

SHARELease



A new lease-concept combining carsharing and ridesharing

Enschede, 29 January 2009

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MANAGEMENT SUMMARY

The role of the car is shifting. Volkswagen recently presented a commercial where they show the car as a means of mobility rather than ownership. That you don't have to own a car to drive it is already clear since a long time, but until recently there were not many options. Recent alternatives such as carsharing schemes are already bringing a change. Also ridesharing alternatives such as carpool cater for this shifting role.

This research tries to see whether or not there is potential for a new form of shared use of mobility, SHARElease. SHARElease is a new lease form which combines the current carsharing initiatives such as Greenwheels with current rideshare initiatives such as Mithfahrgelegenheit.

The research goal therefore is:

“Design and assessment of an innovative integrated carsharing and ridesharing concept aimed on lease companies in a B2E context”

Derived from the goal, the main research question will be:

What are the impacts on lease car drivers, lease companies and the transport market, of an innovative integrated carsharing and ridesharing concept aimed on lease companies in a B2E context?

In order to answer the research question, several sub questions are developed.

To gain more understanding of carsharing, ridesharing and the lease market a paper research is done on the theoretical background. A lot of different definitions exist on both ridesharing and carsharing. Ridesharing is mostly referred to as sharing a private vehicle among more people, where sometimes a clear distinction is made between ordinary ridesharing (more ad-hoc) and carpooling (sharing with a pool of car-owners). Carsharing is clearly described by Hutchinson (2008) as:

“Car sharing is a sustainable transportation service that provides communities significant social and environmental benefits by reducing the use of vehicles and car ownership. It provides members 24x7 access to a dispersed network of shared vehicles, at unattended self-service locations, at affordable hourly and/or ‘per mile’ rates that include gas, insurance and maintenance. Car sharing allows members to save money over the cost of individual car ownership by encouraging members to drive less, use alternative transportation and utilize fuel efficient vehicles when a car is needed.”

Next, the history and current state of ridesharing and carsharing are discussed. Ridesharing already exists since the 70's. Since then better organised systems arose, but the market stays small and stable. Carsharing initiatives started in the 90's and have been growing a little since. Carsharing exists nowadays in around 600 cities around the world.

Lease market figures are derived from the VNA, the association of Dutch Vehicle Leasing Companies. The market is rapidly growing and the amount of lease cars on the roads as well. Also, the role of the lease company is shifting from being a provider of cars towards being a provider of mobility.

Now that the background is clear, the proposed system can be designed in more detail. The SHARElease concept gets 2 main parts, SHARECar and SHAREride. With SHARElease, a user can receive financial benefit from lending out the car or taking other people. How this financial benefit will be designed is ambiguous and the questionnaire outcomes will give answer to the preference of possible users on this question. People who do not own a car can benefit from this system by subscribing to it and request for a car or a ride when they need.

With SHARECar, a user is posting the availability of his vehicle online, and other users can book the car. The car owner receives benefit for this, while the other user pays for it. Registration, payments, and identification will all be automatically.

With SHARERide, a user offers a ride on his daily route and other users can apply for this ride. One can choose others by the assessing their profile, so that pleasant combinations occur. Again the car owner receives a benefit for this while the other pays for it. And again, registration will be done automatically.

For more information on the system architecture and the stakeholders, please view Figure 4: System components and stakeholders.

The user assessment which is carried out next consists of a CONVERGE assessment and the questionnaire design. The CONVERGE assessment is build up out of seven stages, being: Definition of User Needs, Describing Applications, Defining Assessment Objectives, Pre-Assessment of Expected Impacts, Assessment Methods, Data Analysis and finally Reporting Results. It is the base for the further structure of the report. Four key stakeholders are discussed: Lease Company, Car-driver with lease car, Government and the traveler without a car.

Output from CONVERGE is brought into the questionnaire design. The questionnaire consists of 3 parts, being demographics, work characteristics and opinion about SHARElease. The questionnaire was distributed among a network of people working in companies with many lease car drivers and customers of Athlon Car Lease.

The questionnaire is distributed among approx. 1500 clients, of which 245 gave a response. This delivered around 230 useful respondents, of which only around 150 respondents could be included in the analysis due to time limits.

According to the results of the questionnaire 20% of the lease-car drivers is willing to make use of SHARElease. The potential user is concerned about environmental issues and has a preference for ridesharing over carsharing. The respondent that indicated that they do not want to make use of the new lease-concept, give as most important reason that they want to have their car always available.

Based on the results, a risk assessment is carried out according to the RAID analysis. Five major risks are identified. These are: Lack of support of government, Lack of initiative by lease-company, Lack of use by lease car driver, Privacy issues (the use of a somewhat private car) and Fraud/incorrect use of the system by its users. Based on the analysis, only for the first three, mitigation strategies have to be taken. These strategies are mainly aimed at risk control and consist of conducting more research, cost benefit analysis and market analysis, as well as starting with a pilot project. It can be concluded that most of the risks can be controlled by the Lease Company, though they are not the risk owner.

Based on results and risk analysis, some conclusions can be drawn. Though difficult to estimate, the effect on traffic demand could be of a scale of a reduction of total vehicle kilometres in the Netherlands of 1%.

The questionnaire has shown that there is a small base for the SHARElease-idea. This base has growth potential once the concept is implemented and proven functional. However, at this moment a full implementation of the concept is not viable. The concept can be implemented partly to draw attention for this new attitude towards mobility in order to make an implementation on a bigger scale in the future possible.

The outcomes of this research are showing that there is a potential for new ideas on mobility. SHARElease is originally designed to be implemented in the near future. C,mm,n is designed for the year 2020. Therefore, SHARElease or parts of the concept could be used as implementations along the route to the implementation of the c,mm,n.

For the development towards the implementation of the SHARElease-concept it is needed to write a business plan, which contains at least a cost-benefit analysis and a marketing plan.

The questionnaire has shown that employees are still highly dependent on the availability of their lease car. This signifies that they have a limited view on their own mobility. The attitude towards the mobility of employees should change to make the SHARElease-concept viable. The lease company can play an important role in this process towards a better use of all mobility means.

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INTRODUCTION

Every day, a lot of people drive their car to work while being the only person in the car. With the shift towards a higher sense of awareness on sustainable mobility, there's also a trend towards a more efficient, more economical use of the car. The shared use of the private vehicle.

Recently, pilots have been done on carsharing initiatives for private users. Concepts like the Greenwheels (or Zipcar in the USA) become more visible on street corners and there are numerous examples of similar initiatives.

There are also ideas which take the lease car company as initiator to a carsharing pilot, which is not strange considering the fact that currently, 40 percent of all new sold cars in the Netherlands are lease company owned.

A lot of new innovative technologies are used to help make these concepts a success. Innovations like key-less entry systems, internet based management and subscription systems and in-car registration systems (of fuel spent / kilometres driven) cater for the carsharing concept.

Another relatively new concept is the community based ridesharing systems that exist in the Internet currently. A system like the German Mitfahrgelegenheit (hitchhiking / carpooling community) provides the user with a database on available rides entered by other users. Applying for a ride can be done online.

The question arose whether an lease company initiated integrated carsharing and ridesharing concept could work as a B2E (Business to Employee) context. Is it possible to design a concept for this and to what extent would it work? What would be the impacts on user behaviour (more environmental awareness and more shared use of vehicles) or fleet management (more efficient fleet and maybe not a car for every employee) and might there be even a spatial impact (shifts in land use due to the possible impacts mentioned before)? These questions will be answered in this research.

Furthermore, this research will be coupled with the c,mm,n project, an open source concept to develop the car of the future (2020).

Research Goal & Questions

Based on the already existing initiatives found in the literature and the idea of focussing on the B2E market, the aim is to design and assess a concept which will integrate car-sharing and car pooling.

The goal of the research is thus described as:

“Design and assessment of an innovative integrated carsharing and ridesharing concept aimed on lease companies in a B2E context”

Derived from the goal, the main research question will be:

What are the impacts on lease car drivers, lease companies and the transport market, of an innovative integrated carsharing and ridesharing concept aimed on lease companies in a B2E context?

This main research question has to be subdivided in order to be able to use it in the research. Sub questions will be:

How will a well designed innovative integrated carsharing and ridesharing concept aimed on lease companies in a B2E context look like?

Given the design, how will the impact assessment on lease car drivers, lease companies and transport market take place?

The focus of the system will be that there is a combination of a highly innovative ridesharing system and a highly innovative carsharing system. This focus can be visually represented using Figure 1.

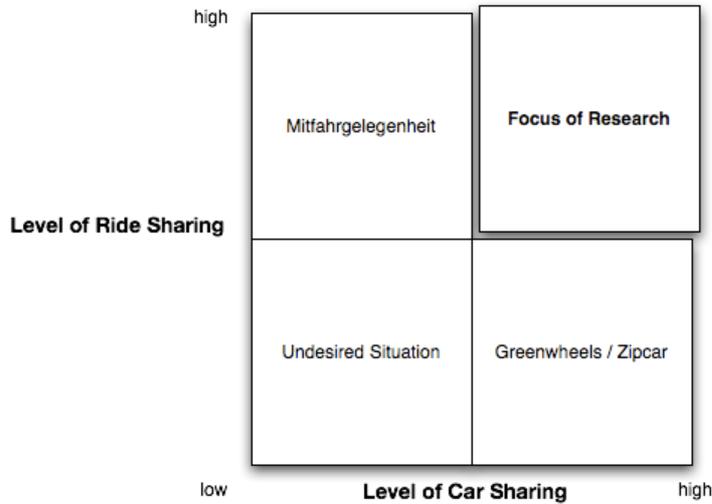


FIGURE 1 LEVEL OF RIDESHARING VS. LEVEL OF CARSHARING MATRIX

Scope

The aim of this research is to develop and design a lease concept in which carsharing and ridesharing are combined. The cars to be used are more environmentally friendly than current lease car models. The focus of the research will be on the end user, which is earlier described as researching the B2E market. The quantitative user assessment will be held among lease car drivers as well. This should gain insight in whether or not they are willing to share their car with others, if they are willing to take other people and what benefit they would like to receive. The result of this study should be some figures about the willingness to join the system.

THEORETICAL BACKGROUND

The theoretical background consists of two parts. First, an analysis of existing concepts of car-sharing and ridesharing will be done using scientific articles.

The second part consists of a quick market scan on the lease market. Answers to questions like the market share of leased cars in the Netherlands will be given.

Literature review

The concept of ridesharing and carsharing has been in the interest of many researchers. The concept of ridesharing is subject of scientific research since the end of the 1970's. The car-sharing concept is developed in the latest ten years. Environmental issues are becoming more important the latest years and attention is drawn to the decrease of pollution. A decrease of vehicle kilometres is a good way to decrease air pollution.

In the following sections several topics concerning ridesharing and carsharing are presented. First the definitions of ridesharing and carsharing are discussed.

Definitions

Ridesharing

Ride share is also termed lift share or journey share. There are some discrepancies between the different authors about the definitions of ridesharing and carpooling. Some authors see carpooling as a form of ridesharing, while others see ridesharing as something different as carpooling. Haster (n.d.) has a short description in which no difference is made between ridesharing and carpooling:

“Organised car pooling is the sharing of rides in a private vehicle among two or more individuals. An example of an organised form of car pooling is a website, sms, telephone lines etc.”

The Victoria Transport Policy Institute (2008) divides ridesharing into carpooling and vanpooling:

“Ridesharing refers to carpooling and vanpooling (the term is sometimes also applied to public transit, particularly commuter express bus); in which vehicles carry additional passengers. Carpooling uses participants' own automobiles. Vanpooling usually uses rented vans (often supplied by employers, non-profit organizations or government agencies). Most vanpools are self-supporting – operating costs are divided among members. Vanpooling is particularly suitable for longer commutes (10 miles or more each way).”

MCPS (n.d.) explains that carpooling is different from ridesharing. A rideshare is a personal arrangement to be driven regularly and not a formal commitment to share commuting responsibilities. Carpooling involves a mutual and reciprocal exchange of time and resources. Each member should drive and purchase gas. A carpool schedule should be agreed upon prior to committing to the carpool group.

Another well-known form of ridesharing is dynamic ridesharing. This concept is also known as instant ridesharing, ad-hoc ridesharing, real-time ridesharing or dynamic carpooling.

According to Wikipedia (n.d.) dynamic ridesharing denotes a special implementation of a carpooling service which enables the formation of carpools on very short notice. Typical for this type of carpooling is:

arrangement of one-time trips instead of recurrent appointments for commuters,
the usage of mobile phones for placing carpooling requests and offers through a data service,
automatic and instant matching of rides through a network service,

The network service compensates the driver by an integrated billing system.

Carsharing

The definition of Haster (n.d.) describes in general what carsharing is about:

“Carsharing means that a number of persons share the use of one or more cars. The use of a car is booked in beforehand and the user is paying a fee based on the distance and/or time.”

However, this description is not enough to fully understand the concept of carsharing. Shaheen (2006) describes the concept as follows:

*Individuals Gain Benefits of Private Vehicle Use Without Costs and Ownership Responsibilities.
Individuals Access Vehicles by Joining Organization that Maintains Fleet of Cars in Network of Locations.
Vehicles Are Frequently Located in Neighborhoods, at Transit Stations, or Businesses.
Carsharing Members Typically Pay for Use Through Hourly Rates and Subscription - Access Plans.*

However, this definition still is not complete. Hutchinson (2008) adds some characteristics to the concept:

“Car sharing is a sustainable transportation service that provides communities significant social and environmental benefits by reducing the use of vehicles and car ownership. It provides members 24x7 access to a dispersed network of shared vehicles, at unattended self-service locations, at affordable hourly and/or ‘per mile’ rates that include gas, insurance and maintenance. Car sharing allows members to save money over the cost of individual car ownership by encouraging members to drive less, use alternative transportation and utilize fuel efficient vehicles when a car is needed.”

The potential of ridesharing and carsharing

Nowadays there are several projects concerning ridesharing or carsharing, but there are no examples of projects which combine the two principles. To understand the development and the potential of both systems, the past, present and future should be considered. Therefore first a short history of ridesharing will be presented, since it has the longest history and after a short history of carsharing will be presented.

Ridesharing

The concept of ridesharing is almost as old as the car it selves. For the very first beginning people saw the opportunity of driving together to the destination. For example, in the Second World War, it was suggested to American consumers to share a ride to save fuel for the war.

Better organised projects concerning ridesharing can be found since the late 1970’s. Several researches have been performed on the development of carpooling, but they almost all found that the market share of car-poolers is small and stable.

There exist plenty of carpooling agencies for commuters, but there is no large scale operation of an instant ridesharing service today. However, pilot projects have proven the technical feasibility of such service.

Advanced concepts, only described in publications so far, explore options for position tracking of users using GPS enabled devices to avoid the necessity to manually enter the current position when requesting/offering a ride.

multihop matches: passengers change cars to get to their final destination (Wikipedia, n.d)

Visbeek and Van Renswouw (2008) have designed an incar system or interface called Karma, which is capable of picking up people that need a ride. They have called the feature “Flexibel carpoolen”.

Carsharing

Carsharing first appeared in Europe between the 1940s and 1980s (Cohen & Shaheen, 2007). However, the first known organised carsharing projects were developed in the late 1990’s. The last decade several project concerning car-sharing were set up and the first results were presented in articles. However, the scale of the projects is still relatively small. Today, carsharing operates in approximately 600 cities around the world, in 18 nations and on 4 continents. Approximately 348,000 individuals share nearly 11,700 vehicles as part of organized carsharing services.

Barth and Shaheen (2002) developed a useful classification framework for shared-use vehicles, which is shown in Figure 2. The classification makes no differentiation between car share for single users and car share which is combined with ride share. In the combination, multiple users can variously use the vehicles as drivers or passengers.

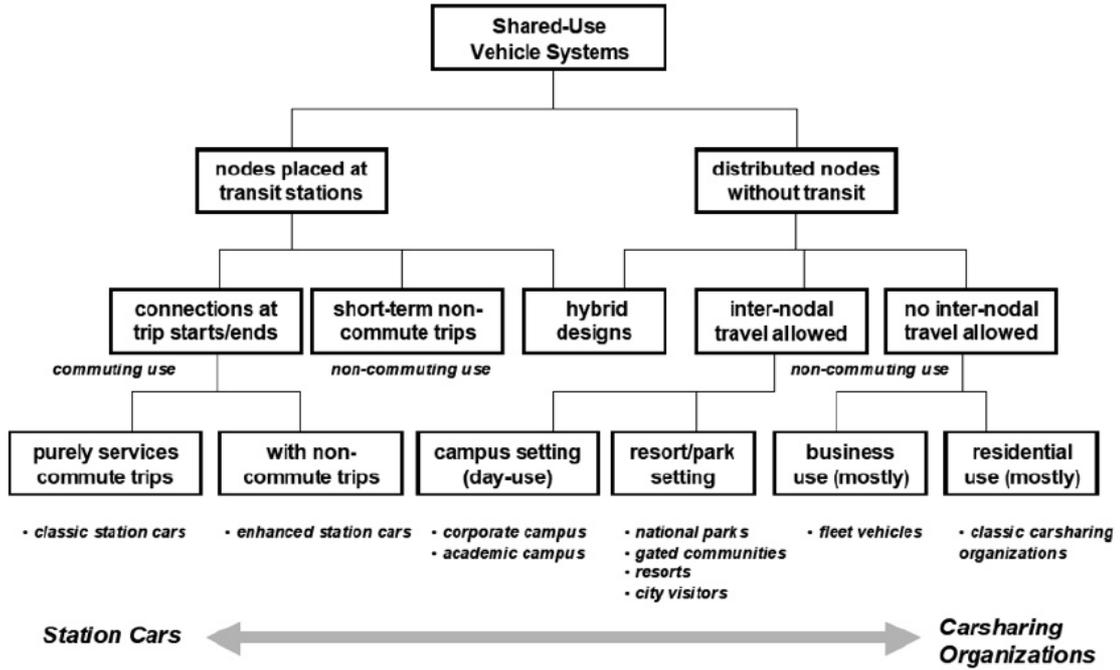


FIGURE 2 SHARED-USE VEHICLE CLASSIFICATION SYSTEM (BARTH & SHAHEEN, 2002)

According to Cohen & Shaheen (2007) the neighbourhood can be seen as the biggest market segment for carsharing in most countries. Also several countries have business as biggest market segment.

Lease Market

Lease is a form of hiring, with the transfer of certain ownership. There are two major forms of lease being financial lease and operational lease.

With financial lease, the legal ownership stays with the lease company where the economical ownership is being transferred to the customer. With operational lease the customer has no economical ownership. This means that the owner does not have to deal with tax, maintenance or issues alike.

The Dutch lease market is represented by the VNA, association of Dutch Vehicle Leasing Companies. The members of this VNA account for 86 % of the market. Every year the VNA publicises their yearly figures. Figures mentioned in this report are derived from the 2007 figures.

In the last few years, a rapid growth can be seen in the lease market. Growth in 2006 was 4,1% en in 2007 5,2% (VNA, 2008). The figure below gives the distribution of all cars in the Netherlands.

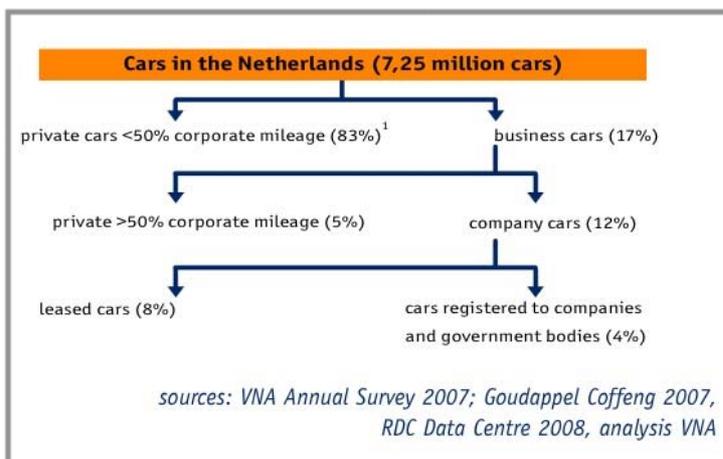


FIGURE 3 CARS IN THE NETHERLANDS (VNA, 2008)

The figure shows that the potential market this research is aiming on has an 8% of the total amount of cars in the Netherlands. These percentages seem to have been stable for the last years.

A large share of the lease fleet is taken by construction companies. They have car ownership levels of over 30%. Other interesting figures are average age of the current fleet, which was in 2007 little over 22 months, the fuel type (56% diesel, 42% petrol and only 2% LPG). The share of vehicles running on alternative fuel types is rapidly increasing. In 2007, there were 700 lease cars running on alternative fuels.

Finally, the number of new lease cars bought as a percentage of all new cars bought is presented. In 2007, this figure rose sharply and is now at 32%.

In contrast, according to Goudappel Coffeng (2007) the number of lease cars has decreased with 4% in the last years. However, the use of the lease cars has grown with 20%. Lease cars are responsible for 14% of the total car mobility in the Netherlands when presented in number of vehicle kilometres.

In June 2008 Automotive has held a questionnaire under dealers and lease-companies to ask for the current and future status of the lease market. In general the respondents were satisfied and optimistic (Automotive, 2008). One of the major prospects of the respondents was a bigger focus on sustainability in the future.

According to Kenan Aksular, innovation manager at Athlon Car Lease, in the near future the role of lease companies is shifting from car-provider to mobility manager (Aksular, 2008). The lease-companies are no longer focused on car-mobility, but also other forms of mobility. In this way they can present their customers the most efficient way of travelling.

DESIGN

This chapter will discuss the design of the system. The system will be called SHARELease, since it is predominately a new lease form which aims on sharing the car as much as possible.

As discussed earlier, the SHARELease system will consist of 2 main concepts, being the SHARECar and the SHARERide system. This chapter will discuss the design of both of the main components, as well as the overall system. First, a general outline of the concepts will be presented, before going discussing both SHARECar & SHARERide in more detail.

GENERAL

As mentioned earlier, the role of the car is seen as shifting from ownership to a tool for mobility. This shifting role is recognized by the lease market (Aksular, 2008). The SHARELease concept caters for this shifting role.

SHARELease is a lease concept which keeps the same prices and the same preconditions as current lease forms. However, there is a limitation that users have only the availability of a car which has the energy label A or B. The advantage of the system is the fact that a user can receive financial benefit from lending out the car or taking other people. How this financial benefit will be designed is ambiguous and the questionnaire outcomes will give answer to the preference of possible users on this question.

People who do not own a car can benefit from this system by subscribing to it and request for a car or a ride when they need. They can do requests over a web application which will inform users who stated they are willing to share their car or share a ride. They would pay about the price that is currently utilized in the carsharing or ridesharing market.

The lease company should take a leading role in the development of such a system. Already, the lease company is shifting from their role as a car provider towards being a mobility provider.

Possible advantages of the system are a lower amount of total car kilometers driven, more efficient use of a fleet of vehicles and the fleet becomes more sustainable since only the A and B labels are used. Finally, users become more aware of their own mobility.

Figure 4 shows the different system components in relation to each other and to different stakeholders. The components with a red circle are related to SHARECar and will be discussed in the paragraph SHARELease. The components with a green circle are related to SHARERide and will be discussed in the paragraph SHARERide.

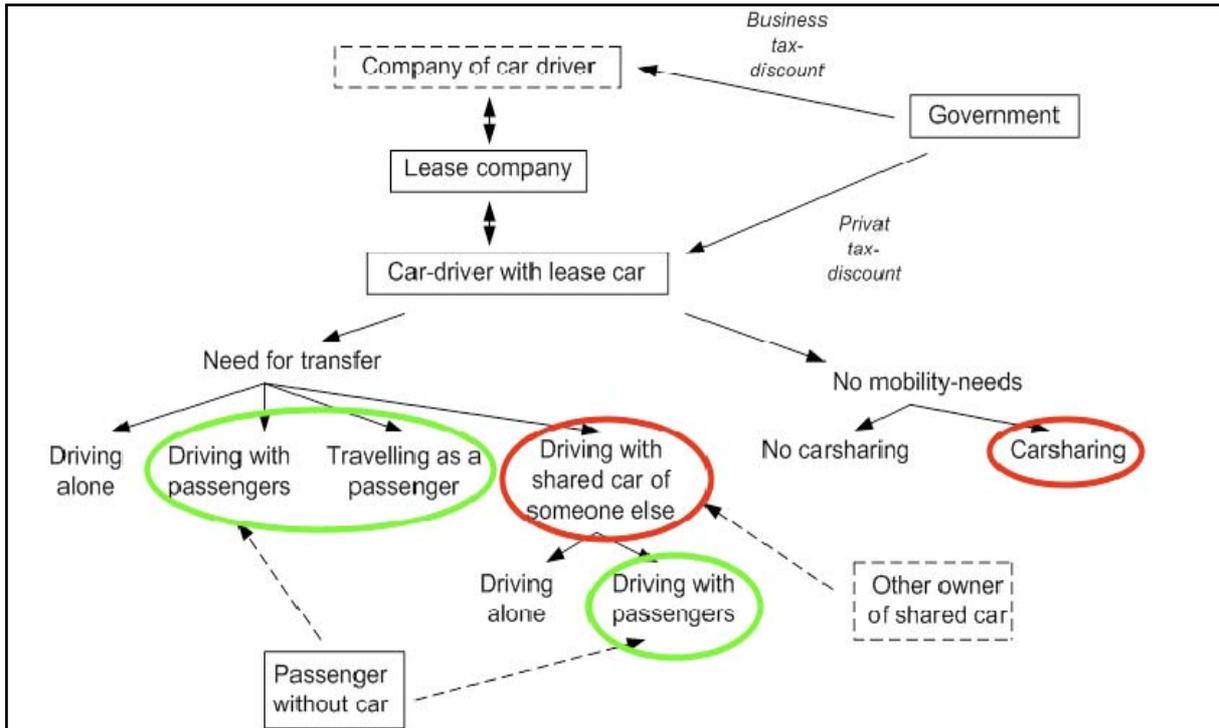


FIGURE 4 SYSTEM COMPONENTS AND STAKEHOLDERS

SHARECAR

When using SHARECar, a user posts availability online. Availability is the time where a user does not have to use the lease car and where it is possible for others to hire it. The user does not have to do anything, apart from giving availability and keeping the car clean and empty of personal belongings. This is a negative aspect of the system, since a user cannot store umbrellas, road maps or other belongings anymore in the car. However, this does not way up against the positive impacts of using SHARECar. The hirer can open the car with a code and does not need the keys of the owner. AI registration will be done automatically and the user can view the details of this registration online.

A user does not have to give availability if it does not fit his or her schedule. There is a full flexibility in choice of hours that a car can be given available.

Payment will be done per hour that a car is used by another person. If the car is not used while being available, no payment will be done. The exact amount is not known yet and will form a question in the questionnaire. A few Euros per hour is seen as reasonable.

The web application will be designed in such a way that it can combine schedules of different users and thereby create optimal solutions. Sharing of a car within a company is an option as well.

Of course, users would like to know who is driving “their” car and if the person who hires the cars is responsible. Therefore, ratings will be given to reliable users. This system can be compared to the seller reliability on the online market place of eBay.

SHARERIDE

Though SHARERide is a different component from SHARECar, they share the same background and web application. Users of SHARELease notify their daily route on the web application and notify if and under which conditions they are willing to take other users with them.

Conditions are the amount of extra time needed to pick up a person, the time and kilometers they will join the ride and a small personal description of the person to see whether interests match. SHARERide has a social part next to a transport related part.

If a user agrees on picking up, the intelligent navigation system will lead the user towards the person to be picked up. From here, everything will go automatically. Registration is done automatically and payments alike. After a ride, a user can give his preference in whether he or she liked the company or not. This way, a set of favorable people is generated which will be taken more often.

USER ASSESSMENT

This chapter will first discuss an assessment based on the CONVERGE method. Next, the questionnaire design will be discussed.

CONVERGE ASSESSMENT

Stakeholder Assessment is done using the CONVERGE method [Ertico, 1998]. CONVERGE is a structured method or guidebook for the assessment of Advanced Transport Telematics. The method consists of seven stages, being:

1. Definition of User Needs
2. Describing Applications
3. Defining Assessment Objectives
4. Pre-Assessment of Expected Impacts
5. Assessment Methods
6. Data Analysis
7. Reporting Results

Despite the fact that CONVERGE is primarily designed for the use with advanced transport Telematics, most of the stages are more or less applicable for the SHARELease concept.

In the next seven paragraphs, each of the stages will be discussed for the SHARELease concept.

DEFINITION OF USER NEEDS (STAKEHOLDER IDENTIFICATION)

The first stage is that the main stakeholders must be identified. This identification will consist of defining the interest of the different stakeholders (either positive or negative) and their actions in the realisation of the project. In the design concept diagram, the four main stakeholders were already identified. Those are:

- Lease Company
- Car-driver with lease car
- Government
- Traveller without a car

Other stakeholders involved are:

- Software developers
- Employer of the car-driver with lease car
- Manufacturers of entry system / registration device (KARMA)
- Legislative authorities
- Environmental NGO's
- Car Manufacturers

However, since the other stakeholders do not fall within the scope of the project, they will not be discussed further. Only the four main stakeholders will be discussed in more detail in the following paragraphs.

Lease Company

The lease company and the lease market are earlier described in the lease market scan. The interest of the lease company is first and foremost the creation of revenue by providing mobility. A secondary interest could be the contribution to environmentally friendly solutions of mobility. Lease companies are shifting their role from a provider of lease cars towards being a provider of mobility in more than one modality

The actions of the lease company in the realisation of the project are very broad. The need to be the initiator to the project. They need to do initial financing of the project, provide cars with the necessary equipment and the web-application that will serve as the interface between the different stakeholders or users should be managed by the lease company

Car-driver with lease car

This stakeholder will be the main user of the system and of the cars provided. A car-driver (or in some occasions the fleet or mobility manager) has to choose for the specific lease form or contract, which will give him or her tax benefit to a cost of less flexible mobility options. This can be either lending his or her car to other (carsharing) or taking other people for a trip (rideshare). To some users, this type of lease contract might appeal, to others not. The quantitative user needs assessment to be carried out at a later stage will answer the question to what extent this type of lease contract appeals to users. Questions that will be asked are to what extent they are willing to use the system, how many hours per week they are willing to share their car and how many times per week they are willing to share their ride.

The interest of the car driver is to have access to (car) mobility within certain flexibility. Another interest is value for money, regarding mobility, and when discussing the SHARElease concept, ease of use could also be in the interest of the car-driver. More detailed and confirmed answers can be given as a result of the quantitative user needs assessment.

The actions of the car-driver are in choosing the SHARElease concept instead of current lease alternatives. In order to make the system work, he or she has to play an active role in choosing when mobility is needed and when not, in order to make the cars free for other users at certain times and locations.

Government

At the moment, the government receives tax money from the car in different ways. Tax is levied on car purchase (purchase tax and VAT), car ownership and fuel tax. In addition, a road pricing scheme is in progress. Since lease car owners who use the car for private mobility as well don't pay those taxes, they have to pay extra income tax on the benefit they receive from having this form of mobility. This tax is 25% of the catalogue value of the car per year. For environmental friendly cars however, the tax is only 20% or 14% of the catalogue value of the car per year, depending on the amount of CO2 emission. This is one way of how the government is steering towards more environmental friendly car mobility. In the concept of SHARElease, the role of the government is to appreciate this new concept of mobility by reducing the tax percentage further.

The interest of the government is their policy goals towards mobility being met. This can be done by approving and appreciating measures like SHARElease.

Their action will be in the appreciation, as mentioned earlier.

Traveller without a car

This person seeks a form of mobility. The offer from SHARElease consists of a membership with access to 2 basic forms of mobility: SHARECar when they need a private form of transportation and SHARERide when they just need a ride from A to B.

The interest of this group is having access to the new forms of mobility through a reliable and easy to use (web) interface. Preferably this interface is reachable through different forms of communication devices. The design of this interface, which will be used both by this stakeholder and the owner of the lease car, can also be tested using the quantitative user needs assessment.

The action this stakeholder needs to take is subscribing and using the service. The more people join, the better the system will function. This counts for the user of the lease car as well.

Summary

The stakeholder outlines given above can be summarised in below table.

Stakeholder	Interest	Actions
Lease Company	Create revenue, provide mobility, contribution to the environment	Project initiator, financing, project manager
Lease Car driver	Access to mobility, flexibility, value for money, tax discount	Join, provide agenda details, create large base
Government	Meeting policy goals	Appreciation of project, give tax discount
Traveller without a car	Access to mobility, flexibility, value for money	Join, create large base

TABLE 1 STAKEHOLDER SUMMARY

DESCRIBING APPLICATIONS

The description of applications the SHARElease concept is consisting of will be done using the table below.

Application	Technologies	Function or Service	Verification
Web Interface	HTML, GSM, UMTS, GPRS, Database of users, database of cars (up to date)	Account Information, Availability, Booking, Billing, Fleet Management	NL
Car Interface / Chip Card / Mobile phone Communication / Recognition. RFID (Bluetooth?) Registration		KM / time / fuel registration. User identification	NL

TABLE 2 DESCRIPTION OF APPLICATIONS

Web Interface

The web interface will be the core of the system. It will have 3 main parts, being the part to be used by the lease car driver, the part to be used by the traveller without a car and the part being used by the fleet manager. The lease car driver uses the web interface to notify the system of moments when his or her car can be used by others. He or she can also view account details, see the amount of credits gained over participation and the discount to be received over the next time period. Of course, a lease car driver can apply for a car share or ride share as well.

The traveller without a car can subscribe to the website and gets an account. With this account, he or she can apply for a car share or ride share. The systems will match demand and supply and a few options will be presented. The more intelligent the system will be built, the better the options and mobility advices could become. One could even think of the system suggesting public transport or NMT alternatives in order to reach departure point or destination. Payment can also be done using the web interface.

The fleet manager or mobility manager (responsible for the car park of a company) has access to certain information about the fleet of cars in his or her company participating in the SHARElease program. Information can be gathered about time and km driven, fuel consumption or even real time track & trace.

Technologies to be used in the web interface are all existent. A website has to be built and some underlying concepts have to be built in. The website has to be built in such a way, that it is reachable from different communication devices (i.e. including mobile devices). Therefore, connection over GPRS or UMTS has to be made possible.

Car Interface / Communication / Registration

Vehicles that are joining the SHARElease program will be equipped with a device in which several devices will be incorporated. First of all, the device will make a user gain access to the vehicle, without the use of a key. This can be done using a smart card, mobile device or a personal code. The device will register who is using the car (the lease car driver or a SHARECar user) and register the time and km driven. This registration will be communicated to the Web Interface using GPRS data connection or other data communication alike.

DEFINING ASSESSMENT OBJECTIVES

To meet the earlier described user needs, assessment objectives need to be described. This is done by translating the user needs to assessment objectives and then categorise them. The assessment categories are:

- Technical Assessment
- Impact Assessment
- User Acceptance Assessment
- Socio-economic Assessment
- Market Assessment
- Financial Assessment

The most important categories concerning this research will be chosen. The presentation of the definition of assessment objectives can be done using another table, which will be presented below.

Assessment Category	Assessment objective	User Groups involved in validation
Impact Assessment	Measure Traffic Impact (derived from demand) Lower general traffic demand	Lease car driver, Traveller without car
User Acceptance	High user acceptance of system / willingness to pay	Lease car driver, Lease company, government
Market Assessment	High future demand for system	Lease car driver, Lease company, government

TABLE 3 ASSESSMENT OBJECTIVES

As seen from the table, focus will be on three assessment categories (Impact Assessment, User Acceptance Assessment and Market Assessment). Different user groups are mentioned, and they will all have their impact in the assessment. However, focus for the assessment will be on the lease car driver, because it appears in all types of assessment and is easy to reach given the limitations in time and funds.

The questionnaire will also measure user acceptance. Users will be asked to what extent they are willing to use the systems and what their motivation is to use (or to not use) the system.

PRE ASSESSMENT OF EXPECTED IMPACTS

Next step is the pre assessment of the expected impacts. The table shows the expectation of the expected impacts.

Impacts Expected	Target Groups	Impact
Measure Traffic Impact (derived from demand) Lower general traffic demand	Lease car driver	+
Higher user acceptance of system / willingness to pay	Lease car driver	+
Higher future demand for system	Lease car driver	+

TABLE 4 PRE ASSESSMENT OF EXPECTED IMPACTS

The impacts of the system on the general demand for traffic will be positive, although probably marginal. The idea is that the impacts will largely come from the part of SHARERide. The scale of these impacts will be derived from literature and will be discussed in the conclusions chapter.

This system is, though built up from existing components, as a whole quite unique. Therefore, there are no benchmarking figures regarding user acceptance. However, since car drivers are in general sensitive to financial measures, the expectation is that there will be quite a high user acceptance. The results from the questionnaire will tell whether this expectation is correct or not. The same counts for the higher future demand for the system. User acceptance and future demand are highly correlated.

ASSESSMENT METHODOLOGY

The assessment methodology stage defines how the actual assessment is taking place. In order to structure this stage, seven key steps are defined. Those are:

1. Definition of Indicators
2. Reference Case
3. Data Collection
4. Conditions of Measurement
5. Statistical Consideration
6. Measurement Plan
7. Integrity of Measurement

The seven key steps will be discussed next.

Definition of Indicators

There are two main criteria important for the definition of indicators. First, they have to be able to reflect clearly the related performance or impact. Secondly, they must be capable of reliable assessment.

The indicator for the impact on traffic (impact assessment) will be the demand for car travel. Though it is difficult to extract figures on car travel demand in this research, there are some figures on the impact of car-sharing initiatives on car travel demand. When the impact of SHARElease can be determined, a cautious estimation of changes in car travel demand can be done.

An indicator for user acceptance would be the willingness to use the system which can be measured in a 5-point scale. Furthermore, questions that indicate the extent to which users are going to use the system (the amount of hours that a car is available or the number of people a user wants to take per week) will be asked in the questionnaire.

Reference Case

Since the main focus will be on the user analysis, the reference case should be chosen from the user perspective. Therefore, the logical choice is one of the current lease concepts. The standard full operational lease with the right to use the car for private trips will be chosen as a reference case, and research will be structured around this reference case.

Data Collection

Data will be collected under users of a lease car. A questionnaire which will be online available will be distributed among organisations with a large number of lease car drivers. The companies which are asked to participate are Dura Vermeer (Construction), TNO (Research), Vialis (Consultancy), Witteveen & Bos (Consultancy), Goudappel Coffeng (Consultancy), AOS Studley (Consultancy) and more organisations alike. These companies have a high amount of lease car drivers.

Another pool of data will be collected from clients of Athlon Car Lease. This lease car company distributed the questionnaire among 1500 of their clients. Most of them are working in consultancy.

Conditions of Measurement

In order to get proper research results, the conditions around the measurement should be managed and be stable as much as possible. For the user research, this would mean that users have a same knowledge background on lease, carshare and rideshare, which can be provided as an information sheet through the questionnaire.

Statistical consideration

The population which will respond to the questionnaire needs to be as homogeneous as possible. Since there is no budget for research, and respondents are hard to find, every input is needed. This however, can cause some biased results and a false representation of the population. The consequences of this problem will be discussed in more detail in the paragraph of data collection.

Measurement plan

There are no considerations to be taken regarding the measurement plan. Since there will be no field trials or test applications, measurements will not be influenced in any way.

Integrity of Measurement

There are three considerations for the integrity of measurement. Those are completeness, insularity and disturbance of the validation process. All are to neglect regarding this research.

DATA ANALYSIS

Data analysis will be done using SPSS. This software package is especially designed to work with questionnaires.

REPORTING RESULTS

First, the results will be presented, where after a risk analysis will be done. Secondly, the results will be combined with the literature. Results should give insight in possible supply for the system whereas literature should give figures about possible demand.

QUESTIONNAIRE DESIGN

The questionnaire is developed with the criteria from CONVERGE in mind.

The questionnaire consists of 3 parts. The first part is designed to receive general demographic information on the respondents. In the second part, more details on work characteristics are asked and the third and final part will ask opinions on the SHARElease system. Next, the three parts will be discussed.

An example of the questionnaire can be found in appendix 1.

DEMOGRAPHICS

Demographic data is asked for 2 reasons. First, it serves as a monitor for the distribution of the sample of population that is received. Disturbances in this sample can be taken in consideration when reviewing results. Secondly, Demographics can give insight in certain relations between e.g. age or education and the opinion on the system. Literature gives some statements about opinions on car-sharing (e.g. car-sharing is more positively received by higher educated people in their 30's) which can be verified with the data received from this questionnaire. Other relations between demographics and the opinion about the system can also be discovered and explained.

The demographics section contains questions on: gender, age, family situation, housing situation (spatial), income and education.

WORK CHARACTERISTICS

The assumption is that relations can be found between certain work characteristics and car-sharing. One assumption is that the more a person is using the lease car for work purposes, the less interested he or she is in the SHARElease concept. There could be relations found between the opinion on car-sharing and the work sector. Other relations could be that people with a lower travel distance to work are less likely to participate in ride-sharing, because the benefits do not weigh up against the effort.

The work characteristics section contains questions on: single trip distance to work, working situation (spatial), sector, availability of a lease car, km per year travelled for business purpose and km per year travelled for non business purpose.

SHARELEASE OPINION

The final part of the questionnaire consists of the questions specific on SHARELEASE. The results of this part could give an idea on the supply to be expected when this system would be implemented. If the supply is not sufficient, analysis and relations between work characteristics and demographics can give directions on how to improve the supply.

Furthermore, incentives for the use or not use of the system are questioned, and the issue on how to receive the benefit and the amount of benefit are also discussed

In order for respondents to have the same knowledge before answering the questions, a short introduction to SHARELEASE is given as well.

The SHARELEASE section contains questions on: likeliness of use of SHARELEASE, incentive for the use of SHARELEASE, incentive for the non-use of SHARELEASE, receiving benefit, preference for one of the components over the other, availability for SHARECar and SHARERide, amount of benefit received for use.

RESULTS OF THE QUESTIONNAIRE

In the following paragraph the results of the questionnaire will be presented shortly. An extensive presentation of the results of the questionnaire is presented in Appendix 2. The questionnaire was first distributed among our own network on a small scale. This gave 27 useful responses. The response to this first version of the questionnaire was used to improve the questionnaire for a distribution on a larger scale. The cooperation with Athlon Car Lease made it possible that the questionnaire was distributed among approximately 1,500 lease-drivers, which were all clients of Athlon Car Lease. Because Athlon Car Lease already has plans to run a pilot-project which is also called SHARElease, but is a slightly different concept, the choice is made to make use of a different name in the second version of the questionnaire, c,mm,nLEASE. 250 respondents have answered the questionnaire. However, since the link to the questionnaire was distributed too close to the deadline of the project, not all the answered questionnaire could be taken into account. In the processing of the results only 142 questionnaires could be taken into account, of which 126 were useful. The main criteria on what base the results were selected, was whether an answer was given to the most important question of the questionnaire: Will you make use of SHARElease? In total, the answers of 153 respondents are discussed. It should be considered that the results of the questionnaire will not give a complete image of the opinion of lease-car drivers, but give at least a small impression of their characteristics and preferences.

The paragraph is divided into several parts. First the demographic and work characteristics of all the respondents are presented. Next the preferences of the potential users are discussed and finally the opinion of criticsasters of the concept is taken into account.

DEMOGRAPHIC AND WORK CHARACTERISTICS OF RESPONDENTS

In 2007 Goudappel Coffeng conducted a survey to the characteristics of the driver of a business car. As was presented before around 50% of a the business cars are lease cars.

According to the survey the typical driver of a business car is 43 years old, often a man, married or living together. Further has the driver in many cases one or two children, a relative high education level, 40% has a household-income of more €60.000, makes extraordinary long workweeks and is often a manager. Finally the driver of a business car often has a second (or even third) car available in the household.

It seems that the group of respondents with an age between 25 and 34 years is slightly overrepresented in the sample. This can be explained by the fact that this generation is possibly more willing to respond to questionnaires like this one and more positive about the concept. Only half of the respondents has children, but this can be explained by the overrepresentation of young respondents. Furthermore a majority is married. This corresponds with the image of a typical business car driver.

It can be concluded that the lease-car driver does not have a typical place of living. However, a majority lives in an urban environment. The income of an average lease car driver is spread around 2 times modal, which is consistent with the image of a typical lease car driver. 92% of the respondents has finished an education at HBO or WO-level. This seems rather high, but in general for a job with a lease car this level of education is needed.

The average distance a lease-car driver has to travel from home to work is around 50 kilometres. A large majority of the respondents states they are working on a business & science park. While 76% gave this answer, a minority is working at a mixed living and working area or an isolated working area. Since on business & science parks the companies are close together, these parks have potential for the SHARElease-concept. With 82% the service & consultancy sector is overrepresented in the results of the questionnaire. However, the service sector is a broad definition of several specific sectors. Possibly the possession of a lease car is likely in the service sector. The questionnaire was mend for lease car drivers in general, so maybe employees in other branches who do not have a lease car available did not respond to the questionnaire. 92% of the respondents had a lease car which they also use for private purposes and 5% uses its lease car only for business purposes. 5 respondents had no lease car available, but remarkably 2 of those were interested in the SHARElease-concept. The respondents without a lease car are not excluded from the results. The average distance per year travelled

for business purposes is around 30,000 kilometres and the average distance travelled per year for private purposes is around 10,000 kilometres.

CHARACTERISTICS OF POTENTIAL USERS

POTENTIAL OF SHARELEASE

Figure 5 shows the opinion of all the respondents to the questionnaire to the SHARELease-concept. For this figure can be concluded that 20% of the lease-car drivers is positive about the concept and will make use of it, once implemented.

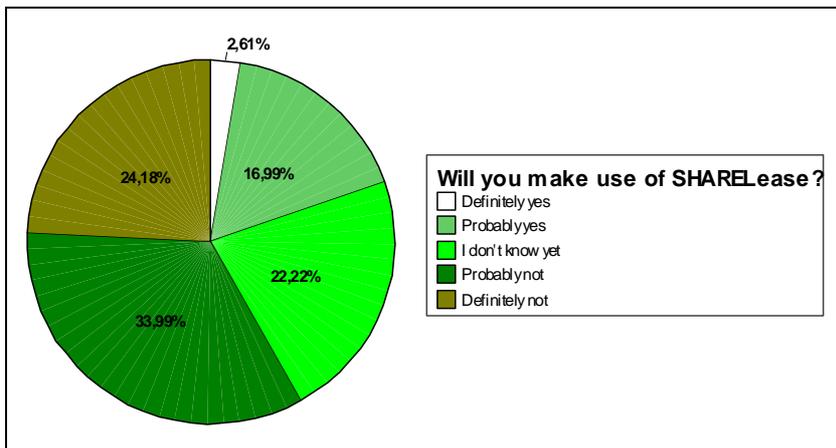


FIGURE 5 POTENTIAL OF SHARELEASE

In the following section only the opinion of the group of lease-car drivers which were positive about the SHARELease-concept are taken into account. Most of the other respondents have also responded to the questions about the design of the SHARELease-concept, but since these respondents have a negative opinion about the concept, they are excluded. The reasons why this group is negative, is presented in the last section.

REASONS WHY TO MAKE USE OF SHARELEASE

In the questionnaire all the respondents could choose for three described reasons and also write down a different reason.

93,3% of the positive respondents choose the lower costs as a reason to make use of the concept. 73,3 % is positive about the concept because of the environment friendly character of it and the opportunity of meeting new people is only for 20% of the positive respondents a reason. From these facts is seems that the respondents that indicate to make use of the SHARELease-concept take environmental issues in consideration. But even more they want to reduce their expenditures to their lease-car.

WAY OF RECEIVING REWARD

The respondents were also asked to their most favourable way of earning the benefit of using SHARELease. This was a component of the design which was not clear yet. 90% of the positive respondents opted for the discount on their tax over the possession of a lease-car in the next month.

Only one respondent chooses mobility points as benefit. For this can be concluded that lease car drivers are not thinking of transferring between different forms of mobility. In the questionnaire also the option of free fuel was included, but an employee will not see this as a benefit, since the fuel is not paid by the employee, but by the employer.

PREFERENCE FOR ONE OF THE COMPONENTS EXPRESSED IN TIME

The respondents were also asked to their most favourable option when they will make use of SHARELease. The results show that the positive respondents are more willing to take passengers with them than make their car available for other users. In this case, the SHARERide-component is more popular than the SHARECar-

component. However should be taken into consideration that the scaling of the option can be wrong, since all the options consist of two components. The two components can be weighted differently by the respondents.

AVAILABILITY FOR CARSHARING

Figure 6 shows the estimated availability of the lease car for carsharing in hours per week. More than half of the respondents has chosen an option in which their car is more available than the minimal option. This indicates that a majority of the positive respondents is willing to share their car on a regular basis.

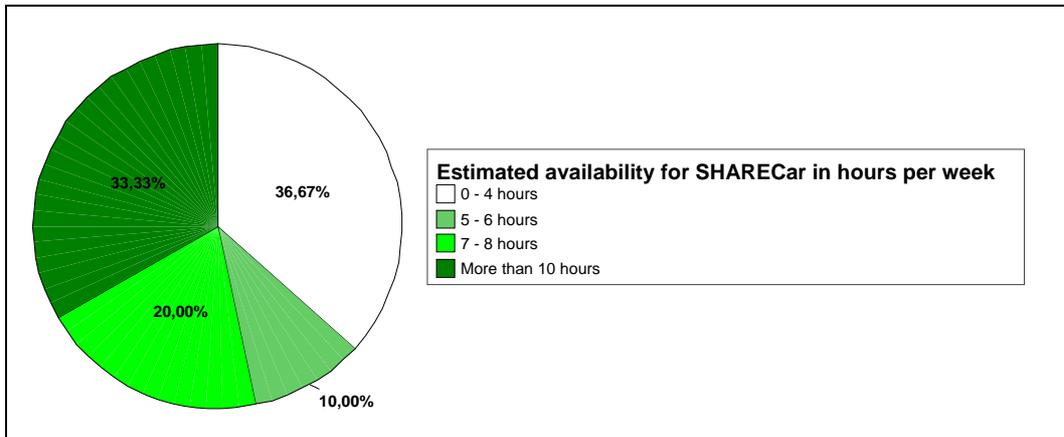


FIGURE 6 ESTIMATED AVAILABILITY OF LEASECAR FOR SHARECAR

AVAILABILITY FOR RIDESHARING

Figure 7 displays the estimated willingness to pick up other passengers. Ridesharing requires more effort than carsharing, because for ridesharing the driver should leave its optimal route. This causes a increase of travel time and costs. The costs depend on the value of time of the driver. However, a smart navigation system can reduce the costs, because the benefit of picking up a passenger can overweight the cost of the loss in time. According to the figures the willingness to participate in the SHARERide-component is even bigger than for SHARECar, since a smaller percentage of positive respondents chooses the minimal option.

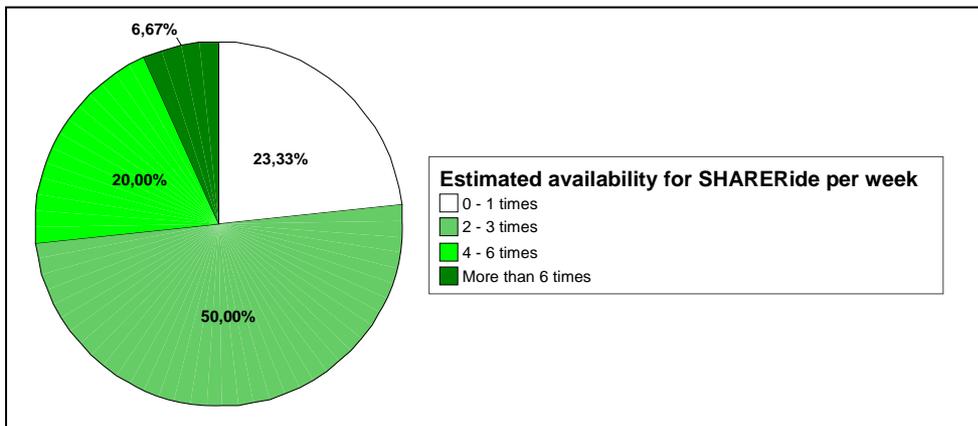


FIGURE 7 ESTIMATED AVAILABILITY OF LEASECAR DRIVER FOR SHARERIDE

PREFERENCE FOR ONE OF THE COMPONENTS EXPRESSED IN MONETARY BENEFIT

In the last question of the questionnaire the respondents were also asked to their most favourable option when they will make use of SHARElease, but in this case the characteristics of the components were expressed in monetary value instead of time. The results show that the positive respondents are more opting for a higher benefit for taking passengers with them than making their car available for other users. Also in this case, the SHARERide-component is more popular than the SHARECar-component. However also in this case should be taken into consideration that the scaling of the option can be wrong, since all the options consist of two components. The two components can be weighted differently by the respondents. The values for the monetary benefit are chosen by reason and can cause a wrong representation.

RELATION BETWEEN AGE CATEGORY AND USAGE OF SHARELEASE

It was expected that younger drivers are more likely to have a positive opinion about the new lease concept. However, there can be no relation found between the age-category and the potential use of SHARELease.

CHARACTERISTICS OF RESPONDENTS WITHOUT POTENTIAL OF USING SHARELEASE

Finally, the respondents that had a negative opinion about the usage of SHARELease are taken into account separately. It is especially interesting to investigate what would be their reasons not to choose for the use of SHARELease.

88,6% of the negative respondents gave as a reason that they want to have their car always available. 47,2% allows no one else driving in their car, 41,5% said it is too much effort for too less benefit and 39,8% stated that they are using their car too much to receive enough benefit.

From this results can be concluded that especially the availability of the car is the biggest issue and not the use of the car. This causes a remaining disuse of lease cars.

RISK ASSESSMENT

The deployment of an Intelligent Transport System is complex and brings many risks with it. The risks that can harm the deployment of an Intelligent Transport System can be identified by using the RAID approach. RAID stands for Risk Analysis of ITS Deployment, and is developed by the European Union Telematics Application Programme. RAID focuses (as well as CONVERGE) on the risk assessment of Transport Telematics. Therefore, it is somewhat difficult to apply on the SHARELease concept. The RAID approach consists of three steps:

- Step 1: Identification of risks
- Step 2: Development of risk mitigation strategies
- Step 3: Recommendations

These steps will be discussed in the following paragraphs.

IDENTIFICATION OF RISKS

The first step in RAID is the identification of risks. This identification is structured in again three steps, being:

- deployment scenarios
- implementation constraints
- threat assessment

The first step is to develop a deployment scenario. The deployment scenario is the framework in which a risk can take place. Multiple scenarios can be presented. However, given the low complexity of this project, only one deployment scenario is presented. The framework is presented below in Table 5.

Geographical Scope	Urban or Interurban
Main trends for ITS development planning	ITS strategies aimed at using Telematics applications for traffic demand management by introducing access restrictions and other dissuasion measures.
The level of public and private co-operation	Mixed situation of public and private actors (both government and lease company)
Time Horizon	Risks and mitigation of risks are likely to occur between deployment (2009) and 2012

TABLE 5 DEPLOYMENT SCENARIO

Next step is the identification of risks according to a RAID defined framework. Only the main (and already consolidated) risks will be discussed, despite RAID is capable of and designed to handle many risks. The main risks to be discussed in this chapter and according to the scenario are:

- Lack of support of government
- Lack of initiative by lease-company
- Lack of use by lease car driver
- Privacy issues (the use of a somewhat private car)
- Fraud/Incorrect use of the system by its users

The extent of a threat is described in its consequences, the probability of occurrence and the level of impact. The latter two are also rated as a high (H), medium (M) or low risk (L). According to this rating, a risk receives a color code. This color code can be Green, Yellow, Orange or Red. Orange and Red risks are suitable for mitigation strategies.

Next, the five earlier described risks will be described in more detail according to the RAID framework.

Threat description	Lack of support of government. Government does not see a need for investing in the project.
Threat consequences	No support in tax reduction. Look for other ways of (monetary) benefit from the system.
Probability of occurrence	Difficult to estimate. Government should support from a policy point of view, but there are many alternatives. (M)
Level of impact	Tax benefit is likely to be the strongest incentive for use. If this benefit cannot be guaranteed, support drops. High impact (H)
Risk rating scheme	High & Medium = Orange

TABLE 6 RISK – LACK OF SUPPORT FROM GOVERNMENT

Threat description	Lack of initiative by lease-company. The lease company does not see the benefit for investment. The major initiator drops.
Threat consequences	No funding for the system. High ambiguity if the project can start.
Probability of occurrence	For the moment, clear figures on the possible success of the system are lacking. A lease company might want to gain more insight, or else won't join. (M)
Level of impact	No system, no SHARELease. (H)
Risk rating scheme	High & Medium = Orange

TABLE 7 RISK – LACK OF INITIATIVE BY LEASE COMPANY

Threat description	Lack of use by lease car driver. Although both government and lease company support the system, the end user won't.
Threat consequences	A lot of money invested in a system that receives no customers.
Probability of occurrence	Questionnaire shows that 20% of lease car drivers is willing to use it. This seems to be enough for the investment (M)
Level of impact	If the base of users is not big enough, the system wont function. (H)
Risk rating scheme	High & Medium = Orange

TABLE 8 RISK – LACK OF USE BY LEASE CAR DRIVER

Threat description	Privacy issues. The system cannot work because of legislation on privacy.
Threat consequences	A possible lawsuit, heavy modification of the system or cancelling the project.
Probability of occurrence	The private information used by SHARELease seems to be not more than is similar existing systems. (M)
Level of impact	With some modifications, the system could be continued. (M)
Risk rating scheme	Medium & Medium = Yellow

TABLE 9 RISK – PRIVACY ISSUES

Threat description	Fraud or incorrect use of the system by its users. Users will abuse the system due to flaws in design.
Threat consequences	Undesired use of the system. Loss of revenue.
Probability of occurrence	Since the idea is to use state of art systems in identification and security, the occurrence is not too high. It always stays vulnerable to hackers or alike. (M)
Level of impact	When information density towards the lease company is high enough, fraud or (deliberate) incorrect use can be discovered early in order to halt it. (M)
Risk rating scheme	Medium & Medium = Yellow

TABLE 10 RISK – FRAUD OR INCORRECT USE OF THE SYSTEM BY ITS USERS

From the five risks described above, only three receive an orange color code. These are the lack of support by the government, the lack of initiative by a lease company and the lack of use by the user. The remaining two risks received a yellow code and are hence not taken into account in the next step, the development of risk mitigation strategies.

Before starting with development of risk mitigation strategies, risks have to be consolidated. Because of the low complexity of the system and the low amount of risks that are discussed no consolidation will take place.

DEVELOPMENT OF RISK MITIGATION STRATEGIES

The development of risk mitigation strategies will be done according to a defined framework as well. For each risk, actions can be described to mitigate this risk. Furthermore, the actor who has to take the action is mentioned as well as the type of risk mitigation, being either a risk control or risk avoidance action. Actions will be described per risk. Presentation of the actions will be done in the table below.

Action	By whom	Type
Give other forms of benefit other than Tax Benefit.	Lease Company	Avoidance
Convince Government by presenting results (91% of users would like to receive benefit)	Lease Company	Control

TABLE 11 RISK MITIGATION – LACK OF SUPPORT FROM GOVERNMENT

Action	By whom	Type
Use results of this research as input for a Cost & Benefit analysis	Lease Company	Control
Start a relatively small pilot with low starting costs, in order to figure out the potential for the project.	Lease Company	Avoidance

TABLE 12 RISK MITIGATION – LACK OF SUPPORT BY LEASE COMPANY

Action	By whom	Type
Heavily promote system and use testimonials to prove the benefits of the system	Lease Company / Lease Car Driver	Control

TABLE 13 RISK MITIGATION – LACK OF SUPPORT BY LEASE CAR DRIVERS

RECOMMENDATIONS

In the last chapter, risk mitigation strategies are presented for the risks. It can be concluded that most of the risks can be controlled by the Lease Company, though they are not the risk owner.

Further research is necessary to take away the ambiguity that is a source of many of the risks presented. To a certain extent this mean the performing of actions that are mentioned earlier. When more is clear, some risks might solve without taking action.

CONCLUSION

This chapter will draw some conclusions based on the research done. First, the impact on traffic will be discussed. Secondly, something can be said about the impact on the lease car driver who wishes to participate. Then, possibilities for lease car companies are reviewed. Finally, the cooperation between SHARElease and c,mm,n will be discussed.

TRAFFIC DEMAND

Though very difficult to estimate any effects on traffic without extensive research and possibly modelling, it is possible to say something about the extent to which the effects of this concept could reach. As mentioned in the literature review, 14% of all vehicle kilometres in the Netherlands are produced by lease car drivers. When assuming that the respondents form a good sample of lease car drivers (with an average amount of kilometres) in the Netherlands, it can be concluded from the questionnaire that 20% of lease car drivers is willing to join the program. This would mean that 2,8% of vehicle kilometres are influenced by the system. The problem is that the extent of this influence is highly unclear. However, the people that like to join are highly motivated to participate as much as possible. If a reduction of 1/3 of vehicle kilometres could be accomplished, the total number of vehicle kilometres in the Netherlands could be reduced by a percent. Though this figure sounds very small, the effects could be quite high in peak hours, where the percentage of lease car drivers is higher.

The effect will again be reduced by the new demand created with SHARECar. This means that some cars will be used more which will increase total kilometres per car. On the other hand, people who use carsharing schemes take more notice of their mobility and will reduce it often.

Concluding, effects on traffic could be quite high, but more research is needed to give more accurate figures on these effects. How this could be done will be described in the chapter recommendations.

THE LEASE CAR DRIVER

To investigate the potential of the SHARElease-concept among lease-car drivers a questionnaire is distributed among lease-car drivers in our own network and in cooperation with Athlon Car Lease among 1,500 clients of them. This delivered around 230 useful respondents, of which only around 150 respondents could be included in the analysis due to time limits.

According to the results of the questionnaire 20% of the lease-car drivers is willing to make use of SHARElease. The potential user is concerned about environmental issues and has a preference for ridesharing over carsharing. The respondent that indicated that they do not want to make use of the new lease-concept, give as most important reason that they want to have their car always available.

The lease car driver will most likely change his or her mobility pattern due to participation in the SHARElease program. To receive more benefit out of the SHARECar-component, it will make the lease car more available. This requires a better thinking about the possible trips during a day. The SHARERide-component becomes more beneficial when more passengers are picked up. To pick up other passengers takes more time, which causes that the lease car driver should depart earlier to arrive on time at their desired destination. Half of the positive respondents estimates they will pick up 2 to 3 passengers a week.

A VIABLE BUSINESSMODEL?

The questionnaire has shown that there is a small base for the SHARElease-idea. This base has growth potential once the concept is implemented and proven functional. However, at this moment a full implementation of the concept is not viable. The concept can be implemented partly to draw attention for this new attitude towards mobility in order to make an implementation on a bigger scale in the future possible.

One of the proposed mitigation strategies in the risk analysis is the start of a pilot of SHARELease among a small group of clients, preferably within one company. The pilot gives ideas about how a possible larger implementation would be without the cost of a large implementation.

INTEGRATION WITH C,MM,N

The outcomes of this research are showing that there is a potential for new ideas on mobility. SHARELease is originally designed to be implemented in the near future. C,mm,n is designed for the year 2020. Therefore, SHARELease or parts of the concept could be used as implementations along the route to the implementation of the c,mm,n. Also, results can be used as a justification of certain systems designed for the c,mm,n car, such as the earlier described KARMA device. A smart navigation system, which is able to navigate to passengers, is part of the KARMA device. This smart navigation system can make the implementation of the SHARERide-component possible. The SHARECar component can be implementation once the attitude towards mobility has changed.

RECOMMENDATIONS

For the development towards the implementation of the SHARELease-concept it is needed to write a business plan, which contains at least a cost-benefit analysis and a marketing plan. Due to the scope of the project this could not be implemented in this research. This research can be seen as a first exploration of the potential of the SHARELease-concept. Before the distribution of the questionnaire it was unknown what the potential would be. The potential for the concept is needed as an input for a business-plan. With the potential an estimation can be made of the scale of the implementation and the costs and benefits it will cause. For a marketing plan the scale of implementation needs be determined and a profile of the potential users. Because of the scale of this project and the limited time left after the analysis of the results of the questionnaire, this could not be included.

The questionnaire has shown that employees are still highly dependent on the availability of their lease car. This signifies that they have a limited view on their own mobility. The attitude towards the mobility of employees should change to make the SHARELease-concept viable. The lease company can play an important role in this process towards a better use of all mobility means. As was mentioned before, Athlon Car Lease already has plans to run a pilot on the SHARELease-concept in a slightly different form. Their idea is to place shared cars at business locations of which the employees can make use of when necessary. This business-idea suits with the conclusions of our research. The employee is not yet ready to share their car with others.

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SHARELease

A new lease-concept combining carsharing and ridesharing

Appendices

APPENDIX 1: QUESTIONNAIRE (IN DUTCH)

Vragenlijst SHARElease

Hartelijk dank dat u wilt deelnemen aan onderstaande enquête. Voor het open source mobiliteitsproject c,mm,n, onderzoekt een groep studenten van de Universiteit Twente het gebruikspotentieel voor een nieuwe leasevorm, genaamd SHARElease. De enquête bestaat uit 3 onderdelen. In deel 1 worden persoonlijke gegevens gevraagd en in deel 2 gegevens over werk en leaseauto gebruik. In deel 3 wordt, na een korte introductie van SHARElease, in een aantal vragen uw mening over SHARElease gevraagd. De enquête duurt ongeveer XX minuten. Veel Succes!

Deel 1: Demografische gegevens

1. Bent u een man of een vrouw?

- Man
- Vrouw

2. Wat is uw leeftijdscategorie?

- Jonger dan 25 jaar
- 25 t/m 34 jaar
- 35 t/m 44 jaar
- 45 t/m 54 jaar
- 55 t/m 64 jaar
- 65 jaar of ouder

3. Kies de gezinssituatie die het beste bij uw situatie past.

- Alleenstaand zonder kinderen
- Alleenstaand met kinderen
- Samenwonend / gehuwd zonder kinderen (of kinderen uitwonend)
- Samenwonend / gehuwd met kinderen

4. Kies de woonomgeving die het beste bij uw situatie past

- Centrum-stedelijk
- Stedelijk buiten-centrum
- Groen-stedelijk
- Centrum-dorps
- Landelijk wonen
- Werkgebied

5. Wat is uw inkomen? (Modaal is €31.500 bruto)

- Beneden modaal
- Modaal
- Tot 1,5 keer modaal
- Tot 2 keer modaal
- Meer dan 2 keer modaal
- Geen antwoord

6. Wat is uw hoogstgenoten opleiding? (of waar u momenteel mee bezig bent)

- Lagere school
- LBO / MAVO / VMBO
- MBO / HAVO / VWO
- HBO / WO
- Postdoctoraal

Deel 2: Werk**7. Wat is de afstand van huis tot uw werk? (enkele reis)**

- 0 - 5 km
- 5 - 15 km
- 15 - 30 km
- 30 - 50 km
- 50 - 100 km
- meer dan 100 km

8. Kies de werkomgeving die het beste bij uw situatie past.

- Bedrijventerrein / business & sciencepark
- Gemengd woon- en werkgebied
- Vrijstaande werklocatie
- Bedrijfsverzamelgebouw

9. In welke branche bent u werkzaam?

- Bouwnijverheid
- Detailhandel food
- Detailhandel non-food
- Dienstverlening
- Gezondheidszorg
- Groothandel
- Horeca en Recreatie
- Industrie
- Transport

10. Kies de situatie die het beste bij u past.

- Ik heb geen leaseauto
- Ik heb wel een leaseauto, maar gebruik deze niet prive (geen bijtelling)
- Ik heb wel een leaseauto en gebruik deze ook prive (wel bijtelling)

11. Hoeveel maakt u zakelijk gebruik van uw leaseauto? (per jaar)

- minder dan 5.000 km
- 5.000 - 10.000 km
- 10.000 - 20.000 km
- 20.000 - 30.000 km
- meer dan 30.000 km

12. Hoeveel maakt u privé gebruik van uw leaseauto? (per jaar)

- Geen privegebruik mogelijk (max. 500 km per jaar)
- 500 - 2.500 km
- 2.500 - 5.000 km
- 5.000 - 10.000 km
- meer dan 10.000 km

Deel 3: SHARElease

De volgende vragen gaan specifiek over het SHARElease concept.

SHARElease is een lease-concept waarbij in de basis dezelfde tarieven en dezelfde voorwaarden gelden als voor de huidige leasevormen. De beperking is dat u alleen de beschikking heeft over auto's met een energielabel A of B. Daarnaast heeft u de mogelijkheid meer voordeel te behalen uit het gebruik van uw auto. Het SHARElease-concept bestaat uit twee extra componenten bovenop een normaal lease-contract: SHARECar en SHARERide.

Met SHARECar geeft u online aan wanneer u uw auto niet gebruikt en deze door derden gehuurd mag worden. U hoeft verder niets te doen, behalve het schoon houden van de auto. De huurder kan zelfstandig de auto openen en alles wordt automatisch bijgehouden. U krijgt korting per gebruikt uur. Met SHARERide geeft u uw dagelijkse route aan en of u anderen wilt meenemen. U krijgt automatisch bericht wanneer iemand mee wilt rijden en u kunt dit accepteren of weigeren. Registratie gaat automatisch en u ontvangt een korting per persoon per kilometer.

Het voordeel dat u met SHARElease heeft is dat u bij deelname aan de beschreven programma's SHARECar en SHARERide financieel voordeel krijgt. Hoe dit voordeel wordt verkregen, willen we ook aan u vragen. Deelname aan SHARECar en SHARERide is vrijblijvend. Wanneer u kiest voor een SHARElease-contract, dan krijgt u de beschikking over een auto met zuinig energielabel A of B. U heeft dan vaak al een belastingvoordeel, omdat de bijtelling voor extra zuinige auto's 14% is, 20% voor zuinige auto's en 25% voor de standaard auto's. Vervolgens wordt dit voordeel groter, naarmate u meer deelneemt aan de programma-onderdelen SHARECar en SHARElease.

U kunt er dus ook voor kiezen om een bijvoorbeeld een tijd lang de auto niet beschikbaar te stellen.

13. Stel dat u, naast de keuze voor de huidige lease vormen de aanbieding krijgt om van de nieuwe lease vorm, SHARElease, gebruik te maken. Zou u gebruik willen maken van deze leasevorm?

- Zeker wel
- Waarschijnlijk wel
- Weet nog niet
- Waarschijnlijk niet
- Zeker niet

14. Wat zou voor u een reden zijn om wel mee te doen met SHARElease? Kies 1 of meer antwoorden

- Lagere kosten
- Milieuvriendelijk
- Nieuwe mensen ontmoeten

15. Wat zou voor u een reden zijn om niet mee te doen met SHARElease? Kies 1 of meer antwoorden

- Ik gebruik mijn auto te veel
- Ik wil mijn auto altijd kunnen gebruiken (bijvoorbeeld in onverwachte gevallen)
- Ik wil niet dat andere mensen in mijn auto rijden
- Teveel moeite voor te weinig opbrengst

16. Als u gebruik maakt van SHARElease, wordt u beloond naar mate van gebruik. Hoe zou u deze beloning willen ontvangen?

- Korting op bijtelling, volgende maand verrekend
- Gratis brandstof
- Mobiliteitspunten, in te wisselen voor verschillende vormen van mobiliteit

17. Stel, u neemt deel aan het SHARELease programma, en specifiek aan SHARECar, waarbij u tijden opgeeft waarin anderen uw auto kunnen huren. Per verhuurd uur krijgt u een vergoeding. Bovendien neemt u deel aan SHARERide, waarbij u dagelijkse routes opgeeft en aangeeft of mensen met u mee mogen rijden. In ruil hiervoor ontvangt u een vergoeding. Hoeveel uur per werkweek (ma-vrij) verwacht u uw auto te kunnen vrijgeven (het gaat hierbij om uren tussen 6 uur 's morgens en 10 uur 's avonds) en hoe vaak zou u anderen mee willen nemen ? Kies de voor u meest aantrekkelijke optie.

- Beschikbaarheid 4 uur per week en per week mogen 8 personen meerijden
- Beschikbaarheid 8 uur per week en per week mogen 6 personen meerijden
- Beschikbaarheid 12 uur per week en per week mogen 4 personen meerijden
- Beschikbaarheid 16 uur per week en per week mogen 2 personen meerijden

18. Hoeveel uur per week verwacht u uw auto vrij te kunnen / willen geven?

- 0-4 uur
- 5-6 uur
- 7-8 uur
- 9-10 uur
- meer dan 10 uur

19. Hoe vaak per week wilt u iemand meenemen?

- 0-1 keer
- 2-3 keer
- 4-6 keer
- meer dan 6 keer

20. Zowel voor gebruik door anderen van SHARECar en het meenemen van anderen met SHARERide ontvangt u een vergoeding. Kies de voor u meest aantrekkelijke optie.

- €1,50 per uur voor SHARECar en €0,15 per persoon per kilometer voor SHARERide
- €3,50 per uur voor SHARECar en €0,10 per persoon per kilometer voor SHARERide
- €5,50 per uur voor SHARECar en €0,05 per persoon per kilometer voor SHARERide

21. Bedankt voor het invullen van de enquête. Wanneer u nog vragen, opmerkingen en/of suggesties heeft kunt u deze in onderstaand veld invoeren.

APPENDIX 2: RESULTS OF THE QUESTIONNAIRE

In the following paragraph the results of the questionnaire will be presented. The questionnaire was first distributed among our own network on a small scale. This delivered 27 useful answered questionnaires. The response to this first version of the questionnaire was used to improve the questionnaire for a distribution on a larger scale. The cooperation with Athlon Car Lease made possible that the questionnaire was distributed among 1,500 potential lease-drivers, which were all clients of Athlon Car Lease. Because Athlon Car Lease already has plans to run a pilot-project which is also called SHARElease, but is a slightly different concept, the choice is made to make use of a different name in the second version of the questionnaire, c,mm,nLEASE. So far 250 respondents have answered the questionnaire. However, since the link to the questionnaire was distributed too close to the deadline of the project, not all the answered questionnaire could be taken into account. In the processing of the results only 142 questionnaires could be taken into account, of which 126 were useful. The main criteria on what base the results were selected, was whether an answer was given to the most important question of the questionnaire: Will you make use of SHARElease? In total, the answers of 153 respondents are discussed. It should be considered that the results of the questionnaire will not give a complete image of the opinion of lease-car drivers, but give at least a small impression of their characteristics and preferences.

The paragraph is divided into several parts. First the demographic and work characteristics of all the respondents are presented. Next the preferences of the potential users are discussed and finally the opinion of criticsasters of the concept is taken into account.

Demographic and work characteristics of respondents

In 2007 Goudappel Coffeng conducted a survey to the characteristics of the driver of a business car. As was presented before around 50% of a the business cars are leasecars.

According to the survey the typical driver of a business car is 43 years old, often a man, married or living together. Further has the driver in many cases one or two children, a relative high education level, 40% has a household-income of more than two times modale, makes extraordinary long workweeks and is often a manager. Finally the driver of a business car often has a second (or even third) car available in the household.

Gender

Figure 1 shows the gender of the respondents. The gender is not evenly spread, but it this is also stated in the survey of Goudappel Coffeng (2007).

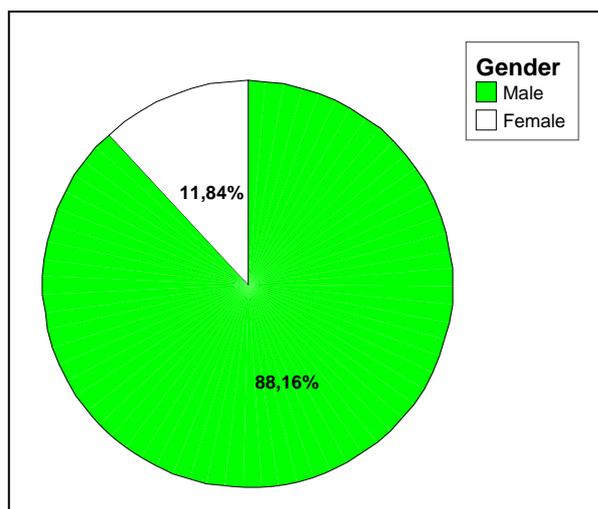


FIGURE 1 GENDER OF RESPONDENTS

Age

Figure 2 shows the distribution of the respondents among the stated age-categories.

It seems that the group of respondents with an age between 25 and 34 years is slightly overpresent in the sample. This can be explained by the fact that this generation is possibly more willing to respond to questionnaires like this one and more positive about the concept.

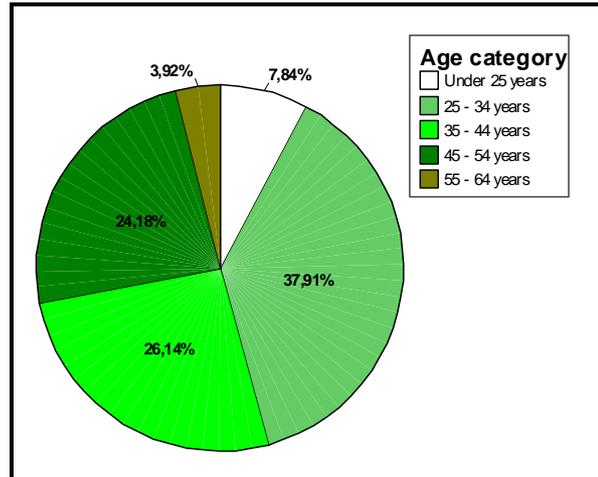


FIGURE 2 AGE-CATEGORY OF RESPONDENTS

Family situation

Figure 3 shows the family situation of the respondents. The figure shows that only half of the respondents have children, but this can be explained by the overrepresentation of young respondents. Furthermore, the figure shows that a majority is married. This corresponds with the image of a typical business car driver.

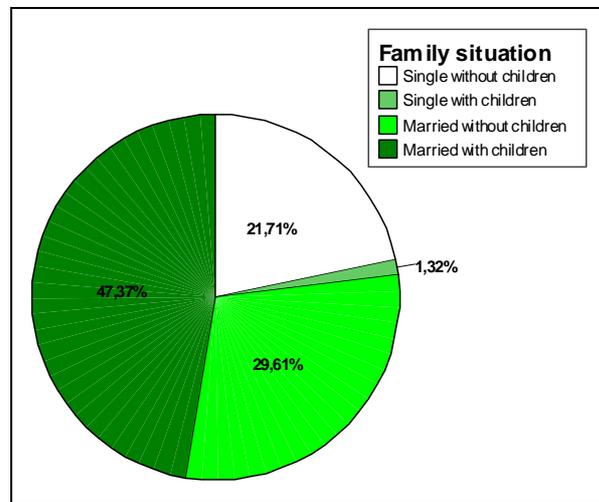


FIGURE 3 FAMILY SITUATION OF RESPONDENTS

Living situation

Figure 4 displays the living situation of the respondents. It can be concluded that the lease-car driver does not have a typical place of living. However, a majority lives in an urban environment.

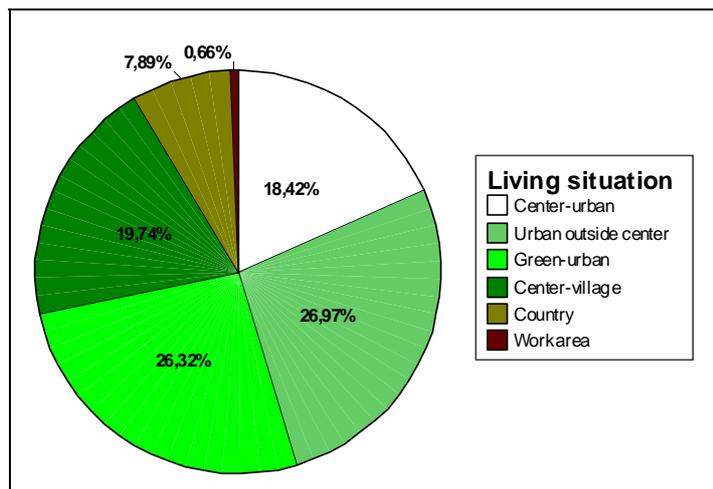


FIGURE 4 LIVING SITUATION OF RESPONDENTS

Income

Figure 5 presents the distribution of the respondents over the different income-categories. As can be seen, the income of an average leasedriver is spread around 2 times modal, which is consistent with the image of a typical leasedriver.

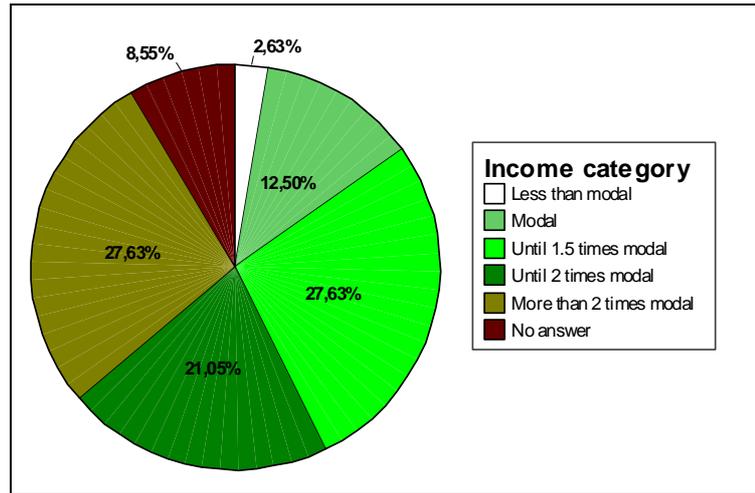


FIGURE 5 INCOME OF THE RESPONDENTS

Education

92% of the respondents has finished an education at HBO or WO-level. This seems rather high, but in general for a job with a leaseacar this level of education is needed.

Distance from home to work

Figure 6 the distance the respondents have to travel from their home to their worklocation is presented. The average distance a lease-car driver has to travel from home to work is around 50 kilometres.

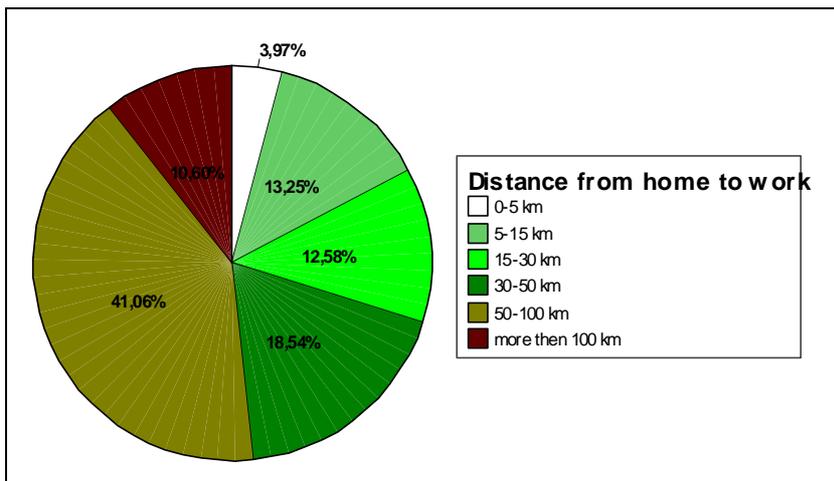


FIGURE 6 DISTANCE FROM HOME TO WORK

Work situation

A large majority of the respondents states they are working on a business & science park. While 76% gave this answer, a minority is working at a mixed living and working area or an isolated working area. Since on business & science parks the companies are close together, these parks have potential for the SHARElease-concept.

Branche

With 82% the service-branche is overpresented in the results of the questionnaire. However, the service sector is a broad definition of several specific branches. Possibly the possession of a leaseacar is likely in the service-branche. The questionnaire was mend for leaseacar drivers in general, so maybe employees in other branches who do not have a leaseacar available did not respond to the questionnaire. Besides the service-branche, the construction industry was also represented in the results with 10%.

Availability of a lease car

Of course in the questionnaire was checked whether the respondent had a lease car available. 92% had a lease car which they also use for private purposes and 5% uses its lease car only for business purposes. 5 respondents had no lease car available, but remarkably 2 of those were interested in the SHARELEASE-concept. The respondents without a lease car are not excluded from the results.

Distance business

Figure 7 presents the distance travelled per year for business purposes. In this figure only respondents on the c,mm,nLEASE-version of the questionnaire are presented, since the first version uses a different categorisation. From the figure can be concluded that average distance per year travelled for business purposes is around 30,000 kilometres.

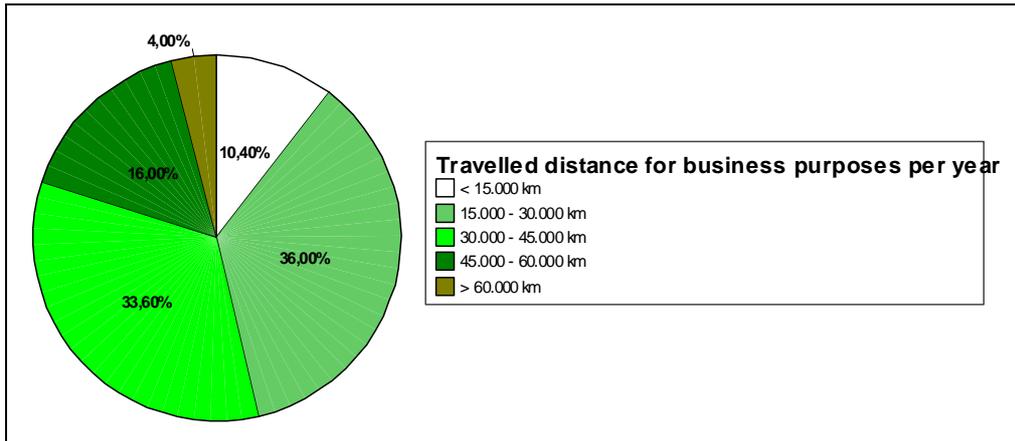


FIGURE 7 TRAVELLED DISTANCE FOR BUSINESS PURPOSES PER YEAR

Distance private

Figure 8 presents the distance travelled per year for private purposes. Also in this figure only respondents on the c,mm,nLEASE-version of the questionnaire are presented, since the first version uses a different categorisation. The average distance travelled per year for private purposes is around 10,000 kilometres.

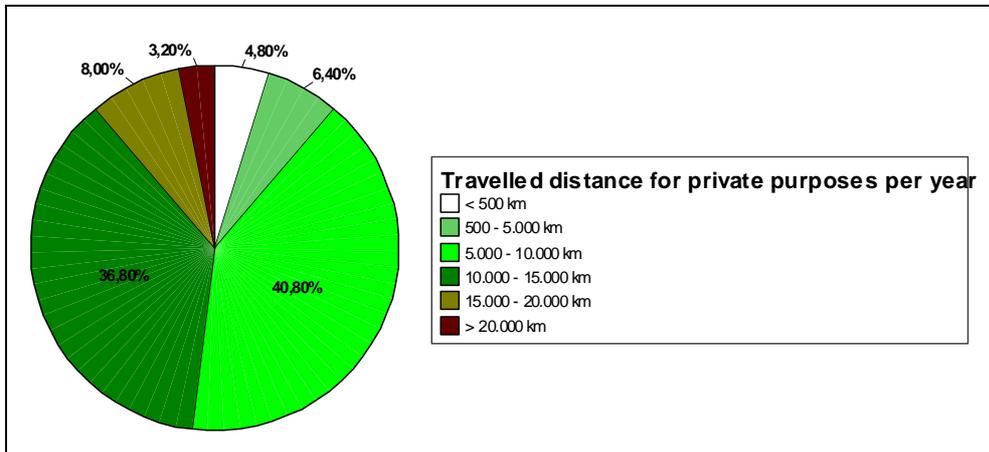


FIGURE 8 TRAVELLED DISTANCE FOR PRIVATE PURPOSES PER YEAR

Characteristics of potential users

Potential of SHARElease

Figure 9 shows the opinion of all the respondents to the questionnaire to the SHARElease-concept. For this figure can be concluded that 20% of the lease-car drivers is positive about the concept and will make use of it, once implemented.

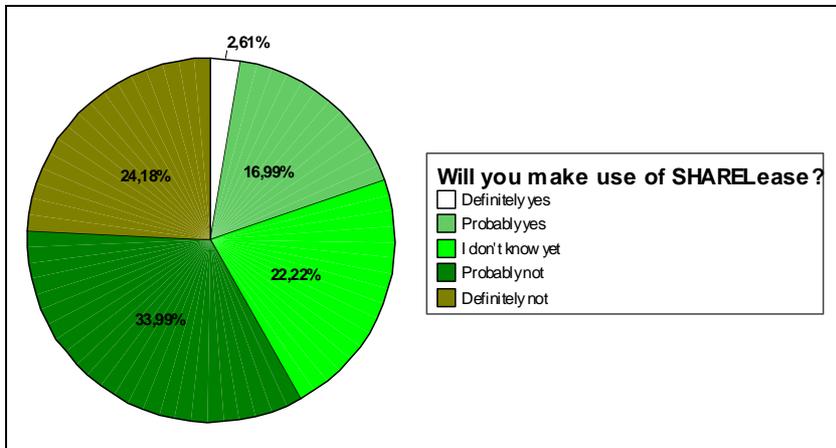


FIGURE 9 POTENTIAL OF SHARELEASE

In the following section only the opinion of the group of lease-car drivers which were positive about the SHARElease-concept are taken into account. Most of the other respondents have also responded to the questions about the design of the SHARElease-concept, but since these respondents have a negative opinion about the concept, they are excluded. The reasons why this group is negative, is presented in the last section.

Reasons why to make use of SHARElease

In the questionnaire all the respondents could choose for three described reasons and also write down a different reason.

93,3% of the positive respondents choose the lower costs as a reason to make use of the concept. 73,3 % is positive about the concept because of the environment friendly character of it and the opportunity of meeting new people is only for 20% of the positive respondents a reason. From these facts it seems that the respondents that indicate to make use of the SHARElease-concept take environmental issues in consideration. But even more they want to reduce their expenditures to their lease-car.

Way of receiving reward

The respondents were also asked to their most favourable way of earning the benefit of using SHARElease. This was a component of the design which was not clear yet. 90% of the positive respondents opted for the discount on their tax over the possession of a lease-car in the next month.

Only one respondent chooses mobility points as benefit. For this can be concluded that lease-car drivers are not thinking of transferring between different forms of mobility. In the questionnaire also the option of free fuel was included, but an employee will not see this as a benefit, since the fuel is not paid by the employee, but by the employer.

Preference for one of the components expressed in time

The respondents were also asked to their most favourable option when they will make use of SHARElease. The results in Figure 10 show that the positive respondents are more willing to take passengers with them than make their car available for other users. In this case, the SHARERide-component is more popular than the SHARECar-component. However should be taken into consideration that the scaling of the option can be wrong, since all the options consist of two components. The two components can be weighted differently by the respondents.

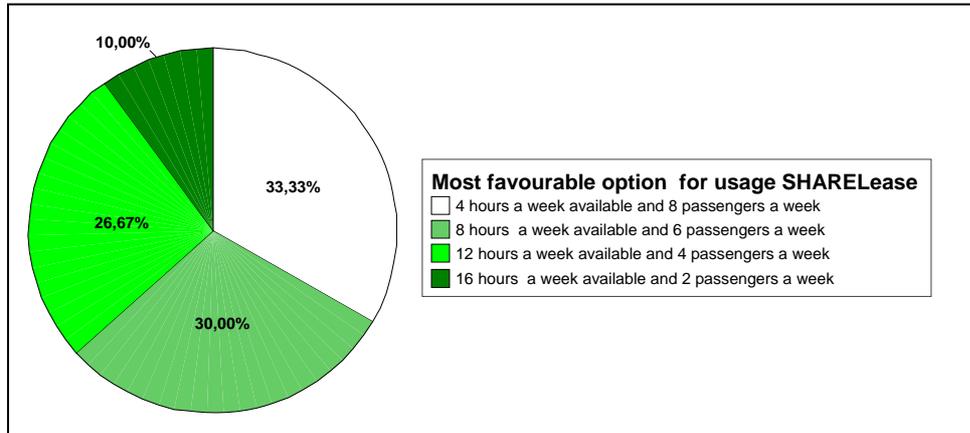


FIGURE 10 MOST FAVOURABLE OPTION FOR USING SHARELEASE EXPRESSED IN TIME

Availability for carsharing

Figure 11 shows the estimated availability of the leasecar for carsharing in hours per week. More than half of the respondents has chosen an option in which their car is more available than the minimal option. This indicates that a majority of the positive respondents is willing to share their car on a regular basis.

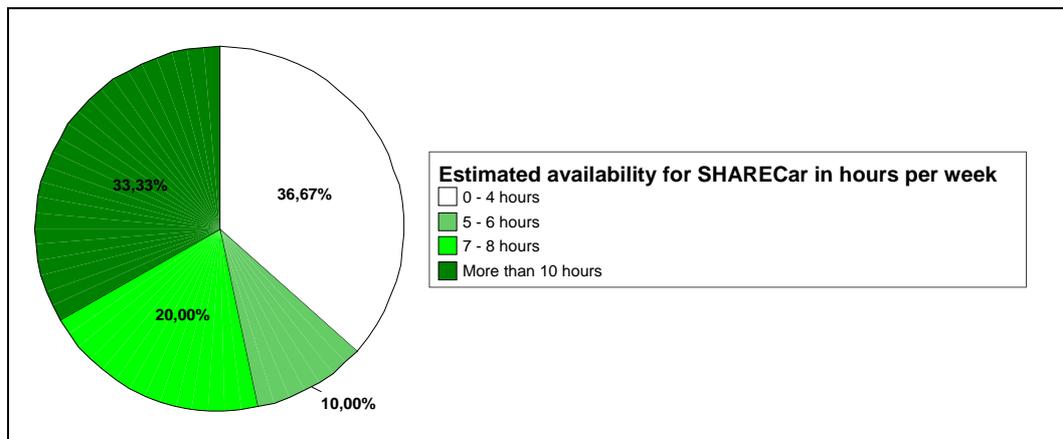


FIGURE 11 ESTIMATED AVAILABILITY OF LEASECAR FOR SHARECAR

Availability for ridesharing

Figure 12 displays the estimated willingness to pick up other passengers. Ridesharing requires more effort than carsharing, because for ridesharing the driver should leave its optimal route. This causes a increase of travel time and costs. The costs depend on the value of time of the driver. However, a smart navigation system can reduce the costs, because the benefit of picking up a passenger can overweight the cost of the loss in time. According to the figures the willingness to participate in the SHARERide-component is even bigger than for SHARECar, since a smaller percentage of positive respondents chooses the minimal option.

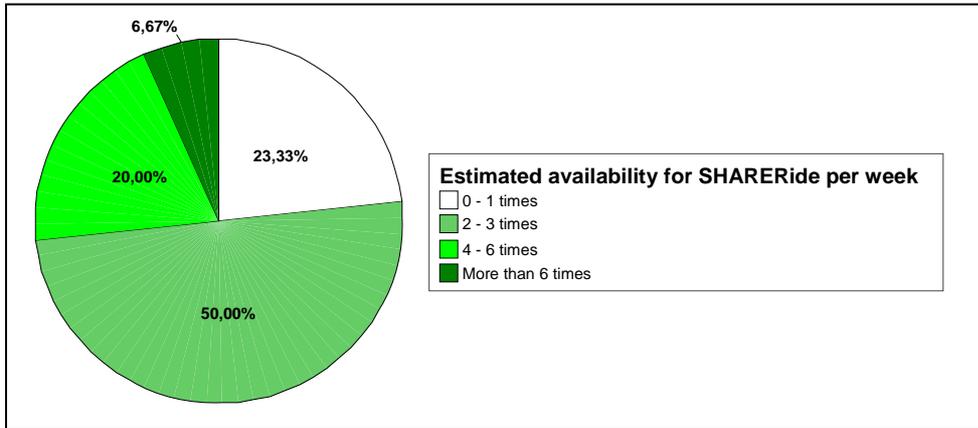


FIGURE 12 ESTIMATED AVAILABILITY OF LEASECAR DRIVER FOR SHARERIDE

Preference for one of the components expressed in monetary benefit

In the last question of the questionnaire the respondents were also asked to their most favourable option when they will make use of SHARElease, but in this case the characteristics of the components were expressed in monetary value instead of time. Figure 13 shows that the positive respondents are more opting for a higher benefit for taking passengers with them than making their car available for other users. Also in this case, the SHARERide-component is more popular than the SHARECar-component. However also in this case should be taken into consideration that the scaling of the option can be wrong, since all the options consist of two components. The two components can be weighted differently by the respondents. The values for the monetary benefit are chosen by reason and can cause a wrong representation.

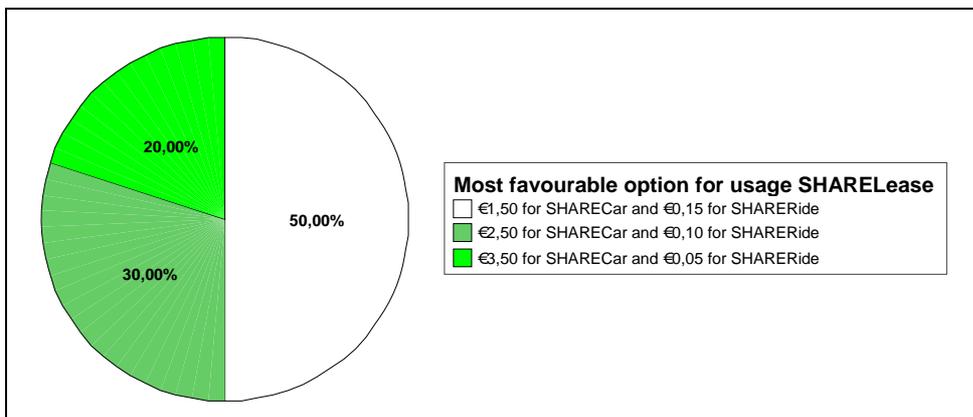


FIGURE 13 MOST FAVOURABLE OPTION FOR USING SHARELEASE EXPRESSED IN MONETARY BENEFIT

Relation between age category and usage of SHARElease

In Table 1 the differences between the different age-categories in their opinion about the SHARElease concept are presented. It was expected that younger drivers are more likely to have a positive opinion about the new lease concept. However, there can be no relation found between the age-category and the potential use of SHARElease.

		Potential user		
		Potential user	Potential non-user	Total
Age category	Under 25 years	16,7%	83,3%	100,0%
	25 - 34 years	22,4%	77,6%	100,0%
	35 - 44 years	17,5%	82,5%	100,0%
	45 - 54 years	21,6%	78,4%	100,0%
	55 - 64 years		100,0%	100,0%
Total		19,6%	80,4%	100,0%

TABLE 1 RELATION BETWEEN AGE CATEGORY AND POTENTIAL FOR SHARELEASE

CHARACTERISTICS OF RESPONDENTS WITHOUT POTENTIAL OF USING SHARELEASE

Finally, the respondents that had a negative opinion about the usage of SHARElease are taken into account separately. It is especially interesting to investigate what would be their reasons not to choose for the use of SHARElease.

88,6% of the negative respondents gave as a reason that they want to have their car always available. 47,2% allows no one else driving in their car, 41,5% said it is too much effort for too less benefit and 39,8% stated that they are using their car too much to receive enough benefit.

From this results can be concluded that especially the availability of the car is the biggest issue and not the use of the car. This causes a remaining disuse of lease cars.