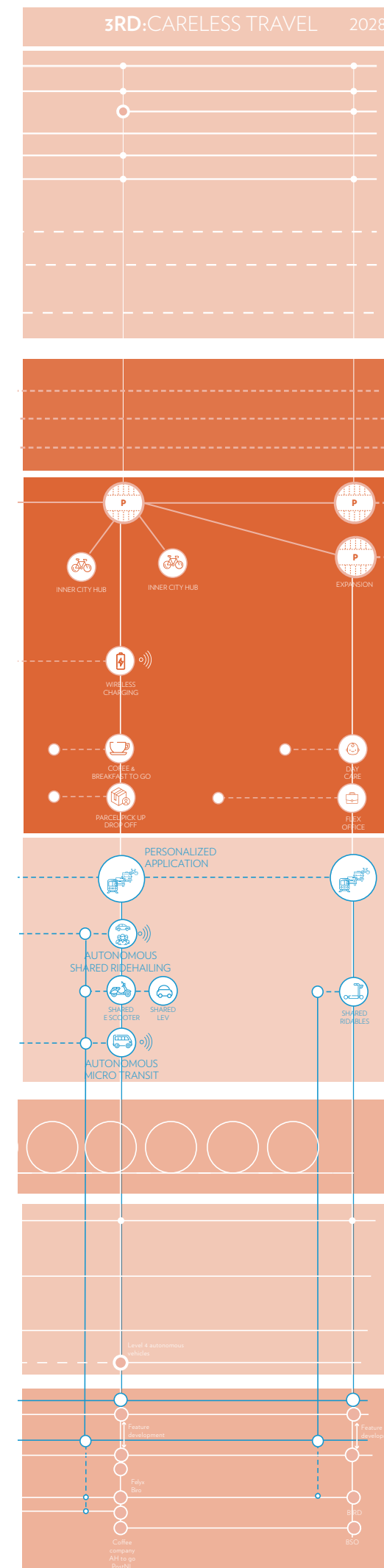
- Shared E scooter (Felyx)
- Shared LEv: Convenient light electric vehicle purposefully built for urban commuting (Biro)
- Shared E rideables: Electric step (Bird)

OUTER CITY MOBILITY SOLUTIONS

Autonomous vehicles:

After 2025 LeasePlan will start with the first deployment of shared autonomous micro-transit vehicles. Based on the expert interview with Elmer van Grondelle we can conclude that autonomous vehicles will initially be deployed on highways. According to him this can be attributed to fewer changing context factors which could affect the driving capabilities of autonomous vehicles. Because the interhub micro-transit vehicle will only transport people between hubs of key cities they will predominantly drive on highways. As such, they could be made autonomous.

Urban autonomous mobility is not included in to scope of this project as this is expected to be implemented after 2030.

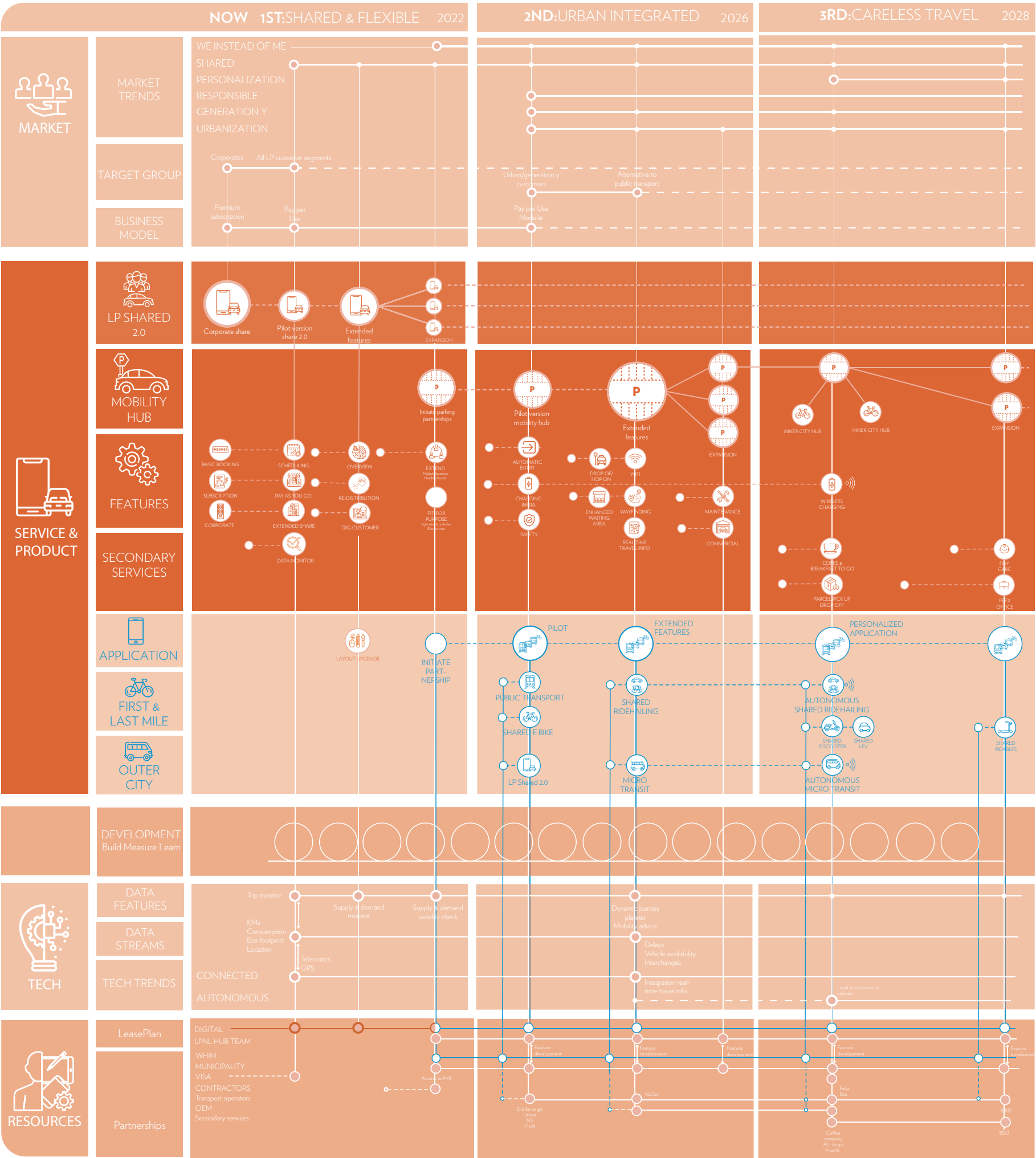


VISION

WE SET OUT TO BECOME THE MOBILITY PARTNER OF THE FUTURE, DELIVERING CARELESS MOBILITY TO OUR CUSTOMERS

5.1.6 TACTICAL ROADMAP

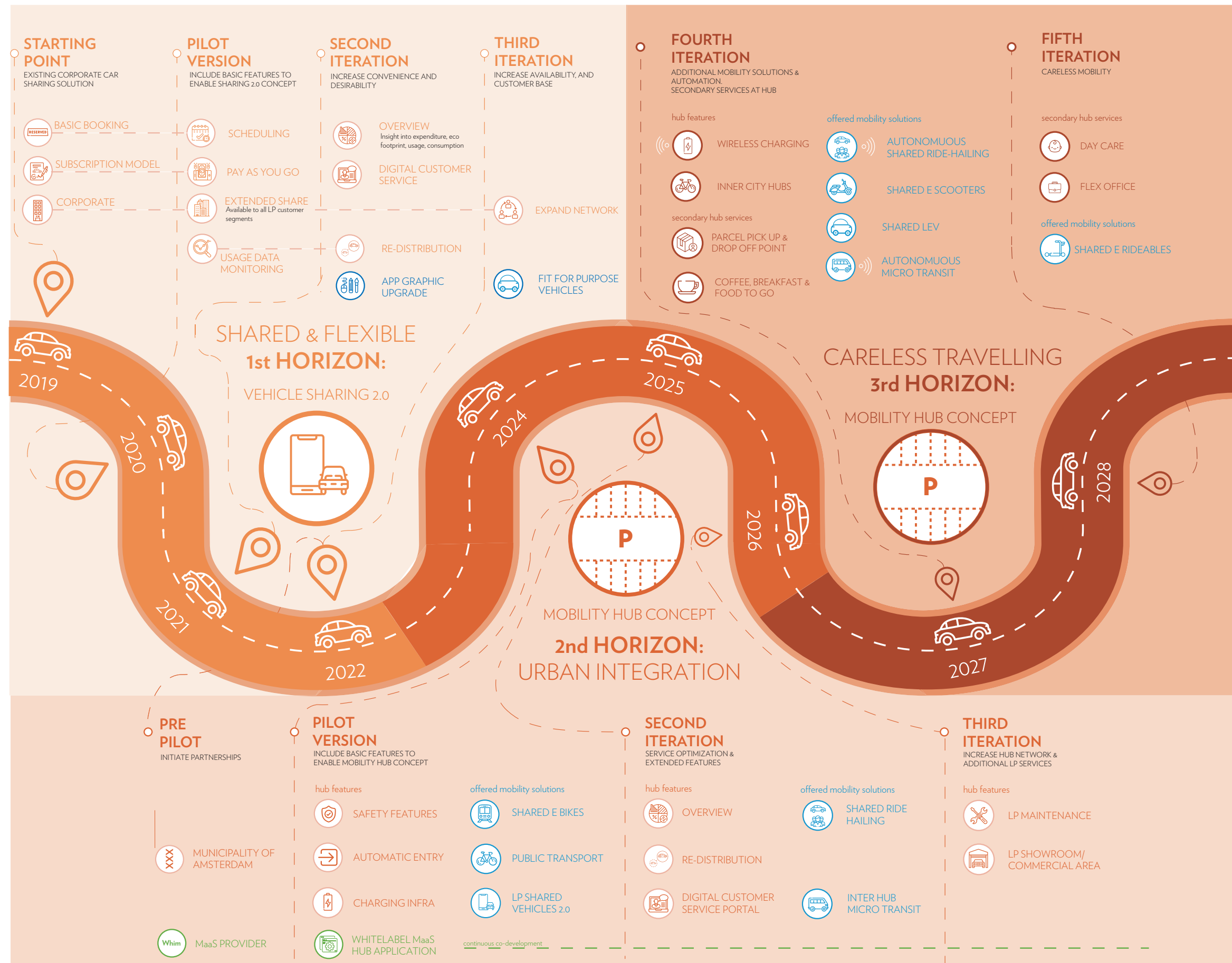
The previously displayed horizons and their subsequent parts of the roadmap each built up to the overall tactical roadmap for the mobility hub concept. This tactical roadmap displays a highly detailed and compressive overview of the required steps and innovation strategy behind the LeasePlan mobility hub concept. This roadmap is specifically designed for the management team and transition department of LeasePlan Netherlands. The aim of this roadmap is to sufficiently inform the management team of the ongoing developments within the market and when, what and how LeasePlan should anticipate these changes, ultimately allowing them to obtain sustainable future growth. It does so by illustrating the step by step product and service developments leading up to the desired future vision. Additionally, it connects and relates the different service and product developments with the market value drivers, technological requirements and the required development resources. As such, the innovation strategy behind the mobility hub concept has been made explicit and actionable.



VISION
WE SET OUT TO BECOME THE MOBILITY PARTNER OF THE FUTURE, DELIVERING CARELESS MOBILITY TO OUR CUSTOMERS

5.1.7 STRATEGIC ROADMAP

The tactical roadmap is meant for internal communication within LeasePlan and is meant as an actionable informative tool for the management team. Additionally, a strategic roadmap has been created to communicate the innovation strategy and vision behind the mobility hub concept to relevant partners, suppliers and other LeasePlan employees. As opposed to the tactical roadmap, the strategic roadmap is meant as an informative tool that briefly and clearly communicates the service developments and value of the concept. As such the level of depth within this roadmap is little compared to the tactical roadmap. Ultimately, this strategic roadmap would allow LeasePlan to attract and establish the required key partnerships and collaborations.



5.2 CONCEPT EVALUATION

What could be improved or taken into consideration

5.2.1 INTERNAL EVALUATION

What could be improved or taken into consideration

For the validation of the desirability, viability and feasibility of the concept and proposed roadmap three internal sessions with LeasePlan employees have been performed. The goal of these sessions was to generate feedback on the concept and adapt the concept accordingly. During these sessions the concept and its underlying considerations, thinking and strategy were first presented. Thereafter an interactive discussion was initiated in which the LeasePlan employees were asked several questions regarding the feasibility, viability and desirability of the concept. The key findings of these sessions are written below

Session participants

Viola Kieffer Rijnsdorp - Product marketing manager what's next
Gerard Heijboer - Product specialist car sharing
Jan Mostert - Head of transformation LPNL

DESIRABILITY LeasePlan PERSPECTIVE

From the sessions we can conclude that the mobility hub concept is desirable for LeasePlan. Several reasons were mentioned for the desirability of the concept; 1) The concept aims to strengthen and tackle pain point along the journey of urban LeasePlan customers instead of challenging the value of vehicle centred. As such, it fits within the strategy of LeasePlan which is focused on enhancing and strengthening their core business, which is centred around vehicles.

2) The concept aims to fill in the expected mobility gap along the first and last mile of urban LeasePlan customers. As such, LeasePlan enables and satisfies the transportation needs of their current and future customers if urban areas become free of personally driver driven vehicles. 3) Instead of carrying the responsibility and providing the required first and last mile mobility solutions LeasePlan partners with already existing mobility operators. Again, this fits within the strategy and focus of LeasePlan. 4) With the current business model and concept LeasePlan has the role of mobility integrator. They can determine which first and last mile solutions they want to offer to their customers. This enables LeasePlan to select and offer the best fitting mobility solutions, based on the usage insights and customer feedback.

During the sessions an additional opportunity was brought forward, which could potentially increase both the desirability and viability of the mobility hub concept. The mobility hubs could be used as LeasePlan touchpoints for a wide variety of services, such as maintenance, showroom, service point etc. LeasePlan could for instance build small showrooms where they present special deals and enable current and potential customers to try out the latest vehicles. By doing so LeasePlan is able to increase its brand awareness, since the network of mobility hubs will be spread across the key cities throughout the Netherlands.

Within the second iteration of the roadmap this opportunity was included in the second horizon developments of the mobility hub concept.

Desirability from the perspective of the user

During the different sessions the LeasePlan employees brought forward one desirability considerations from the perspective of the user. One main concern was the offered safety and security features at current P+R solutions. The current P+R solutions do not provide the necessary safety features for users to feel safe at night, this especially holds true for women. This unsafe feeling is strengthened by the distant locations of these P+R solutions.

Within the initial concept this safety concern was not taken into account. Therefore, several safety features were included into the follow up iteration of the roadmap.

FEASIBILITY

LeasePlan recently initiated the what's strategy with the aim to deliver innovative and digital CaaS solutions. Before this strategy LeasePlan mainly focused on making incremental changes to their fleet management and vehicle leasing solutions. This was done on an irregular and occasional basis. As such it is difficult to determine a feasible time pacing strategy for the development of the mobility hub concept.

Despite this, the chosen time pacing strategy was considered feasible, especially within the first horizon. By making minor changes to the current corporate car sharing solution the basic version of the LeasePlan sharing 2.0 concept can be created. As such, the development of the concept would require little resources and development time, which in turn would enable quick iterations.

Within the initial roadmap the time pacing strategy of each innovation cycle was set at one year, based on previous development cycle of the sharing application. No difference was made between the development of the sharing application and the mobility hub concept. But the sharing application builds on a previous concept and as requires less development costs and time. The mobility hub concept on the contrary proposes a completely new concept and as such would require more development resources and time. Therefore, the initial development process is set at two years.

Secondly, the partnership strategy behind to mobility hub concept was believed to make the development more feasible. LeasePlan currently does not have the innovative capabilities in-house to develop the MaaS mobility hub concept. Additionally, the market is ahead of LeasePlan in the development of MaaS solutions. Therefore, it would be most beneficial to partner with these players and co-develop a LeasePlan whitelabel MaaS mobility hub concept. This would reduce development time and enable LeasePlan to utilize already existing technology and expertise.

Additionally, LeasePlan has no desire to be responsible for mobility services spanning across different modes of transportations. By partnering with existing first and last mile mobility providers LeasePlan would be able to fill in the described future urban mobility gap and divert the responsibility for doing so. This would increase: 1) The feasibility since LeasePlan can utilize existing

solutions and expertise of their partners; 2) The desirability since LeasePlan does not carry the responsibility for doing so.

VIABILITY

In line with the research findings the sessions indicated that the viability of the mobility hub concept is strongly intertwined with the experienced pain of vehicle centred mobility. If the costs and experienced vehicle centred mobility pain of urban LeasePlan customers significantly increases than their need for fitting solutions and their willingness to pay for the added value of such solutions will increase. Consequently, the viability of the mobility hub concept will increase.

Secondly, multiple LeasePlan employees indicated that the inter hub micro transit solutions could significantly increase the viability of the concept. This can be attributed to the high mobility demand between the hubs of key cities and the capability of the micro transit solution to transport multiple people between these hubs at once. As such, LeasePlan could potentially compete/ substitute public transport within the Netherlands.

Additionally, by transporting multiple people at once LeasePlan could potentially reduce the required traffic on the road and as such support the mobility goals of the government. LeasePlan could leverage this benefit by collaborating with the government in findings ways to stimulate these micro transit solutions. One example could be by allowing these micro transit solutions to drive over the emergency lanes during rush hour and traffic jams, which is already happening with public busses. In turn, this would make the solution more desirable and convenient for LeasePlan customers.

Thirdly, From the sessions we can conclude that it is difficult to validate the viability and business model behind the mobility hub concept. Several reasons were mentioned for this: 1) The business model behind the mobility hub concept is dependent on many different factors, one of which is the partnership network. Within the mobility concept LeasePlan would buy bundles of mobility from other mobility operators at a set price, but these prices will be set defined and set during contract negotiations. Another example is the utilization of shared vehicles. Utilization assumption can be made but these could significantly diver in reality, which in turn would affect the viability of the concept.

2) while developing far future innovations and strategies you have to take into account various uncertainties. Examples are the assumed pace and impact of societal, market and technological developments. Although the assumptions are based on research and expert interview, they could significantly diver in reality. Consequently, the viability of the concept could be higher or lower than expected.

Despite the difficulty in determining the viability of the mobility hub concept the sessions did indicate that a more comprehensive business case could be created. Therefore, this aspect is included in the final recommendations part of the report.

to make calculated assumptions.

5.2.2 EXTERNAL EVALUATION

What could be improved or taken into consideration

The scope of this master thesis is directed towards the current and future problems of vehicle centred urban mobility. Consequently, the concept provides a solution for current and future LeasePlan customers who live or have to commute towards urban areas while using their leased vehicles. During our analysis phase we found that municipalities and governments are increasingly looking for ways to reduce the mobility problems stemming from the current vehicle centred mobility landscape. To validate whether our proposed mobility hub concept supports the needs and demands of these municipalities an external validation session has been organized with Diederik Basta, innovation officer of the municipality of Amsterdam. Similar to the internal sessions the concept was first presented and thereafter an interactive discussion was initiated with the goal to validate the desirability, viability and feasibility of the concept from the perspective of the municipality.

DESIRABILITY FROM THE PERSPECTIVE OF THE MUNICIPALITY

According to Diederik Basta the mobility hub concept is desirable for the municipality of Amsterdam in a number of ways. First of all, the concept supports the wish of the municipality to make the inner city of Amsterdam free of personally driver driven vehicles. He mentions several benefits of vehicle free cities; 1) Freeing up of public space due to reduced need for parking; 2) Reduction of air pollution from fossil fuel powered vehicles; 3) Increased accessibility and liveability due to reduced number of vehicles on the road.

Additionally, Diederik Basta mentions that they mainly focus on mobility within the innercity (within the A10). Despite this focus he does believe that by strategically placing the mobility hubs at the outskirts of the city, beyond the A10, the need to enter the inner city or drive on the A10 by car can be significantly reduced.

Diederik Basta believes in the strategy to enhance the current P+R solutions. He mentioned that the P+R solutions do not provide the required convenience, flexibility, comfort and security. He argues that the solution should not be a distant unsafe concrete parking spot but a location where commuters can easily park their cars and can seamlessly make the transition to various first and last mile services. Furthermore, he believes that these mobility hubs can be made more attractive by offering commuters various additional services such as flex offices, retail spaces, hospitality etc.

Instead of solely focussing on mobility hubs on the outskirts of the city Diederik Basta mentioned that smaller inner city mobility hubs could increase the desirability of the concept. By doing so LeasePlan would be able to provide first and

last mile solution on a neighbourhood level. Consequently, the availability of mobility solutions would increase, bringing mobility closer to the customer and ultimately increasing the attractiveness and convenience of the mobility hub concept. Therefore, these smaller first and last mile inner city hubs were included in the second iteration of the roadmap.

FEASIBILITY

Diederik Basta believes that the mobility hub concept and the innovation roadmap are feasible. He mentions several reasons for his view on the feasibility of the concept; 1) The development of the concept does not require high development investments both in terms of costs and time. This can be attributed to the innovation strategy of the concept which is built on already existing mobility solutions, such as the current available P+Rs, the MaaS mobility platform of Whim and already existing mobility services from different transport operators. By combining and making minor adjustments to these already existing solutions the LeasePlan mobility hub concept can be created.

Additionally, Diederik Basta mentions that such a partnership strategy is increasingly becoming common ground within the mobility industry. He mentions that the different mobility players are starting to see that they cannot control the entire journey of their customers. As a result, companies are increasingly looking for partners to fill in the gaps along the journey of their customers.

VIABILITY

According to Diederik Basta the viability of the concept is dependent on the changes within the mobility landscape of Amsterdam. He mentions that parking and driving will become more and more costly and inconvenient in Amsterdam in the near future. He believes that while the level of inconvenience and costs increase the attractiveness and user willingness of the mobility hub concept will grow.

Secondly, Diederik Basta mentions that support and funding can be granted if the concept is able to support the goals of the municipality of Amsterdam. Currently, this is also the case with the P+R solutions, in which commuters can get access to public transport at reduced fees. He does mention that if the concepts wants to be considered for funding it needs to create an equal level playing field for both users and transport operators. As such, the concept should not only be applicable for LeasePlan customers and it should offer and integrate multiple willing transport operators.

Similar to the results of the internal validation, Diederik Basta believes that the proposed interhub mobility solutions could

add significant value to the current mobility landscape. Mor specifically, he believes that these interhub mobility solutions could potentially reduce the number of cars between key cities by transporting masses of people more conveniently and efficiently. In turn, this would significantly reduce the congestion, vehicle travel loss time and pollution.

Additionally, Diederik Basta believes that these interhub mobility solutions could be an alternative/back-up to current public transport. He mentioned that current public transport solutions are already reaching maximum capacity during rush hours. As such, public transport will not be able to completely or significantly replace personally driver driven vehicles. Therefore, Diederik Basta believes that such micro transit solutions could support this development.



6.0 CONCLUSION & FINAL RECOMMENDATIONS

Answering research question & addressing limitations

6.1 CONCLUSION

Value of the project & answering the research questions

This part of the thesis will give answer to the contributions and value of the research project. Both in terms of the mobility industry and SPD. Secondly, it will explicitly answer the set research questions.

CONTRIBUTION OF MASTER THESIS

This master thesis aims to contribute and add value to the field of SPD and the mobility industry in various ways. First of all, the goal of this thesis is to sketch a future mobility scenario in relation to mobility as a service (MaaS). MaaS is expected to challenge the value proposition of various big established mobility players and offer the current mobility landscape many benefits. For the competitiveness and relevance of these big established companies it therefore becomes pivotal to anticipate this future mobility concept.

At present, a lot of misconceptions still exists around MaaS despite its increased popularity and potential benefits. Therefore, the first goal of this thesis was to clarify the different characteristics, principles, requirements, challenges, implications and benefits of MaaS. By combining these insights with the value drivers, market and technological developments of the mobility industry a comprehensive future mobility scenario could be sketched. From this future mobility scenario various mobility players could draw valuable knowledge and insights on which they can built a desirable, feasible and viable innovation strategy.

The second goal of this thesis was to develop such an innovation strategy within the field of the fleet management market. More specifically, for LeasePlan the biggest fleet manager within the Netherlands. From the expert interviews and MaaS research insights we can conclude that MaaS could prevent the need for long term leasing contracts. Consequently, LeasePlan could cannibalize its own market and challenge its value proposition by developing a consumer focused MaaS proposition. Instead, this thesis therefore proposes a solution which strengthens and takes away pain points along the journey of LeasePlan customers by using the characteristics and principles of MaaS.

ANSWERING THE RESEARCH QUESTIONS

Up until now most of the research questions have been answered indirectly through the gathered insights from the discover, define and development phases. Therefore, this section of the thesis will cover and answer the different research question directly and explicitly. Within the project brief the following 3 research questions were set:

What does the future of mobility look like in relation to MaaS?

From the market analysis we can conclude that the current vehicle centred mobility landscape is on the verge of change. This can be attributed to several factors; 1) The level of congestion, pollution and vehicle travel loss time will significantly increase the upcoming years; 2) Younger upcoming generations demand more flexible and convenient mobility solutions fit to the circumstances at hand, with no strings attached; 3) Rapid technological developments are expected to change the way people move from A to B. One solution to the above described problems and need for flexibility and convenience is MaaS. MaaS provides. MaaS aims to MaaS aims to combine and integrate different mobility services on one overarching mobility platform. By integrating and combining the different mobility services MaaS is able to provide the best possible mobility solution based on the trip and personal preferences of the user at hand, with no strings attached. Additionally, MaaS allows the customer to plan, book and pay for their entire trip across multiple modes of transportation at once. By doing so MaaS aims to prevent the need for vehicle ownership and long-term leasing contracts. This would ultimately reduce the required number of vehicles on the road, increase the efficiency of traffic and subsequently increase the accessibility and liveability of society.

From the research insights we can conclude that this mobility scenario holds several benefits to the customers: 1) Freedom to choose preferred modes of transportation based on the trip and circumstances at hand, with no strings attached; 2) Access to personalized and tailored mobility advice based on personal preferences; 3) Lower overall mobility expenditure by paying for actual usage only.

From the research insights we can conclude that the experienced mobility pain will significantly increase. This especially holds true for urban areas where the ongoing rapid urbanization trend subsequently increases the demand for mobility. Based on these insights and the expert interviews we can conclude that MaaS shows most potential within these urban areas. This can be attributed to several reasons; 1) The experienced mobility pain will increase people's willingness to change to more flexible and convenient mobility solutions such as MaaS; 2) MaaS required and is built on the integration and combination of various mobility services spanning across multiple modes of transportation. By doing so the service is able to deliver best option mobility to its customers whenever, wherever and however the customer desires. At present, the number of available mobility services within urban areas is significantly higher, as opposed to rural areas, creating favourable conditions for MaaS.

Based on the market and technology research insights we can conclude that the viability, feasibility and desirability of MaaS will increase as the mobility market and technology will

further progress. Connected vehicle technology is expected to develop rapidly and autonomous vehicles are expected to be widely available from 2025 onwards. Both these technological developments are capable of significantly increasing the efficiency and convenience of mobility and MaaS. In turn, this would enable higher quality customer experiences and further drive down the costs of mobility and MaaS.

Secondly, the ongoing access over ownership and sharing economy trend are expected to further develop. Within the mobility industry this would divert more and more people from vehicle ownership and long-term leasing contracts to more convenient and flexible access-based shared mobility services.

What will be the role of LeasePlan in this future, based on their current position?

Based on the market, competitor and internal analysis insights we can conclude that there is a need to change for LeasePlan. This can be attributed to several factors; 1) Customers will become increasingly dissatisfied with vehicle centred mobility as the experienced mobility pain is expected to increase significantly. This pain can be attributed to personally driver driven vehicle free cities, high parking costs, rapid increases in congestion and vehicle travel loss time etc. 2) employees and employers demand more flexible and convenient mobility solutions fit to the trip and circumstances at hand, with no strings attached.

Based on the MaaS research insights we can conclude that MaaS could provide a solution to the above-mentioned problems. Despite this opportunity it can be argued if LeasePlan should and is capable of developing a consumer focused MaaS proposition. First of all, as mentioned previously MaaS could prevent the need for lease vehicles as such the development of MaaS could challenge the core business and value proposition of LeasePlan. Secondly, the development of MaaS requires strong extensive programming and innovative capabilities, which is a current weakness of LeasePlan. Additionally, it would require the company to change from a fleet management company towards a software and service company which is not what the company stands for. Thirdly, for MaaS to become valuable it has to deliver mobility solutions whenever, wherever and however the customer desires. This requires the integration and combination of a wide variety of mobility providers. It is questionable if this partnership network can be established and if MaaS is able to deliver upon this promise.

Therefore, this thesis proposes a LeasePlan specific solution which aims to strengthen and tackle several challenges of the future vehicle centred journey of our customers by using the principles and characteristics of MaaS. More specifically, the solution aims to fill in the first and last mile mobility gap along the journey of urban LeasePlan customers in a future where cities become free of personally driver driven vehicles. It does so by offering seamless transitions from the traditional vehicle journey towards innovative, flexible and convenient first and last mile mobility services. This seamless journey is enabled by combining a physical mobility hub with a digital MaaS mobility hub application. By strategically positioning these hubs at the outskirts of the city LeasePlan is able to prevent the need to

enter the more congested and inconvenient inner city by car. Additionally, the mobility hubs are made more attractive by offering additional services such as flex-work spaces, retail and grocery spaces, maintenance shops etc. The role of LeasePlan within the development and implementation of the mobility hub concept is further clarified in the answer to the next research question.

How can LeasePlan get there?

Within the first horizon focus is put on fulfilling the changing customer needs of LeasePlan. These customers desire more flexible and convenient CaaS solutions, with no strings attached. This master thesis proposes one solution for doing so, which is built on the already existing LeasePlan corporate vehicle sharing service. Currently this solution is offered as a premium monthly subscription, making it primarily attractive to the bigger corporates and organizations. By enabling pay per use LeasePlan would be able to offer shared vehicles to its smaller customer segments as well. By doing so LeasePlan would be able to increase the flexibility and convenience of their current offerings.

Within the second and third horizon focus is put on the development of the LeasePlan mobility hub concept. Similar to any MaaS proposition the development of this solution requires partnership and collaborations between multiple companies and across industries. The following partnerships are pivotal for the development of the mobility hub concept:

MaaS whitelabel mobility application:

As mentioned previously, LeasePlan does not have the innovative capabilities internally nor the desire to develop a MaaS proposition. Additionally, the market is already way ahead of LeasePlan in the development of MaaS propositions. Therefore, LeasePlan should partner with Whim, a level 3 MaaS provider operator in Scandinavia. This partnership would allow LeasePlan to co-develop the platform and application of the MaaS mobility hub. Doing so offers LeasePlan several benefits: 1) By utilizing the existing platform, experience and expertise of Whim LeasePlan is able to save development time and costs; 2) By creating this whitelabel mobility hub platform and application LeasePlan is still able to take up the role of mobility orchestrator and integrator. They can determine which first and last mile solutions should be integrated on the platform based on their own customer research.

From the set strategy of LeasePlan we conclude that the company wants to focus on vehicles solely. As such, the concept aims to fill the first and last mile urban mobility gap by partnering with the desired and required first and last mile mobility operators. LeasePlan could buy in bundles of mobility from these mobility operators and in return ask for their service to be integrated on the platform. The offered first and last mile mobility solutions will increase while the concept further develops in time, offering customers more and more choice and personalized mobility solutions.

The development process of both concepts follows the lean methodology. By piloting small-scale and low validity concepts LeasePlan can generate preliminary data and customer feedback. By analysing this data and feedback grounded adjustments and desired features can be added to the

concept. This continuous build measure learn loop would allow LeasePlan to iteratively develop the concept according to the wishes of their customers and changes within the market.

VISION VERSUS PROPOSED CONCEPT

Within this master thesis we set the following vision for LeasePlan: “We set out to become the mobility partner of the future, providing carefree mobility solutions to our customers”. If we compare the proposed mobility hub concept to the set objectives and values behind this future vision, we can draw several conclusions. The mobility hub concept proposes a customer centric solution as it aims to tackle current and future mobility pain points of our customers. While doing so the iterative nature of the development process allows the company to include and adjust the concept according to the wishes of the customer.

The mobility hub concept aims to offer customers a sense of mobility freedom. It does so by providing customer various first and last mile solutions from which to choose, based on their personal preferences and the trip at hand. But the aim of the concept is to stimulate and enable vehicle centred mobility. Despite this, the concept would prevent the need for lease vehicles by providing more flexible and convenient inter-hub shared mobility services.

But compared to MaaS the freedom of choice within the mobility hub concept is limited. But as mentioned previously it is questionable if MaaS could reliably deliver this complete freedom of choice wherever, whenever and however the customer desires. By limiting the scope of the solution to a specific pain point the MaaS solution expected to deliver a more reliable and carefree mobility service.

The MaaS mobility hub application/platform is built on the characteristics and principles of MaaS. As such the solution is able to deliver highly convenient and seamless mobility solutions and transitions. It does so by integrating the planning, booking and payment services of the different mobility operators.

Additionally, if we compare the concept to the value driver of responsibility, we can identify several factors that attribute to this value: 1) The concept aims to provide responsible mobility solutions by only offering electric mobility solutions; 2) The concept aims to contribute to the public goals of the government in reducing the number of required vehicles. As such, the solution would contribute to the reduction of congestion, vehicle travel loss time and pollution; 3) Ultimately, the solution would increase the accessibility and liveability within the Netherlands and for the customers of LeasePlan.

6.2 FINAL RECOMMENDATIONS

Considerations to take into account

Based on the insights of the internal and external validation sessions and the project conclusions several limitations and future recommendations for the project could be identified.

BUSINESS MODEL VALIDATION

Within this master thesis focus was put on the conceptualization and strategy behind the mobility hub concept, based on the gathered research insights. Thereafter, the concept and its subsequent strategy were plotted on the delivered roadmap. While doing so the business model behind both concepts were briefly clarified by filling in the business model canvas. But no calculations and estimates were made concerning the potential profitability, revenue streams and cost structure behind the concept. As such the proposed solutions lacks a solid business case, which made it difficult to validate the viability and desirability of the concept from the perspective of LeasePlan. Therefore, I recommend LeasePlan to clarify the business case behind the concept in the near future if they decide to continue with the concept.

Additionally, these estimations will be more easily made further on in the development process. As of now the concept is built on various assumptions and uncertainties, which make it difficult to make sound calculations. One main uncertainty is the partnership network behind the mobility hub concept. While estimating the costs and potential revenues of such services questions arise like: What will it cost to buy in first and last mile mobility bundles from our partner operators and what could we gain by doing so? Another example is potential vehicle utilization of the LeasePlan shared vehicles and the rates at which these rides will be priced. Several of these factors can only be calculated after the partnerships are set and if preliminary data is available. Therefore, we recommend LeasePlan to enter in these partnerships early on in the development of the concept. Secondly, LeasePlan could generate preliminary data and feedback by initiating small-scale pilots. Based on these preliminary insights LeasePlan would be able to make a better calculated business case.

GETTING TO KNOW THE CUSTOMER

The mobility hub concept describes a future mobility scenario, which is built on mobility factors that are nonexistent currently. One such examples is the expected vehicle free cities and significant increases in vehicle travel loss time. Because people are unaware of the implications and effects of these market developments, they have difficulty in expressing and seeing how this would affect their mobility choices and Behaviour. Despite this, expectations and assumptions can be made by using preliminary market and user research insights, which

is also done within the development of the mobility hub concept. But in order for LeasePlan to validate the potential value, benefits and risks of the concept it becomes pivotal to initiate small-scale pilots. These small-scale pilots would offer customers the ability to really experience the concept and give more grounded feedback accordingly. Additionally, by going through such a process LeasePlan is able to observe and generate preliminary customer and usage data. Based on these insights LeasePlan would be able to iteratively develop the mobility hub concept according to the wishes of their customers.

POTENTIAL INFLUENCE POLICY MAKING

One major challenge and driver of change within the mobility industry is policy making and regulations. From the research insights and expert interviews with the municipality of Amsterdam we can conclude that the government and the municipalities are actively looking for ways to prevent increases in congestion, vehicle travel loss time and pollution. One proposed solution is the development and implementation of new policies and regulations which would stimulate more efficient and effective mobility solutions, as opposed to personally driver driven vehicles. Subsequently, expectations are that these new policies will increasingly challenge the value of personally driver driven vehicles.

For LeasePlan it becomes pivotal to anticipate these changes because their current value proposition is built around personally driver driven vehicles. They could do so by actively participating in the lobbying process of such policies and regulations. Additionally, LeasePlan should collaborate with the municipalities and the government to collectively improve the future mobility landscape and increase the accessibility and liveability within the Netherlands. By establishing such collaborations mutual benefits can be obtained for both LeasePlan and the government. From the interviews with the municipality of Amsterdam we could conclude that customers of the LeasePlan mobility hub could get financial support from the municipality because the concept contributes to the desire to make Amsterdam free of personally driver driven vehicles. In turn, this would make the solution more attractive to our customers.

PARTNERSHIP NETWORK

One of the key enablers behind the LeasePlan mobility hub concept is the partnership network. The development and implementation of the concept requires a wide variety of partnerships within and outside of the mobility industry. For LeasePlan it therefore becomes pivotal to establish these partnerships early on in the development process and maintain them accordingly.

Due to LeasePlans' clear focus on vehicle solutions they have to completely rely on partner mobility operators for the first and last mile mobility solutions. Strict agreements have to be made to guarantee the availability and quality of these partner mobility services. Additionally, it could prove to be more viable and desirable to tap into different modes of transportation themselves. Preliminary research insights and expert interviews indicate that younger generations value vehicles less, as such LeasePlan could lose its strong market position.

Secondly, one of the key enablers behind the mobility hub concept is the MaaS mobility hub application/platform. Within the innovation strategy we choose to partner with Whim, a level 3 MaaS provider in Scandinavia. By co-developing a white label MaaS mobility hub application LeasePlan is able to save development time and costs by utilizing the experience and expertise of Whim.

But while doing so LeasePlan completely relies on the technology and development capabilities of Whim. As such they do not possess the freedom and flexibility to make changes to the MaaS mobility hub concept themselves when they desire too. While establishing this partnership LeasePlan should therefore seek to validate how this is going to affect their development capabilities.

NEXT STEPS DEVELOPMENT

This master thesis provides LeasePlan with a high overview innovation strategy that aims to provide a solution to a future mobility scenario in which cities become free of personally driver driven vehicles. This innovation strategy consists of two preliminary concepts plotted on a tactical and strategic roadmap. Due to time limitations the development depth of the concepts is confined to an idea mapping overview, which thereafter is translated into a service blueprint and business model canvas. Before these concepts can be realized, future developments should seek to elaborate on the depth of both concepts. This could for instance be done by: 1) Clarifying the different usage scenarios (Persona's, locations, trip types etc.); 2) Designing the look and feel of the concept, both physically (Mobility hub, micro transit etc.) and digitally (Application, platform etc.); 3) Calculating through the business case behind the concept.

Secondly, this master thesis proposes one solution to the need for more flexible and convenient CaaS solutions. Despite this, several highly valuable, feasible and desirable ideas and opportunities popped up during the project. One example was the LeasePlan carpooling solution, which connects colleagues that share similar destinations. Ultimately, this would enable them to share rides and as such reduce the costs of mobility. Therefore, I would recommend LeasePlan to seek and extend their vehicle sharing products and services beyond the single solution provided in this thesis.

If LeasePlan decides to continue with the project I would recommend them to seek to land the project within product development and LeasePlan digital. Collaborations between the two could benefit and boost the development of the

concept as the proposed solutions spans and combines both the physical and digital medium.

6.2 PERSONAL REFLECTION

What have I learned during my graduation?

PROJECT MANAGEMENT

Looking back at my graduation project I can conclude that it has been an extensive learning experience, both personally and professionally. First of all, while working at LeasePlan I gained first-hand experience in project management within a big established company. In the beginning this was something, which I had to get used to. Meetings and sessions needed to be planned 2 months ahead, before I even know what the session would look like. In the end, it showed me the importance of planning and time management. By doing so, I was able to facilitate several sessions both internally and externally.

SCOPING OF PROJECT

Additionally, one of the main hurdles within my graduation was the scope of my project. The main topic of my thesis was mobility as a service, which is a very extensive and complicated mobility proposition. It involves many different factors and offers various benefits. To comprehend MaaS I just started reading several general papers on the topic. While I was reading, I noticed so many fields and areas of interest within MaaS, the opportunities seemed endless. Due to my curiosity I kept searching for the most interesting and valuable opportunity. While doing so I drifted away from my initial project objective, which was creating a strategy specified for LeasePlan. As a result, the beginning of my research phase was quite unfocussed, unstructured and unnecessary extensive.

But I was able to regain my focus by looking at my previously done research insights from the perspective of LeasePlan. By doing so I was able to pinpoint several LeasePlan specific opportunities and problems. In the end this LeasePlan specific opportunity made my idea generation sessions more structured and grounded.

For upcoming projects, I would now draft clear research goals beforehand. This would allow me to search for papers more structured and see validate whether a paper fits with my objectives and goals of the project.

TIME MANAGEMENT vs. WRITING

I'm a hand on doer by nature, as such I like to facilitate creative sessions, generate ideas, do interviews etc. While doing so I'm able to create a clear picture in my head on what I'm supposed to do and what I've learned. Consequently, I tend to skip regular writing sessions in which I report preliminary findings. During my graduation I noticed that the longer I waited with writing the more difficult it became for me to clearly and correctly write down the thoughts in my head.

Therefore, I decided to incorporate small writing blocks in my weekly planning in which I wrote down my findings of that specific week. This allowed me to clear my mind, be more focussed afterwards and reflect and set new goals accordingly.

BE OPEN FOR CHANGE

Although the process of my report is written in a linear fashion, my actual project process was far from linear. At the beginning of the project I set myself the goal to deliver a consumer focussed MaaS proposition. But while doing research I found out that: 1) MaaS would challenge the value proposition of LeasePlan, therefore it would be questionable if LeasePlan should deliver such a solution. 2) LeasePlan did not possess the required resources to develop such a proposition. Consequently, I had to shift away from my initial goal and find a different opportunity in which I could use the knowledge and findings of my research. This led to the mobility hub concept, which aims to use the principles and characterises of MaaS. By doing so LeasePlan is able to tackle pain points along the future journey of its customer and strengthen their vehicle centred value proposition.

REFERENCES

AAA, American driving survey: Methodology and year one results, May 2013–May 2014, April 2015, http://newsroom.aaa.com/wp-content/uploads/2015/04/REPORT_American_Driving_Survey_Methodology_and_year_1_results_May_2013_to_May_2014.pdf. View in article

Automotive management NL (2018) automotive leasemaatschappij top 60; Retrieved from: <https://automotive-management.nl/shop/rapporten-boeken/22250-leasemaatschappij-top-60-2018>

Arup (2018) Mobility as a service: The value proposition for the public and our urban systems

Bardhi, F. & Eckhardt, G. (2012). Access based consumption: the case of car sharing. Journal of consumer research, 39.

Bergsteijn, B. (2017) The great AI paradox; *MIT technology review* Retrieved from: <https://www.technologyreview.com/s/609318/the-great-ai-paradox/>

BBMG (2016) The Five Human Aspirations

Blijenberg, A. (2015) Nieuwe mobiliteit: na het autotijdperk

Brouwer, P., Hemerik, R., Stolp, R., Vousten, E. (2018) Nationaal zakenauto onderzoek 2018.

Center for automotive research (2017) Roadmap for Automotive Technology Advancement; Retrieved from: <https://www.cargroup.org/roadmap-for-automotive-technology-advancement/>

Corwin, S., Pankratz, D.M. (2017) Forces of change: The future of mobility. *Deloitte insights*

Corwin, S., et al. (2015) Deloitte university press, The future of mobility

CBS (2018) Transport en mobiliteit; Retrieved from: <https://www.cbs.nl/nl-nl/maatschappij/verkeer-en-vervoer/transport-en-mobiliteit>

CBS (2018) Bevolking; ontwikkeling in gemeenten met 100 000 of meer inwoners; Retrieved from:

CPB (2015) De economie van de stad

Duranton, G., & Turner, M. A. (2011). The fundamental law of road congestion: Evidence from US cities. American Economic Review, 101(6), 2616-52.

Duranton, G. en D. Puga, 2004, Micro-foundations of agglomeration economies, In: Handbook of Regional and Urban Economics, vol.4, ed V. Henderson en J.F. Thisse, Amsterdam, North-Holland: 2063-2117

EEA, Approximated EU greenhouse gas inventory 2016, 07/11/2017

EY (2015) Global generations: A global study on work-life challenges across generations

European commission (2015) Paris agreement; Retrieved from https://ec.europa.eu/clima/policies/international/negotiations/paris_en#tab-0-0

Forbes (2014) Regulatory Environment Has More Impact on Business Than the Economy, Say U.S. CEOs

Gartner (2018) Gartner Identifies the Top 10 Strategic Technology Trends for 2019

Giffi, C. A., Vitale, J., Rodriguez, M.D., Gangula, B., Schmith, S. (2014) The changing nature of mobility; Deloitte insights; Retrieved from: <https://www2.deloitte.com/insights/us/en/deloitte-review/issue-15/automotive-trends-gen-y.html>

Goodall, W., Dovey Fishman, T., Bornstein, J., Bonthron, B. (2017) Mobility as a service: de volgende revolutie in de mobiliteit; Deloitte review

Harvard business review (2018) The age of personalization. Retrieved from (27-11) <https://hbr.org/sponsored/2018/09/the-age-of-personalization>

Hertzke, P., Muller, N., Schenk, S., Wu, T. (2018) The global electric-vehicle market is amped up and on the rise; *McKinsey & Company*

Hietanen, S. (2014). Mobility as a Service. the new transport model, 2-4.

Hull, D., Hymowitz, C. (2016) Google thinks self-driving cars will be great for stranded seniors; Bloomberg BusinessWeek, March 2, 2016, <http://www.bloomberg.com/news/articles/2016-03-02/google-thinks-self-driving-cars-will-be-great-for-stranded-seniors>. View in article

Ho, C., Hensher, D. A., Mulley, C., & Wong, Y. (2017). Prospects for switching out of conventional transport services to mobility as a service subcription plans - A stated choice study.

IDEO (2016) Beyond Cars: Designing Smarter Mobility

Jittrapirom, P., Caiati, V., Feneri, A. M., Ebrahimigharehbaghi, S., Alonso González, M. J., & Narayan, J. (2017). Mobility as a service: A critical review of definitions, assessments of schemes, and key challenges.

Kahneman, D., Krueger, A.B., (2006) “Developments in the measurement of subjective well-being,” Journal of Economic Perspectives 20, no. 1 (2006): p. 12

Kamargianni, M., Li, W., Matyas, M., & Schafer, A. (2016). A critical review of new mobility services for urban transport. Transportation Research Procedia, 14, 3294-3303.

Kamargianni, M., & Matyas, M. (2017). The business ecosystem of mobility-as-a-service. In Transportation Research Board (Vol. 96). Transportation Research Board.

Karlsson, I. C. M., Sochor, J., Aapaoja, A., Eckhardt, J., & König, D. (2017). Deliverable 4: Impact Assesement MAASiFiE project funded by CEDR.

Karlsson, I. C. M., Sochor, J., & Strömberg, H. (2016). Developing the ‘Service’ in Mobility as a Service: Experiences from a Field Trial of an Innovative Travel Brokerage. Transportation Research Procedia, 14, 3265-3273. doi:10.1016/j.trpro.2016.05.273

Kooiman, N., A. de Jong, C. Huisman, C. van Duin en L. Stoeldraijer (2016), PBL/CBS Regionale bevolkings- en Huishoudensprognose 2016–2040: sterke regionale verschillen. CBS Bevolkingstrends (8): pp. 1-41

Kuhnert, F., Sturmer, C. (2018) PWC: Five trends transforming the automotive industry

KiM (2017) Mobiliteitsbeeld 2017; Retrieved from: <https://www.kimnet.nl/mobiliteitsbeeld/mobiliteitsbeeld-2017#bereikbaarheid-article5>

KiM (2018) Kerncijfers mobiliteit 2018: retrieved from: [file:///Users/pepijn/Downloads/Kerncijfers+Mobiliteit+2018%20\(1\).pdf](file:///Users/pepijn/Downloads/Kerncijfers+Mobiliteit+2018%20(1).pdf)

KiM (2018) Mobility as a Service – regionale pilots; Retrieved from: <https://www.rijksoverheid.nl/documenten/brochures/2018/06/25/mobilty-as-a-service---regionale-pilots>

LeasePlan. (2017). 2017 annual report. retrieved from: <https://www.leaseplan.com/corporate/investors/annual-report-2017#annual-report-builder>

MaaS global oy (2016) Whimapp; Retrieved from: <https://whimapp.com/>

McKinsey & Company (2016) Automotive revolution – perspective towards 2030. Retrieved from: <https://www.mckinsey.com/~media/mckinsey/industries/high%20tech/our%20insights/disruptive%20trends%20that%20will%20transform%20the%20auto%20industry/auto%202030%20report%20jan%202016.ashx>

National Highway Traffic Safety Administration (NHTSA), “Critical reasons for crashes investigated in the national motor vehicle crash causation survey,” Traffic Safety Facts, February 2015, <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812115>.

NZO (2018) Nationaal zakenauto onderzoek 2018

Osterwalder, A. Pigneur, Y., (2010) Business model generation

Remi Tachet, Paolo Santi, Stanislav Sobolevsky, Luis Ignacio Reyes-Castro, Emilio Frazzoli, Dirk Helbing, and Carlo Ratti, “Revisiting street intersections using slot-based systems,” PloS one 11, no. 3 (2016): e0149607. View in article

Ries, E. (2011) The lean startup

Roland Berger, Focus (2018) Car as a service; Medium term opportunities for fleet management providers;

Roland Berger (2018) Embracing the car-as-a-service model; The European leasing and fleet management market;

Rosenthal, S.S. en W. Strange, 2004, Evidence on the nature and sources of agglomeration economies, in: V. Henderson en J.F. Thisse (eds), Handbook of Regional and Urban Economics, vol 4, Amsterdam: North-Holland: 2119-71.

SAE (2018) Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles

Shannon Bouton et al., (2013) How to make a city great, McKinsey & Company

Shuttel (2019) Stap in. Stap op. Stap over.; Retrieved from: <https://www.shuttel.nl/>

Shostack, G. L., (1982) "How to Design a Service", European Journal of Marketing

Sochor, J., Arby, H., Karlsson, M., & Sarasini, S. (2017). A topological approach to Mobility as a Service: A proposed tool for understanding requirements and effects, and for aiding the integration of societal goals. In 1st International Conference on Mobility as a Service (ICOMaaS), Tampere, Finland.

Sochor, J., Karlsson, I. C. M., & Strömberg, H. (2016). Trying out Mobility as a Service: Experiences from a field trial and implications for understanding demand. Transportation Research Record: Journal of the Transportation Research Board, 2542. doi:10.3141/2542-07

Spierings, K. (2018) Reizigersonderzoek Zuidas Mobility Experience

Smile mobility. (2015). Results of the smile pilot. Retrieved from smile-einfachmobil.at/pilotbetrieb_en.html#dieergebnisse. Accessed on December 6th, 2017

Strömberg, H., Rexfelt, O., Karlsson, I. C. M., & Sochor, J. (2016). Trying on change – Trialability as a change moderator for sustainable travel behaviour. Travel Behaviour and Society, 4, 60-68. doi:10.1016/j.tbs.2016.01.002

Tachet, R., Sagarra, O., Santi, P., Resta, G., Szell, M., Strogatz, S., and Ratti, C. (2017) Scaling Law of Urban Ride Sharing,

Tachet, R., Santi, P., Sobolevsky, S., Reyes-Castro, L., Frazzoli, W., Helbing, E and C. Ratti (2016) Revisiting Street Intersections Using Slot-Based Systems

TfL (2019) Congestion charge; Retrieved from: <https://tfl.gov.uk/modes/driving/congestion-charge>

TfL (2019) Open data users; Retrieved from: <https://tfl.gov.uk/info-for/open-data-users/>

Thuiswinkel waarborg (2018) Q1 2018 goed voor € 6,25 miljard aan online aankopen. Retrieved from: <https://www.thuiswinkel.org/nieuws/3759/q1-2018-goed-voor-6-25-miljard-aan-online-aankopen-13>

Trendwatching (2018) THE STATE OF PLAY

Turrentine, T. S., & Kurani, K. S. (2007). Car buyers and fuel economy? Energy Policy, 35(2), 1213-1223. doi:10.1016/j.enpol.2006.03.005

United Nations, Department of Economic and Social Affairs, Population Division, World urbanization prospects: The 2014 revision, highlights (ST/ESA/SER.A/352), 2014, <https://esa.un.org/unpd/wup/Publications/Files/WUP2014-Highlights.pdf>

VNA (2017) Populariteit autoleasing neemt verder toe. Retrieved from: <https://www.vna-lease.nl/nieuws/niet-leden/populariteit-autoleasing-neemt-verder-toe>

World economic forum (2018) Why partnership is the business trend to watch

Appendix A

Key findings Diederik Basta - CTO Innovatieteam Gemeente Amsterdam

Key findings Interview Diederik Basta, Gemeente Amsterdam (Dutch)

Introductie eigen master project:

- Klantbehoefte veranderd, in plaats van alleen auto wilt men een allesomvattende mobiliteit oplossing
- LeasePlan moet mee veranderen met deze klantbehoefte
- MaaS als onderwerp van de studie
 - o Best toepasbaar binnen stedelijk gebied, aangezien de wereld sterk verstedelijkt en mobiliteit voorzieningen zich toespitsen op dit gebied.
 - o Volgende generatie, gewend aan technologie, toegang boven eigendom nog geen mobiliteit gedrag ontwikkeld
 - o Keuzevrijheid, gemak, personalisatie, zonder problemen
- 4 hoofd mobiliteit thema's:
 - o First/last mile transportation
 - o transities (transitie rural/stad)
 - o Korte afstand verplaatsingen
 - o Lange afstand verbindende verplaatsing (PT, cars)

Vragen gemeente Amsterdam:

Wat zijn de huidige problemen en Barriers van mobiliteit binnen het stedelijk gebied?

- Specifieke plekken/toestromen (Knelpunten)
- Niet gebouwd voor veel autoverkeer, binnenstad is unesco kan geen wegen aanbouwen.
- Druk ritten met 50% omhoog
- Luchtkwaliteit problemen, onder Europese normen (Stadshouderskade, wibautstraat)
- Tekort aan parkeerplaatsen
 - o Mensen parkeren auto aan de rand van de stad en gebruiken ander vervoer om naar de eindbestemming te komen
- Mobiliteits transitie stedelijk gebied buiten stedelijk gebied en vice versa
- Cultuur 28% heeft een auto (per huishouden), gedrag is moeilijk te beïnvloeden!
- Verschillende problemen per gebied. Zaanstad heeft weinig mobiliteitsvoorzieningen (First & last mile)
- P+R is niet volledig functioneel
 - o Gefocust op dagjesmensen
 - Pendelaars voorkomen
 - Ride-hailing (Randstadgemeente oplossingen)
 - Together application (Incentive)

Visie op mobiliteit?

- Transitie bezit naar gebruik (Doelstelling = 50% bezit geen auto)
- Poolbusjes deel mobiliteit
- Sociale mobiliteit, mensen die mobiliteit niet kunnen bekostigen tegemoetkomen (Toegespitst op bepaalde segmenten)
 - o Clustering van mensen en locaties

Rol van de auto binnen deze visie.

- Luxe-product – status beeld
- Auto gebruik in de stad staat gelijk aan roken
 - o Perceptie auto wordt meer een beperking
 - Ruimtelijke indeling wordt belangrijker dan auto
- Auto wordt vervangen door ov
- In de toekomst zal de auto steeds meer uit de stad geforceerd worden door hoge parkeerkosten etc.

Appendix B

Key findings interview Elmer van Grondelle - Assistant professor, automotive design

- Autonomie eerst gefocussed op buiten stedelijk gebied
 - Weinig verkeer, weinig verkeer en toevoeging ov.
 - Treinen als connecting verbinding
- Car 2 go verspreid over de Randstad
 - Populair binnen de randstad

Waar zien jullie de mogelijkheden tot mobiliteit?

- Beter gebruik maken van de huidige infrastructuur
- Meer deel mobiliteit
- Stimuleren van schone en efficiënte mobiliteit
- Beter verbinden van auto en openbaar vervoer met first and last mile oplossing de stad in

Hoe ziet volgens jullie de MaaS gebruiker eruit?

- o Adoptie
- o Jongere generatie
 - Minder gehecht aan status
 - Moeilijk om auto weg te doen
 - Maar om grote impact te hebben moet je meerdere segmenten aanhaken
 - Verschillende type auto's die inwisselbaar: voor binnen de stad klein vervoer, voor vakantie groot vervoer

Wat zijn de requirements van MaaS?

- Verschillende userinterfaces, toegespitst op de karakteristieken van de persoon
- Plannen, boeken en betalen geïntegreerd
- 80% van de vervoerders aangesloten zijn
 - o Wil je critical mass bereiken
 - o En mobiliteit kunnen leveren hoe, waar en wanneer de klant het wilt

Wat zijn de challenges van MaaS?

- Open data standaard API waar iedere mobility operator mee kan connecten
 - o Gebruik deze AP om services te leveren
- Randvoorwaarde opstellen aan MaaS service-provider (geen monopolie creëren)
 - Wetten en regelgeving wordt hiervoor opgesteld
- Zakelijke reiziger (Lease auto voordelig ingeschaald)

Perceptie huidige deelconcepten?

- Liever niet extra dingen toevoegen aan de openbare ruimte
- (Felyx wil graag meer scooters (Wordt tegen gehouden door de ontwikkeling))
- Deelauto – lange afstanden
- Service provider – kortere afstanden

Wat zijn de value drivers van de gemeente?

- Drukke
- Duurzaamheid
- Leefbaarheid
- Bereikbaarheid

Notes meeting Elmer van Grondelle:

Brief introduction graduation assignment

Reason for the interview: Technology scouting

Vision +- 10 years is very short, not a lot will change in such a short period of time.

What is your view on the technological developments of vehicles? And at what pace do you think the most pivotal technologies will develop?

Within cars a lot will change

- Connected vehicles will offer a variety of additional services, which make the trip more convenient and comfortable. We are already starting to see the benefits of connected vehicle technology but in the near future V2I and V2V technology will further increase the safety and driving capabilities of vehicles.
- Autonomous vehicles will be deployed on highways and dedicated lanes between busy roads quickly. This will already happen around the year 2020-2021, the technology is already there. At these roads few factors influence the driving capabilities of autonomous vehicles, compared to urban areas.

What holds back the implementation of new mobility technologies?

Regulations and user acceptance are lacking behind, the technology is already there.

Mobility is dependent on emotional behavior

- Status plays a role
- Anti EV movement is decreasing, people start to accept EVs and see the benefits of such vehicles.
 - o Range etc. is not a problem (charging costs up to 20 min, in which people can easily do something else)

Do you see any other influential factors within the mobility landscape?

Rise of generation Y will change the mobility industry

- Vehicle ownership is decreasing
- Instead more substitute mobility services such as MaaS will enter the market

What is your vision on mobility?

- The biggest problem to the current mobility landscape rush hours. During these set timeslots mobility demand is the highest, creating severe congestion and gridlock problems. If you travel at 14:00 you will not experience any problems.
- PT innovation is lacking behind, consequently autonomous and connected vehicles will be capable of challenging PT.
- Urgency for mobility solutions is less urgent within rural areas, as the problem is less obvious and noticeable.

What is your perception on the fleet management industry?

- Instead of focusing on car sales, leasing should focus on selling KMs/usage
- Damage and maintenance revenues will decrease when automation and EV will be more accepted.
- Strength of car leasing = Financing of vehicles
- Partnership and supplier network

Appendix C

Key findings interview Paul Rooijmans - Founder Tranzer

Notes Paul Rooijmans tranzer:

Introduction to project

Reason for the interview: Get your perspective on MaaS and gain insights in the challenges while developing such a proposition.

Can you tell me something about Tranzer?

- Tranzer enables customers to plan and pay for their trip with different public transport providers (NS, GVB, Connexxion etc.) via the Tranzer application. As such, customers can conveniently pay for their required public transport mobility digitally. Additionally, via the Tranzer application customers can also access other modes of transportation such as cabs. Despite this, Paul seeks to connect more mobility providers to his application.

Strengths of the company:

- Connecting public transport with other stakeholders in the mobility industry

What is your vision on the mobility industry?

- Governmental institutions should stimulate mobility usage outside of peak hours
 - o Raising costs for peak hours
 - o Stimulating different transportation modes
 - o Change from asset driven towards usage business models
 - Providing customers with incentives to share data or/and step away from personal vehicle ownership
 - o Used example: The Airline industry stimulates people to travel outside of the season by offering reduced travelling costs. As such, airline carriers are able to maximize asset utilization

What are the challenges/pain points of the current mobility landscape and for the development of MaaS?

- Governmental institutions should stimulate different usage patterns and modes of transportation
 - o At present, government lack a clear and actionable mobility vision. Such a vision would support the government in creating more innovative and efficient mobility solutions.
 - o Providing unlimited mobility would not positively influence the mobility landscape because people would start using comfortable/less sustainable modes of transportation where they otherwise would not. Additionally, Paul believes solutions should rather look into pay per use rates that would stimulate the best possible mobility solutions in terms of efficiency and sustainability.
- At present, the different mobility providers do not want to open up their data sets for MaaS service providers. This prevents service providers from delivering more efficient multimodal trips. The technology that enables such trips is already built. Paul believes that shared mobility providers that utilize the public space should be forced to open up their datasets. Used example: Greenwheels uses dedicated public parking spaces, for which the Dutch population pays. As such, Greenwheel should be more willing to collaborate with the citizens in providing better fit mobility solutions.
- Yield management: Equalizing usage across the day

Appendix D

Key findings interview Jacco Lammers - Founder Goabout

Notes interview Jacco Lammers - Go About

Can you tell me something about Go about?

First working MaaS concept, which combines multiple transportation modes and enables payment and planning across a variety of transportation methods.

Target group characteristics:

Go about doesn't believe in a segmentation based on Millennials etc. but rather on target groups with interesting needs and problems.

- Focused on the consumer segment
Go about does not believe there currently exists a problem within the business market. Or at least not a problem, which is pressing to trigger modal shifts.
- Customers who experience problems in their daily commute
- Customer who already experience/go through multimodal trips
Make their current customer journey more convenient and comfortable by offering additional services (planning, ticketing, real time information)
- Not focused on incidental usage:
Tarif of bike sharing services are so low they offer customers the incentive to lose their personally owned modalities.
- Car users who make a lot of kilometres are not an interesting segment, as they prefer the car to any other form of transportation.

Target location:

- Go about targets specific locations where mobility problems currently exist and where there is no widely accepted solution.

What do they offer?

- Public transport: public transport services are included via electronic ticketing.
- Car sharing services
- Bike sharing services (point to point): Go about has its own premium quality shared bikes, with similar or better quality than standard Dutch bikes. (especially offered at location where a lot of people have to walk 7+ minutes)
The benefit of point to point is that the number of bikes can be lower and people can't leave their bikes at the most random places (Better usage)
- Walking

What are the barriers and Challenges of MaaS?

- Difficult to combine and integrate mobility services from several mobility providers on one platform at the same price. Mobility providers can demand the same or even higher ticket prices, this leaves little margin for the MaaS provider. As a result, go about designed and manages its own bike sharing services.
- Stakeholder management: Go about would like to have control over the services it offers. If it wants to provide a different service (cost, quality, characteristics) it is dependent on the commitment and willingness of its partners.
- MaaS providers have no knowledge on customer needs/expectations as such services are non existing. This knowledge can only be acquired by piloting and gaining experience.
What currently happens is that companies have an idea/perception of what customer would desire and base their service on this assumption. They should rather gain experience on a small scale and adapt more swiftly before implementing the service on full scale.
- User needs are still unknown as people are not aware of such services

- Little available services that provide the desired mobility solution, which can be added to the platform.
- The service should add value to the current situation
 - o If losing a car gives benefits the financial situation it could stimulate service usage

What is your vision on mobility in relation to MaaS?

Improving the service (price, convenience, comfort etc.) to such a level that it increasingly challenges car users/single modal customers.

- Go about does not believe in an unlimited amount of mobility offers to allow for an unlimited amount of transportation options. They rather offer the best solution.

Market insights:

- MaaS is not interesting for rural areas, as the rural population does not experience problems.
- Governments, municipalities and other stakeholders are willing to cooperate and adapt the service in public space (placement of bikes)
- Dutch cities have a well-developed mobility solution and provision
In Rotterdam there is an extensive metro, bus, train, tram network. In addition, a abundance of mobility services exists. This makes the mobility problem less pressing.
The problem of mobility is centred on the transition between rural and urban areas.

What is your perspective on the fleet management market?

- LeasePlan should not be afraid of being affected by MaaS, as the business/car user group is not the most affected and primary target group for MaaS
- Look for a differentiating factor, what problem can you solve by providing MaaS
- Go about thinks LeasePlan should acquire a MaaS service (personal gain)
- Private lease could offer an interesting market as this would offer immediate benefits to the customer
- On the long term MaaS could impact car leasing

What role do you think the car will play in the future of mobility?

- Go about believes the role of the car will remain in the upcoming years

What is your perception of autonomous vehicles?

- Autonomous vehicles will radically change the market and mobility landscape IF they reach level 5 autonomy.

What opportunities do you see with the development of MaaS?

- While developing MaaS you should focus on replacing the second car instead of the first car. Especially, the second car is not used on a regular basis as such MaaS could provide a valuable alternative to this second car.

Do you have any suggestions?

- Focus on a specific target group/location/problem

Appendix E

Key findings interview Onno van der Veen - Partner Ideate

Interview Onno van der Veen – Partner Ideate (DUTCH)

Hoe zag de Maas pilot eruit?

Antwoord: Mensen werden gestimuleerd om hun auto te laten staan door middel van het vrijstellen van een mobiliteitsbudget van 1000. Dit budget kon gebruikt worden bij verschillende mobiliteits services (felyx, greenwheels etc.)

- Werd planning, betaling en reservering via 1 app geregeld?
De planning en reservering van mobiliteiten werd niet via een platform georganiseerd, men moest gebruik maken van de verschillende apps van de providers. Wel werd het aanbod en gebruik door de mobiliteitsfabriek vergemakkelijkt, en werd er aan het eind van de maand een totale rekening opgesteld die men in 1x kon betalen.
Tevens was er een helpdesk opgezet mochten er vragen zijn van de verschillende klanten.

Eind perceptie gebruiker, level van MaaS?

De eindgebruiker had niet zozeer het idee dat zij gebruik maakte van MaaS en was zich enigszins bewust van het verschil tussen MaaS en de huidige service.

Wat is volgens jou de huidige status van onze mobiliteit industrie?

- Mensen ondervinden steeds meer pijn in hun huidige mobiliteitsgebruik
Voorbeeld: Lange wachttijd parkeervergunning zorgt ervoor dat het niet mogelijk om auto bij huis te parkeren, hierdoor wordt de auto op 15 min van thuis locatie geparkeerd. Dit zorgt ervoor dat de klant eerst een bus naar zijn auto moet nemen.
- Het tijdperk van de auto is al 50-100 jaar gaande, het is tijd voor verandering. De file problemen nemen steeds meer toe naarmate de urbanisatie vordert, extra infrastructuur zou hier geen oplossing voor zijn.
- Huidige vormen van mobiliteit moeten beter benut en gebruikt worden (denk aan autodeelservices)
- Bij de ontwikkeling van nieuwe wijken wordt er anders naar de mobiliteit voorzieningen gekeken. Denk aan aantal parkeerplaatsen per huishouden, en mogelijkheden voor gedeelde en publiekelijke mobiliteitsvoorzieningen per wijk.

Status MaaS?

Wat zijn de karakteristieken van MaaS?

Mogelijk neemt de potentie en populariteit van MaaS kwadratisch toe. Meer gebruikers zorgt voor meer aandacht van mobiliteit providers etc.

- Er bestaat niet een MaaS klant en er gaat ook geen 1 MaaS provider zijn. Meerdere providers leveren meerdere services aan verschillende klanten

Wat zijn de challenges van MaaS?

Mobiliteit gebruik is een gewoonte en aangeleerd gedrag:

- Onbewust van de alternatieven en mogelijke voordelen

- Autorijder kijkt naar de voordelen van de auto niet naar de mogelijke voordelen van de trein
- Mensen moeten de mogelijkheid krijgen om MaaS te testen om hier de voordelen van in te zien.
- Data integratie tussen de verschillende providers
- Creëren van een equal level playing field zodat iedereen gelijke kansen krijgt
- Na 2 – 4 weken gaan gebruikers de voordelen van MaaS inzien en kunnen zij andere gewoonte aannemen
- Het leveren van added value ten opzichte van huidige voorzieningen. Sustainability op zich is meestal niet een doorslaggevende factor.
- In combinatie met een kostenbesparing zijn mensen bereid de service te gebruiken
 - o Probleem met kosten → mensen hebben geen overzicht van de totale kosten van hun mobiliteit omdat aanschaf/verzekering etc. meestal niet wordt meegenomen in hun afwegingen. Om dit inzicht te geven zou het waardevol zijn om een nulmeting door te voeren

Waar zie jij Mogelijkheden voor MaaS?

- Niet of of oplossing maar en en, geef gebruikers meerdere opties (combinatie tussen lease en business card)
- Werkgevers en influencer aanpak kan MaaS gebruik bevorderen
- Business case van MaaS is veelbelovend

Welke rol speelt de gemeente binnen de ontwikkeling van MaaS

De overheid heeft de macht over publieke ruimte en zal deze dan ook steeds meer gebruiker om andere vervoersmiddelen en services te stimuleren.

- Gemeente hebben al verschillende autoluwte plannen opgesteld om parkeerplekken binnen de stad terug te dringen en het gebruik van bestaande plekken te optimaliseren

Rol van de auto:

Aankomende jaren gaat de auto zeker nog de meest dominante mobiliteit zijn, echter gaat het gebruik hiervan zeker veranderen en optimaliseren.

- Voornamelijk in niet stedelijk gebied kan men niet om de auto heen aangezien de voorzieningen daar veel slechter zijn.
- Parkeren van de auto wordt steeds moeilijker binnen stedelijk gebied, dit schept mogelijkheden voor last mile solutions aan de rand van de stad.

Wie denk je dat de service provider rol in gaat nemen?

Ik schat de kans klein dat PT de rol van service provider aan kan. Een private service provider kan sneller bewegen en innoveren wat het mogelijk maakt zo'n oplossing door te voeren.

AppendixF

Different LeasePlan service levels

EasyPlan	<u>Closed Calculation</u>	Fixed cost, basic but complete service scheme for small fleet customers.
ComfortPlan	<u>Closed Calculation</u>	Fixed cost, full-service scheme for mid-size customers.
FlexiPlan	<u>FlexiPlan</u>	Flexible, full-service scheme in terms of duration and number of kilometers. No additional cost when adapted.
Open Calculation	<u>Open Calculation</u>	A full service and bespoke flexible product aiming at mid-size and larger companies, offering clients disclosure of the service budgets we manage for them and potentially share in a positive result when both the client and LeasePlan achieve a positive operational result for that specific client.
OwnerPlan	Management only	LeasePlan provides fleet management services only. Fleet is from the client itself.
TransitionPlan	Managing Out	Support existing fleet transfer towards Leaseplan service.
Global Solutions		LeasePlan International provides and supports the creation of harmonized services for globally operating clients.

Appendix G

Creative session 1 urban mobility

SESSION SET UP

Creative session: Urban mobility

Introduction:

The current vehicle centered mobility landscape within the Netherlands is on the verge of change. Expectations are that the level of congestion, vehicle travel loss time and pollution will significantly increase in the near future. In turn, this affects the accessibility and livability within the Netherlands. This especially holds true for urban areas where the demand for mobility increases rapidly due to rapid urbanization.

To prevent these problems from further intensifying the Dutch government plans to make cities free of personally driver driven vehicles. In turn, this creates a mobility gap along the journey of current and future LeasePlan customers. Therefore, it becomes pivotal for LeasePlan to develop solutions that fill in this mobility gap in a convenient and flexible matter.

Based on the above described information the following initial H2 Was defined:

H2: How to enable urban transportation for our current and future customers, if cities become free of personally driver driven vehicles?

Sub questions:

- What vehicle centered mobility problems currently occur within urban areas?
- What does careless mobility entail and how can we provide careless mobility?

Goal session:

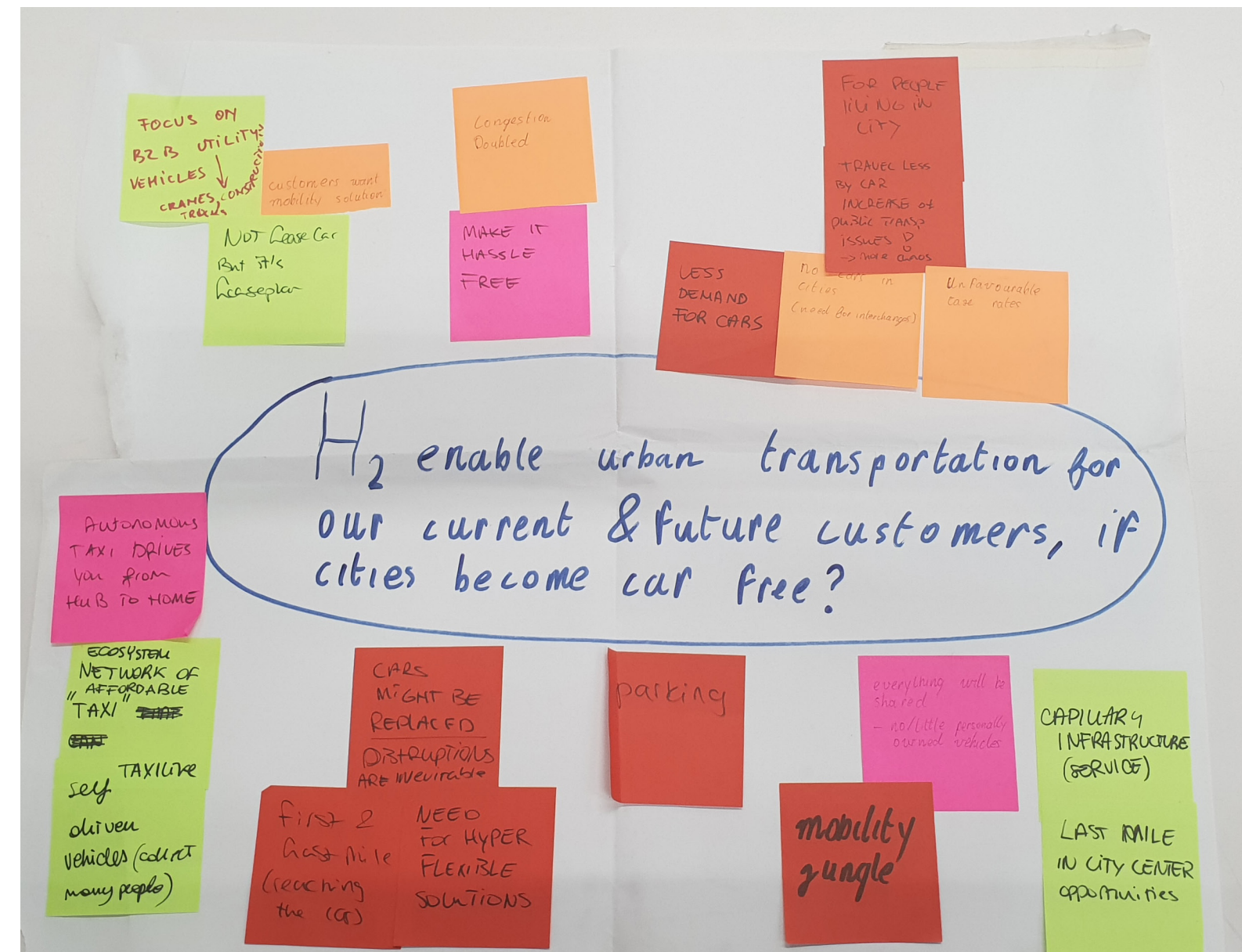
- Generate ideas that could enable urban mobility from the perspective of LeasePlan/vehicles
- Identify problems, opportunities and challenges of vehicle centered mobility
- What would the underlying business model of such a service look like?
 - o Partners, costs, value proposition
- Turn preliminary ideas into presentable concepts

Planning session 1:

Context exploration	30 min
Mind-map <u>initial</u> H2	20 min
Clustering	5 min
Revised H2's on subtopics	5 min
Idea generation	25 min
<u>Brainwriting</u> 4-4-5	20 min
<u>Prepare presentation</u>	3 min
Presentations	8 min
Connecting the dots	10 min
Group brainstorm conceptualization	
Conceptualization:	
Split up brainstorm on identified idea clusters	15 min
Poster creation	5 min
Final presentation	6 min
Last questions??	

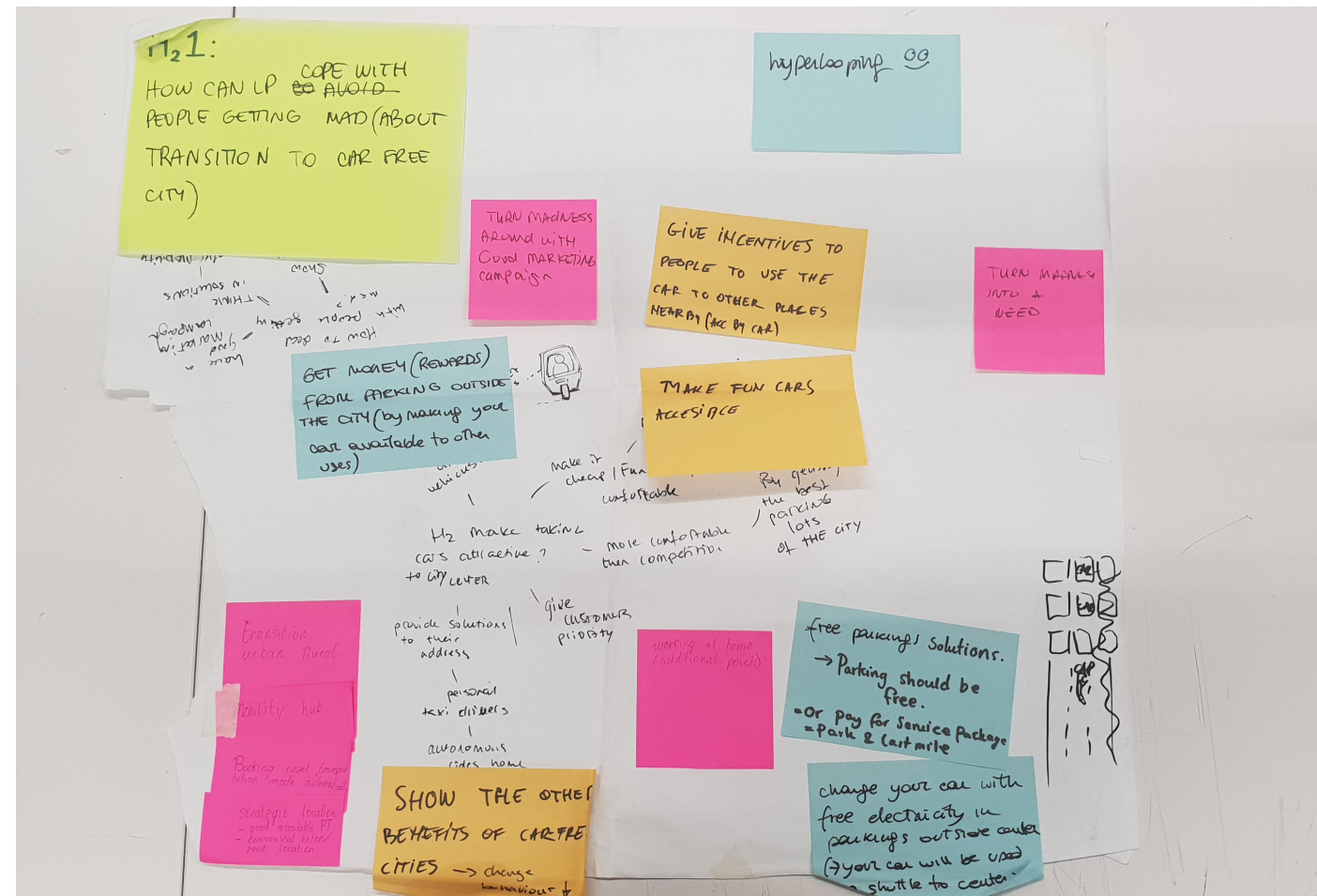
SESSION RESULTS:

MINDMAP INITIAL H2



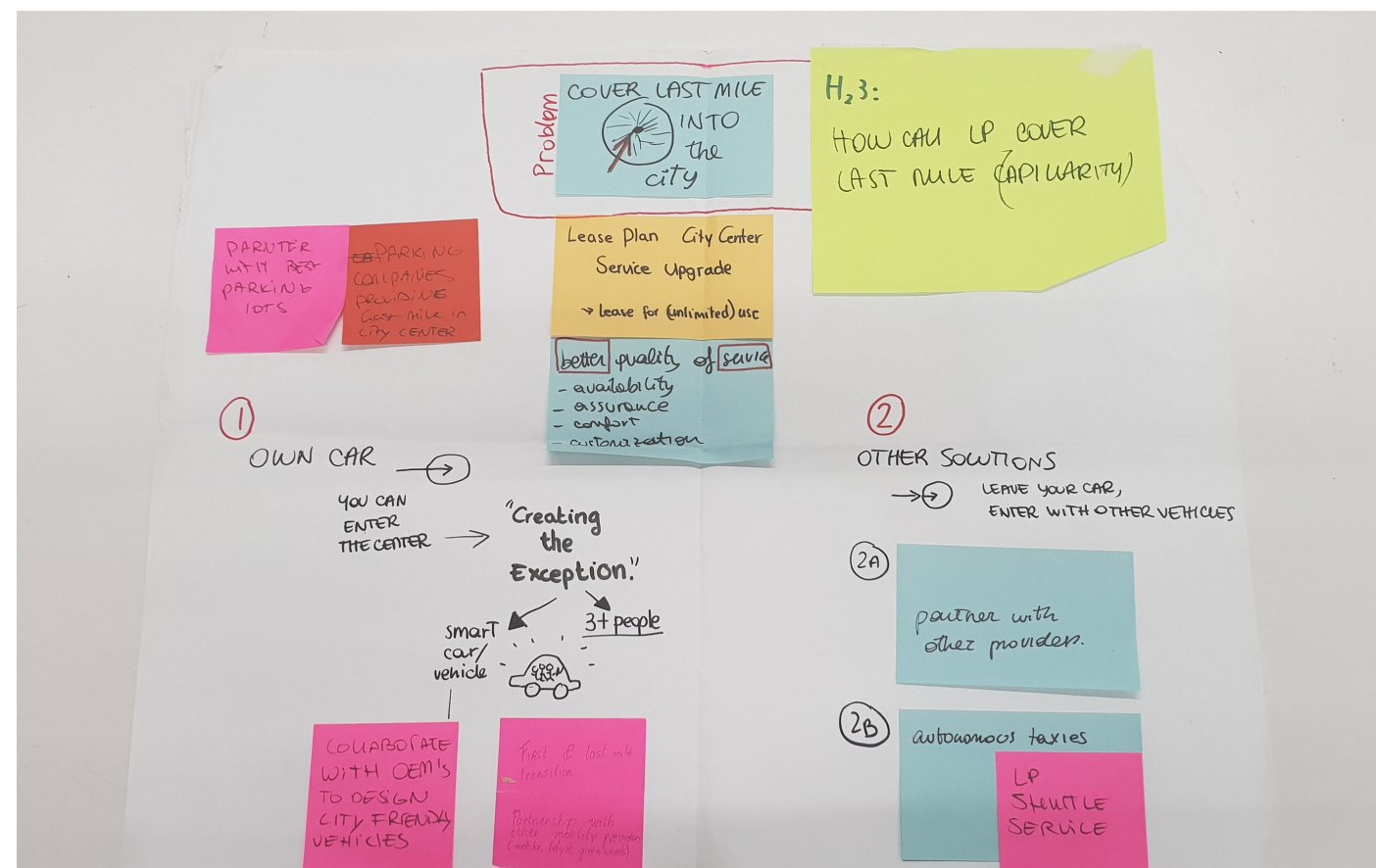
NEW H2 clusters + concepts

How can LeasePlan cope with people getting mad



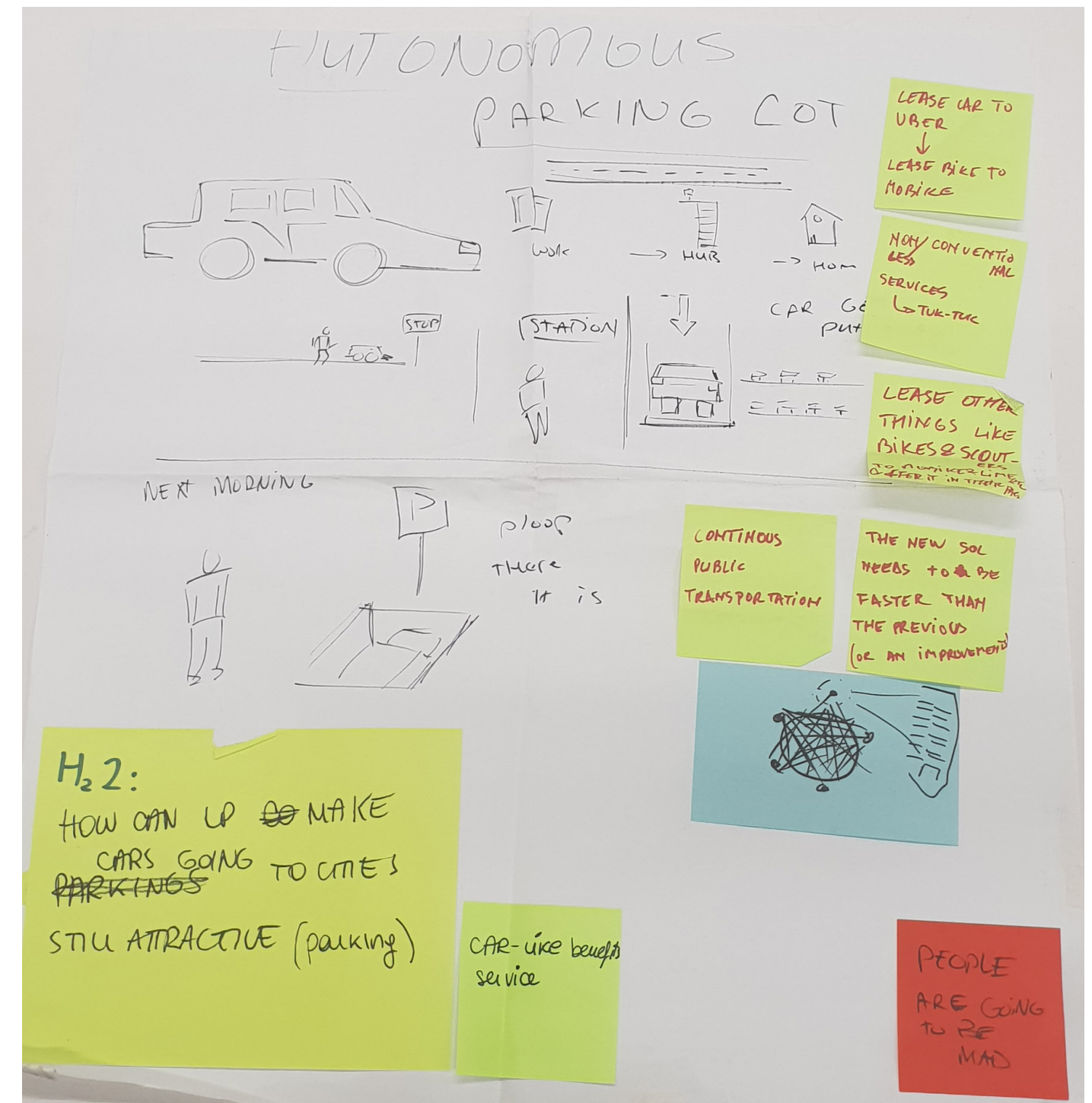
NEW H2 clusters + concepts

How can LeasePlan cover last mile (Network mobility)



NEW H2 clusters + concepts

How can LeasePlan make cars going to cities still attractive? (Parking)



Appendix H

Creative session 2 urban mobility

SESSION SET UP

Creative session: Urban mobility

Introduction:

The current vehicle centered mobility landscape within the Netherlands is on the verge of change. Expectations are that the level of congestion, vehicle travel loss time and pollution will significantly increase in the near future. In turn, this affects the accessibility and livability within the Netherlands. This especially holds true for urban areas where the demand for mobility increases rapidly due to rapid urbanization.

To prevent these problems from further intensifying the Dutch government plans to make cities free of personally driver driven vehicles. In turn, this creates a mobility gap along the journey of current and future LeasePlan customers. Therefore, it becomes pivotal for LeasePlan to develop solutions that fill in this mobility gap in a convenient and flexible matter.

Based on the above described information the following initial H2 Was defined:

H2: How to enable urban transportation for our current and future customers, if cities become free of personally driver driven vehicles?

Sub questions:

- What vehicle centered mobility problems currently occur within urban areas?
- What does careless mobility entail and how can we provide careless mobility?

Goal session:

- Generate ideas that could enable urban mobility from the perspective of LeasePlan/vehicles
- Identify problems, opportunities and challenges of vehicle centered mobility
- What would the underlying business model of such a service look like?
 - o Partners, costs, value proposition
- Turn preliminary ideas into presentable concepts

Planning session 2:

Context exploration	35 min
Mindmap initial H2	10min
Customer journey mapping (while using mindmap info)	15 min
Clustering	5 min
New H2 development	5 min

Idea generation

Brainwriting 4-4-5	20 min
Prepare presentation	3 min
Presentations	8 min

Connecting the dots

Group brainstorm conceptualization

Conceptualization:

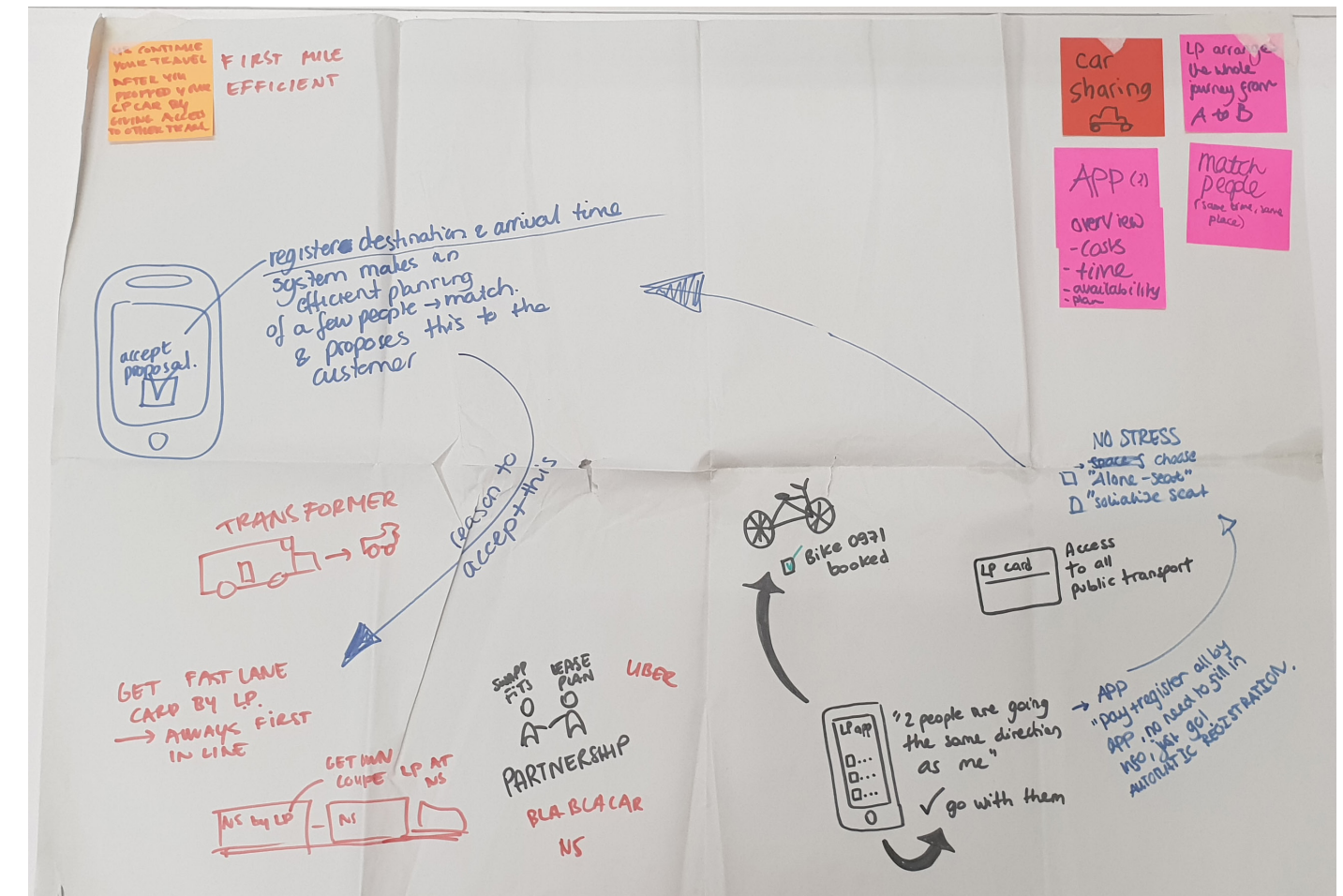
Split up brainstorm on identified idea clusters	15 min
Poster creation	5 min

Final presentation	6 min
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SESSION RESULTS:

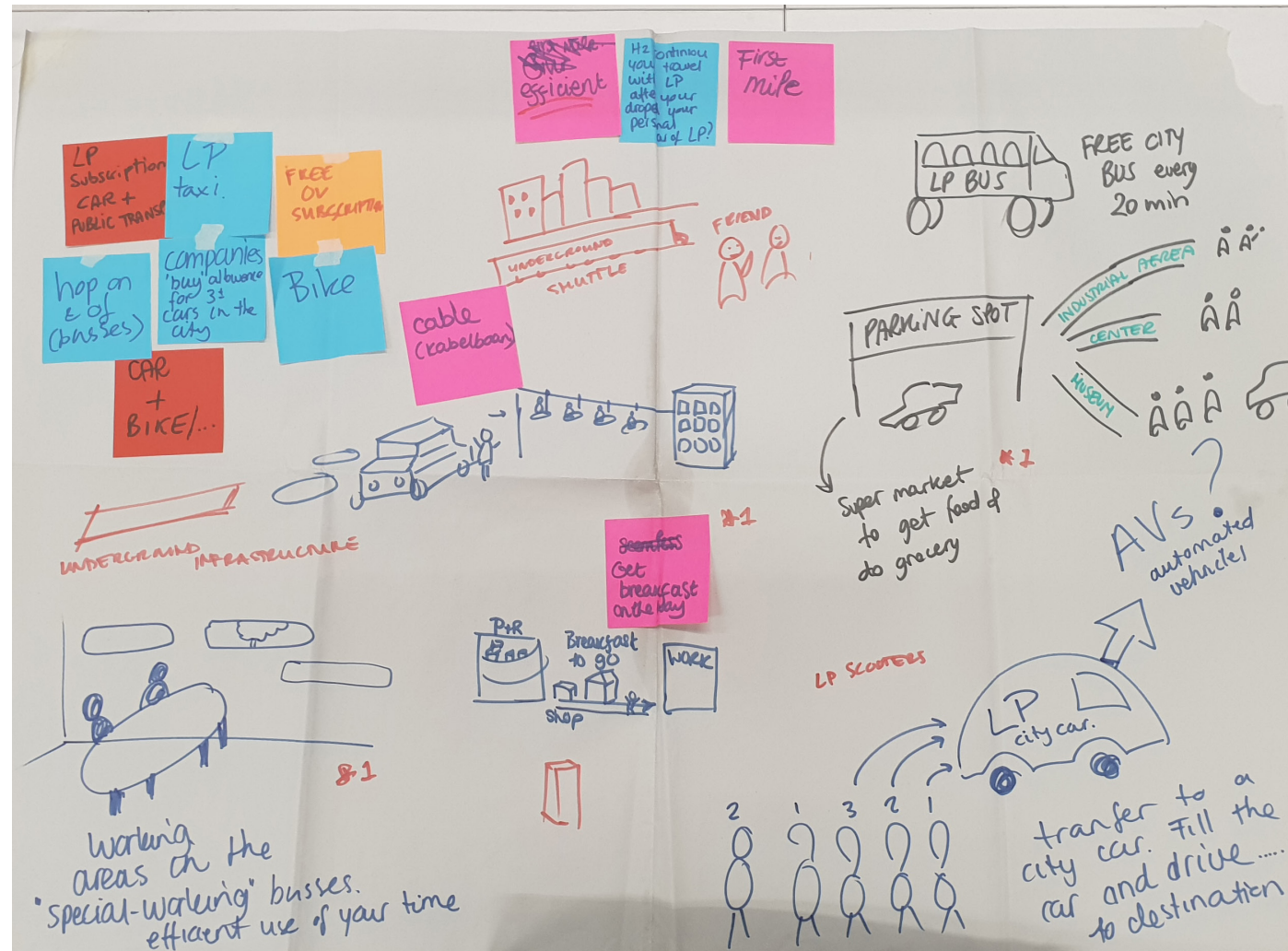
NEW H2 clusters + concepts

How to continue your travel after you dropped your LP car, by giving acces to other travel



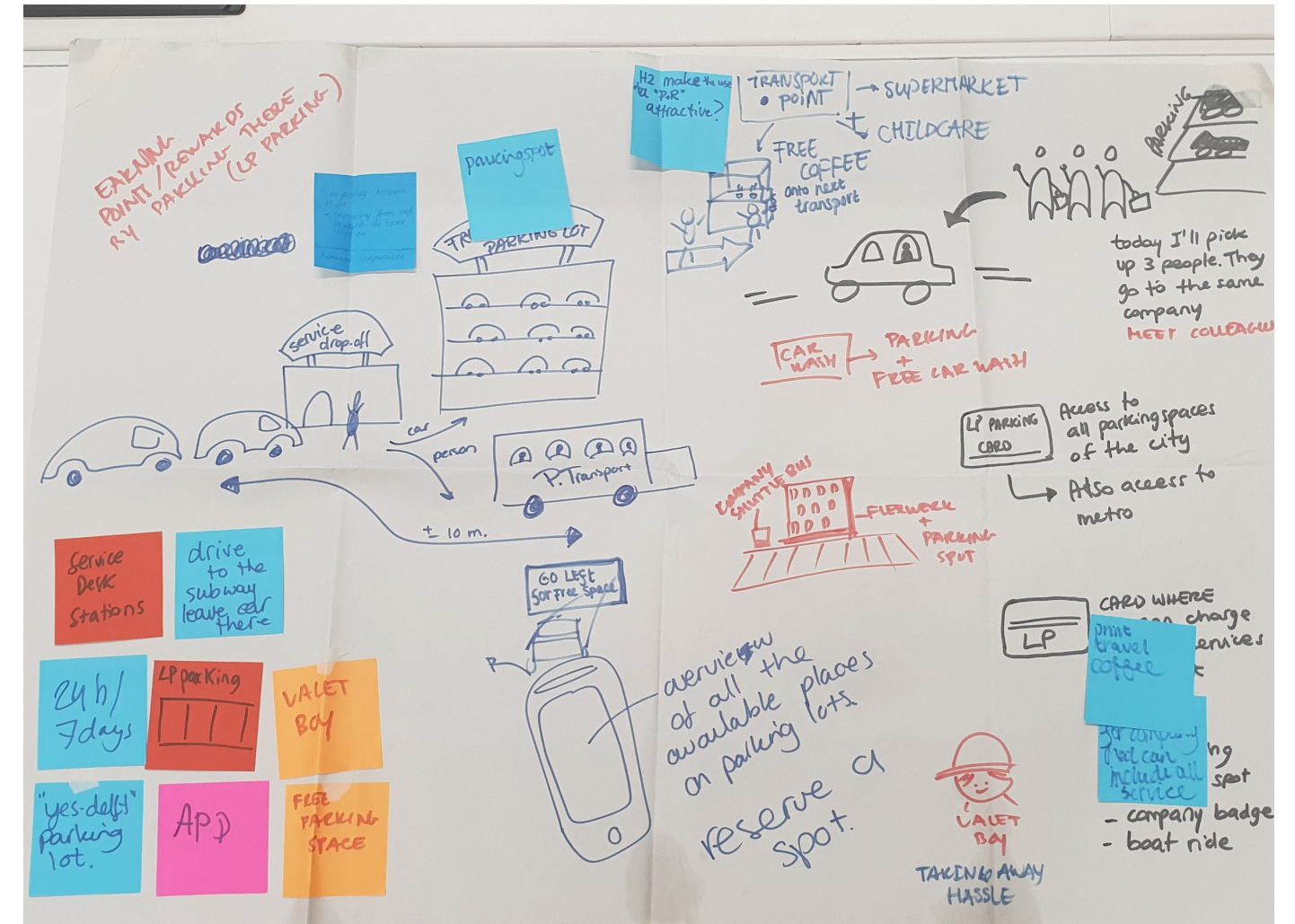
NEW H2 clusters + concepts

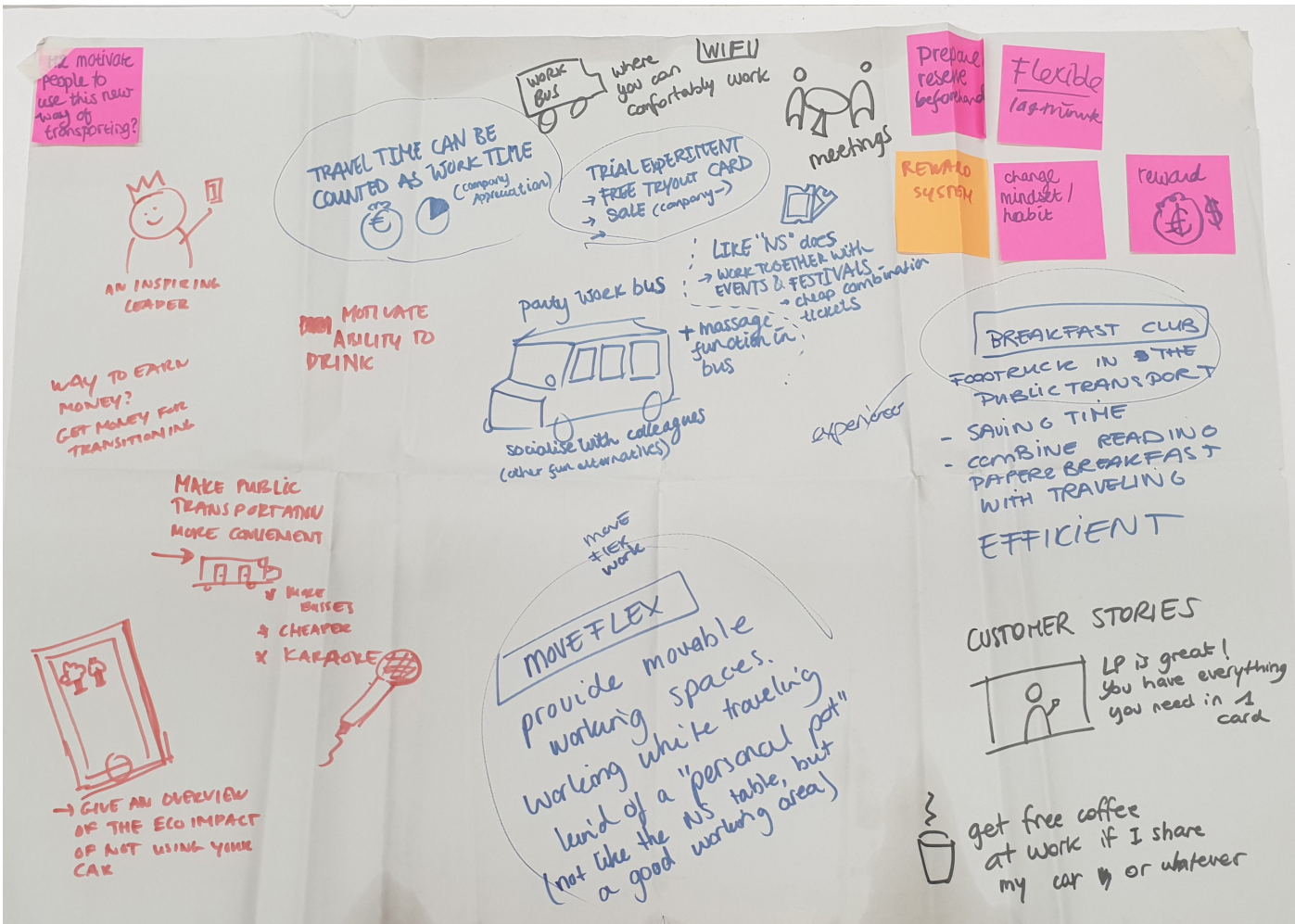
How to continue your travel after you dropped your personal LP car?



NEW H2 clusters + concepts

How to make the use of P+R attractive?





Appendix I

Creative session vehicle sharing

SESSION SET UP

Creative session: Flexible vehicle leasing solutions

Introduction:
Our society is rapidly changing due to a variety of societal, technological and economic developments. In addition, younger generations are increasingly replacing the baby boomer generation as most dominant population segment. The characteristics of this younger generation are fundamentally different from the boomers. As a result, they demand more flexible and convenient mobility solutions fit to the circumstances and trip at hand, with no strings attached. The current long-term vehicle leasing solutions of LeasePlan do not provide the desired levels of flexibility and convenience. Therefore, it becomes pivotal for LeasePlan to increase the flexibility and convenience of their current CaaS solutions.

Based on the above described information the following initial H2 Was defined:
H2: How can LeasePlan provide more flexible mobility solutions?

- Sub questions:
- What does flexibility mean?
 - o Modes of transportation
 - o Contract vs. pay per use
 - o Vehicle types

- Goal session:
- Generate ideas on flexible vehicle leasing solutions
 - Identify barriers, which are linked to such value propositions
 - What would the underlying business model of such a service look like?
 - How can we enable pay per use/km?

Planning sessions:

Context exploration	40 min
4W/2H	15 min
Who, what, where, when, how, how much?	
Mind-map	15 min
Clustering	5 min
Revised H2's on subtopics	5 min
Idea generation	25 min
Brainwriting 3-3-5	15 min
Prepare presentation	5 min
Presentations	5 min
Connecting the dots	20 min
Group brainstorm conceptualization	

Last questions??

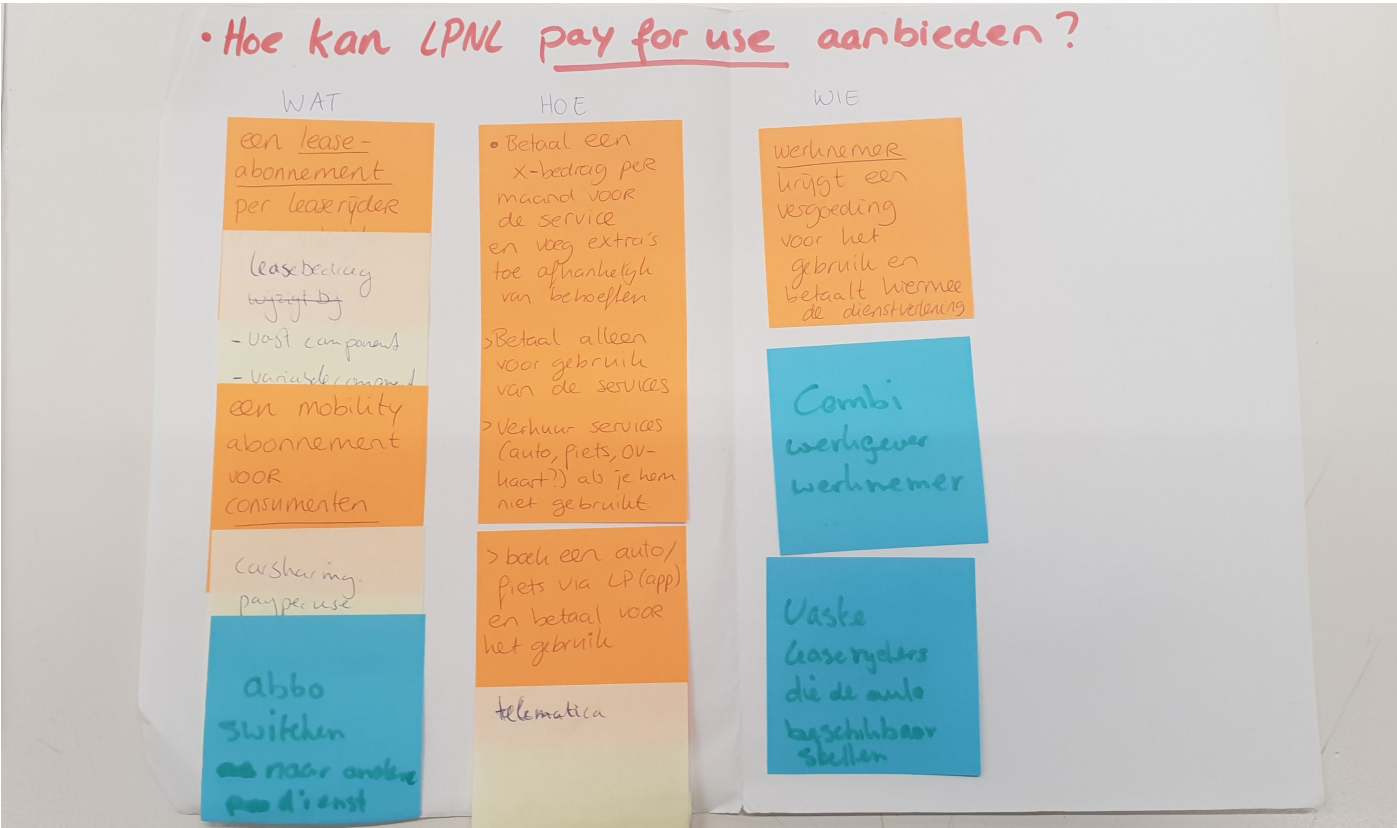
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SESSION RESULTS:

4W/H



H2-2: How to deliver pay per use



H2-3: How to enable multimodal shared mobility solution

NEW H2 + Brainwriting:

H2-1: How to deliver vehicles flexibly

