A design vision and strategy for a user-centred high quality public transport network in 2040

MSc graduation report, March 2021

Seamless Personal Mobility lab

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This report is commissioned by the Seamless Personal Mobility Lab.

March 2021

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This project received project funding for Public-Private Partnerships for Research and Development (PPP allowance) from the Dutch Ministry of Economic Affairs and Climate Policy via CLICKNL.

Acknowledgement

Dear reader,

With this report, my time as a student has come to an end. After 5,5 inspiring years at the faculty, I proudly present to you my final deliverable ‘a design vision and strategy for a user-centred high quality public transport network’. During the last six months, I spent my time diving into the subject of the public transport network with all its stakeholders. It was a complex world and I had a lot to learn, I did for example not even know what a concession was. Looking back, it has been a great learning experience. I would like to thank the people surrounding me for the past six months for their help and support.

I am very grateful to my TU Delft mentors Suzanne and Sylvia and company mentor Réne. Your advice helped to challenge me and the design to become even better. Your feedback was spot on and always gave me new insights. I also want to thank you for the kind words when needed.

Furthermore, I would like to thank all the people participating in this project for being a participant in my interviews, presentations, co-creation sessions and validation discussions. Especially Peter from province Zuid-Holland and supervisor of R-net. You were always there to help me and connect me to other people.

And of course, I want to thank my family and friends. I would not have made it without you. You gave me advice, nice distractions and sometimes ‘een schop onder de kont’ when I needed it. So thank you.

For now, enjoy reading!

Amber van der Gulik
March 2021
Delft

Executive summary

The high quality public transport network implemented by R-net, short for Randstadnet, follows a product formula on multiple public transport modalities (bus, tram, metro, and train) and acts as a quality mark. R-net is a collaboration between six public transport authorities and nine operators. However, currently R-net is confusing the traveller and losing credibility among its stakeholders. Ultimately, an aligned future vision and collaboration structure is missing. This project creates a future vision, illustrates how R-net should look like in this future and proposes a strategy for how to reach this.

In 2040, commuting with the high quality public transport network is the norm. The vision is based on relevant trends and the future fulfilment of the six fundamental needs of the commuter; comfort, autonomy, security, recognition, competence and morality. It presents a seamless door-to-door travel experience integrating different modalities.

Three concepts were created to explore how R-net should look like in this future vision. These were combined to the final future role of R-net: B1-net, for a journey without worries. B1-net will be the facilitator for collaboration with the stakeholders in the future high quality public transport network with the help of a mobility roundtable structure. Furthermore, it will provide certainty to the traveller by being in direct contact with them, utilise a certification structure and enable safe data sharing. The communication with the traveller happens via a mascot of a bee. The bee flies along with the traveller in their journey providing this certainty.

The experience of the traveller in the vision and concept of the high quality public transport network addresses their fundamental needs and provides certainty. Therefore it will be more attractive and has the possibility to attract more travellers to the network instead of their car. This is beneficial to reach societal goals, like CO2 reduction.

For the transition from R-net into B1-net, an organisation strategy is proposed with the help of the analogy of how bees make honey. First, R-net will need to ‘prepare’, collect nectar. A reconstruction will take place to a full-time commitment and the customer service for the traveller is started. This is followed by ‘starting the real process’ which represents how a bee shares its nectar. The public transport authorities are persuaded to join the network and the mobility roundtable is initiated. Hereafter, the honey is capped with beeswax which explains ‘seal the deal’. Public transport operators already connected to R-net are persuaded and the first B1-certificat is allocated. The next step is ‘nurture and expand’, like filling more cells in the honeycomb. This step is about expanding the network and keep revising the requirements for the certificate until in 2040 there is a complete ecosystem of the high quality public transport network. When the honey is ready.

The strategy is implemented in a roadmap together with the traveller needs, trends and launch strategy to give a complete overview of how to reach the vision: Commuting with the high quality public transport network is the norm.

List of abbreviations

DOVA	Decentrale OV-autoriteiten
R-net	Randstadnet
OV	Openbaar vervoer
PT	Public transport
BTM	Bus, Tram, Metro
MRDH	Metropoolregio Rotterdam Den Haag (metropolitan region Rotterdam The Hague)
VRA	Vervoerregio Amsterdam (ransport region Amsterdam)
RET	Rotterdamse Elektrische Tram
GVB	Gemeentelijk Vervoerbedrijf
HTM	Haagsche Tramweg-Maatschappij
NS	Nederlandse Spoorwegen
EBS	Egged Bus Systems
CROW	Centrum voor Regelgeving en Onderzoek
KiM	Kennisinstituut voor Mobiliteitsbeleid
MaaS	Mobility as a Service
CO2	Carbon dioxide

List of definitions

Concession
The right to perform public transport to the exclusion of others in a certain area during a certain period of time

Randstad
A megalopolis in the central-western Netherlands

MaaS
A new transport concept that integrates existing and new mobility services into one single digital platform, providing customized door-to-door transport and offering personalized trip planning and payment options. Instead of owning individual modes of transportation, or to complement them, customers would purchase mobility service packages tailored to their individual needs, or simply pay per trip

Public transport
passenger transport open to every one according to a timetable with a car, bus, train, metro, tram or a vehicle propelled through a guidance system.

Modality
A mode of transportation.

Traveller
A person who is travelling or who often travels

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Introduction

1

This chapter describes the context of the graduation project. This is structured in the project background, the problem definition, scope, assignment and stakeholders. This is followed by the project approach which shows the project process, the structure of the report and the deliverables.

1.1 Context

Project background

A public transport network has the potential to enhance the environment in which people live, work and relax. In the Randstad (a megalopolis in the central-western Netherlands) a public transport network is implemented called R-net, short for Randstadnet. It acts as a quality mark for high quality public transport (R-net, n.d). The goal of R-net is to increase and maintain accessibility within the Randstad (de Wilt & Bergsman, 2017).

R-net is a collaboration of multiple regional authorities in the Randstad. The authorities are self-responsible for including R-net in their public transport concessions. However, they are not uniformly strict on the requirements of ‘high quality’ public transport. This has resulted in a discrepancy in quality between different parts of the Randstad. For example, a R-net bus in Amsterdam would never be permitted to be named R-net by a different authority in another district, because it won’t qualify to ‘high quality’. This could be harmful for the brand of R-net, because the difference in quality could be confusing the traveller.

The regional authorities work together with regional operators. A total of nine operators are to carry out the promises of R-net. This includes bus, tram, metro and regional trains, see figure 1.

It is unclear if the traveller believes in the added value of R-net. As less than 10% of people who have heard of R-net know what it really stands for (de Wilt & Bergsman, 2017), it seems the effort of R-net’s branding are not having that much effect. Lastly, the needs of the traveller regarding the high quality transport network are most likely changed since the start of R-net in 2011. However, R-net’s values and operations have not been updated.

Problem definition

To conclude, the stakeholders of R-net are not aligned on the requirements of implementing R-net resulting in a discrepancy and confusion for the traveller. Furthermore, the traveller seems not to be aware of what R-net is and stands for.

Figure 1: Example of bus, tram, metro and train of R-net

Scope

R-net is implemented in the Randstad. The Randstad is relatively the densest area of the Netherlands. This brings opportunities and threats which are different in comparison to other areas where there is fewer demand for public transport. Furthermore, the needs of the travellers are most likely different. Therefore the focus of this project is the public transport network only in the Randstad.

Assignment

The assignment of the project is to:

Create a design vision and strategy for a high quality public transport network, based on travellers needs. Translate this vision into a strategy for the organisation of R-net and its branding.

The outcome is a design vision that will be an easy to understand concept suitable for various stakeholders. The strategy will be designed in the form of a roadmap that will explain how to reach the vision. Both the vision and the strategy put the traveller at the center and create an alignment of the different stakeholders of R-net.

The project brief can be found in Appendix A.

Seamless Personal Mobility Lab

This graduation project was executed within the Seamless Personal Mobility Lab of the TU Delft. The lab is one of the Delft Design Labs of the faculty of Industrial Design Engineering. In the lab, new concepts for future personal mobility experiences for the users are explored. Solutions are generated that match both the needs of the travellers and the different mobility stakeholders. Partners in both public and private organisations are connected to the lab. These are Ministry of Infrastructure and Water management, TransLink Systems, DOVA, CROW, RET, GVB, Rover and 9292 REISinformatiegroep.

DOVA

The project was carried out in close collaboration with DOVA. DOVA is a partnership between the 12 provinces of the Netherlands, the metropolitan region Rotterdam The Hague (MRDH) and transport region Amsterdam (VRA). They focus on improving the public transport in multiple themes. Together with CROW they form the OV-campus. A mentor of the organisation, Réne Borsje, was assigned to be involved in the project and provide support.

R-net

R-net is a collaboration between different stakeholders. The project was executed in close contact with members of the province Zuid-Holland, as they are currently responsible for the collaboration with R-net. Other stakeholders like the VRA, EBS and RET were also involved.

1.2 Project approach

Project process

This project is structured with the Double Diamond model (British Design Council, 2005). This model is constructed in four phases: discover, define, develop and deliver, figure 2.

Discover | The first phase consists of two analyses; context and internal. The context analysis will provide insights about the current public transport network, the needs of the traveller and how the desired future high quality public transport network should look like. The internal analysis will explore R-net and give insights about their strengths and weaknesses on how they collaborate, implement and communicate.

Define | The define phase is used to translate and synthesize all gained insights and knowledge. The result of the context analysis are future requirements for the desired public transport network. The internal analysis is concluded with the root of the problem to really find the problem within R-net. A SWOT analysis brings both studies together and a design brief is formulated.

Develop | During the development, an ideation is performed to find trends and the future fulfilment of the found needs of the traveller. These are combined into a future vision for the high quality public transport network.

Deliver | The final phase is to conceptualise the future vision of the public transport network and concepts of how R-net should look like. This is concluded with an implementation plan.

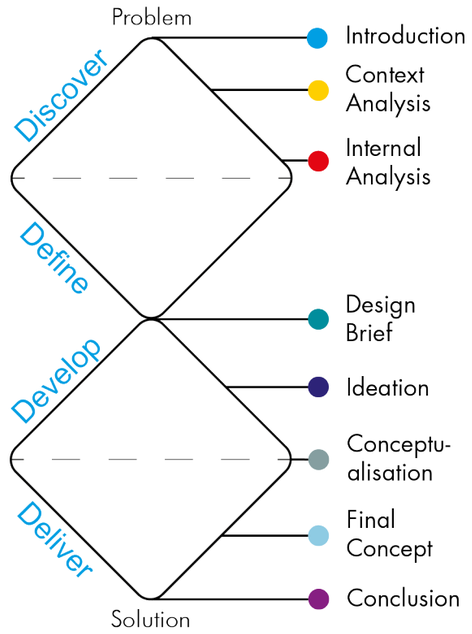


Figure 2: Double diamond with project process

The different elements and colours on the right side of figure 2 correspond with the chapters in this report.

Project deliverables

The deliverables of the graduation project are:

- A future vision of the desired high quality public transport network (pp.98 - 99).
- A new concept of R-net in the high quality public transport network with video (pp.123 - 125)
- A roadmap for the implementation strategy (pp.152 - 153).

Context Analysis

2

The context analysis first describes the general public transport system in the Netherlands, the importance of public transport and how it is currently organised. This is followed by an overview of the demand for public transport and the general vision for the future of the public transport network.

Next up, a high quality public transport is introduced with the quality attributes.

The third subchapter is about the needs of the traveller in the public transport. The method and results of the conducted interviews with commuters are explained. The result is six fundamental needs in the public transport network according to the commuter.

The following subchapter describes different elements about the desired future travel experience and governance strategy.

The chapter is closed with a conclusion which presents 13 future requirements for the design of the public transport network derived from the analysis.

2.1

The Dutch public transport system

This chapter describes an introduction to public transport and its general vision. First the organisation set-up and why public transport is important is discussed. This is followed by an analysis of the current demand for the public transport network. The subchapter is concluded by a general vision, objectives and ambition for the future public transport network.

2.1.1 Public transport in the Netherlands

Organisational set-up

Public transport in the Netherlands is regulated in a decentralised manner. In other words, it does not have a central travel authority or governing body, but is overseen by a committee. This committee consists of governments, transport providers, and consumer organisations (Veeneman, Kuijk & Hiemstra, 2020).

Provincial and local authorities are responsible for granting concessions in their region (Government of the Netherlands, 2011). Operators can apply to these concessions. The winning operator is responsible for providing the public transport services throughout the contract (e.g. bus, tram, metro and train). Consumer organisations, such as Rover, represent the passengers and can advise on the execution of the concessions.

Next to the operators, mobility service providers facilitate mobility solutions. Often these are shared transportation services in which an individual can make use of the transportation for a period of time after which the same transportation is used by other individuals as well (Veeneman, Kuijk & Hiemstra, 2020). These solutions are especially convenient for the traveller to use as first-and last-mile solutions before-and-after they have travelled with a public transport provider.

The importance of public transport

Accessibility and mobility are of great importance in the Netherlands as it connects urban areas with economic centers and makes other activities accessible. Public transport, certainly in combination with the bike, plays a major role in this. In 2017, a total of 25 billion kilometres were travelled in public transport (Public Transport in 2040, 2019).

Public transport has certain advantages over other means of transport. First of all, because a large number of individuals travel collectively, public transport is space-effective. As space is a premium, especially in dense urban areas, this has a large advantage over private means of transport, like the car.

Furthermore, public transport is considered to be a more sustainable alternative (Holmgren, 2017). We are faced with the challenge of radically reducing CO2 emissions and public transport can play an important role in this.

Next to this, public transport generally is considered a safe way to travel. Accidents rarely happen among public transport consumers. This is in contrast with the car accidents which resulted in 237 victims in the Netherlands just last year, 2020 (Slachtofferwijzer, 2020).

2.1.2 Demand for a public transport network

In general, the demand for public transport in the Netherlands has been growing over the last few years (INFO, 2020). This is reflected in congestion in every form of public transport. However, the demand varies; in urban areas has been a high growth, and is the network approaching overload, while in other areas and timeslots is too little demand to keep it financially sustainable (Venne & Wijmen, 2019). In both situations, the quality of the public transport network experienced by the traveller is in danger.

Effects COVID-19

Recently, the demand for public transport has seen a big decline due to the COVID-19 pandemic and its regulations. In 2020, the distance travelled in public transport has been dropped up to 45% (KiM, 2020). Because of long-term effects, like structural behaviour change to work from home or travellers choosing for a private means of travel, it is expected that only in 2025 the level of travel distance will be the same again as in 2019. Figure 3 shows the decline of the pandemic with its expected long-term consequences on the demand for public transport. It also visualises the estimated growth after recovery in 2025 of about 40% (Public Transport in 2040, 2019). Even due this temporary decline, it is important to be prepared to cope with the growth after 2025.

The estimated growth can mainly be explained by the growing population and an improvement in the quality of the whole network (KiM, 2020). This shows that not all is lost and there is an opportunity to come out stronger after the crisis. By investing now, mainly in capacity and quality, the demand for public transport will recover.

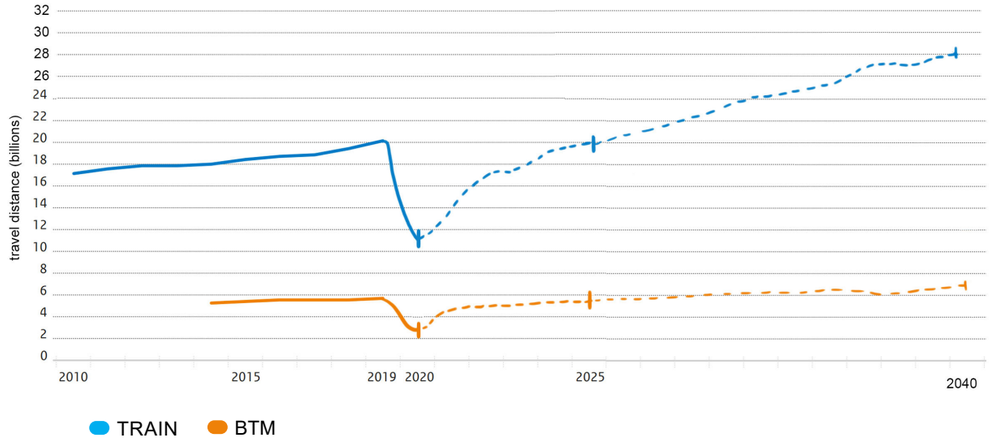


Figure 3: Travel distance of the last year and upcoming years (KiM, 2020)

2.1.3 General vision for the future of the public transport network

General vision

In 2015 a partnership was started between the central government, provinces, transport operators, and ProRail to create a joint vision for public transport:

'By 2040 travel for people in the Netherlands will be fast, sustainable, safe, comfortable, reliable and affordable. To travel to work, school and leisure and social destinations they will use their own transport, public transport or a combination. Connections will be good both within the Netherlands and with our neighbouring countries; big cities will have well-developed collective transport systems, with short travel times. Good transport links for individual users have made the Netherlands into one of the most competitive, liveable and sustainable countries in the world. Public transport is an essential component of the whole transport system which focuses on passengers and their door-to-door journeys.'

- (Public Transport in 2040, 2019, p.7)

Furthermore, figure 4 presents the transition from where we are now and how it should look like in 2040 (Regionaal OV toekomstbeeld 2040, 2019).

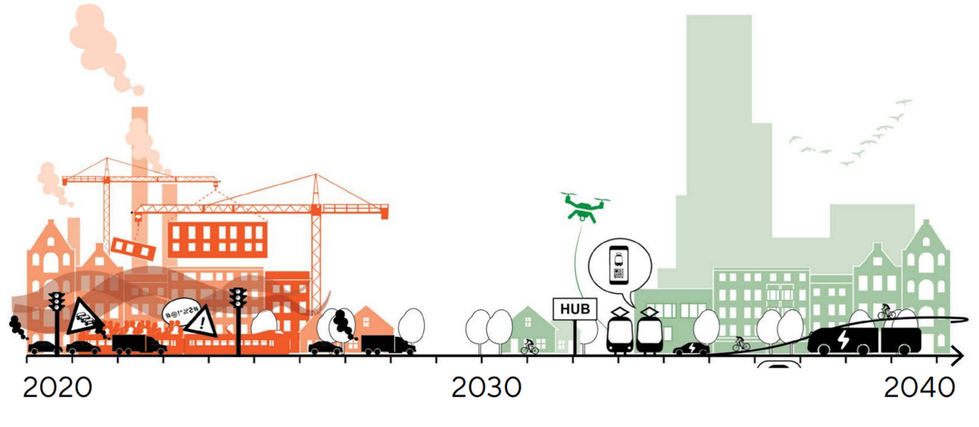


Figure 4: Transition of public transport network (Regionaal OV toekomstbeeld 2040, 2019)

Objectives

In a report by the Dutch government, four objectives for 2040 are defined to make the public transport system satisfactory ready for the above-mentioned future visions (INFO, 2020; Public Transport in 2040, 2019).

1) Increase capacity of the public transport by 40%
2) The entire public transport sector will be emission-free and circular
3) Passengers will rate public transport with an average score of eight out of ten
4) Create a barrier-free door-to-door transport experience

They argue it is important to act now as the time needed to prepare and carry out the infrastructure projects is relatively long. Furthermore, because of the long period of time the public transport contracts (concessions) are awarded.

Ambition

In 2040 the public transport network should exist out of multiple possibilities and means of transport existing alongside each other creating one network. This way the traveller should experience going from A to B as one journey (Public Transport in 2040, 2019).

In 2040, walking and (e)biking should be the norm. It is suggested that distances till 15km can be travelled by (e)bike. The (e)bike is an affordable, healthy and sustainable alternative. Greater distances can be travelled by a combination of walking or (e)bike and public transport. For less urban areas, the car will be the preferred choice.

Another alternative are the upcoming shared mobility concepts to act as first-and last-mile solutions. In time these can, with the combination with public transport, result in less pressure of cars in cities.

2.1.4 Conclusion

In conclusion, the Netherlands has a well organised public transport system and the advantages of public transport are receiving increasing attention. Until the outbreak of COVID-19, the number of passengers has been growing and will most likely continue to grow again after the pandemic. However, improvements need to be made concerning capacity, sustainability, and passenger experience. The public transport sector has a vision for 2040 which can be used as a guideline for future developments.

2.2

A high quality public transport network

This chapter provides an introduction to a high quality public transport network. It gives a definition and explanation. This is followed by high quality attributes and an explanation of which attrtibutes are considered most important.

2.2.1 Introduction of a high quality public transport network

According to Levinson & Zimmerman (2003), the definition of a high quality public transport network, inspired on, Bus Rapid Transit, can be defined as:

"an integrated system of facilities, services and amenities that collectively improve the speed, reliability, and identity of public transit." *(p.4)*

In other words, a network of different services working together to increase the quality of the whole system. This includes different mobility services like the bus, tram, metro and train.

Furthermore, because the future vision for the public transport network is a door-to-door travel experience, also the first-and last-mile should be included in this network. Mirco-mobility is expected to play an important role in this (Clewlow, 2019). Micro-mobility is a trend of the last couple of years and is defined as small, human-and electric-powered transportation such as bikes, scooters, and mopeds (Clewlow, 2019) which are available in a shared system.

By including the different mobility services the network could look as visualised in figure 5.

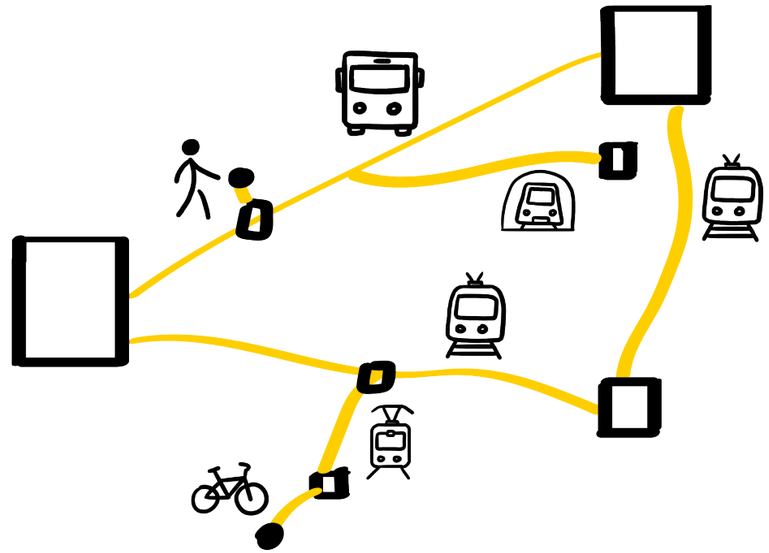


Figure 5: Visualisation of a high quality public transport network with a door-to-door expereince

2.2.2 Attributes of a high quality public transport network

When creating an attractive public transport network for the traveller, the quality of the network has to be well considered. The quality of the public transport network can be defined with quality attributes (Redman, Friman, Garling & Hartig, 2012).

These attributes can be categorised either as physical or perceived. Physical attributes are measured without involving the users of the public transport services, but with the help of assumptions about the impact on the user. This is in contrast to the perceived attributes in which the user is included by observation. The physical quality attributes for a public transport service are: *reliability, frequency, speed, accessibility, price, information provision, ease of transfers, and vehicle condition*. The perceived attributes are *comfort, safety, convenience, and aesthetics*. See table 1 for the definitions.

Most important attributes

According to the scientific literature review of Redman et al. (2012), reliability, frequency, fair prices, and speed are found to be the most important attributes for public transport travellers. However, it is worth mentioning that the relative importance on the attributes is to a large degree dependent of the user demographic, personal situations, and previous experiences with public transport services.

The top 3 of the most important quality attributes of people living in the Randstad are in line with the findings of Redman et al. (2012). The top 3 are high reliability, frequency, and speed (de Wilt & Bergsman, 2017). In this study 'price' is not mentioned, however they did find that price is the biggest motivation not to travel with public transport and thereby should also be considered as important.

Table 1: Definitions of public transport service quality attributes (Redman et al. 2012)

	Attribute	Definition
Physical	Reliability	How closely the actual service matches the route timetable
	Frequency	How often the service operates during a given period
	Speed	The time spent travelling between specified points
	Accessibility	The degree to which public transport is reasonably available to as many people as possible
	Price	The monetary cost of travel
	Information provision	How much information is provided about routes and interchanges
	Ease of transfers/ interchanges	How simple transport connections are, including time spent waiting
	Vehicle condition	The physical and mechanical condition of vehicles, including frequency of breakdowns
Perceived	Comfort	How comfortable the journey is regarding access to seat, noise levels, driver handling, air conditioning
	Safety	How safe from traffic accidents passengers feel during the journey as well as personal safety
	Convenience	How simple the PT service is to use and how well it adds to one's ease of mobility.
	Aesthetics	Appeal of vehicles, stations and waiting areas to users' senses

2.2.3 Conclusion

A high quality public transport network is a collaborative system of stakeholders working together to increase the quality of the service for the traveller.

A high quality public transport network can be defined by a large number of attributes. Reliability, frequency, fair prices and speed are found to be the most important. The attributes are necessary to consider when the needs of the traveller in the network are identified later in the next paragraph.

2.3

Travellers needs in the public transport network

It is important to know the needs of the traveller in the public transport network to make a future design. The needs are found by conducting interviews with commuters and finding their fundamental needs in the public transport network. Six fundamental needs were found and are illustrated.

2.3.1 Fundamental needs

To find the needs of the traveller in a high quality public transport network, a study was done on fundamental needs. This is because fundamental needs are universal and are not derived from other needs (Desmet & Fokkinga, 2020). Furthermore, a fundamental need can lead to increased well-being when fulfilled. It motivates behaviour in a wide range of situations and not only in specific circumstances, so it is suitable for a public transport network.

In total there are thirteen fundamental needs, table 2 for a short overview and Appendix B for the descriptions. By identifying which fundamental needs are most important to the travellers in the public transport network, a more focussed scope can be created when designing its services during this project.

Table 2: Short overview fundamental needs (Desmet & Fokkinga, 2020)

Competence
Autonomy
Purpose
Community
Relatedness
Impact
Recognition
Security
Beauty
Morality
Fitness
Stimulation
Comfort

2.3.2 Method interviews commuter

Interview preparation

The needs in the public transport network were found by performing qualitative research. Six semi-structured interviews were held with the target group (Patton, 2020). The target group in this project is the commuter. The participants selected for the interviews travelled to work either by public transport (n=4) or by car (n=2). This provided a diverse set of needs and gave insights into the transportation choice of the commuters.

The interview was set-up with the help of context mapping methods (Sanders & Stappers, 2012). Context mapping helps designers learn about people's everyday experiences and aids them in creating solutions that fit people's needs.

A sensitising booklet (Sanders & Stappers, 2012) was filled in by the participants in advance of the interview, during their travel journey before and after work, see Appendix C. In the booklet, they were asked to plot their journey on a timeline with the events that happened and how they felt about this. This way, people were triggered to map and review their journey. The booklet acted as a starting point of the interview.

However, due to new COVID-19 restrictions, most commuters were forced to stay at home. This resulted in that not all participants could fill in the booklet. To minimise the effect on the insights, more time was spent during the interview to recall the most recent travel experiences.

The interviews were constructed following the path of expression (Sanders & Stappers, 2012), shown in figure 6. First, the activities in the present were asked, sometimes with the help of the booklet. Then memories were recalled from earlier travel experiences by asking how the journey in the booklet or most recent travel experience differed from other travel experiences. Hereafter, the participants were asked to reflect on the memories and think about possibilities for the future and their ideal future transport network.

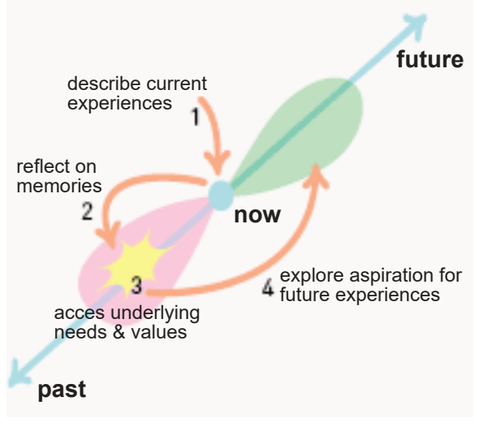


Figure 6: Steps of path of expression (Sanders & Stappers, 2012)

Furthermore, in both types of interviews (commuters with public transport or car), it was asked why they chose this kind of transportation. The biggest difference in the interviews was the focus on past experiences. With the car users, most had less past experiences in public transport so the questions were focussed on what they would convince them to commute with public transport. The interview guide can be found in Appendix D.

Conducting the interviews

Due to COVID-19, all interviews were performed online via video calling applications. Because of this, the body language of the participants was more difficult to observe. This could possibly have led to misinterpretations. During the interviews when the interviewer was not 100 percent sure about the interpretation, the intentions were asked directly to the participant to minimise the effect of misinterpretations.

Data analysis

The interviews were analysed using a clustering method. Insights were written on post-it notes and relationships were found between the individual insights. This lead to several clusters of what the needs of the commuter are in the public transport network. See figure 7 for an impression of the process. The yellow post-it notes are insights, blue are cluster names.

Results

The results of this analysis are insights about the commuter and about what their needs are, see next paragraph. Those needs were translated into six most important fundamental needs of the commuter in the public transport network.

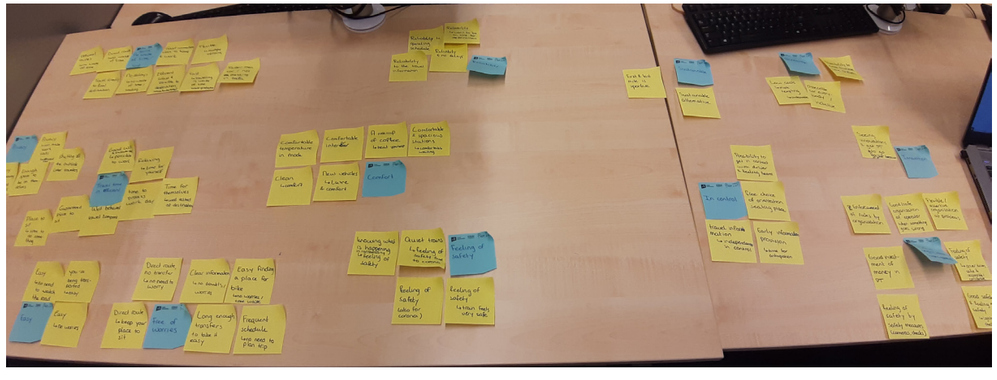


Figure 7: Impression of clustering the interview insights

2.3.3 The commuter

The target group in this project is the commuter for the reason that they have a big share in the total amount of travellers and they travel often. They are also an important source of income for the operators. Also, the focus of R-net, the high quality public transport network in the Randstad, is on the commuters (OV-bureau randstad, 2010).

The definition by the Cambridge Dictionary (2021) of commuter is *"someone who regularly travels between work and home"*. They mostly have a fixed travel journey, either by car or public transport. A commuter is a 'must passenger' for which the journey is a routine component of a working day (Van Hagen & Bron, 2014).

Making the choice

In general, commuters make a choice between travelling by car and/or public transport. This choice is very personal. Generally, the car is perceived as more comfortable, flexible, and faster for supporting a busy lifestyle. It is more private and can be used as a status symbol or an identity reflection (Jakobsson Bergstad et al., 2011). Public transport is considered as a more sustainable alternative for the car (Holmgren, 2007). Other reasons why commuters choose for public transport or the car are found by the interviews, see table 3.

Table 3: Reasons why commuters choose public transport or car found in interviews

	Why public transport	Why car
Effectivity	- Spend travel time effective by working/relaxing	- Can make private calls - Guaranteed place to sit
Costs	- Compensation to travel with public transport - No parking costs	- Car is cheaper long distance
Relaxing	- No need to watch the road	- Own private bubble with full control - Better choice in bad weather
Accessibility	- Reach directly middle of the city - Stop is close to home and work	- Can reach remote locations - Intermediate stops are easier to make
Speed	- Good connection - No standing in traffic	- Direct route, no stops in-between - No delays
Fitness	- Can bike of walk to train/bus	
Sustainability	- Most sustainable alternative	
Flexibility	- No set parking time - Have many options	- You can get everywhere
Ease	- Extra facilities (cup of coffee)	- reach destination without thinking

The need for certainty

During the interviews it was found not having certainty about their journey is a big barrier for travellers to not choose the public transport network for their commute. Uncertainty creates stress; am I going to miss my train? Will I be on time for my meeting? Most commuters who now choose for the car believe the public transport is not a good alternative for them because of these concerns and stress.

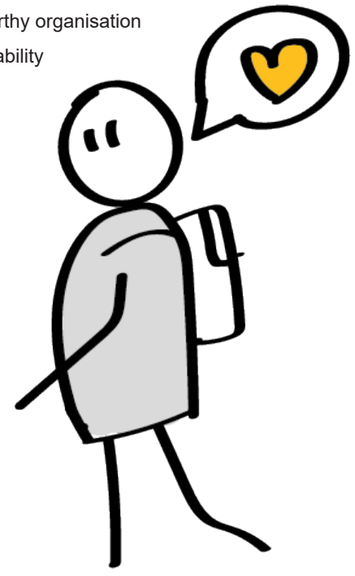
This need for certainty is also found during the research from Branddocters (2011) performed for R-net. Especially unfrequent travellers do not have the trust in the public transport network to let them reach their destination in time.

By providing certainty, and proving this over and over again you take away the stress and make the public transport a more attractive alternative. When certainty is realised, the traveller will have control, comfort and security which are found to be important needs.

Needs in public transport

Thirteen needs of the commuter in public transport (not to be confused with the thirteen fundamental needs) were found during the interviews with the commuters. See Appendix E for a detailed explanation of the needs.

- Comfort
- Ease
- Free of worries
- Being in control
- Reliability
- Feeling of safety
- Privacy
- No waste of time
- Innovation
- Efficient travel time
- Accessibility
- Trustworthy organisation
- Sustainability



2.3.4 Fundamental needs commuter in the public transport network

Fit in fundamental needs

The found needs fit into six fundamental needs of Desmet & Fokkinga (2020). For example; Comfort, Ease, and Free of worries all fall under the fundamental need 'Comfort'. This is because 'Comfort' means *'Having an easy, simple, relaxing life, rather than experiencing strain, difficulty or overstimulation.'* (Desmet & Fokkinga, 2020 and table 4). This is applied to all six fundamental needs, see figure 8.

By comparing the quality attributes from paragraph 2.2.2 with the six fundamental needs, it was found that all quality attributes fit in the fundamental needs. The fundamental needs provide an answer to why the quality attributes are important. For example, the attribute *information provision* is important because it gives travellers 'Autonomy' & 'Comfort'. Because the quality attributes fit well, it seems that the six fundamental needs give a complete overview of the needs of the commuter.

Table 4 provides an overview of the fundamental needs, needs of the interviews and quality attributes.

Table 4: Overview fundamental needs of commuters in the high quality public transport network

Fundamental need	Description (Desmet & Fokkinga, 2020)	Needs interview	Quality attributes
Comfort	**Having an easy, simple, relaxing life**, rather than experiencing strain, difficulty or overstimulation.	- Comfort - Ease - Free of worries	- Comfort - Frequency - Information provision - Convenience - Ease of transfers
Autonomy	**Being the cause of your actions and feeling that you can do things your own way**, rather than feeling as though external conditions and other people determine your actions.	- In control - Reliability	- Reliability - Information provision
Security	**Feeling that your conditions and environment keep you safe from harm and threats,** rather than feeling that the world is dangerous, risky or a place of uncertainty.	- Feeling of safety - Privacy	- Safety
Recognition	**Getting appreciation for what you do and respect for who you are**, instead of being disrespected, underappreciated or ignored.	- No waste of time - Innovation	- Guaranteed place to sit
Competence	**Having control over your environment and being able to exercise your skills to master challenges,** rather than feeling that you are incompetent or ineffective.	- Efficient travel time	- Frequency - Speed - Availability
Morality	**Feeling that the world is a moral place and being able to act in line with your personal values**, rather than feeling that the world is immoral and your actions conflict with your values.	- Accessible - Trust in organisation - Sustainable	- Accessibility - Price - Vehicle condition

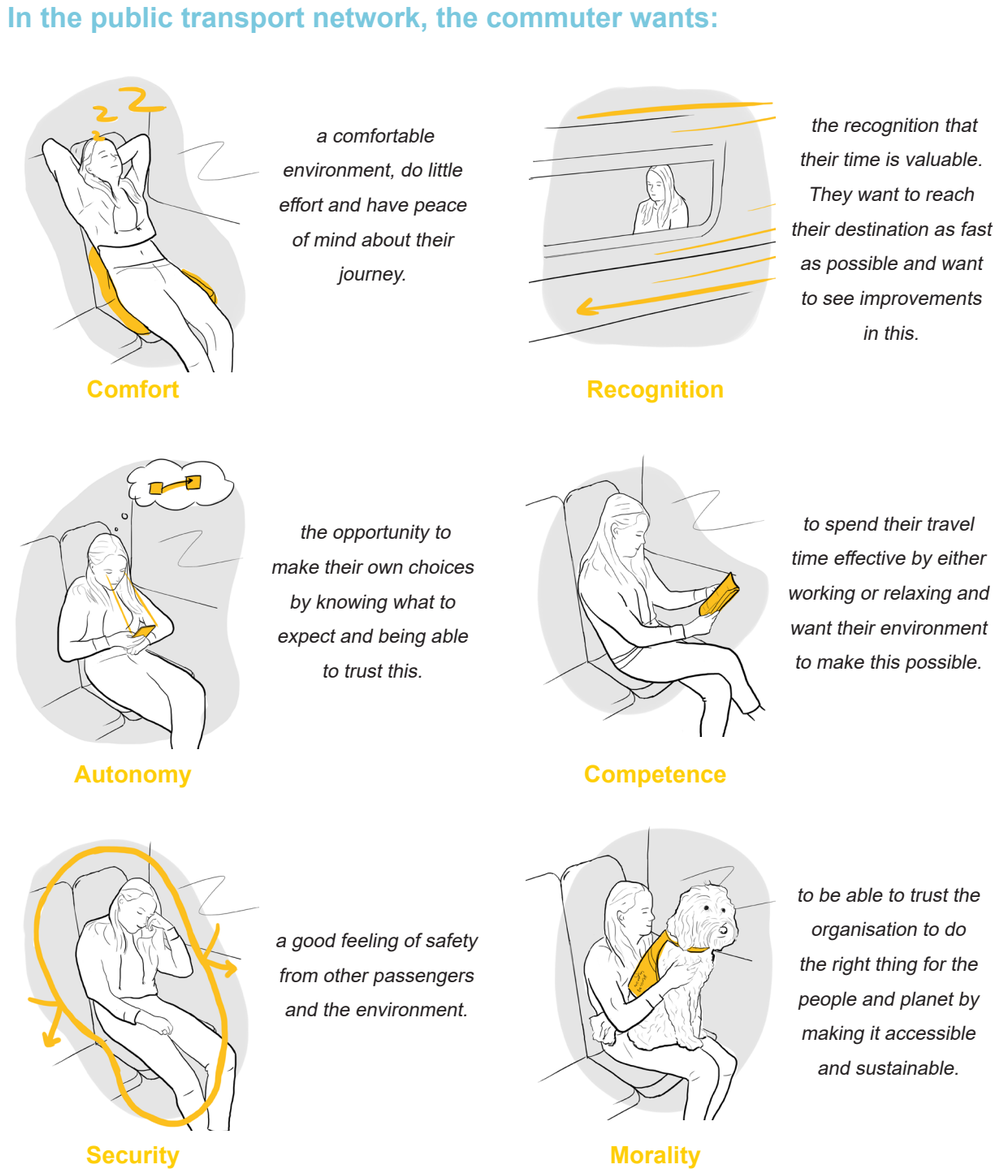


Figure 8: Illustration of fundamental needs of commuters in the high quality public transport network

Reflection on fundamental needs

It can be concluded that those six fundamental are seen as most important by the commuters when travelling with public transport. But why do the commuters not have the need to experience Purpose, Community, Relatedness, Impact, Beauty, Fitness, and Stimulation in the context of public transport?

It seems the commuter doesn't expect the public transport network to provide for those needs and therefore are not wishing this. For example, the commuters don't wish to experience Purpose in the public transport network itself, but the network transports them to their destination where they can have a purpose, like their family. In this way, the fundamental need is satisfied and it does not have to be included in the design of the public transport services. Therefore, the six fundamental needs found in the research do need to be implemented in the design of the public transport services.

It is also interesting to look at how public transport could mean something for those unwished fundamental need. Take for example Fitness. The public transport services could include this need by creating a bigger focus on the first and last mile and make this more sportive. However, due to the scope and time restrictions of the project, it is decided those other fundamental needs will not be included. The focus will be on the six fundamental needs and how they will look like in the future.

2.3.5 Conclusion

The interviews with the commuters resulted in an overview of their current needs in public transport. Thirteen needs fit into six fundamental needs: comfort, autonomy, security, recognition, competence and morality. By increasing the satisfaction of those needs, public transport will be more attractive to the traveller.

2.4

Elements for the desired future public transport network

This chapter describes elements on how to create a desired future travel experience for the commuter. It discusses the peak-end rule, an integrated platform and opinions of the commuter. Next, the future governance strategy is explained. The last paragraph describes a relevant healthcare case-study to find inspiration and lessons learned.

2.4.1 Peak-end rule

A traveller experiences a journey mostly during two crucial moments, during the peak and at the end; the peak-end rule (Kahneman, 2011). The peak is when people experience the strongest emotions, either positive or negative. The end is of great importance for the user's experience as this is most remembered, see figure 9. According to Kahneman (2011), the rest of the experience is not forgotten but is just not included in the overall experience evaluation.

This means that the future travel experience should include a high peak with a positive emotion and a high positive emotion at the end. In a study conducted by the NS (van Hagen & Bron, 2014), the positive peak is currently when people find a seat in public transport. However, in the future, this could be something else.

Van Hagen & Bron (2014) explain the current journey does not end with a high peak for 'must passengers' (a commuter for which the journey is a routine component of a working day). This is because the journey doesn't end after the train journey; the last-mile is also considered part of the journey. This is an important consideration in the design of the future vision.

In conclusion, the desired future high quality public transport network should have a high peak of emotion somewhere during the journey and at the end with the last-mile. Especially the last-mile has the opportunity for improvement.

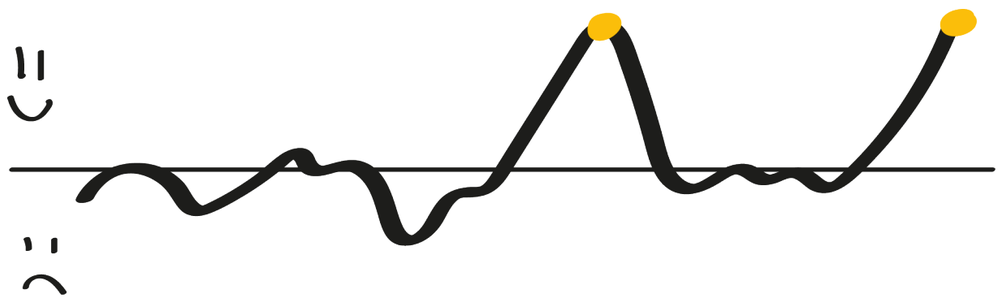


Figure 9: Peak-end rule (Kahneman, 2011)

2.4.2 Integrated ditigal platform

MaaS

In the future, digital platforms will play an important role to facilitate interaction between the traveller and the transport provider to create seamless trips. One of these business concepts is Mobility as a Service (MaaS). MaaS integrates different transport modalities into a joint, seamless service. The goal of MaaS is to provide tailored mobility solutions focussed on the end user's travel needs (Mukhtar-Landgren et al., 2016). It integrates the currently fragmented tools and services for the traveller and creates one product via a single interface. With MaaS, the traveller could have access to easy, flexible, reliable, price-worthy and seamless transit from A to B (Kamargianni & Matyas, 2017). It integrates for example planning the trip, booking, real-time travel information, payment, and ticketing.

TRIP

Another concept for the same purpose is TRIP-platforms (Veeneman et al., 2020). With this platform, a traveller can make a *Transaction* to pay for the services. He/She could *Reserve* the mobility service making it more reliable. Third, the platform provides *Information* about the traveller's current journey. Last, the platform offers the possibility for *Planning* the journey in advance or for real-time optimization.

In conclusion, the design of the future high quality public transport network should include an integrated digital platform for the traveller to create a seamless door-to-door experience.

2.4.3 Important elements according to commuters

By asking '*Why*' the commuter made certain decisions during their interviews, desired aspects about the future visions of the high quality public transport network were found, figure 10. See Appendix F for each future concept explained.

A recurring theme is that in the future, the commuter wants to reach their destination in an efficient manner. This is mostly designed by using a smart system and direct routes, such as the carpool to work in a smart drone (#1) or shuttle (#6). Those concept collect people who live close to each other and drives directly to their joint destination.

Something else all the visions have in common is comfort. The transport services are made smaller/ private so each commuter has more privacy, like the ski lift system (#4). Furthermore, comfort comes back by having a guaranteed place to sit, for example, because they can reserve a chair (#3) or it is just always possible (#2).

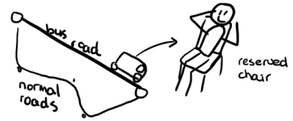
Last, sustainability appears as an important aspect in the desired visions. The commuters agree public transport should still play an important role in the whole transport system. This is for example shown that the different transport modes are still 'public'. This is more efficient in regards to space, costs, and the environment.

So in conclusion, in the future, the commuter wants a public transport system that is smart, fast, comfortable and sustainable by making it more efficient.

#1 Carpool to work in a smart drone system

#2 Autonomous first class metro

#3 Buses using own, efficient roads



#4 Travelling like with a skilift

#5 Decentral organisation becomes central

#6 Travelling with a smart, direct shuttle

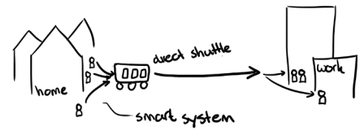


Figure 10: Desired future visions according to commuters (illustrations made by author)

2.4.4 Desired future governance strategy

Balance between integration and innovation

To achieve the desired future travel experience in the high quality public transport network for the commuter, the governance strategy cannot be forgotten. The transition of the door-to-door journey with the shared mobility services will create a different landscape of solutions for the traveller, possibly even a highly fragmented landscape if not mitigated by a purposeful policy and design strategy (Veeneman et al., 2020). Furthermore, if an integrated digital platform such as MaaS is to be realised, a new business ecosystem with all the different stakeholders working together is required (Kamargianni & Matyas, 2017).

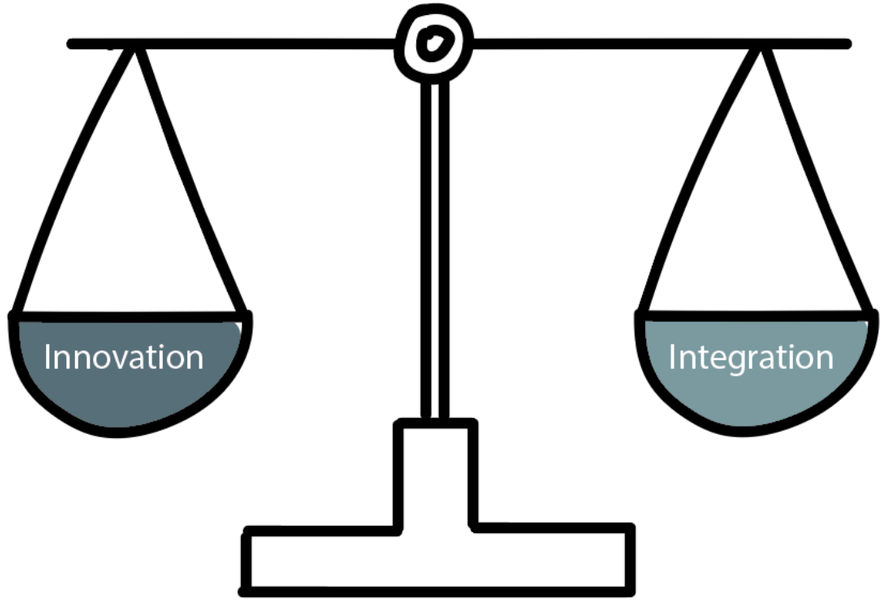
Because of this, policymakers will need to create a strategy that supports collaboration and prevents the landscape to be fragmentised. If this fragmentation would be the case, the future network will not have the integrated system desired. However, there is also a concern that the landscape will become a monopoly where, for example, all the offerings of mobility providers are state owned and do not face any competition. This would create a highly integrated system, however there will be little focus on innovation resulting in an outdated user experience (Veeneman et al., 2020).

For these reasons, the study of Veeneman et al. (2020) suggests finding a balance between integration and innovation in the future public transport network. When this is achieved an optimal combination has been found between competition and therefore innovation, while at the same time encouraging collaborations to create an integrated service for the traveller. The advantages this creates are shown in figure 11.

Also, in the agreements made about the MaaS pilots in the Netherlands, it states public authorities should facilitate MaaS, but are not the executing actors (Bogaerts, 2019). They can act as neutral parties creating a more open market. The case-study of TNO (Vonk Noordegraaf et al., 2020) confirms over-regulation leads to stifleling the private sector investment, innovation, and development and also believes that a well-formed public/private sector collaboration will prove to be the most effective strategy.

Proactive mode

Next to the balance between integration and innovation, policymakers will need to switch from a reactive mode to a more proactive one to keep up with the technological developments (Snellen & Hollanders (2017).



Competition between mobility providers

+ up-to-date experiences for high level of usability
+ attractive price levels
+ tailored solutions for local/regional situations

Regulated by the government

+ seamless travel experience with door-to-door planning and payment
+ regulation societal goals
+ consistenty and simplicity in network
+ best price possible
+ easy to enter the market

Figure 11: Balance between innovation and integration (Veeneman et al., 2020)

2.4.5 Healthcare case-study MedMij

MedMij

A healthcare case-study about MedMij, conducted by TNO (Vonk Noordegraaf et al., 2020), was analysed to find lessons learned for mobility policy options useful for this project. The healthcare sector is, just like the mobility sector, faced with barriers and enablers because of digitalisation and technological advancements. Both sectors have private parties that are responsible for carrying out public tasks. Therefore this comparison is valuable to make.

MedMij is a foundation that brings together all relevant healthcare stakeholders in order to work towards an agreement framework. All healthcare platforms and services should adhere to this agreement framework for safe data sharing. The goal of MedMij is for patients to take control and ownership of their own health by having their data.

The Ministry of Public Health, Welfare and Sports facilitates the development of MedMij. It hosts ‘roundtable’ conversations with representatives of each relevant stakeholder group. The MedMij agreement framework works with a certification structure, see figure 12. About 50 companies have already joined MedMij and received the MedMij label.

Lessons learned

1) Make use of a certification structure to allow third parties to join for guaranteed safe data sharing.

2) Facilitate collaboration through a roundtable conversation structure with representatives of each relevant stakeholders group.

Figure 12: MedMij certification label

2.4.6 Conclusion

The desired future high quality public transport network should accommodate the peak-end rule and be facilitated with an integrated digital platform According to the commuters, the system should be smart, fast, comfortable and sustainable by making it more efficient. In the future governance strategy a balance between integration and innovation should be found with a proactive mode. Last, lessons learned from the healthcare case-study MedMij can be taking into account.

2.5

Conclusion

The context analysis is concluded with requirements for the design of the future high quality public transport network.

Future requirements

The context analysis can be summarised into 13 requirements for the design of the future high quality public transport network. These requirements will be used to design the future vision and concept.

1) The future high quality public transport network should maintain or even increase the advantages of the current public transport network like sustainability, space effective and safety. *(Par. 2.1.1)*

2) The future high quality public transport network should have enough capacity for the expected growth in the public transport sector. *(Par. 2.1.2)*

3) The future high quality public transport network should be a reflection of the general future vision of the public transport network made by the Dutch government. *(Par. 2.1.3)*

4) The future high quality public transport network should to be a door-to-door travel experience by combining different means of transport, like walking, the (e)bike, bus, tram, metro, train ánd shared mobility services. *(Par. 2.1.3)*

5) The future high quality public transport network should provide certainty to the traveller about their journey. *(Par. 2.3.3)*

6) The future high quality public transport network should convince car users to switch to a public transport commute. *(Par. 2.3.3)*

7) The future high quality public transport network should address the future fulfilment of the six fundamental needs; comfort, security, autonomy, recognition, competence, and morality. *(Par. 2.3.4)*

8) The future high quality public transport network should have a peak of positive emotion and a high positive emotion at the end of the journey, so the last-mile. *(Par. 2.4.1)*

9) The future high quality public transport network should have an integrated digital platform (MaaS / Trip). *(Par. 2.4.2)*

10) The future high quality public transport network should be efficient making it smart, fast, comfortable, and sustainable. *(Par. 2.4.3)*

11) The governance strategy of the future high quality public transport network should have a balance between integration and innovation. *(Par. 2.4.4)*

12) The future high quality public transport network should make use of a certification structure to allow third parties to join. *(Par. 2.4.5)*

13) The future high quality public transport network should facilitate collaboration through a roundtable conversation structure with representatives of each relevant stakeholder group. *(Par. 2.4.5)*

Internal Analysis

3

In this chapter, R-net is analysed to find the strengths and weaknesses of the organisation. First, a general introduction about R-net is provided. This is followed by the stakeholders and how they collaborate in the current situation. Furthermore, it is explained how the implementation of R-net functions. Last, the communication of R-net with the traveller will be discussed. The chapter is concluded with the most important strengths and weaknesses listed and a root of the problem analysis to find the underlying problems to be solved.

3.1

Introduction to R-net

The introduction to what R-net is explains how R-net works and the goal of R-net. It illustrates a brief history of R-net and why R-net was created. The chapter will finish with an overview about the current situation of R-net.

3.1.1 What is R-net?

A high quality public transport network

In the Randstad (a megalopolis in the central-western Netherlands) a high quality public transport network has been implemented. This high quality network is branded as ‘R-net’, short for ‘Randstadnet’. R-net follows a product formula on multiple public transport modalities (bus, tram, metro, and train). It acts as a quality mark to distinguish ‘high quality’ from ‘regular quality’ public transport. (Over R-net, n.d.)

Five assurances

R-net says to deliver five assurances (Over R-net, n.d.)

Reliable | R-net runs on time and offers good connections, so you can always make the journey you desire.

Frequent | R-net drives several times an hour, so you will never have to wait long.

Accessible | R-net vehicles and bus stops are designed so that all passengers can use R-net.

Fast: R-net does not stop at all stops and mostly travels using its own infrastructure be quick.

Attractive: R-net vehicles and bus stops are comfortably furnished and have a recognisable design.

Goal

The original vision of R-net is to have a public transport network of Olympic quality in 2028. This was because of the possibility of the Olympics being organised in the Netherlands in 2028. The vision includes the promise to the traveller of fast and reliable connections between living areas, economic centers, cities, and important intersections (OV-bureau Randstad, 2010, p.5).

How does it work?

R-net has been implemented in the provinces of Flevoland, Noord-Holland, Zuid-Holland, the Metropolitan region of Rotterdam The Hague, and the Transport Authority Amsterdam. Nine operators carry out the public transport services. (Over R-net, n.d.)

The implementation of R-net is decided in a concession. Often times a normal route is ‘upgraded’ into an R-net route. For example, a Connexxion bus line is transformed into R-net. It will get a new route, bus, and bus stops.

3.1.2 Brief history of R-net

R-net is an outcome of the results of OV-bureau Randstad. OV-bureau Randstad started in 2009, see figure 13, with the goal to increase the competitive advantage of Randstad. At that point, the Randstad was losing points in comparison to other European regions (TNO, 2010). Increasing the accessibility through a high quality public transport network could improve this.

The Ministry of Infrastructure and Environment, urban regions, and the public transport authorities worked together on how to achieve this vision of the high quality of a public transport network. Together they made agreements about how it should work and look like. This was signed in 2010 (OV-bureau Randstad, 2010). R-net officially started for the public in Noord-Holland in and around Amsterdam in 2011. Zuid-Holland needed more time for preparations for R-net and started in 2014 with the first route Leiden - Zoetermeer.

In the meantime, OV-Bureau Randstad achieved its initial goals and discontinued in 2013. The responsibility of implementing R-net was left to each authority for itself. This has resulted that not one organisation has the collective interests in mind of R-net. However, then and now more and more lines are transformed in R-net.

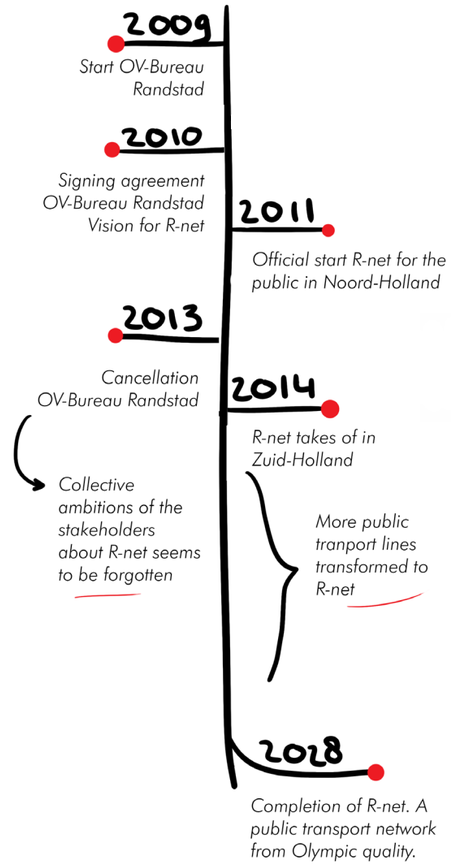


Figure 13: Timeline R-net

3.1.3 Why R-net?

R-net originally started because of economic reasons, see figure 14. Because of R-net, the quality of the public transport network in the Randstad would increase, which in turn would increase the number / share of travellers in public transport. This is because public transport would be more attractive to the traveller and therefore they will choose to travel with public transport. This would create more revenue: economic advantage.

However, over the last years, sustainability has become an even bigger focus and the realisation came that R-net could, and should, also play a role in this as public transport is considered to be a more sustainable alternative – sustainable advantages (like zero-emission buses, circularity etc.).

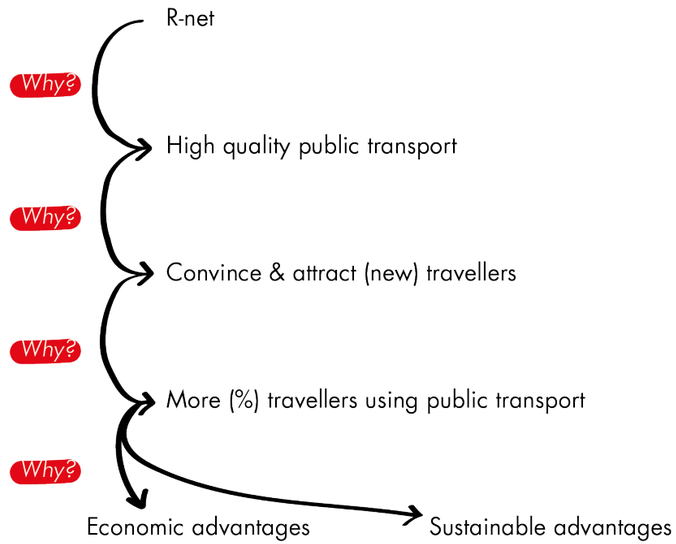


Figure 14: Why laddering R-net

3.1.4 Current state R-net

Currently, at the beginning of 2021, R-net has 63 bus routes, 5 tram routes, 9 metro routes and 2 train services (Waar rijdt R-net nu?, n.d.). Figure 15 shows where R-net is operating in the Randstad. The success of R-net has proven itself. Where R-net is implemented, there is a significant increase in the number of passengers. Furthermore, customer appreciation increases (interview stakeholders R-net).

Figure 15: Map of where R-net is implemented (R-net, n.d.)

Customer

The customer of R-net is the traveller. They are making use of – and paying for- the services. According to OV-bureau Randstad, R-net is for *"the sensible people who can choose for the wise and pleasant way of travelling in the Randstad"* (OV-bureau Randstad, 2010, p.42). Who they mean by this are commuters who have the possibility to choose between their private vehicle or public transport.

Handbook

The prescribed exterior of R-net has been documented meticulously in a handbook. The handbook states standards about the different looks of the various modalities, see figure 16, and their requirements. In general, these are elements that distinguish 'regular public transport' with 'high quality public transport'. The most important goal for 2028 is travelling without planning. This is translated to a minimum frequency of 6/h in peak-hours and 4/h off-peak. (bestuursovereenkomst, 2012, p.16)

Other characteristics of R-net are having a: high operating time, minimum travel speed, reliability to the operating schedule, recognisable with the R-net brand identity and last, facilities like bike stands, dynamic travel information signs, and the R-net abris (Handboek, 2018).

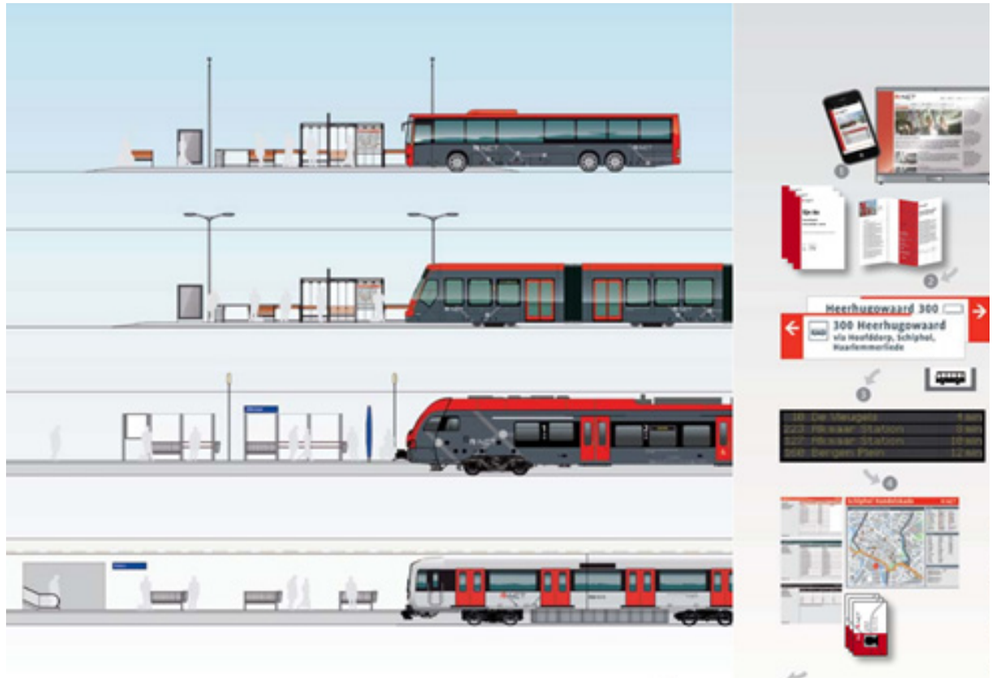


Figure 16: How R-net should look like according to its handbook (Handboek, 2018).

3.2

Current collaboration R-net

This chapter explores the collaboration of R-net. It introduces first the direct stakeholders and second the indirect stakeholders. It is explained how the direct stakeholders collaborate with each other and the strengths and weaknesses of the collaboration.

3.2.1 Stakeholders

Nowadays, R-net is a collaboration between six authorities and nine operators. Also other stakeholders are involved.

Authorities

At the moment, six authorities are implementing R-net in their concessions (R-net, n.d.), see figure 17. They make the planning and decisions about when and where a public transport area should be transformed into R-net. More information about the authorities can be found in Appendix G.

Figure 17: Authorites R-net

Operators

Nine operators are to carry out the promises of R-net (R-net, n.d.). Together they have different means of transport; bus, train, metro, and tram, see table 5. Most of them have ‘regular’ lines next to the ‘high quality’ lines of R-net.
The operators can be divided into regional operators and urban operators (R-net, n.d.). The regional operators are Arriva, Connexxion, EBS, Qbuzz, Keolis, and NS (NS more on national scale). They operate in a big area mostly in-between cities.
The urban operators are GVB, HTM, and RET and operate mostly within the city, like the GVB in Amsterdam.

Interviews conducted

During this analysis, in-depth interviews were conducted with stakeholders of R-net to gather insights. Two public transport developers of EBS, a public transport developer RET, a public transport advisor VRA, the supervisor board of representatives R-net of province Zuid-Holland, the director of Rover. Also the commuters were involved.

Table 5: Overview operators implementing R-net and which means of transport

	Arriva	Connexxion	EBS	Qbuzz	KEOLIS	NS	GVB	HTM	RET
Train				●		●			
Tram							●	●	●
Metro							●		●
Bus	●	●	●	●	●				●

Regional operators | Urban operators

Other direct stakeholders

The direct stakeholders are, next to the authorities and operator, the traveller and road administrator. They are placed in the first circle in the stakeholder map of figure 18. The responsibilities and needs & wants of the direct stakeholders can be found in figure 19 on the next page. The direct stakeholders have to deal with conflict of interests (Public transport developer EBS, Oct. 15, 2020). None of the stakeholders have R-net as their top priority and the feeling of responsibility is missing (Strategic public transport advisor Amsterdam Transport Authority, Oct. 12, 2020)

Indirect stakeholders

The indirect stakeholders involved with R-net are shown in the next circle of the stakeholder map.

- Customer representative organisations (e.g. Rover) represent the traveller and gives advice to direct stakeholders.
- Other traffic & People living close to public transport encounter R-net.
- Security, Maintenance and the Cleaner make sure the system works behind the scenes.
- The driver is the face of R-net.
- The Ministry provides grants to finance R-net.

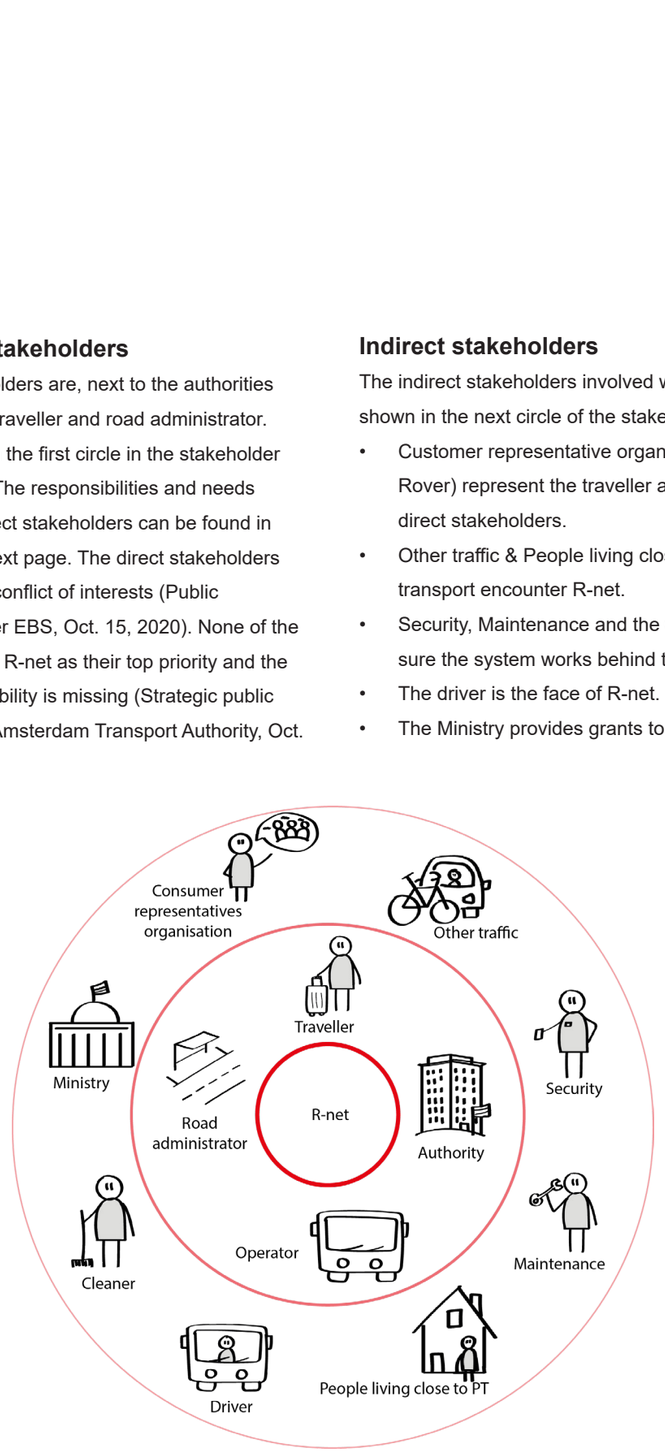


Figure 18: Stakeholder map R-net

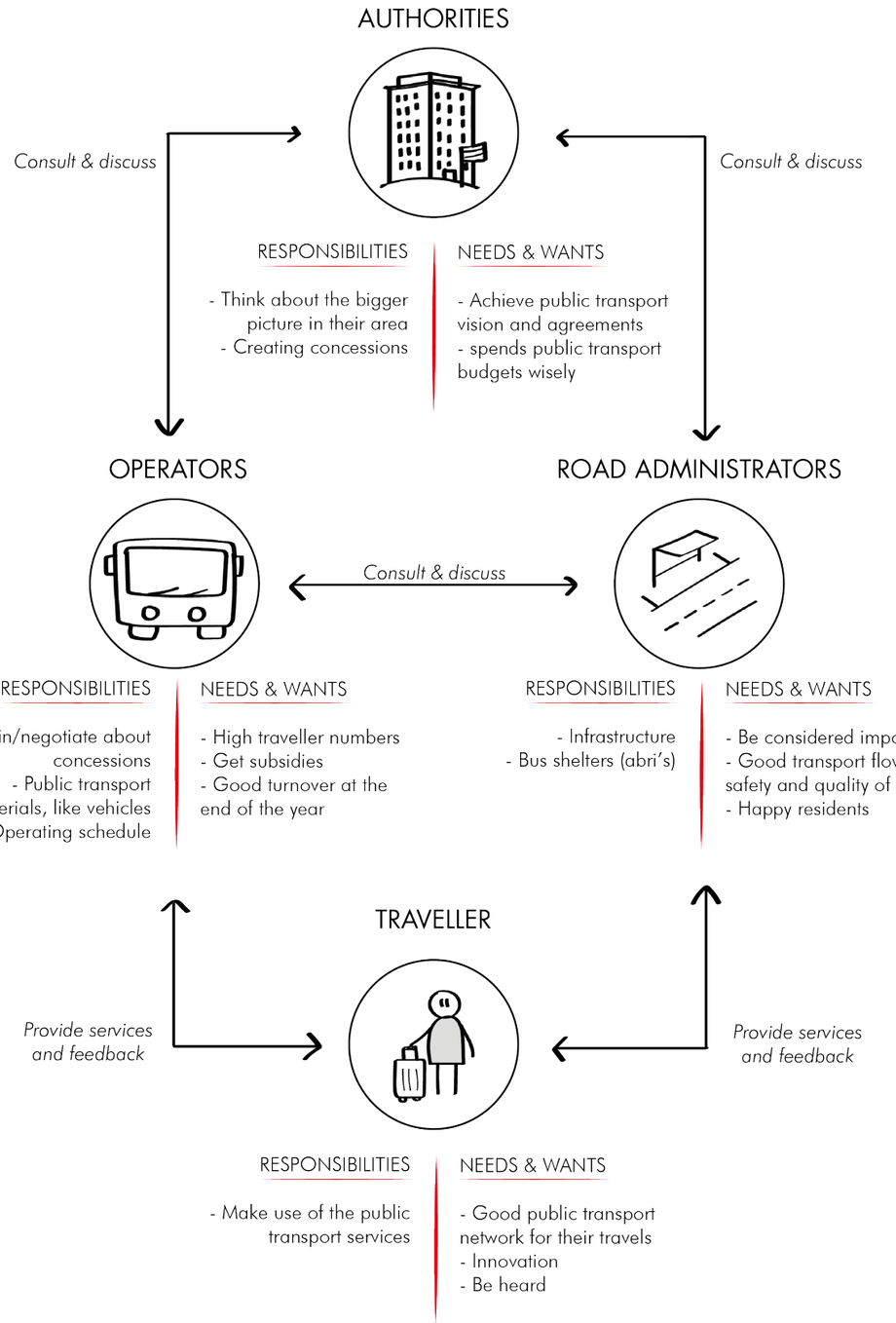


Figure 19: Responsibilities and needs & wants of the main stakeholders of R-net and their collaboration

3.2.2 Collaboration between the authorities

Board of representatives

Different authorities implement R-net making it necessary for them to collaborate. This collaboration is organised within a board of representatives. They meet around twice a year to discuss information and progress of the set goals. For example, currently they are working on an implementation monitor system. At the moment the province of Zuid-Holland is responsible for this board. A head of the board of representatives was assigned to make sure all the stakeholders work on those goals, the supervisor. (Supervisor R-net, Oct. 29, 2020).

Board agreement

The different authorities signed a board agreement at the beginning of R-net. This agreement was valid for eight years and had unknowingly expired last year. For now, they work with the old agreement, but plans are made for the new one for the upcoming eight years, until 2028. This allows revising the agreement, for example the requirements and product formula. (Supervisor R-net, Oct. 29, 2020).

Too little commitment

The supervisor of the board of representatives mentioned it is difficult to put R-net and working on its goals in the agenda of the other members of the board. If he wouldn't push, nothing would happen. The commitment of the board of the authorities is missing. This is mostly due to time and capacity problems.

Difficult decision making

The collaboration between the authorities can be described as a sum of different authorities who make their own decisions. A structure and mindset is missing to make overarching decisions for R-net as a whole.

> "The organisation of R-net is complicated and we are actually not organised to do this" - Supervisor R-net

Insufficient communication

Interestingly, the Amsterdam Transport Authority seems not to be aware of what the province of Zuid-Holland is (trying to) work on (Strategic public transport advisor Amsterdam Transport Authority, Oct 12, 2020). This gives the impression that the communication between the authorities is not that strong. Also, a better communication from the board of representatives to the rest of the organisation is needed. By articulating the value of working together and how this could create more impact would create bigger support.

3.2.3 Collaboration with operators and road administrators

Most of the time R-net is implemented because of the authority incorporating R-net in their concessions. The operators carry out the concession and therefore R-net. The road administrator takes care of the infrastructure. Sometimes these are municipalities, other times the province.

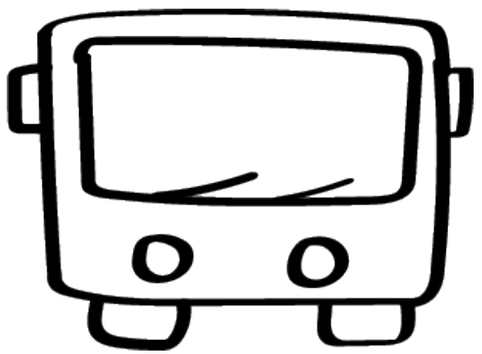
Operators want to play a bigger role

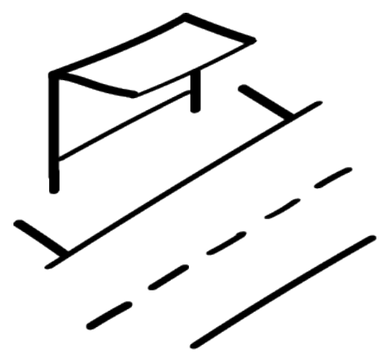
Developers from operators would like to play a role in the decision making and evaluations of the implementation of high quality public transport and thereby R-net. They argue this is because the operators stand more closely to the traveller and therefore could better know their needs regarding the public transport elements. For example, an operator would know where demand has been growing and could use this to make better decisions about where to implement R-net. (public transport developer EBS, Oct. 15, 2020)

R-net wanted by road administrators

Sometimes the road administrator asks the authority and operators if their municipality can be included in the plans for implementing R-net. They want this because they don't want to be left out. In general R-net attracts more travellers to the public transport network and decreases the use of the car which is beneficial for the municipality. It seems R-net works as a means of an increasing demand of high quality public transport and more money becomes available (Director Rover, Oct. 19, 2020).

However, a lot of those routes suggested by the road administrator are not 'high quality' enough nor have this potential. But as nobody is checking or complaining, those routes are transformed into R-net, even though they might not be worthy. For example, in the concession of Waterlanden, almost all the bus routes are now R-net, but not all fulfil the requirements (Public transport developer EBS, Oct 12, 2020).





3.2.4 Collaboration with the traveller

Not involved in the conversation

The traveller is the most important reason for R-net to exist. They make use of the services of the operators and road administrators, see figure 19. However, currently the traveller only provides minimum feedback if not at all. The other stakeholders are not evaluating their services with the traveller, they only look at the number of travellers (public transport developer EBS, Oct 12, 2020).

Furthermore, the authority does not have any communication with the traveller and therefore do not have an idea about the needs and wishes of the traveller.

A good collaboration with the traveller has the potential to increase the current collaboration. This is because the stakeholders would work towards the same goal (Woude van der & Siermann, 2019). To do this, the traveller needs to be involved in the conversation about R-net.

3.2.5 Conclusion

The analysis of the collaboration between and with the direct stakeholders resulted in strengths and weaknesses of R-net. The most important strengths are that beacuse of R-net, the authorities are forced to collaborate which has created a strong foundation to build upon. Furthermore, R-net has a strong reputation among operators and road administrators and therefore R-net seems to be the reason for an increase in demand of high quality public transport.

The weaknesses found in the collaboration of R-net are the conflict of interests and lack of responsiblity from all the stakeholders. None of the stakeholders have R-net as their top priority. Furthermore, the structure of the collaboration between the authorities makes it impossible to make overarching decisions of R-net as a whole and operators don’t have enough say in the decisions made about R-net.

Because of those weaknesses in the collaboration of R-net routes are transformed into R-net even though they are not high quality enough nor have this potential and nobody is stopping this.

3.3

Current implementation R-net

In this chapter the challenges in the current implemenation are discussed. Also the different strategies between authorities and operators is explained. The chapter is concluded with the strengths and weaknesses of R-net related to the implementation.

3.3.1 Challenges

Not strict on requirements

Implementation of R-net is decided in the concession of that area. The authorities are responsible for those concessions. The concession states requirements about the R-net route, for example a minimum frequency in the operating schedule. However, these requirements are often less strict as agreed on and according to the R-net handbook. (Public transport developer RET, Oct 5, 2020).

> "The requirements are greatly degraded, what is the distinctive feature [of R-net] we can communicate to the traveller?" - Public transport developer RET

The result is skepticism about the value of R-net with the operators. They believe the quality has been degrading and claim:

> "R-net has become an easy sticker". - Public transport developer RET

Difficulties in timing

The implementation of R-net entails a lot of aspects coming together. The authorities decide on the routes and requirements of R-net. The operators order new buses and create a new operating schedule. The road administrator oftentimes build new infrastructure and abris. All those elements are important, but finishing them at the same time is difficult (Public transport developer EBS, Oct 12, 2020). Therefore, it is challenging to say when a route can be named R-net. For example, the R-net bus is already driving, while the infrastructure and therefore the speed is not yet R-net worthy. This can lead to confusion for the traveller.

No innovation

> "Could you look at the interior upholstery? That is becoming outdated" - Public transport advisor VRA

The implementation of R-net is still the same as it is described in the handbook of R-net. This means the product formula and requirements have not been revised, while the world has been changing. The needs of the traveller are of course different then in 2008 and they expect for example to see more innovations. However, this has not been the case. It can be concluded that R-net is becoming outdated instead of being a premium brand.

3.3.2 Different strategies

Since 2011, R-net is in the process of being implemented throughout the Randstad. During this time, different strategies of implementation have occurred depending on the authority and kind of operator.

Different strategies between authorities

The various authorities have different strategies. The province of Noord-Holland leaves more room for the operators to implement R-net in their own way. They can for example decide on the travel route and marketing strategy. In contrast to the province Zuid-Holland. They like to be more in control of what the operators decide and therefore work more collaboratively. They both agree implementing R-net is complicated.

> "Honestly, I would give a negative advice on the question if we should implement R-net now." - public transport advisor VRA

Different strategies between operators

Another difference in the implementation strategy is between the kind of operator. The strategy described above mostly refers to the regional operators. With the urban operators (GVB, RET and HTM) the concessions are not open to different operators, but stay with the current operators.

Decisions about the concession, like the requirements and execution of R-net, are made in dialogue between the authority and the operator. The urban operators have their own strong wishes regarding how their public transport should look like. Negotiations take place which can be a struggle according to the Strategic public transport advisor of the Amsterdam Transport Authority.

> "Calling the metro R-net is not beneficial, everybody knows already it has a high quality." - Public transport developer RET

A result of this is compensation. This leads for example to different looks of R-net at those areas. See for example the GVB metro is red light grey instead of dark grey, see figure 20.

Figure 20: R-net metro GVB with light grey colours

3.3.3 Conclusion

Next to the strengths and weaknesses of R-net of its collaboration in the previous paragraph, strengths and weaknesses were found related to the implementation in this paragraph.

The main strength of R-net in the implementation is that implementation of R-net takes place at a clear moment, with a new concession.

The weaknesses of R-net in the implementation are that timing is difficult and a struggle with urban operators. Furthermore, R-net is not innovating is therefore becoming outdated instead of being a premium brand.

Because of the differences in implementation, R-net is different depending on the area and operator. They follow their own requirements of 'high quality' public transport, have a different execution and vary in looks. R-net is positioned as one brand, but is not consistent. This leads to confusion for the traveller and is harmful for the brand.

3.4

Current communication R-net to traveller

First the brand image is described which states certain important problems due to the communication with the traveller. This is followed by an explaination of the online presence of R-net and marketing campaigns. Also this chapter is concluded with strengths and weaknesses regarind the branding.

3.4.1 Brand image

Brand identity

R-net (wants to) position itself as a premium brand in the public transport sector. It acts as a quality mark for high quality public transport. R-net believes in a recognisable transport network that brings assurance to the traveller. Therefore the slogan is: Reizen met de zekerheid van R-net (translated: Travelling with the assurance of R-net), see figure 21. They explain what this assurance is on their website with the 5 certainties also seen in chapter 3.1.1.

R-NET

Reizen met de zekerheid van R-net

Figure 21: Logo and slogan R-net

Losing credibility stakeholders

The brand is under pressure because R-net is not fulfilling its promise of the 5 certainties. It is difficult for the operators to really explain to the traveller what the distinctive features are (Public transport developer RET, Oct 5, 2020). They claim that the brand itself is not that valuable for the traveller. However they do believe the concept behind the brand is valuable as it increases the quality of the public transport network.

Furthermore, the operators and authorities are questioning if the branding and product formula of R-net is even important for the traveller; doesn't the traveller just wants a bus to take them to their destination without caring about its colour. This also shows a loss of credibility among the stakeholders.

Confusing the traveller

The brand R-net leads to confusion from the traveller.

> "That is just another operator right?"
> "You mean RET?"
> "Randstadnet? Weird name, it doesn't represent what it is"

Most travellers see R-net only on the street. However, if you don't know any better, R-net positions itself just as another operator. This is because the whole vehicle has the R-net branding style, like other operators also do. In the R-net vehicles is not explained what R-net really is.

Also, the RET claims they have had complaints from travellers who actually travelled with R-net. Many people mix-up R-net with RET.

Furthermore, on those vehicles, the logo and branding of other organisations are also visible, like of the operators, the regional authority, travel information group 9292, etc. See figure 22. For the traveller this makes it hard to understand where they need to go when they need to get in contact with the operator, for example for a complaint.

Figure 22: Back of R-net bus with all different brands

Brand awareness

The most recent research about the brand image of R-net is from 2017 (n=1012). This report states the brand awareness by the residents of the Randstad was growing, 60% of them had heard of the name R-net (de Wilt & Bergsman, 2017). However, less than 10% of those people knew what R-net really stands for.

During the interviews with commuters (paragraph 2.3.4) this was also the case. Most people did not recognise the name R-net. However, after showing some pictures they did recognise the modality modes, e.g. the bus. But still, most had no idea what R-net is or thought it was just another operator. This shows that the brand awareness of R-net is not that strong among the civilians in the Randstad.

Not seen as a premium brand

According to the interviews (n=6) and other travellers I spoke with during my project, the people that do know R-net do not associate it as a quality brand. They do not think it is any better compared to other operators. They just see it as another red bus that has services sometimes even worse than others. Comments from commuters:

> "I actually prefer the green Connexxion bus. The R-net buses have fewer chairs and the layout is awkward. Furthermore, the check-in points are confusing and slow."

> "I don't like the R-net buses from Haarlem to Amsterdam. They drive way to fast"

> "The bus Delft - Zoetermeer never follows its schedule. Either the bus is too late or leaves too early. Last week I missed my dentist appointment because of it. I do like they have USB ports and real time information on screens in the bus"

> "I actually associate the colour red of R-net with cheap and low quality."

3.4.2 Online presence

Basic website

R-net can be found online via a website, see figure 23. The website can be described as basic where general knowledge can be found, like the R-net routes. R-net does not have its own customer service, the travellers are referred to the underlying operators.

> It is really inconvenient you cannot contact R-net. They are the ones whose names is placed huge on the bus and stand for assurance? Then they should take ownership of the customer service as well. - commuter

Outdated Facebook page

The Facebook page of R-net was created in 2012. Unfortunately, the Facebook pages' last update was only a few months later. Nowadays, it is only used by travellers to comment complaints under the last updates. R-net did not respond, see figure 24.

Figure 24: Facebookpage R-net with complaints.

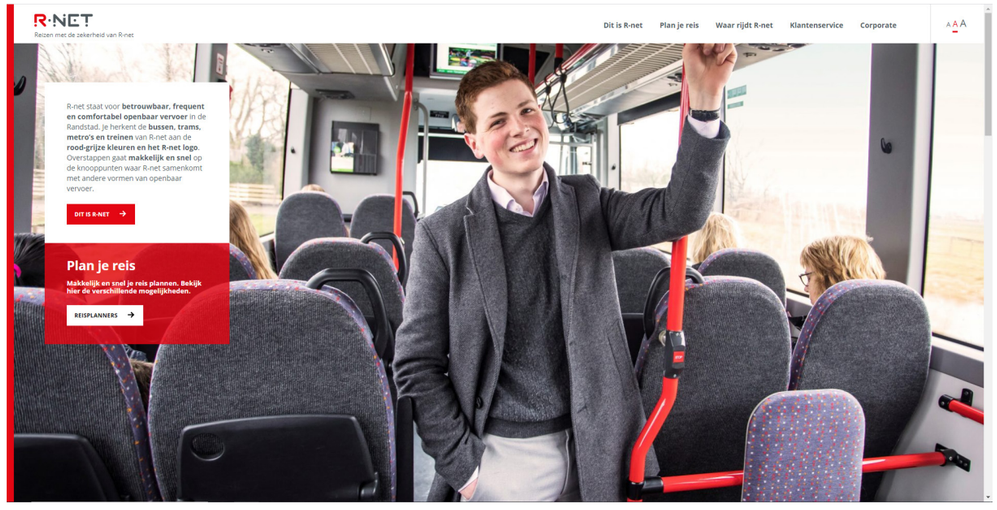


Figure 23: Front page website R-net

3.4.3 Campaigns

R-net had multiple campaigns over the last years, however they were executed by an individual authority and/or operator. For example, the campaign from Public Transport Authority Amsterdam together with Connexxion, EBS, KEOLIS and GVB in figure 25. Their goal was to increase brand awareness. They reached around 1 million people with the campaign (emotion, 2020).

No overarching strategy

However, there has never been an overarching campaign about R-net as a whole. The R-net supervisor (Oct. 29, 2020) also mentioned they do not have enough knowledge about branding. They see it as a blind spot in their knowledge. An overarching branding/communication strategy is missing.

Figure 25: Campaign R-net (emotion, 2020)

3.4.4 Conclusion

The last part of the strengths and weaknesses analysis of R-net was about the communication with the traveller.

First the strengths of the communication of R-net. The brand awareness has been rising and it has had multiple campaigns to increase brand awareness. Furthermore, R-net has its own website and Facebook page for communication.

However, these communications are outdated. Another weaknesses is that R-net is confusing for the traveller as the modalities look like just another operator, display a lot of other brands and the name R-net is similar to RET. Also the traveller does not know what R-net is or stands for and doesn't see R-net as a premium brand. R-net does not have a customer service and an overarching branding/ communication strategy is missing.

3.5

Conclusion internal analysis

The conclusion of the internal analysis describes the main strengths and weaknesses. A root of the problem is displayed to show the underlying problem to be solved.

3.5.1 Overview strengths & weaknesses

This paragraph describes an overview of the most important strengths and weaknesses found in the internal analysis. They are derived from how R-net collaborates, implements and communicates with the traveller. A complete overview of all the strengths and weaknesses can be found in Appendix H.

Strengths

The main strengths of R-net are described below:

1) R-net forces the authorities to collaborate with each other which has resulted in a strong foundation to continue this collaboration.

2) R-net has a strong reputation among operators and road administrators and therefore R-net seems to be the reason for an increase in demand for high quality public transport.

Because of these strengths, it can be concluded that continuing with R-net has its advantages. However, some big changes need to be made in order to make it successful.

Weaknesses

The main weaknesses of R-net are also described below. These will be taking into account when designing the future role of R-net.

1) The stakeholders R-net are in conflict of interests and feel a lack of responsibility. None of the stakeholders have R-net as their top priority.

2) The structure of the collaboration between the authorities results in difficult overarching decisions of R-net as a whole.

3) Operators don’t have enough say in the decisions made about R-net

4) R-net is becoming outdated instead of being a premium brand because they are not innovating.

5) Implementing R-net with urban operators is a struggle, because of the negotiations and leads to compensations.

6) R-net is confusing for the traveller as the modalities look like just another operator, display a lot of other brands and the name R-net is similar to RET.

7) The traveller does not know what R-net is or stands for, and doesn’t see R-net as a premium brand.

8) R-net does not have customer service.

9) An overarching branding/communication strategy of R-net is missing.

3.5.2 Root of the problem

To find the underlying problems of the weaknesses of R-net, a root of the problem analysis was executed (BCs IDE course BEP, 2018). With this analysis you constantly ask why a certain problem exists. This way hidden problems which may not be directly visible come to light. Tackling these hidden problems can potentially create a bigger value.

Figure 26 shows this root of the problem analysis of R-net. The most visible problems are: R-net is confusing for the traveller, R-net is losing its credibility and R-net is not innovating. The most important reason why these problems occur is that R-net is missing an aligned (future) vision.

When this was discussed with the supervisor of R-net, he confirmed this was the case. The original vision of the Olympic quality is not valid anymore as the Olympics are not being held in the Netherlands. Also this vision is just until 2028 and R-net has not looked further than this.

In conclusion, an aligned (future) vision for R-net has the potential to deal with the weaknesses. This will be included in the problem definition in the next chapter.

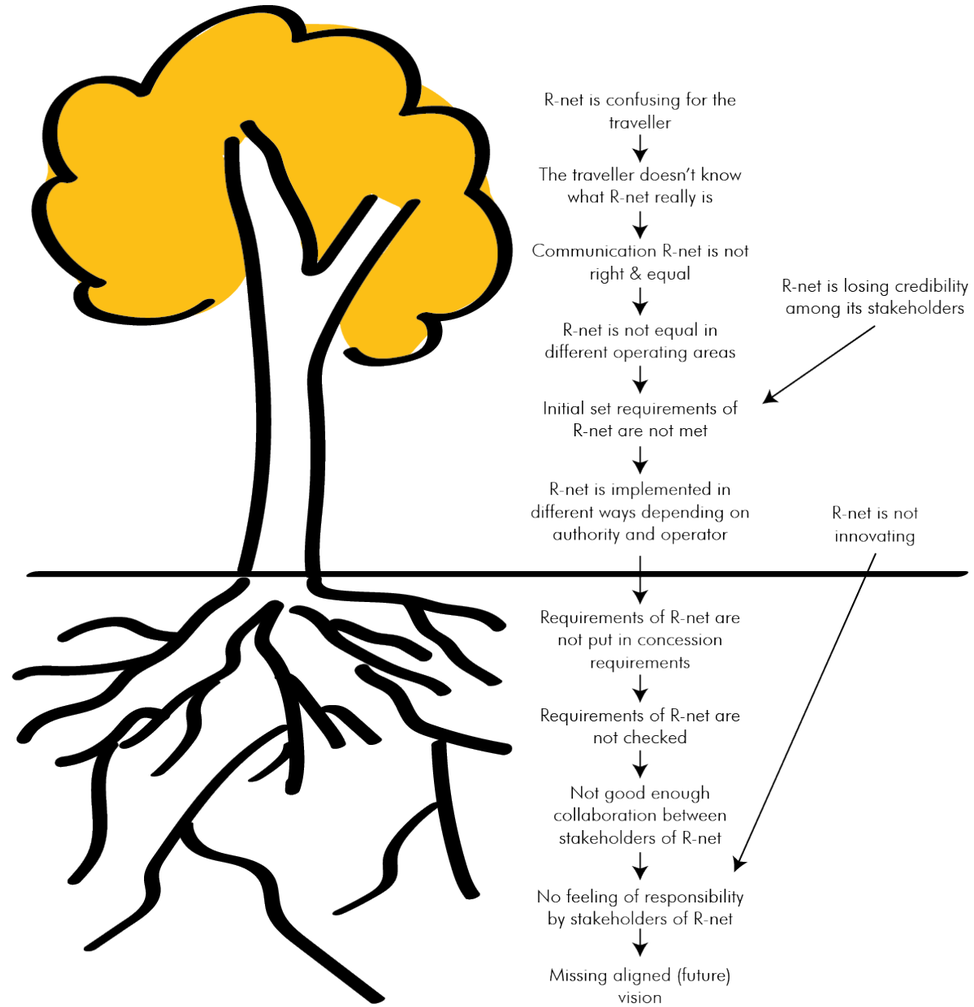


Figure 26: Root of the problem analysis of R-net

Design Brief

To provide a short overview of the previous two chapters, a SWOT analysis of the current high quality public transport network is illustrated. This is followed by the problem definition, design goal and design mission. Especially the design goal acts as the starting point of the next diamond of the process: develop and deliver.

4

4.1 SWOT of the current high quality public transport network in the Randstad

Strengths

- Public transport is a relatively space effective, sustainable and safe alternative.
- The number of travellers in public transport has been growing and is most likely to grow again after the pandemic.
- A general vision and objectives of public transport are created to act as a guide for future developments.
- R-net creates a higher quality public transport network for the traveller and attracts more travellers.
- R-net has a strong collaboration foundation between its stakeholders.

Weaknesses

- The current public transport network reaches its capacity limits (before and after pandemic).
- The current public transport network does not end with a high peak for ‘must passengers’ as the last-mile is not incorporated in the design.
- The current collaboration in the public transport sector does not enable overarching decision making.
- The reactive mode of the governance strategy makes it hard to keep up with the technological developments.
- R-net is confusing for the traveller, losing credibility among its stakeholders and not innovating.

Opportunities

- The advantages of public transport are getting more attention.
- The upcoming shared mobility can, with the combination with public transport, result in less cars in cities.
- The pandemic provides time to reflect on the current public transport network and to make investments to come out stronger after the pandemic.
- The board agreements of R-net is being renewed providing the opportunity to revise and making it future proof.
- An intergrated digital platform can help facilitate the interaction between the traveller and transport provider.

Threats

- The car is still considered a the more comfortable, flexible and faster means of travel.
- Due to COVID-19, the feeling of satety in regards of health risks in public transport is decreased. Hygiene in public transport is more important.
- Due to COVID-19, people have shifted to private means of travel, like the car, instead of public transport. They have bought for example a second car.
- The transition of the mobility system could lead to a highly fragmented landscape or monopoly if not mitigated.
- Breaking the habits of people travelling with the car could be difficult.
- When not improving, the value of R-net could gradually diminish.

4.2 Problem definition

The high quality public transport network R-net is missing an aligned (future) vision (see paragraph 5.2), which has resulted in a diffused collaboration and no feeling of responsibility. No overarching decisions are made about innovation, implementation and communication. This makes R-net unaligned and creates confusion for the traveller and a decrease in credibility among its stakeholders.

4.3 Design goal

Design a seamless door-to-door travel experience to improve the current high quality public transport network, so commuting with the high quality public transport network will be the norm. Furthermore, illustrate the desired role of R-net to reach this future vision.

To improve the current high quality public transport network, the thirteen future requirements of subchapter 2.5 and the strenghts and weaknesses of 3.5 will be addressed. It will have special focus on the fundamental needs (RQ7) and providing certainty (RQ5).

4.4 Design mission

Inspire various stakeholders about the future of the high quality public transport network to create alignment and therefore stimulate collaboration. Encourage them to put the traveller at the center and consequently increase the quality of the network to attract more/a bigger share of, travellers to the sustainable high quality public transport network.

Ideation

5

The ideation phase describes the process of the creation of the future vision of the high quality public transport network. First, the two co-creation sessions are described. Then the result of the brainstorm of the future fundamental needs of the commuter is explained. This is followed by the relevant trends and a description how these are found. Both the future fulfilment of the fundamental needs and the trends are the basis of the future vision of the high quality public transport network.

5.1 Co-creation session 1

Set-up

To generate more ideas about the future vision of the high quality public transport, a digital co-creation was organised. The focus of the brainstorm was what would make commuters proud to travel with the public transport network in the future, as this was the direction of iteration 1, see Appendix I. Four people participated who have an IDE background and often travel with public transport. The sessions was conducted with the use of Zoom and Mural, see Appendix J for the Mural board with the results

The first phase of the session was about finding H2s about when people would like to be associated with the public transport network. These were How To:

- Show who you are?
- Belong to something?
- Make it good for the people and planet?
- Make it good for yourself?

This was followed by an exercise to get into the future mindset by making their future persona. Then the H2s were used for a brainwriting exercise. The ideas were combined into a future scenario, see figure 27: Comfortable for everybody without the need to think.

Results

- The first insights is that people should actually not feel proud to travel with public transport, because it should not considered something special. Instead travelling with the high quality public transport should be the norm.
- Freedom of choice: It is important to have a choice in the kind of public transport based on personality and mood.
- Personalisation: The transportation mode knows you and your preferences and regulates this, for example in the train the chair changes to your body.

Figure 27: Future scenario made by participants co-creation session 1

5.2 Co-creation session 2

Set-up

A second co-creation session was organised to generate ideas about the future fulfilment of the found fundamental needs in the context analysis and what this would mean for the future scenario of the high quality public transport network. The participants were five members of the Seamless Personal Mobility lab. The session was conducted with the help of Zoom and Mural, see figure 28 for an impression and Appendix K for the final Mural board.

The session started with a braindump of the future public transport network in the form of an association flower. This was followed by an introduction of the trends and fundamental needs to make sure everybody understood the context. The fundamental needs were translated into six H2s and the brainstorm started using a brainwriting method. The group was split in two and both made a future scenario: No worries for tomorrow' and 'Sustainable commuters'.

Results

- Inspiration about the future fulfilment of the fundamental needs, these will be explained in the next paragraph For example 'how to satisfy comfort in 2040' could be adressed because everything will be done for you; automation.
- Create more awareness about the advantages of the public transport network to gain back trust in the public transport network after COVID-19.
- The commuter wants to receive positive feedback/compliments as traveller when travelling with public transport
- The commuter wants a smart planner to create the best suitable route for your destination and stops in between, like a MaaS platform

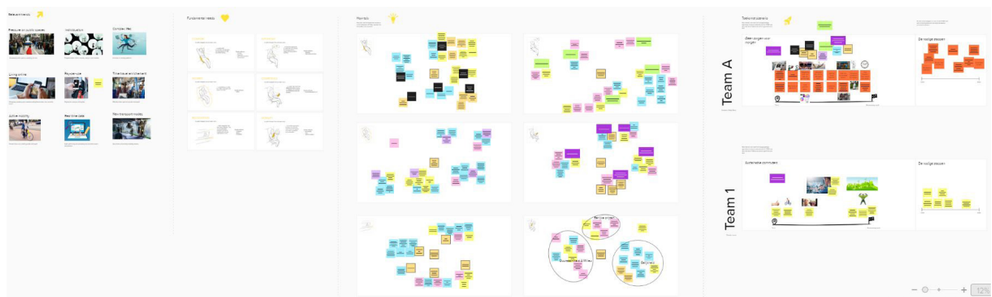


Figure 28: Impression of co-creation session 2

5.3 Future fulfilment fundamental needs

As mentioned in chapter 4, it is important to address the fundamental needs found in paragraph 2.3.4. However, the fulfilment of the current network, which are the quality attributes, is different compared to the future network. Therefore the future fulfilment was explored to find the future quality attributes to implement in the future vision. These were found with the help of the co-creation session of the previous paragraph. The future needs, or future quality attributes, will be implemented in the future vision.

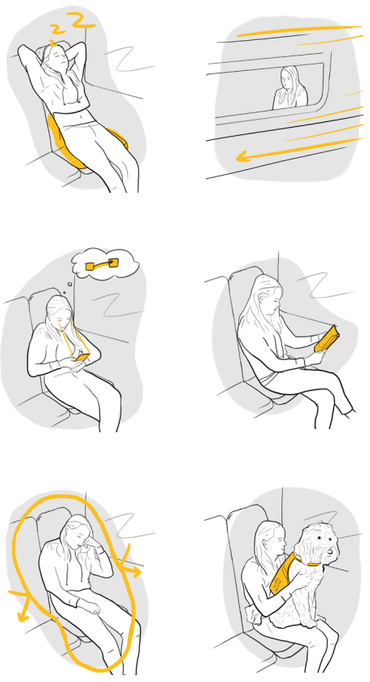


Figure 29: Fundamental needs commuter in the high quality public transport network

Fundamental need comfort: Comfort is about having a comfortable environment, do little effort and have peace of mind about their journey. The future fulfilments of this fundamental needs are:
Personalised comfort | In the future, commuters can be helped by providing more ease on a personal level. For example by receiving the right information automatically or by the environment changing to their personal preferences. This could be an important aspect to make public transport just as comfortable as a private means of transport like the car.
Reassurance | A peace of mind and therefore comfort can be created by providing reassurance messages. This gives confidence to the commuter. For example by receiving a message they will reach their destination on time or they made the right choice.

Fundamental need Autonomy: Autonomy is about being in control of your choices by having the right information.
Freedom of choice | To achieve the opportunity to make their own choices, in the future multiple the traveller can have multiple satisfying options to choose from. So there will need to be a balance between automation in the information provision and the ability for the traveller to choose.

Adaptive system | In the future, the system should be able to adapt effortlessly to the certain circumstances to make the journey as smooth as possible for the traveller. For example by adjusting routes or redirecting passengers when something happens, like an accident.

Fundamental need Security: Security is about the feeling of safety.
Digital security | As the network will make more use of data and other digital tools, this should be very secure in order for travellers to feel safe. This should also be communicated to the travellers.
Privacy | An important aspect for security is the feeling of privacy, both digitally as physically during the journey from other passengers. For example, because of noise cancelling technologies.

Fundamental need Competence: Competence is about spending the time during commuting effectively.
Smart facilities | In the future this can be achieved by introducing smart facilities. They can realise effective travel time, for example by making use of a digital screen in the train to work on.

Fundamental need Recognition: Recognition is about the feeling that the commuters time is valuable.
No more waiting | The ultimate feeling of recognition is when travellers do not have to wait anymore, because their route has good connections and is planned smart and personal.

Fundamental need Morality: Morality is about the commuters wanting to the trust the organisations.
Transparency & fairness | The organisations of the network should work in a transparent manner, for example in their pricing. Next, they should strive for fairness in conditions for employees as well as for the travellers. Also sustainability is an important aspect in this.
Accessibility | In the future, the public transport network should be accessible and considerate for everybody.

5.4 Trends in the future vision

In order to create a feasible future vision for the high quality public transport network, a trend analysis was performed. With the use of the DESTEP method trends were found using mainly two reports. (INFO, 2020) & (Planbureau voor de Leefomgeving, 2019). This resulted in 15 relevant trends in the high quality public transport network, see Appendix L for the complete describtions of those 15 trends. These trends were clustered into eight trends to implement in the final future vision.

Less travelling | Living online has been a trend for a longer time now, we shop online, we order food online etc. Moreover, since the pandemic, most people also work online and it is predicted this behaviour will sustain after the pandemic. Also flexibilisation could lead to less travelling as we can work where and when we want to.

Living online

Flexibilisation

MaaS provider | Mobility as a Service is a new concept that integrates different mobility services into one single digital platform for a door-to-door transport and planning. In the Netherlands are several pilots to experiment with MaaS. The new technology trend of real time data gathering and providing makes this possible. Most likely it will be a complex network with collaborations between competitors.

Real time data gathering

MaaS

Competitor collaboration

Complex networks

Green cities, active mobility | The interest to walking as a mode of transport is increasing. Furthermore, because of electric bikes in the Netherlands, more people travel by bike instead of by car or public transport. This is beneficial because of health reasons and for the quality of the public spaces. This realisation is getting more attention of people and the authorities.

Green cities

Active mobility

Green cities, electric mobility | Over the lasts years, new forms of electric mobility have been introduced. For example, electric bikes, scooters, steps and hover boards. In general, these forms of mobility are more sustainable as they produce less vehicular emissions.

New forms of mobility

Individualism

Nobody owns their own transport | The use of shared mobility services has been rising. With the pay-per-use method, people pay for the use of the product, instead of the product itself. Also car shame and the pressure on public spaces can lead to the stimulation of only using a shared means of transport.

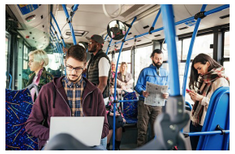
Pay-per-use

Car shame

Pressure on public spaces

Travel time enrichment | Experts believe the time people spend in public transport more and more changes into working time and therefore spend more effectively.

Travel time enrichement



BRT | Bus Rapid Transit is a new bus concept which is high quality, fast, flexible, reliable, sustainable and comfortable. It facilitates direct routes between outskirts of towns to provide an alternative for the car.

Bus Rapid Transit

Trip chaining | There is an increase in the activity patterns for people. People have more and more roles and responsibilities. This is also reflected in the travel behaviours of people. They don't just go directly go to their destination, but go from A to B via C and D. They come from work but get first some groceries and then pick their child up from day-care.

More complex lives

5.5 Conclusion

Two co-creation sessions created inspiration and insights into the future vision of the high quality public transport network. It was found that commuting with the public transport network should be the norm. The ideation phase resulted in the future fulfilment of the fundamental needs and relevant trends which are the base of the future vision.

Conceptualisation

6

The conceptualisation phase presents the final future vision of the public transport. The story about Jerry who commutes with the high quality public transport network is described and illustrated. Other assumptions in the future vision are discussed and the vision is evaluated.

Second, different concepts about the future role of R-net in this future vision are presented. With the help of an evaluation, a final concept design is presented by combining elements of different concepts.

6.1

Future Vision

In this chapter the future vision about the desired future public transport network is described. First, with the help of literature it is described how the future vision can be made with a scenario. Then he scenario is illustrated. The other assumptions of the future vision are explained and the results of the evaluation of the vision is explained.

6.1.1 Creating a future vision with a scenario

The future vision of the high quality public transport network will be created with a future scenario.

Why a future scenario

Most people feel uncomfortable thinking about the future. They prefer to not let anything happen by chance and want to feel in control. However, it is a fact the world will change and it is better to accept this and to face uncertainty. An approach based on a scenario can help with this. Scenarios make exploration of the future possible by showing possibilities in the upcoming changes (Lyons, 2015).

Scenarios do not give all the answers but provide information about alternative perspectives and possibilities (PBL, 2019). This can give policymakers insights and helps them to make choices, both about what is possible and desirable. Furthermore, it can make them think more about long term challenges and opportunities.

A scenario is used to increase insights in important developments. Second, it supports communication between different stakeholders, because the scenario ‘talks’ in a common language. Third, it can increase the involvement of different people and provide an overview of the choices that will have to be made.

How to make a scenario

The scenario in this project is created with the help of the guidelines of the PBL created by Dammers et al. (2013). The most important aspects are:

Qualitative:

The nature of the scenario is qualitative; not based on calculations but on stories. This provides room for imagination and the possibility to include other alternatives. Also, by using a qualitative approach the scenario will be more understandable for various target groups.

Explorative:

Next to extending the existing developments and trends, it is also important to explore new issues. For example by extending a trend in an extreme form within the scenario.

Plausible yet imaginative:

A scenario needs to be plausible in order for people to believe in them. It needs to be imaginable and not seem impossible. This is achieved by creating a coherent storyline, thinking from different perspectives and iterating after testing it with different people. However, the scenario does not only need to be plausible, but also surprising. To implement new and uncertain aspects people have not thought of before. This will trigger people and will initiate discussions.

Storytelling:

A story brings things alive and provokes imagination. A good story is rich in details by including concrete places, connections, events, and actors to present a complete narrative.

6.1.2 Scenario high quality public transport network in 2040

Future vision

The title of the future vision is:

Commuting with the high quality public transport network is the norm

This vision is derived from the believe that if commuting with the high quality public transport network is the norm, more people would choose it. The vision respects some parts of the design goal described in chapter 4.

- It is a seamless door-to-door journey.
- The fundamental needs of the commuters are adressed.

Other elements from the design goal like, providing certainty and illustrate the role of R-net, will be explained in chapter 7.

Future scenario

The future vision is a storytelling future scenario about Jerry who travels to work and back home with the high quality public transport network. At the base of the scenario are the trends and needs found in the ideation phase, see chapter 5.

The next page describes the story of Jerry, the pages next visualises this. It shows how the trends and needs can look like in the commute of Jerry.

Jerry works as an IT-manager in a nursing home. He has an important meeting with the staff so he decides to go to the office instead of working from home (less travelling). He opens the MaaS (MaaS provider) application (transparency & fairness). He sets the time he wants to reach his destination. The application provides multiple travel suggestions (freedom of choice) based on the personal preferences of Jerry and the current situation in the network in a safe way (digital security). Jerry chooses his route based on his mood and the system tells him he has to leave at 10:47. At this time he leaves his house and starts walking (active mobility) to the neighbourhood hub which has electric steps and bikes (nobody owns their own transport). He gets the electric step (electric mobility) and rides to the train station. Because Jerry always wants to get a coffee, the system has send him there a bit early. Jerry gets his coffee and is directed to his seat in the train (no more waiting). His seat changes to his body and the light above him adjusts to his preferences (personalised comfort). Jerry feels free to do what he wants and first wants to stare outside the big window and enjoy his coffee. Then he starts to work and joins a video call meeting (smart facilities) in preparation of his important meeting (travel time enrichment). With the help of noise cancelling technology he can talk in privacy (privacy). After some time the system warns him it is almost time to get off and Jerry collects his stuff. He gets out of the train and walks to work which is close by. The application confirms him he will be in time for his meeting (reassurance). After working, Jerry selects a route again. However, just as he wants to leave he is called with the question if he can pick up the kids from school (Trip chaining). He tells this to the system which gives him an alternative route (adaptive system). This time the best travel option is to go with the bus which rides directly to the school district (BRT). At the school he greets his kids Noa and James. They get a cargo bike (accessibility) and ride home.

Vision for 2040

Trends | Needs

Commuting with the high quality public transport network is the norm

Green cities | Electric mobility

No more waiting

STATION

Personalised comfort

Smart facilities

Privacy

Travel time enrichment

Nobody owns their own transport

HUB

Less travelling

I NEED TO GO TO WORK TODAY

MaaS provider

1 JOURNEY
45 min
NEXT

Transparency & fairness

Freedom of choice

Digital security

Let's go!

Green cities | Active mobility

Accessibility

SCHOOL

Trip chaining

BRT

STATION

Reassurance

Adaptive system

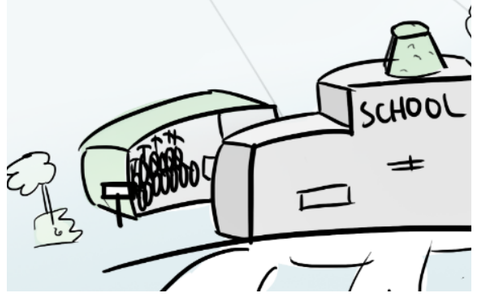
WORK

"can you pick up the kids?"

6.1.3 Assumptions in the future vision

What are hubs?

Mobility hubs are recognisable places of connectivity where different travel options come together that benefit the neighbourhood meet. (Koedood, 2020) . In this future vision, hubs are places in neighbourhoods to store the shared mobility services in walking distance from one's home. This way, the bikes and steps are not placed randomly in the cities resulting in a orderly public space. The train stations in the future vision can also be considered hubs.

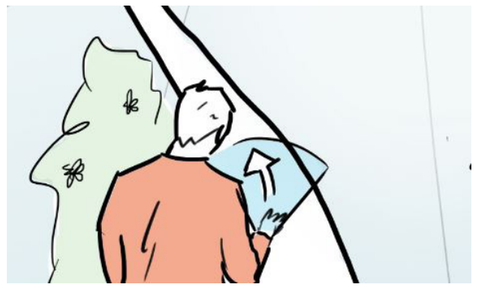


Where are the cars?

In this future scenario, the car is not necessary anymore in the cities (Public Transport in 2040, 2019). All will be accessible through active mobility or the public transport network. However, in the less urban areas, cars would still be the preferred travel option.

What about the technologies used?

In the scenario Jerry uses the MaaS application through a digital projection screen. Furthermore, new noise cancelling technologies are used to create privacy for Jerry. These technologies are suggestions for people to help them reach the future vision mindset. Other technological solutions are also possible to operate the MaaS application of to create privacy.



6.1.4 Evaluation

Evaluation to scenario guidelines

The scenario is presented with a story and visualisation. It tells the story of Jerry and makes use of certain details. This makes the scenario qualitative and storytelling. The scenario is explorative, because of the use of some extreme forms, for example the trend 'nobody own their own transport'. This trend makes it also imaginative as it surprises people. However, as the scenario's foundation is also based on some 'normal' trends (e.g. trip chaining & MaaS), it makes the scenario plausible.

Evaluation with stakeholders

The future vision was discussed with commuters and various stakeholders. In general the people were positive about the future vision. They find the scenario realistic and desirable.

> "I think this is what we are all working towards"
> - representative RET

People were mostly enthousiastic about the integrated journey in which the commuter can make use of one platform. They believed this would make the high quality public transport more attractive. Also the personalised elements, like personal information provision based on your preferences and the personalised comfort were well liked.

> "I am most enthousiastic about the personalised comfort in the train. This is a innovative idea which maybe could appeal to inveterate car users. However, I don't know how operators would feel about realising this, as this would maybe take up more space and therefore can transport less travellers" - representative R-net

Furthermore, the stakeholders recognised the sustainability aspects in the journey. Commuters mentioned this would be a big consideration to convince them to use the high quality public transport network.

The last important desirable aspect was the travel time enrichment. The fact that the work day can already start was appealing to commuters. However, it should be noted that people were reserved about this as they did not believe this would be possible during peak-hours.

A discussion point was the use of the shared mobility in the first-mile of the journey of Jerry. People mentioned this is usually more common for the last-mile, as for the first-mile the personal bike is also a good alternative. However, this was a deliberate choice as this gives Jerry the opportunity to take a different route back home and he is not obligated to go via the train station again to retrieve his bike. This adds flexibility and therefore provides the opportunity to make every journey the most seamless one.

The last point is about the possibility to have other scenarios. For example, when Jerry does not have any kids, the return trip of Jerry could be via the grocery store and the cargo bike could be used for his groceries. Other scenarios are also imaginable.

6.2

Future Role R-net

This chapter explains the three proposed concepts of the future role of R-net. First an overview is provided which is followed by an explaination of the three concepts. Then the concepts are evaluated and combined forming one concept.

6.2.1 Concepts overview

An important aspect of the proposed future vision in the previous paragraphs is the governance strategy, how do we make this vision happen? The governancy strategy is explored with the help of R-net and what role they could play in the future vision. Multiple concepts were found based on the current strenghts and weaknesses of R-net found in chapter 3.

It should be mentioned the concepts use the name R-net. This is to make the concepts understandable to discuss with various stakeholders and gather feedback. The name will be revised later.

The three concepts

Three concepts are proposed for the future role of R-net, see figure 30. They differ from each other in who is responsible for the branding of the network, see vertical axis, and if R-net is visible for the traveller, see horizontal axis.

In the following paragraphs, the concepts will be explained with a description and a travel scenario based on the journey in the future vision of Jerry from paragraph 6.1.

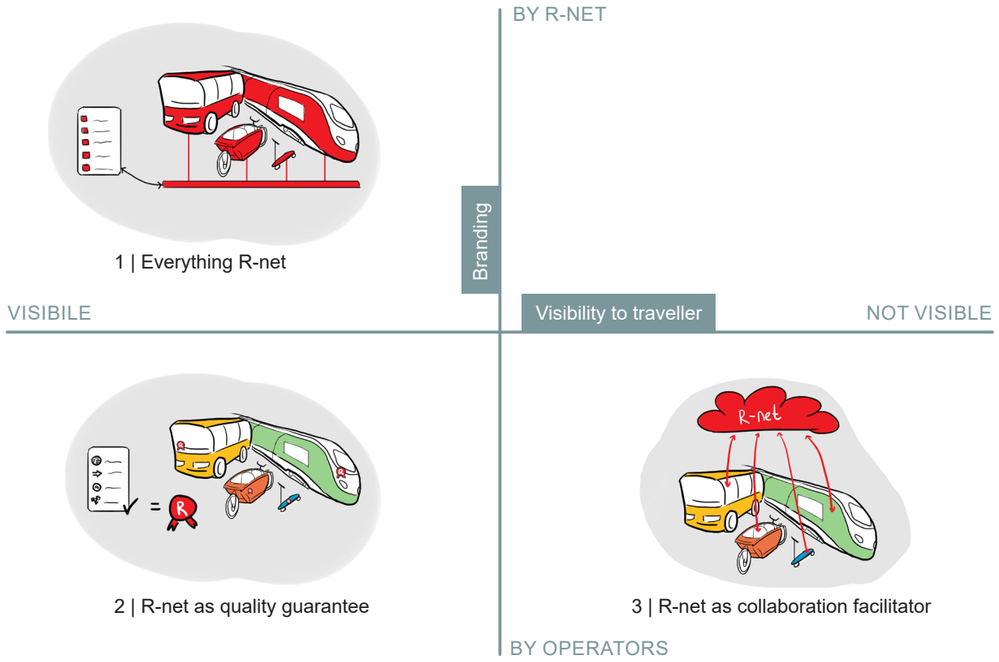


Figure 30: Framework with three concepts future role R-net

6.2.2 Concept 1 | Everything R-net

Description

The whole network, all the mobility services, belongs to R-net. The high quality requirements are set and regulated by R-net. R-net will be the main communication link with the traveller and only use their own branding. Implementation will be the same in every region, see figure 31

Travel scenario

Because the whole network is regulated by R-net, it makes door-to-door planning possible with one platform, see strip 1 in figure 32. Also it provides a consistent user experience througout the whole journey. However, there will be less pressure to innovate so therefore the step Jerry will use will likely be outdated and the bus not very comfortable, see strip 2 and 4 in figure 32.

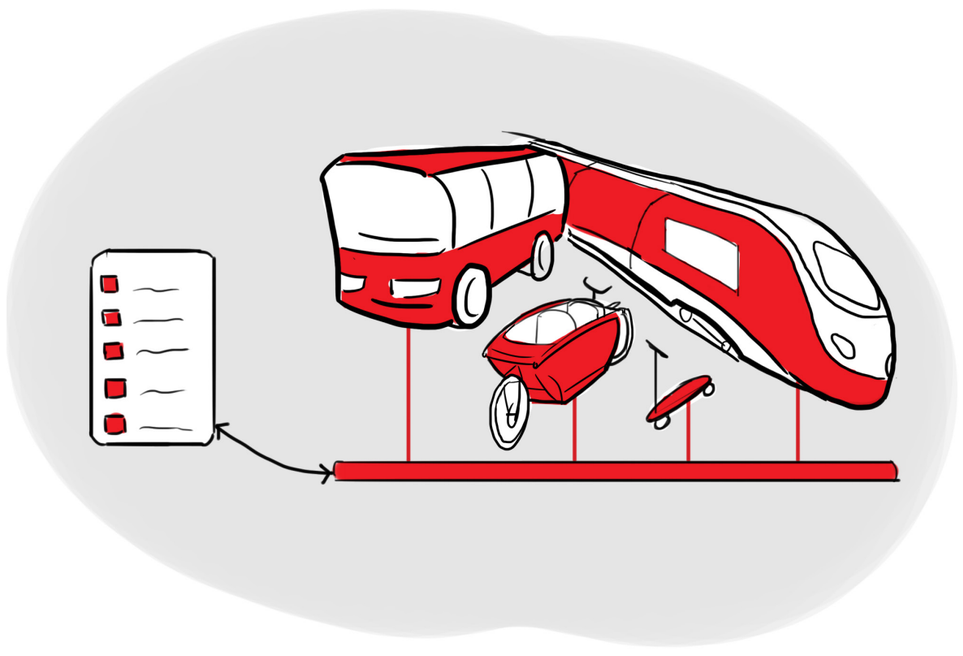
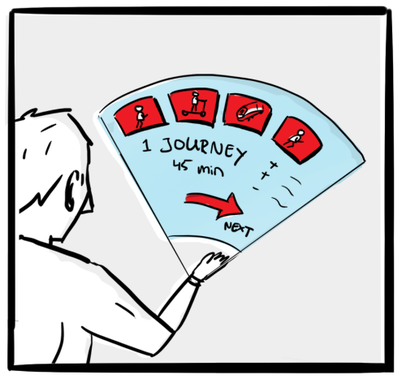
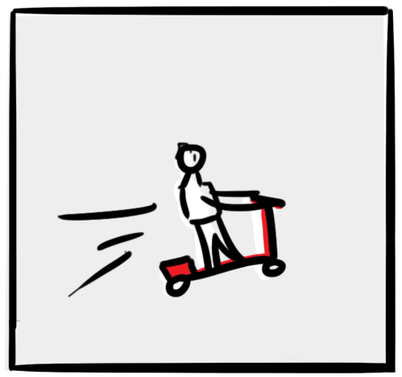


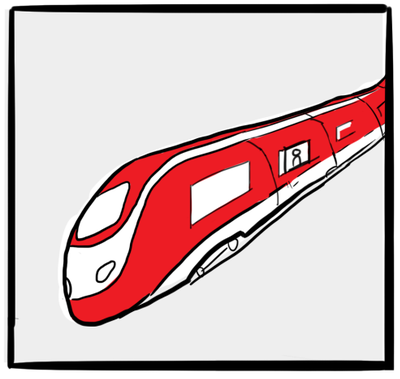
Figure 31: Visualisation of concept 1 | Everything R-net



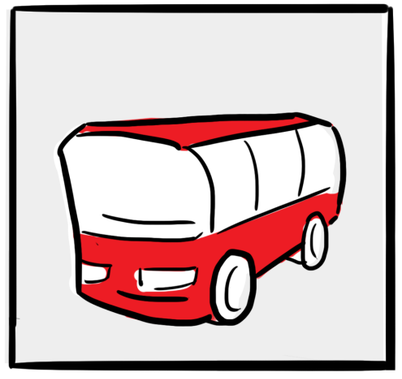
Planning the trip goes smoothly as the systems knows Jerry's preferences and the availibility of all the mobility services.



Because of the pre-booked trip Jerry can just grab an electric step and drive to the train station. However, the r-net step is old and outdated.



Jerry gets a designated seat to spread the passengers evenly throughout the train. The train has the r-net branding style.



The bus knows Jerry's train is a minute late and waits for him. The bus has the r-net branding style but is not very comfortable.

Figure 32: Travel scenario concept 1 | Everything R-net

6.2.3 Concept 2 | R-net as quality guarantee

Description

R-net will set up requirements for the public transport network with the collective interest in mind. For example, avoiding congestion, increase sustainability and fair working conditions. If an organisation wants to join the network, they will be evaluated if they are R-net worthy. By joining they will have the strong name of R-net behind them making them more attractive to the user, because they know they are trustworthy. The organisation can keep its own identity empowering competition, see figure 33.

Travel scenario

As there is no initiative for collaboration between the different parties, this concept will not create an integrated network. Therefore, Jerry will need to use multiple mobility platforms to plan is trip, see strip 1 figure 34. However, becaue of the requirements set by R-net, Jerry will have per individual service a good experience, for example in strip 2 when he does not have to pay when the steps breaks down. Another disadvantage for Jerry, because of the not integrated network, is that the bus cannot wait for the train when this is desired, see strip 4.

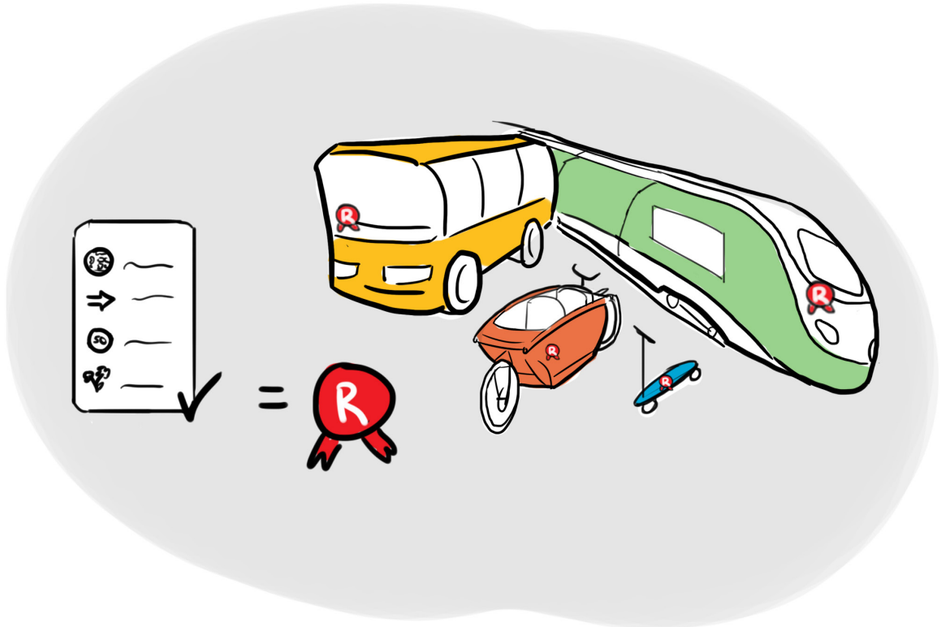
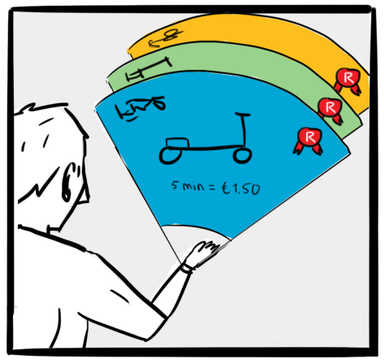
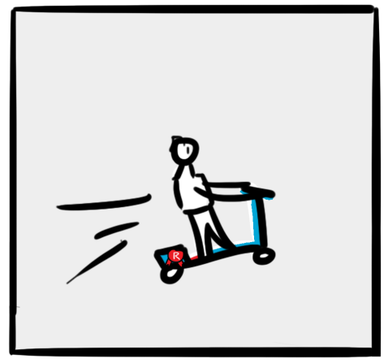


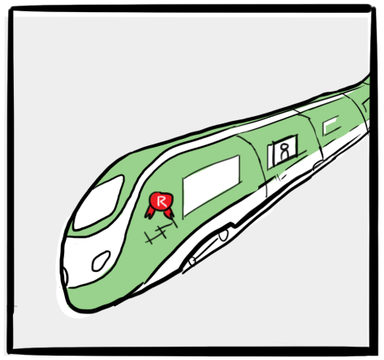
Figure 33: Visualisation of concept 2 | R-net as quality guarantee



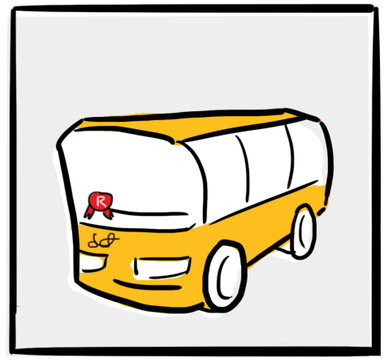
Jerry has to use multiple mobility service platforms to plan and pay for his trip. However, he knows they have high quality services because of the r-net mark. This has his preference over other services.



Jerry gets an electric step and drives to the train station. He knows the step is made sustainable because that's a requirement made by r-net. The step breaks down, but this is not a problem for him.



Because of the r-net quality mark, Jerry knows the trainservices have the collective interest of the people and planet in mind.



Because the train is a minute late Jerry has to wait for the next bus. However the waiting time is comfortable, because that's a requirement made by r-net.

Figure 34: Travel scenario concept 2 | R-net as quality guarantee

6.2.4 Concept 3 | R-net as collaboration facilitator

Description

R-net will be a neutral party and facilitator for collaboration between the different stakeholders in the public transport network. This will be a digital platform which is accessible to everyone. However, by accessing you also need to upload your data. This will improve data sharing and create an integrated system, see figure 35.

Travel scenario

The concept creates an integrated system for Jerry to plan and pay for his trip, see strip 1 figure 36. However Jerry is not protected when his steps breaks down again and he needs to pay a fine. Furthermore, because there is no coordination of the collective interest, the bus does not drive all the way to the school and Jerry needs to walk the last mile, see strip 4.

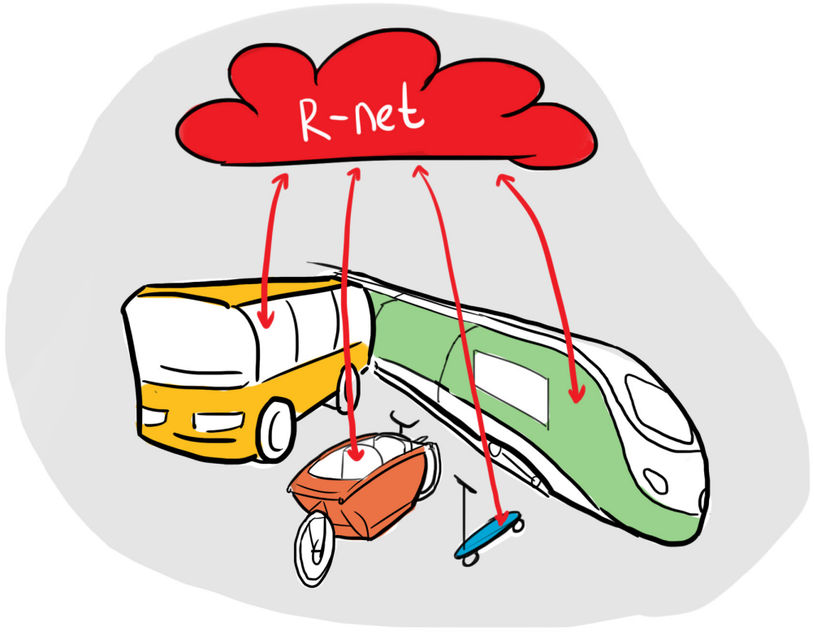
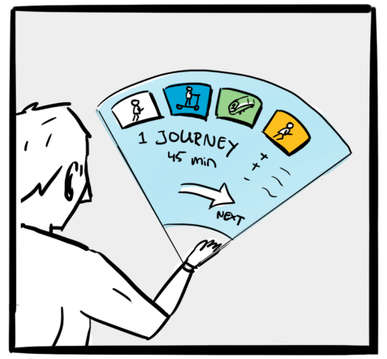
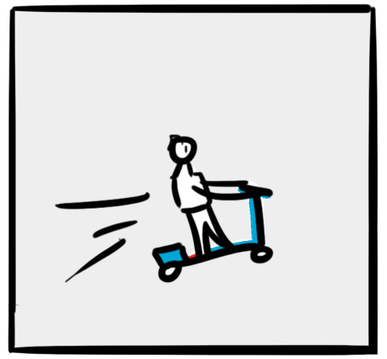


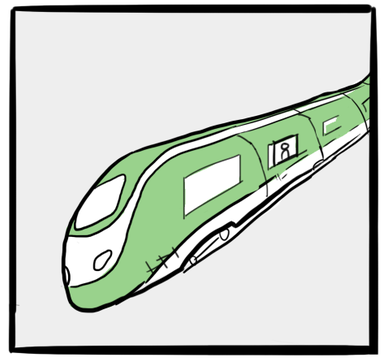
Figure 35: Visualisation of concept 3 | R-net as collaboration facilitator



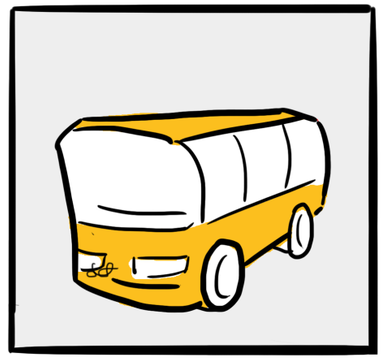
Jerry uses one platforms to plan and pay for his trip. The different mobilities services work together, but have their own branding and rules.



Jerry gets an electric step and drives to the train station. However, the steps breaks down and Jerry needs to pay a fine.



The system advices him a new train and Jerry has a pleasant journey and is happy with the services.



The bus knows Jerry's train is a minute late and waits for him. However, because the school is in a less populated area, the bus unfortunately does not drive there. Jerry needs to walk the last mile.

Figure 36: Travel scenario concept 3 | R-net as collaboration facilitator

6.2.5 Evaluation concepts

The concepts about the future role of R-net were evaluated with the help of the research of Veeneman et al. (2020), see paragraph 2.4.4. So they were evaluated about if they would have the right balance between innovation and integration and the advantages and disadvantages that comes with it.

These insights, together with the stakeholder evaluation in the next paragrah, lead to a final concept of the future role of R-net in the high quality public transport network.

Concept 1 | Everything R-net

As the whole network will be R-net this concept will create a highly integrated network, but less innovation, see figure 37.

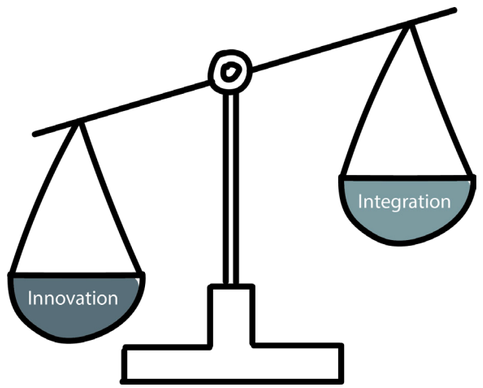


Figure 37: unbalanced mobility landscape between innovation and integration with too little innovation

Advantages

+ consistency user experience for the traveller
+ door-to-door planning
+ TRIP integrated digital platform

Disadvantages

- organisational challenge
- no pressure to innovate
- no tailored solutions per region

Concept 2 | R-net as quality guarantee

The concept will not create an integrated network, but however will have a strong focus on the user experience and innovation, see figure 38.

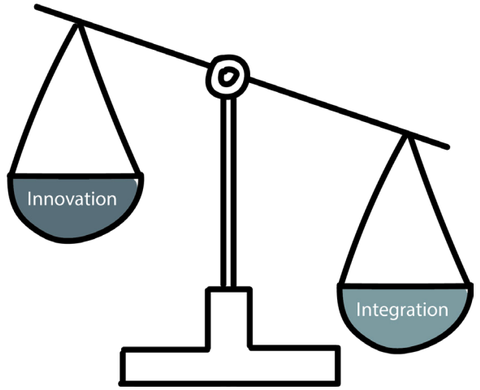


Figure 38: unbalanced mobility landscape between innovation and integration with too little integration

Advantages

+ societal goals are achieved
+ organisation thrives to be even better to get the approved sticker by R-net
+ organisation can keep their own branding stimulating competition
+ the traveller will have certainty

Disadvantages

- no integration between mobility services
- more difficult to enter the market / join network

Concept 3 | R-net as collaboration facilitator

The concept will create an integrated system and stimulate innovation. However there is no focus on the societal goals and therefore does not have all the advantages of having integration, see figure 39.

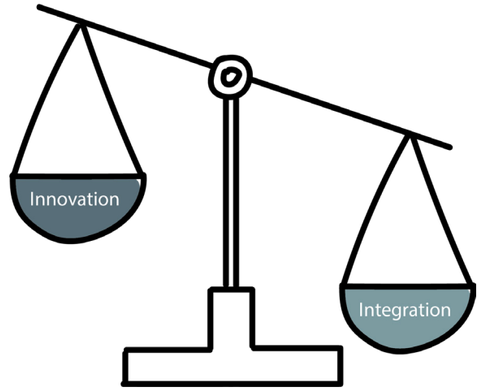


Figure 39: unbalanced mobility landscape between innovation and integration with too little integration

Advantages

+ organisation can keep their own branding stimulating competition
+ integrated network through data sharing and strong collaboration
+ easy entry for new organisations

Disadvantages

- no coordination or regulations for the services
- less priority to providing access to less-populated areas

6.2.6 Stakeholder evaluation concepts

Knowledge sharing session lab

During a knowledge sharing session of the Seamless Personal Mobility Lab, the concepts were evaluated. During these sessions, graduate students have the opportunity to present their work to the partners of the lab and ask for feedback. In this session 12 persons were present from the different organisations; Translink, DOVA, RET, 9292, MRDH, CROW, Rover and the Ministry of Infrastructure and Water Management.

During the session, the future vision and three concepts were presented in 10 minutes. Afterwards, the partners were asked to write down positives and negatives about the three different concepts in an online whiteboard in Mural, see figure 40 for the Mural and figure 41 for a closer look to the positives and negatives. Furthermore, they wrote down which concept had their preference and why. Last, they had the opportunity to write final remarks and tips/tops.

Commuters

Next to the knowledge sharing session, the concepts were discussed with two commuters. This was done with online meetings which a duration of about 40 minutes in which the future vision and concepts were presented and the commuters could immediately react from their perspective.

Supervisor R-net

Last, the concepts were discussed with the supervisor of R-net from province Zuid-Holland. Again the future vision and future roles of R-net were presented and discussed. It was interesting to hear his perspective, because he would be the one to implement it.

Figure 40: Impression of Mural board filled in by partners in knowledge sharing session

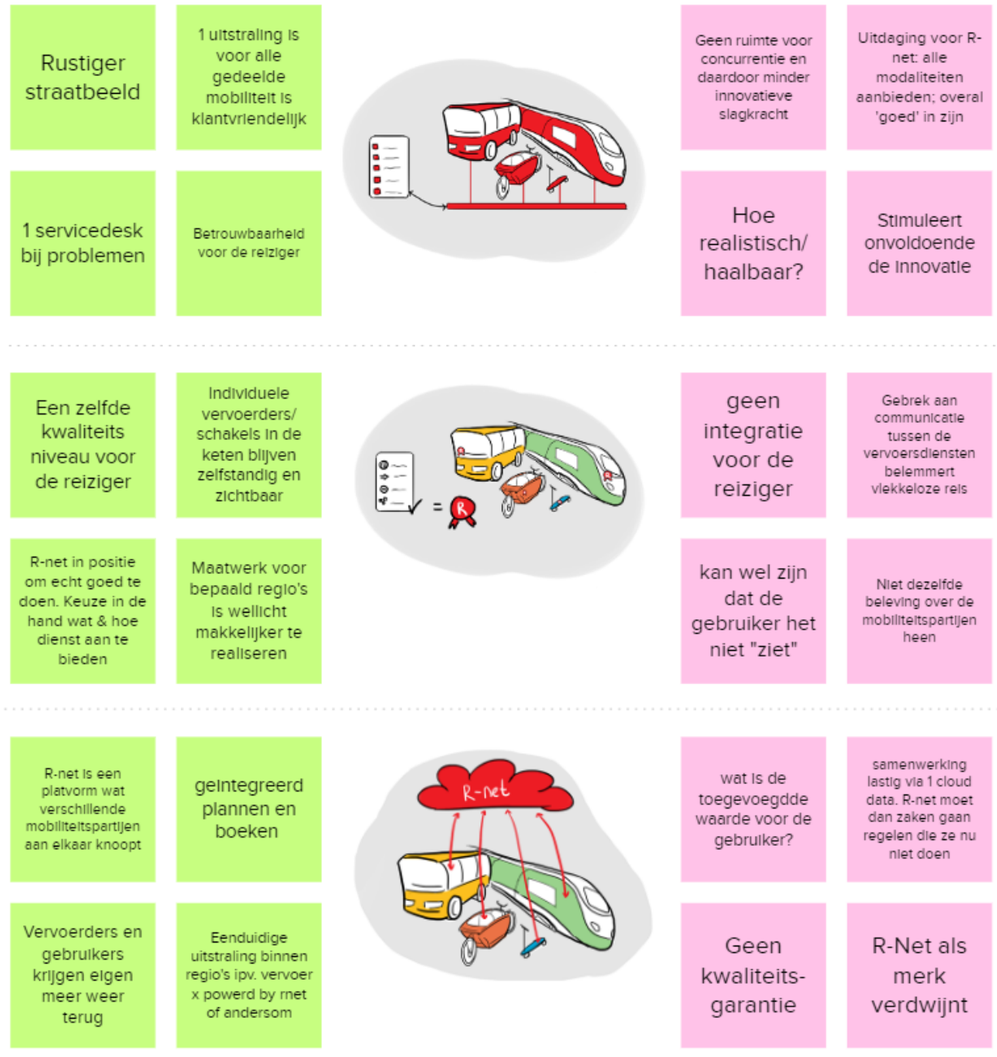


Figure 41: Closer look to positives and negatives about concepts filled in Mural by partners

Concept 1 | Everything R-net

Positives

People were mostly positive about this concept when looking from the perspective of the traveller. It would offer clarity, recognition and a consistent travel experience. Furthermore, it creates a ‘real’ seamless travel experience, also in appearance. Next to this, concept 1 would create a serene street image. Last, R-net would have total control of the network and there would be a lot of integration between the different mobility services.

Negatives

However, concept 1 is considered as the least realistic, because it would need structural changes on a large scale and it would be difficult to execute. Almost all stakeholders mentioned it would not be very feasible. Next to this, they mentioned R-net would become a monopoly without room for competition. It could result in R-net being responsible in something they are not suited for. Last, the concept is far away from the concept R-net is now.

Concept 2 | R-net as quality guarantee

Positives

There were relatively a lot of positives in concept 2. First from the eyes of the traveller; the traveller would get certainty and assurance about the quality of the public transport network, because this is communicated in a clear way and is a constant factor in the whole network. For R-net is it provides the opportunity to really do some good. It would be easy to implement, because it will just be a label. It fits with the R-net system how it is right now. Moreover, the identity of the different transportation services will stay visible and be able to innovate.

Negatives

The negatives about concept 2 are mostly about the lack of a seamless experience. The traveller does not experience the journey as one door-to-door and planning experience. This is because of the lack of communication and integration between the different mobility providers. Next to this, it could be the traveller does not see the R-net brand or would not care about it.

Concept 3 | R-net as collaboration facilitator

Positives

Positive about concept 3 is the integrated system including planning and booking the trip. This is possible because of the communication between the different mobility providers. Also a big focus on data gathering is considered a good idea for future developments. Next, the revision about the freedom of the operators was seen as a good thing, because this would create an unambiguous appearance on the streets as it just one brand and not a ‘brand empowered by ..’. Last, this concept was considered feasible enough to implement and a next step in the evolution of R-net.

Negatives

However a big negative according to some stakeholders was the invisibility of the brand R-net for the traveller. Stakeholders argued this is important for the revenue model of R-net and for the traveller, as they would know R-net is behind the services and therefore could choose for R-net again. Another negative was the lack of quality guarantee. Furthermore, it was noted that R-net will be doing different activities compared to now and if was questioned if they would be able to do this correctly.

Finding the perfect combination

By combining the different strengths of the concept, the ‘perfect’ combination is found. The concept should combine concept 2 with 3, with the feeling of the traveller of concept 1. This would create the best possible travel experience for the traveller and also be feasible and suitable for R-net.

> It seems concept 1 would be the best for me, as integration of the different mobility services is very important for me and I can use one platform to plan my trip. However, concept 3 seems more realistic and could be a good compromise. - commuter

> Concept 2 is the closest to what R-net is now. However, I can imagine a slow transition to concept 3 to become more of a facilitator for public transport. We realise at R-net now we have to change and develop our brand. I have also realised presenting our brand doesn’t necessarily has to be with a whole product formula, this could also be something else like in concept 2. - Supervisor R-net

> I do want to know which company would be behind the seamless travel experience I would get, because then I can choose for them again. - commuter 2

6.2.7 R-net as certainty facilitator | Empowering a seamless commute

Description

R-net will act as facilitator to create certainty among all stakeholders. R-net will empower collaboration to create a seamless integrated network for the traveller to shape a door-to-door journey. R-net will make sure the different parties adhere to the standards set by R-net to achieve societal goals and protection of the traveller. Furthermore, it can support the parties by providing knowledge and experience. When the mobility providers comply to the standards, they will be certified by R-net and belong to the network and improve data sharing. This certification will be communicated to the traveller to demonstrate certainty. The mobility providers can keep their own brand identity to encourage competition and innovation. This will help realise the desired quality for future public transport network for the traveller, see figure 42 & 43.

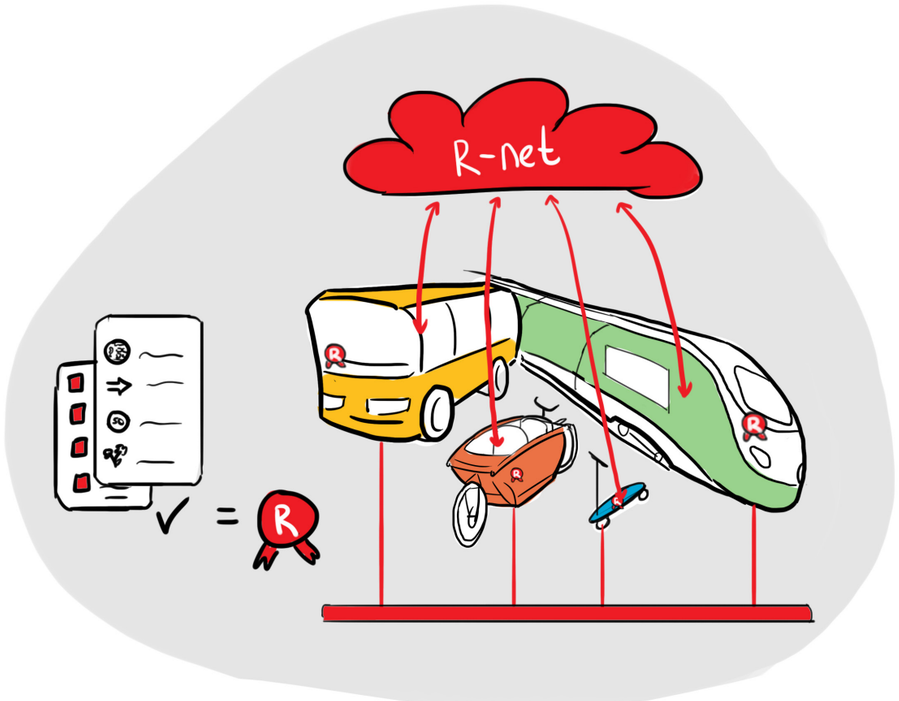
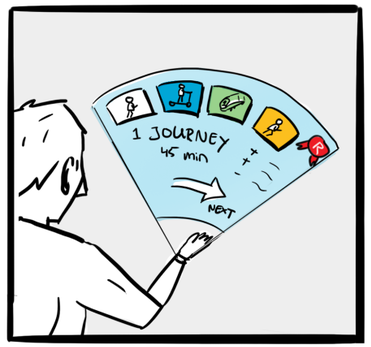
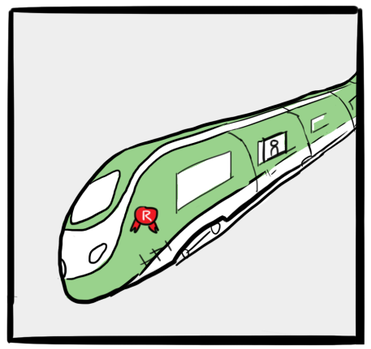


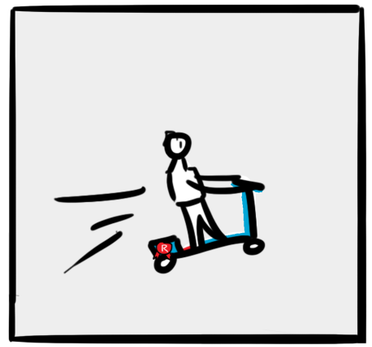
Figure 42: Visualisation of final concept | R-net as certainty facilitator



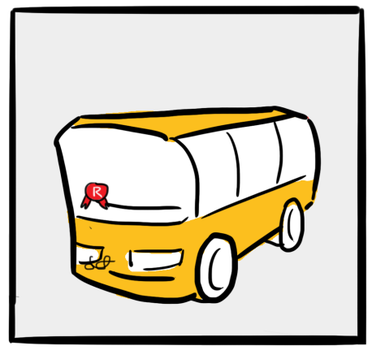
Jerry uses one platforms to plan and pay for his trip. The different mobilities services work together, but have their own branding. He knows they have high quality services because of the R-net mark.



The system advices him a new train. Jerry gets a designated seat to spread the passengers evenly throughout the train. Jerry has a pleasant journey and is happy with the services.



Because of the pre-booked trip Jerry can just grab an electric step and drive to the train station. He knows the step is made sustainable and safe.



The bus knows Jerry's train is a minute late and waits for him. The bus is new, comfortable and sustainable. Jerry arrives directly next to the school area.

Figure 43: Travel scenario final concept | R-net as certainty facilitator

Advantages & disadvantages

When executed correctly, this concept can create a balance between an integrated network ánd stimulate innovation, see figure 44.

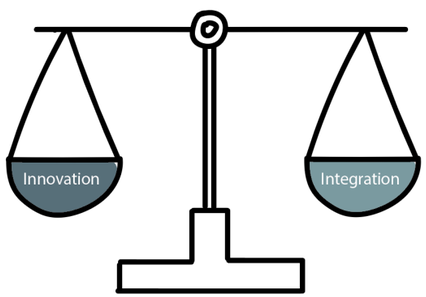


Figure 44: Balance between innovation and integration (Veenemen et al., 2020)

+ Consistent user experience for the traveller.
+ Door-to-door travel experience
+ TRIP integrated digital platform
+ Achieve societal goals
+ Coordinate travellers' protection (e.g. data sharing)
+ Competition is stimulated and organisations will feel pressured to innovate
+ Tailor-made solutions per region possible

+ Easy entry as a result of the shared physical and digital infrastructure.
+ Attractive price levels because of competition and regulations.
+ Mobility providers are supported to implement the best user experience and achieve societal goals.

However, there are some disadvantages to take into account:
- To make this concept work, a strong brand name is very important. However, R-net does not have considerable experience with this, in fact this is a knowledge gap in the current organisation.
- The organisation and employees of R-net will need to do different things compared to know.
- It is a challenge to persuade everybody needed in the high quality public transport to actually join.
- There is a chance the traveller does not see the value of the quality brand when not communicated in the right way.

6.2.8 Conclusion

Three concepts were proposed as the future role of R-net to make the future vision from the high quality public transport netwerk happen: Everything R-net, R-net as quality guarantee and R-net as collaboration facilitator. With the help of the evaluation with literature and stakeholders, the advantages and disadvangtages and positive and negatives were found. By combining the positives of the concepts, a final concept is explained: R-net as certainty facilitator.

Final Concept

7

In this chapter you can read about the final concept of the future role of R-net: B1-net. It expains what B1-net is how it will provide certainty to the traveller in three ways: being in direct contact, utilising a certification structure and enabling safe data sharing.

The next paragraph explain the branding of B1-net with a brand DNA, positioning statements and the brand manifestation.

Paragraph three explains the collaboration network of B1-net in which B1-net is the facilitator. In describes the mobility roundtable structure and explains the relevance of B1-net for the different stakeholders.

The following two paragraphs are about the implementation strategy of B1-net. First the organisation strategy is explained about the transition from R-net into B1-net. Second, a roadmap is illustrated to provide a complete overview from which some important elemements are highlighted.

The final two paragraphs are about the validation of the vision and strategy with stakeholders and the evaluation on the design goal and desirability, feasibility and viability.

7.1

B1-net providing certainty for the traveller

First an introduction of B1-net is provided and the mascot of B1-net is introduced: the bee. Then the three elements of how B1-net will provide certainty to the traveller are explained.

7.1.1 B1-net

Introduction to B1-net

The final concept of the future role of R-net is a facilitator for collaboration in the high quality public transport network. It will provide certainty to the traveller and create a seamless integrated network. The concept will be named B1-net. B1-net is short for ‘Bijeengekomen mobiliteitsnetwerk’, translated to ‘assembled mobility network’.

The name represents what B1-net is and provides the opportunity for R-net to have a clean slate to create positive associations from traveller to the new brand. To increase brand awareness from the traveller, B1-net has a mascot - a bee, see figure 45. In general, bees are associated with being good collaborators supporting the colony and important for nature. These aspects will also be represented by B1-net.

Figure 45: Mascot B1-net

B1-net providing certainty

The main objective of B1-net is providing certainty to the traveller and thereby making sure the commute with the high quality public transport network is the norm, as stated in the design goal in chapter 4. They will do this with three main elements:

1) B1-net is in direct contact with the traveller by introducing the bee as travel buddy. The bee travels together with the traveller and provides certainty.

2) B1-net works with a certification structure for the different parties in the high quality public transport network to provide guaranteed certainty and high quality. This is based on the lessons learned of MedMij (Vonk Noordegraaf et al., 2020). The stakeholders will need to comply to certain standards to join the network of B1-net.

3) B1-net enables safe data sharing between different stakeholders in the network. This is necessary to create the seamless journey for the traveller as they will most likely use multiple means of transport which belong to different stakeholders.

These three elements will be discussed further in more detail in following paragraphs.

7.1.2 Direct contact with traveller

Customer services

In order for B1-net to guarantee certainty it should be in direct contact with the traveller to provide information and customer services (instead of immediately referring to the operators R-net does now).

Take for example bol.com. Bol.com is a web shop, but also a platform for retailers to sell their products. When a customer buys something via bol.com, he/she is in direct contact with the customer service of bol.com instead of the retailer. Bol.com gives them certainty because if something went wrong, they trust bol.com to help or compensate them. This feeling of certainty should also be provided by B1-net.

Therefore, B1-net will be available to answer all the questions and complaints of travellers to improve the network even more, gain trust and guarantee certainty before and after their journey.

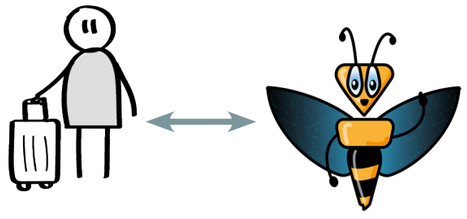


Figure 46: B1-net in direct contact with the traveller to provide certainty

Information provision

However, during the journey it is most important to provide certainty to the traveller. This is because then the traveller will most likely choose again for B1-net. Different kind of messages to the traveller will bring certainty:

- reassuring messages
- positive feedback
- warnings
- travel directions

How this looks like is shown in a video about the journey to work of Jerry displayed in the future vision in paragraph 6.1.2. Scan the QR code below to watch the movie. On the next page examples of the video will explain the different kind of messages for providing certainty to the traveller.

Reassuring messages | The bee of B1-net travels with the commuter to work. Throughout the journey it provides messages to Jerry he is still on schedule and everything is going as planned, see figure 47. Therefore Jerry does not need to worry about his journey and feels certain.

Figure 47: B1-net gives a reassuing message to Jerry “We’re almost here, perfectly on time for your meeting”.

Positive feedback | B1-net gives positive feedback to the traveller about making the right choice. For example when Jerry selects a route he gets this feedback to make him more confident and certain, see figure 48.

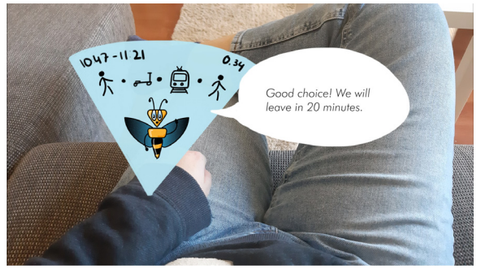


Figure 48: B1-net gives positive feedback to Jerry “Good choice”.

Warnings | Furthermore, it provides Jerry with little warnings about his journey. For example when he has to leave his home or when he almost reaches his destination, see figure 49.

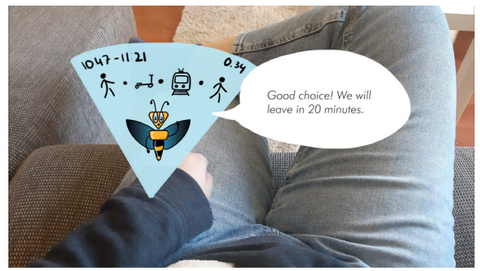


Figure 49: B1-net gives a warning to Jerry “We’ll leave in 20 minutes”.

Travel directions| The last kind of message is providing travel directions to the traveller. B1-net assists the traveller in his journey to give them certainty about their trip, see figure 50.

Figure 50: B1-net gives travel directions to Jerry “Go first straight, then left”.

7.1.3 Certification structure

A quality certificate from door-to-door

To create the highest level of certainty for the traveller, the complete door-to-door journey will need a quality certificate (Vonk Noordegraaf et al., 2020) to create one seamless, trustworthy and integrated network.

The different stakeholders in the network will need to comply to certain standards set by B1-net to create this certainty. These standards will be different compared to what they are now, because the stakeholders will be different, like a shared bike provider. Because B1-net will be a high quality public transport network, the standards for the quality certificate will need to represent this.

Standards

In general, these standards are focussed on two aspects, see figure 51. First, the experience of the traveller, as they should be in the center of the design of the high quality public transport. These standards are the based on the fundamental needs established during the interviews of the commuters, see paragraph 2.3. The second aspect for the standards are societal goals. There are in-line with the suggestions of the MaaS standards (Bogaerts, 2019) and Veeneman et al. (2020).

Those standards should be revised into clear requirements. For example, sustainability could mean; electric mobility, green electricity and recycling material etc. This will be done in collaboration with all the stakeholders, explained in chapter 7.3.2.

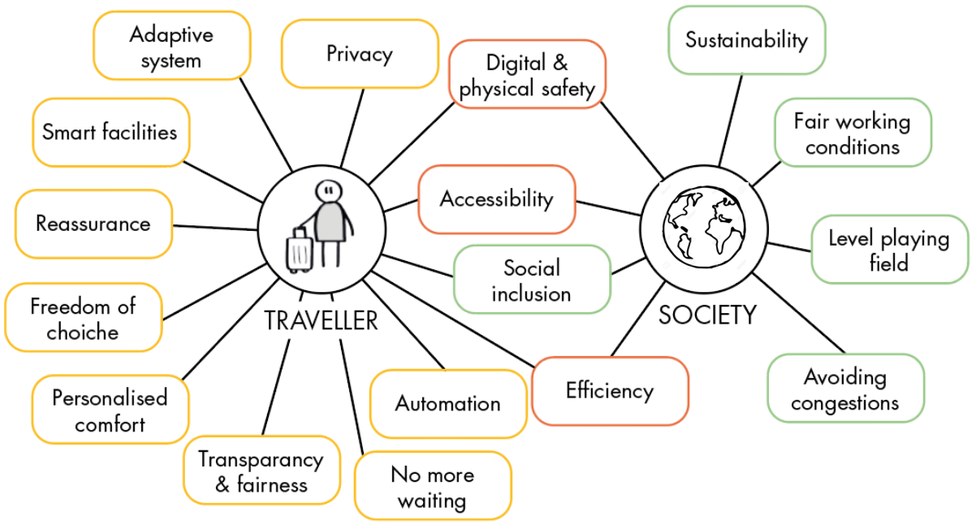


Figure 51: Visual of future standards for organisations to join the network

Visibility to the traveller

The certificates will be seen by the traveller with the help of digital features. They will make use of the application of B1-net and can recognise important elements in the journey to help in their travel, for example the bus stop, mobility hub or the right train platform with the help of digital screens/projectors, see figure 52. These recognisable elements also provide certainty for the traveller as they know which bus or train to take.

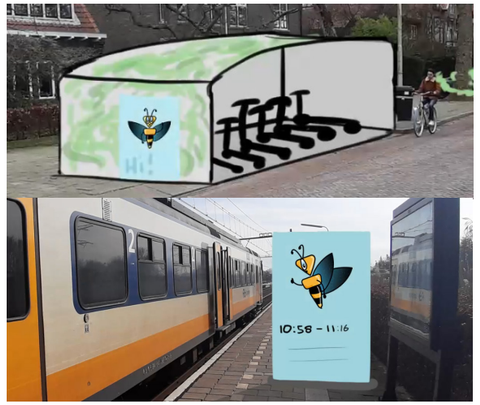


Figure 52: Examples of use of digital projectors by B1-net for the traveller to recognise.

This more digital way of branding is different compared to the operation of R-net now. R-net makes their brand visible by changing the means of transport to their identidy, so a R-net bus. With B1-net, the operators can keep their own identity and will only be visible digitally. The advantage of this way of working is the operation of the operators is made easier, more flexible and saves costs. However, it should be tested if this is enough to convey the brand to the traveller.

7.1.4 Enable data safe sharing

As mentioned before, B1-net will enable data safe sharing between stakeholders. This is necessary to create the seamless journey for the traveller as they will most likely use multiple means of transport which belong to different stakeholders. Data sharing creates important opportunities for the traveller to feel certain. For example by having real time information.

Therefore, information about the availability and schedules of the modalities should be shared in order to make smooth connections. Also, data about the traveller's location and preferences should be shared to all stakeholders. B1-net should provide open APIs and standards for this to make sure this data is shared safely. The traveller will be in control of this data as likewise stated in the MaaS requirements (Bogaerts, 2019).

7.1.5 Conclusion

B1-net is a facilitator for the collaboration in the high quality public transport network. It provides certainty for the traveller in its communication by being in direct contact and using the right messages. Furthermore, it provides certainty by making use of a certification structure for high quality public transport and by enabling safe data sharing.

7.2

Branding B1-net

A strong brand identity is important for the traveller to recognise and trust the brand. In this chapter, the brand identity is formed with a brand DNA and positioning statements. The new name, logo and tagline of the new concept are explained. This is followed by a brand manifestion in which the design principles of the brand are formulated.

7.2.1 Brand identity

As mentioned in the previous paragraph, B1-net will be in direct contact with the traveller. A strong brand identity is important for the traveller to recognise and trust the brand. It will be clear what B1-net is and stands for, as this is currently a problem with R-net. The brand identity was constructed with a brand DNA and positioning statements (Beverland, 2018).

Brand DNA

Based on the analysis and the new proposed concept, the brand DNA seen in figure 53 was formulated. A brand DNA consists of three corner stones (Schoemaker, 2019). The purpose of the brand about what the brand stands for. The personality is about how the brand behaves. The positioning is formulated to create a distinct and credible position.

The main competitor of the public transport network is the car as these are the travellers we want to convince to choose for public transport. For this reason the deepest believe of the brand should be that the public transport network is the most attractive commute.

Following this purpose, the personality of the brand is to be seen as trusting, diligent and professional as this will make network attractive. However, as the new B1-net will also provide support and reassurance, the brand should also behave empathetic, educated and candid.

B1-net offers an seamless travel experience for the traveller and a collaboration for the other stakeholders. In both scenarios, it creates certainty.

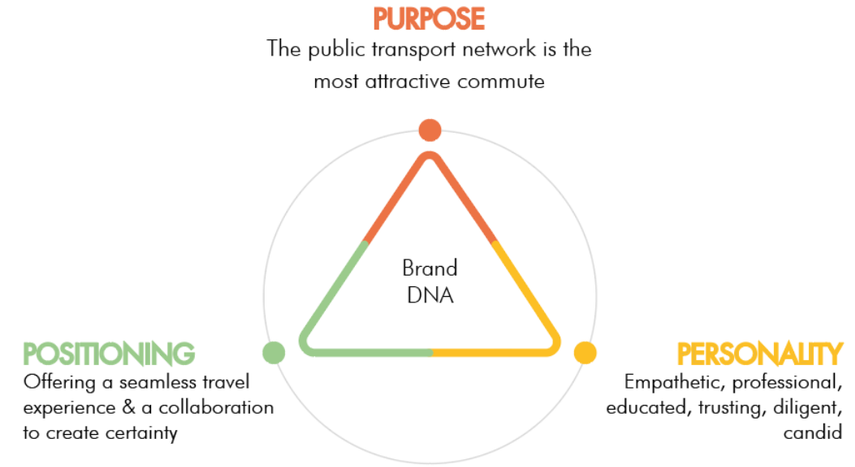


Figure 53: Brand DNA B1-net

Positioning statements

A positioning statement of a brand is build of multiple aspects (Schoemaker, 2019):

- Target audience
- Product category
- Product attribute
- Functional benefits
- Emotional benefits
- Self-expressive benefits

The positioning can be described along the following sentence:
For .. (target audience), .. (Brand name) offers .. (product category) that .. (product attributes), .. (functional benefits) and gives people the … (emotional benefits) to .. (self-expressive benefits)

For the various stakeholders, different statements are formulated:

For **travellers, especially commuters, B1-net** offers **a seamless travel experience** which is **personal** and **adaptable,** is **attractive** and **creates certainty** so you can **focus on doing your own thing.**

For **operators & shared mobility services, B1-net** offers **a collaboration** which is **transparent** and **supporting, attracts customers** and **creates certainty** so they can **focus on expanding their business.**

The statements of the operators and mobility services are the same, but expanding their business has a different meaning. For the operators expanding their business entails riding with a higher frequency, have more customers, get more concessions. For the shared mobility services this is getting more vehicles, expand to more cities and acquire more subscriptions.

7.2.2 Brand manifestation

Name, logo & tagline

For the new brand, a new name was also necessary. The current name ‘R-net’ is confusing for the traveller and does have a bad reputation. B1-net is the new name to represent the new concept (pronounced as BeeOne-net). B1-net is short for ‘Bijeengekomen mobiliteitsnetwerk’ which will be explained to the traveller. The name speaks more for itself, is short and easy to remember, see figure 54.

The key message for the traveller is that they can travel with the high quality public transport without worries by feeling certain. Therefore the tagline of B1-net is: Voor een reis zonder zorgen, translated to: For a journey without worries. It makes the network sound attractive and explains that it will create certainty.

The logo was already introduced at the beginning of the chapter and is the bee. The logo will help to increase brand awareness, convey the brand personality and connect to the audience.

Figure 54: Name, logo, tagline B1-net

Design principles

Because it is important to align all communication, both visually and textual, design principles are generated to create a structured approach. In general B1-net should appear professional and appeal to a b road audience as is explained in the brand DNA. The design principles are based on the personality characteristics shown in the brand DNA. The name logo and tagline were made using those principles.

Behaviour | Trustworthy and keeps their promises. It respects the customer and keeps communication short and to the point.
Typography | The fonts used should be simple and modern with good readability both on screen and in print. Not be too playful, but attractive.
Colours | To seem professional and innovative, it should have a balance between more neutral colours and one bold colour. Not too many different colours should be used.
Illustrations | Should be clean and simple, but have something new in them and be attractive to a broad audience. It should have warm colours to appear candid and trusting.

1

Behaviour

Examples of the language B1-net uses to communicate with the traveller is explained in paragraph 7.1.2, like

“Good choice, we’ll leave in 20 minutes”.

2

Typography

Fonts for the logo of B1-net are:

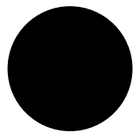
Handlee

Montserrat Light Italic

3

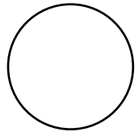
Colours

The colours of B1-net are:



Black

Grey



White

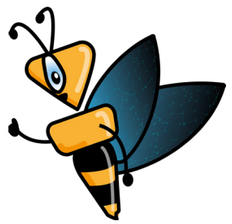
Honey yellow

Blue gradient with overlay

4

Illustrations

Examples of illustrators are from the bee.



7.2.3 Conclusion

B1-net needs a strong brand name. This is created with a brand DNA and positioning statements. B1-net believes the public transport network is the most attractive commute. Its personality is, among others, professional yet appealing to a broad audience. This is reflected with the bee who acts as a mascot to increase brand awareness. B1-net offers a seamless travel experience and creates certainty so the traveller can focus on doing their own thing. The brand DNA is translated into design principles for the brand manifestation.

7.3

Collaboration

In this chapter, the new structure of the collaboration of B1-net is explained. First, the responsibilities are discussed and visualised. Second, the mobility roundtable is introduced and explained. Last, the relevance to all the stakeholders to join the collaboration of B1-net is reviewed.

7.3.1 Responsibilities stakeholders in future collaboration ecosystem

In the future public transport network, different stakeholders will need to work together to create the desired seamless travel experience. Why they would want to join is discussed in paragraph 7.3.3. The responsibilities are described below, for an overview see figure 55.

B1-net

B1-net will act as facilitator for collaboration and be in direct contact with all the stakeholders to increase integration. B1-net creates certainty for all parties. They will be the main communication point with the traveller and can reply directly, or send feedback forward to the other organisations. B1-net makes sure the societal goals and desired travel experience standards are achieved and can help organisations with this by providing support. They will assure safe data sharing between the different parties. Last, they will have a pro-active role and maintain a balance between innovation and integration.

The organisation of B1-net will need to have a full-time commitment from its employees, as this was a learning from the current collaboration with R-net. With a full-time commitment, the feeling of responsibility will likely create a stable collaboration and make sure it is maintaining the promises of B1-net. The first employees can for example be the employees who are currently in the board of representatives of R-net. They are people working for a public transport authority, are invested and already work together.

Operators

The operators mostly keep their current responsibilities, see paragraph 3.2.1. These are to win/negotiate concessions, provide public transport materials, like the vehicles (e.g. bus, tram, train, metro), and the operating schedules. However, next to this, in this ecosystem they will need to provide open infrastructure and share their data. Furthermore, they will need to comply with the set standards of B1-net in order to join the network. Also, they should contribute to share the information and knowledge to the network for close collaboration. Last, the operators should keep improving their services for the traveller.

Road administrators/municipalities

The road administrators or municipalities will be responsible for the infrastructure and abris as they are now, paragraph 3.2.1. In the future, they should also construct the hubs, paragraph 6.1.3, and make sure these are accessible for the traveller.

Shared mobility services organisations

Naturally, these organisations provide the shared mobility services for the traveller. The responsibilities will be similar to the operators with a bigger focus on bringing new innovations in favour of the travel experience of the traveller. They will provide data, information and knowledge and comply with the set standards of B1-net.

MaaS technology provider

A MaaS technology provider will need to join the network to create the integrated digital platform. They will be the experts in this field and make sure it connects to all the services of the network. They will work behind the scenes and will not be in direct contact with the traveller.

An example of such a MaaS technology provider is Trafi. Trafi offers cities the possibility to connect all mobility services to one single platform (Trafi, 2021). It empowers for example Jelbi which is a MaaS provider in Berlin with more than 25 public and private transportation partners combined in one platform (Jelbi, n.d.). Trafi creates this platform for Jelbi, the same will happen in the ecosystem of B1-net in which a Maas technology provider, for example Trafi, creates this platform for B1-net.

Authorities

The public transport authorities will have similar responsibilities compared to now, so thinking about the bigger picture and creating concessions. Furthermore, they will provide the societal goals the network needs to achieve in order to complete the governmental promises.

Ministry of infrastructure and water management

Currently, the ministry functions in the role of orchestrator and initiator within the 7 MaaS pilots in the Netherlands. They have set up a framework agreement with 24 parties that were already actively involved in mobility sharing or with MaaS in some way (Ministry of Infrastructure and Water Management, 2019).

The ministry is responsible for, among others, data sharing, a level-playing field and policy measures regarding parking and sharing concepts (Ministry of Infrastructure and Water Management & Mink, 2019). They found their role as orchestrator was needed for the collaboration between transport operators and MaaS service providers as this would otherwise be difficult to get off the ground.

However, they would want to let go of those responsibilities and transfer them to the other parties in the network when possible (Policy Officer Innovation ministry, 3 March 2021). In conclusion, they could facilitate the start of the collaboration of B1-net, but would then hand over this responsibility to the organisation of B1-net. Therefore they are not placed in the visual of the collaboration in 2040, figure 55.

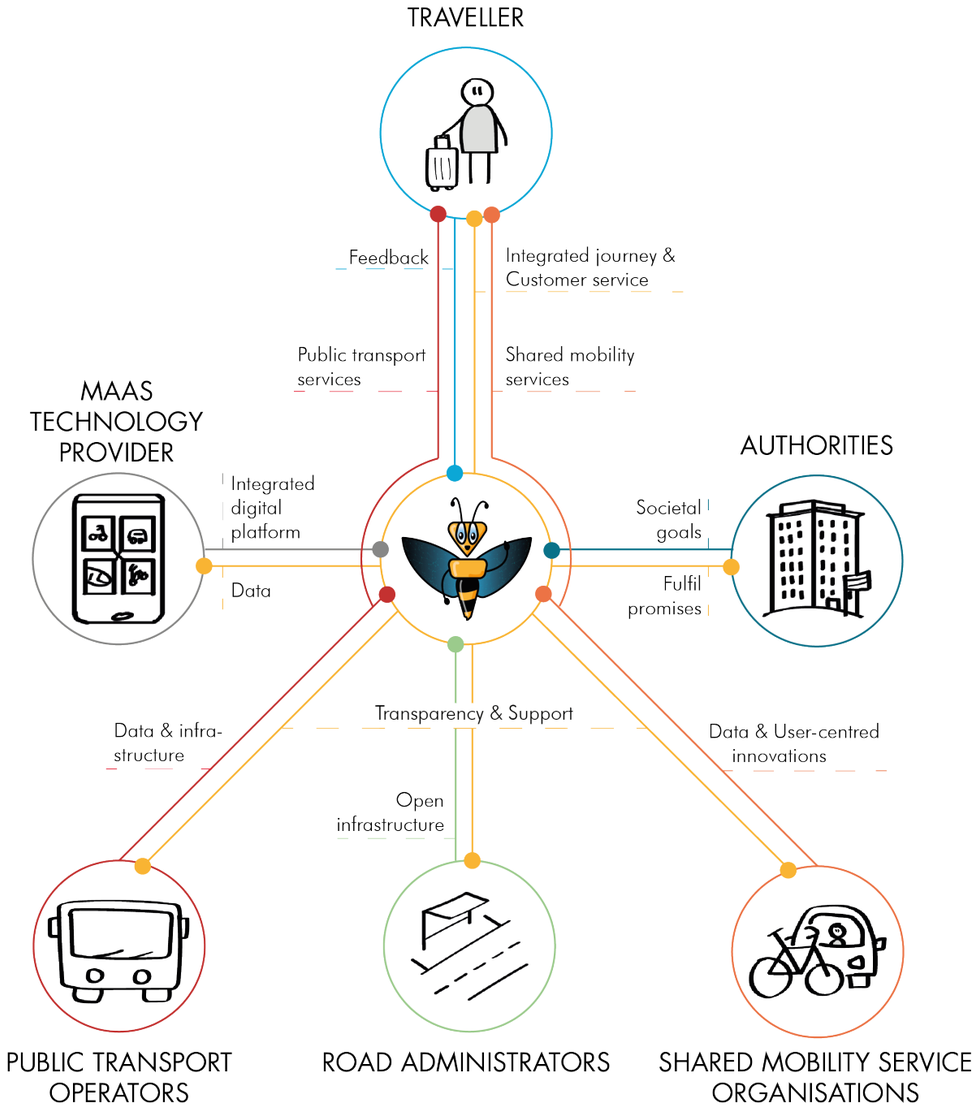


Figure 55: Collaboration of ecosystem in future high quality public transport network 2040

7.3.2 Mobility roundtable

The collaboration of the ecosystem in the future high quality public transport network will be facilitated through mobility roundtables. Inspired by the lessons learned from MedMij (Vonk Noordegraaf et al., 2020), see paragraph 2.4.5.

In this roundtable structure, representatives of the different stakeholders in the ecosystem will come together and discuss important aspects, see figure 56. They will for example set agreements about which requirements are important as mentioned in paragraph 6.3.2. They will discuss how these requirements need to be implemented and how to make sure everybody keeps to those agreements. The enforcement of the requirements is an important learning from the current way of working from R-net, see paragraph 3.5.

Information sharing roundtables

Next to this, a group of representatives should be assigned to share information and knowledge. It would be most suitable to compose a group with stakeholders from the same area. This means multiple sharing groups would form, each with a representative of B1-net to facilitate these meetings. Relevant information for everybody will be shared in the main roundtable.

Innovation roundtable

Also another group will be created to think about and share innovative ideas to improve the services for the traveller. Their concepts can be discussed in the main roundtable to stimulate implementation.

Networked innovation

To stimulate collaboration, some enablers in literature were found. The B1-net collaboration can be described as networked innovation, as this means people from different organisations work together to innovate (Kleinsmann et al., 2009). This includes different components: knowledge sharing, knowledge creation, and knowledge integration (Kleinsmann & Valkenburg, 2008).

Bergman (2015) found multiple barriers and enablers for networked innovation. Some useful enablers for the mobility roundtable structure are described below:

- The presence of a facilitator
- A feeling of ownership from the different actors
- Suitable team members for the project in knowledge & expertise
- Motivated team members
- Actors respecting each other
- Formal & informal meetings
- Empowering the team to make decisions and making them responsible
- Actors understanding of the project goals and context

In conclusion, the members of the mobility roundtables should carefully be selected. B1-net facilitating the roundtable conversations enables collaboration.

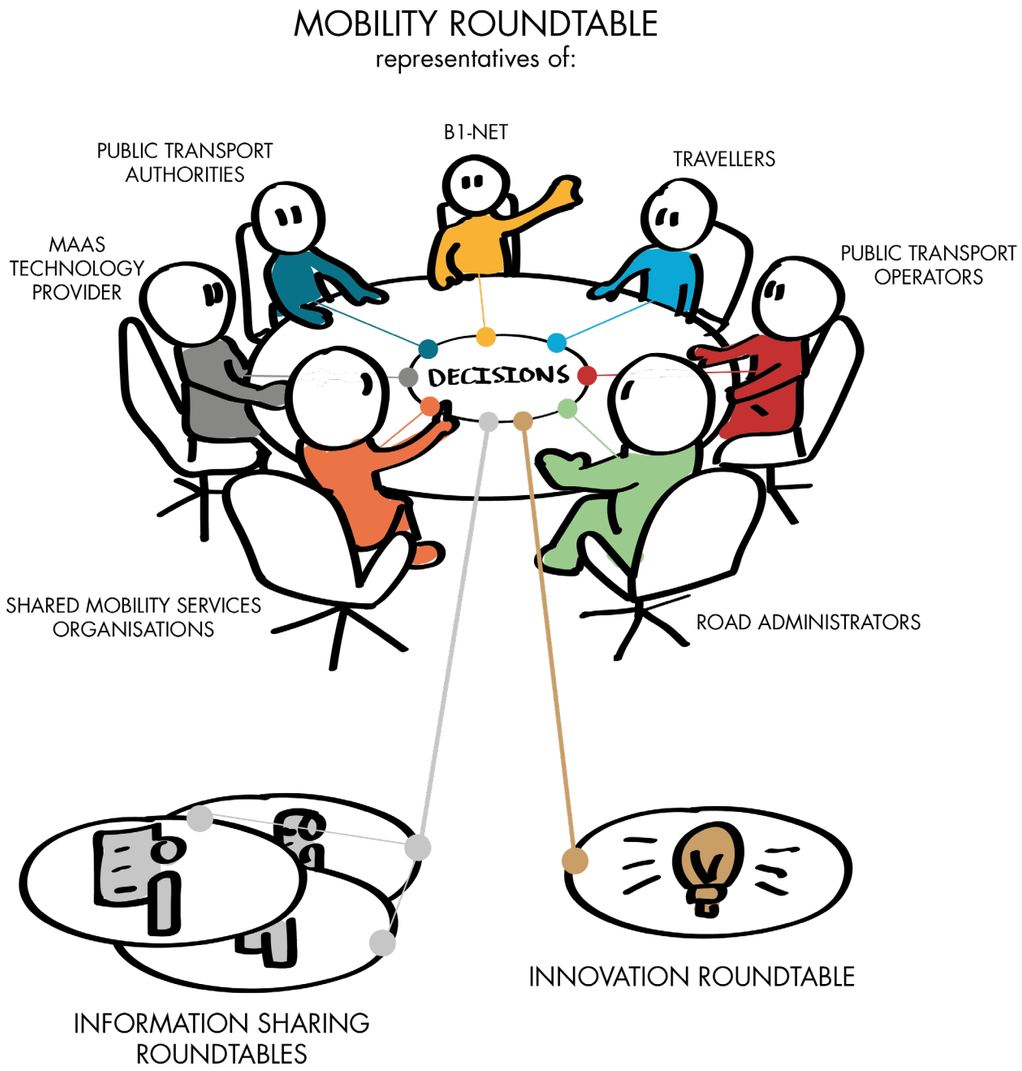


Figure 56: Structure mobility roundtables

7.3.3 What's in it for them?

Relevance for stakeholders

Traveller

The new high quality public transport network is most relevant for the traveller. They will experience a seamless integrated public transport network bringing them to their destination without the need to worry. It creates certainty so they can focus on doing their own thing (see also propositioning statements in chapter 7.2.1). The other stakeholders will need to consider this desired experience for the traveller as most important. This will bring alignment to their collaboration.

Other parties

For the other stakeholders it is relevant to join B1-net, because they would be part of the network. Similar to now, operators and municipalities want to belong to R-net, because they don't want to be left out and it results in more customers. This will be similar with B1-net.

Furthermore, according to the research with the stakeholders of R-net, they would like to have a say in the decisions of R-net. In the future collaboration of B1-net, they will be able to do that. They can provide input and knowledge and belong to the network instead of just carrying out the wishes.

Because of the open infrastructure and data sharing, expanding to other areas for organisations will be more accessible. However, this will need to be done in consultation with the others to maintain the balance of mobility services. Also the information, knowledge and experience sharing has advantages for the organisations to improve their services and therefore attract more customers. As the saying goes, being alone makes you fast, working together brings you far.

Relevance for R-net

In the transition to B1-net, R-net will need to carry out different tasks and have different responsibilities compared to now. They will need to prove they have the capabilities to facilitate the collaboration. The current representatives of R-net consist already of a varied group of different experts. This is a strong foundation of the future mobility roundtable. However, they will need to expand and transition to a full-time commitment instead of organising R-net as a side-job. The members of B1-net will needto have the interest of B1-net as a priority.

In the end, B1-net will result in a bigger share of travellers in public transport which is favourable for the Randstad.

7.3.4 Conclusion

The collaboration within the future high quality public transport network will be facilitated by B1-net. All the different stakeholders in the network have their own responsibilities to achieve a seamless integrated network for the traveller. The collaboration will be structured with a mobility roundtable, based on the roundtable conversation structure of MedMij. By joining B1-net, stakeholders will have a say in decisions and the opportunity to expand their business. In the end, B1-net can result in a bigger share of travellers in the public transport network.

7.4

Implementation | Organisation strategy

In the previous paragraphs, it is discussed how B1-net will look like in 2040. This paragraph explains the strategy of how to get there. It explains the organisation strategy of the transition from R-net into B1-net in four steps. This is followed by the future vision in 2040. To visualise the strategy, an analogy is used about how bees make honey.

7.4.1 Overview of organisation strategy

The organisation strategy is about the transition from R-net into B1-net. The strategy has four steps in a timeline. Those steps are different horizons incorporated in a roadmap. The steps of the organisation strategy are explained with the help of the analogy about how bees make honey.

The first step is now, in 2021. It is to prepare, how a bee first collects nectar to make honey. The second step for the bee is to share the nectar with other bees. This represents when the organisation of B1-net will start the real process in 2023. In 2025 B1-net will seal the deal with the first B1-certificate. Here the analogy is when a bee caps the cell of honey with beeswax. Hereafter these cells are taken care of and more cells will be filled up by the bee. They will nurture in expand, which is what B1-net will do in 2030 and onwards. The final stage is in 2040 when the honey is ready which represents the complete collaboration ecosystem of the high quality public transport network.

The different steps will be discussed in more detail with the most important actions in the next paragraphs.

7.4.2 Steps explained in organisation strategy

Prepare | Collect nectar | now

So the first step into the transition from R-net into B1-net is to prepare, like how a bee starts to collect nectar, see figure 57.

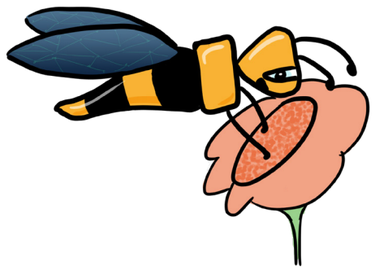


Figure 57: Step 1 of organisation strategy: prepare like collecting nectar.

Start process | Share nectar | 2023

The second step is to start the process, like the bee who shares its nectar with other bees in order to change its properties and dehydrate it so it modifies into honey, see figure 58.

Figure 58: Step 2 of organisation strategy: start process like sharing nectar

Reconstruct to full-time commitment | As mentioned in paragraph 7.3.1, the organisation of B1-net will need to be constructed to a full-time commitment in order to have a strong feeling of responsibility. For the reconstruction, the current R-net authorities will need to be persuaded by the concept of B1-net. They will change their commitment from where they are working now to B1-net and help set up this new organisation.

Set up customer service | As discussed in paragraph 7.1.2, B1-net will be in direct contact with the traveller and offer customer service. By implementing this now, it can bring important insights about the needs and wants of the traveller to take into account in the design of the future high quality public transport network of B1-net.

Persuade public transport operators | The current public transport operators with R-net will be convinced to join the network of B1-net. Because they already work together, this would be a good first step. In order to do this, B1-net will need to have strong arguments and bring prove about the new concept. This can be gathered from 2021 till 2023.

First mobility roundtable | When some public transport operators are convinced, the first mobility roundtable can be organised with the different stakeholders. These roundtable conversations will be used to find the interests of the various stakeholders, like the operators, travellers and authorities, see paragraph 7.3.2. Also the first requirements for the certification structure will be discussed, see paragraph 7.1.3.

Seal the deal | Cap with beeswax | 2025

The honey is deposited into the cells of the honeycomb and capped with beeswax. It is like sealing, which is the next step in the organisation strategy; seal the deal, see figure 59.

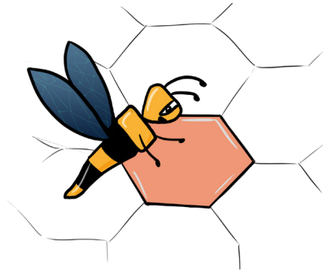


Figure 59: Step 3 of organisation strategy: seal the deal, like cap with beeswax

Nurture & Expand | Fill more cells in honeycomb | 2030

More cells will be filled and capped in the honeycomb, representing more organisations joining the network and more B1-certificates, see figure 60.

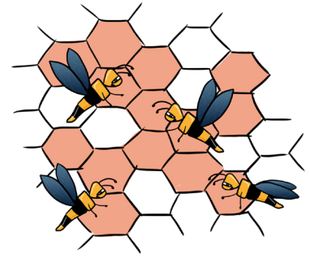


Figure 60: Step 4 of organisation strategy: nurture and expand, like filling more cells in the honeycomb

First B1-certificate | As the interests of the different stakeholders and requirements for the B1-certificate have been discussed in the roundtables, the first routes can receive the B1-cerfiticate. As more stakeholders join the collaboration, because in 2025 also the first shared mobility service organisations will be persuaded to join, the requirements for the certificate will constantly need to be revised.

Information sharing & innovation roundtables | The main mobility roundtable has had some time to establish a strong collaboration. Now the information sharing and innovation roundtables can be introduced, see paragraph 7.3.2. Also results from these conversations can lead to a refinement of the requirements of the B1-certificates.

Expand network | From 2030 and onwards the focus of B1-net will be on expanding the network. Keeping the existing organisations and finding other suitable organisations to join the collaboration.

Furthermore, B1-net will need to keep revising the requirements of the certificate and checking regularly if the specific routes or organisations still meet them. This is important for maintaining the high quality of the public transport network.

Honey | Complete ecosystem | 2040

The final stage is when the honey is finished. This is when B1-net has a complete ecosystem of the high quality public transport network, see figure 61.

Figure 61: Future vision when there is a complete collaboration ecoystem, like when the honey is ready.

7.4.3 Conclusion

The organisation strategy about the transition from R-net into B1-net has four steps; prepare, start process, seal the deal and nurture & expand. This leads to the future vision in 2040 when there is a complete collaboration ecosystem in the high quality public transport network. To explain the steps, an analogy about how bees make honey is used.

Those steps are different horizons incorporated in a roadmap. The organisation strategy is just one element of the roadmap explained in the next paragraph.

7.5

Implementation | Design roadmap

This chapter is about the implementation strategy that is visualised in a roadmap. After the roadmap, some important aspects of the roadmap will be highlighed and explained further. These are dealing with COVID-19, sustainability and the launch strategy.

7.5.1 Roadmap horizons and elements

A roadmap (Simonse, 2017) is a map used to visually track and strategically explore future design innovations plotted on a timeline. A roadmap offers a tactical plan on design innovations to turn a future vision into a reality. The design roadmap for the high quality public transport network was created to provide an overview of the implementation of the concept and future vision.

Horizons

The roadmap was set up with the futures technique of the Three Horizons model (Simonse et al., 2012). The first horizon starts in a current business with existing markets and technologies. The second horizon is the stepping stone towards the third horizon. The third horizon projects new value propositions with new user values and technologies.

The time pacing strategy (Hadlaw, 2003) decides the ‘design cloak’ for the different horizons. In general each horizon takes longer than the previous one. This depends on the sector and competitors in the marketplace (Borkin et al., 2016). The public transport sector can be considered going with a slow space. This design roadmap for the high quality public transport network has a time-pacing of three horizon between now in 2021, and the future vision for 2040. The first horizon is in 2023, the second in 2025 and the last in 2030.

Roadmap elements

The roadmap contains four main elements, see next page: The Traveller needs, Trends & Developments, the Organisation strategy (already explained in the previous paragraph) and the Launch strategy.

Each element explains the current situation, the events and action points in each horizon and have their own sub future vision. Those four sub future vision together lead to the final future vision shown in paragraph 6.1 “Commuting with the high quality public transport network is the norm”.

Traveller needs | In this element, the 10 future fulfilments of the found fundamental needs of the commuter are plotted, see paragraph 5.3. They are placed in the timeline where they are most important, however most stretch over a longer time. This is indicated by a line and arrow. Also the current needs because of COVID-19 are implemented as they are important to consider.

Trends & Developments | Here the trends from the future vision, see paragraph 5.4, are plotted. Furthermore, other developments/events are included to create a better overview

Organisation strategy | The different actions from the B1-net organisation already explained in paragraph 7.4 are plotted in the timeline.

Launch strategy | The launch strategy explains the action points B1-net needs to take to communicate the new network to the traveller. It consists of multiple campaigns and different target groups.

	2021 | Now	2023 | Horizon 1	2025 | Horizon 2	2030 | Horizon 3	2040 | Future vision
Traveller needs	Avoid public transport Individual mobility Accessibility Freedom of choice	Gain back trust Privacy Smart facilities Transparancy & fairness	Reassurance Adaptive system	Digital security Personalised comfort	Travelling with certainty without the need to worry
Trends & Developments	COVID-19 MaaS pilots Less travelling Electric mobility	Active mobility Trip chaining Travel time enrichment	MaaS provider BRT New pt buses are zero-emission	Nobody ows their own transport No more waiting All pt buses are zero-emission	Integrated network for a seamless travel experience
Organisation strategy	PREPARE Reconstruct to full-time commitment Gather traveller insights Set-up customer service Persuade authorities	START PROCESS First mobility roundtable Initial certification requirements Persuade operators	SEAL THE DEAL First B1 certificates Revising requirements Information sharing & innovation roundtables Persuade shared mobility service organisations	NURTURE & EXPAND Expand network Persuade more organisations	A high quality public transport network collaboration ecosystem
Launch strategy	Prepare information Testing concept	Target current pt users Launch B1-net	Target car users #benikbij campaign	Target specific users Company/municipality collaborations	Every Dutch citizen knows B1-net
	Raise awareness positives public transport	Introduce interventions			

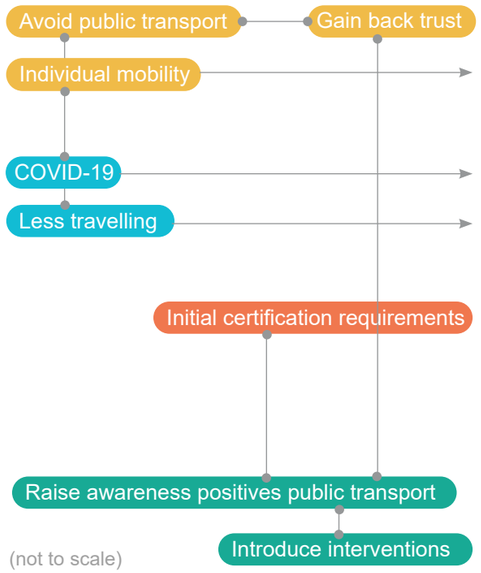
COMMUTING WITH THE HIGH QUALITY PUBLIC TRANSPORT NETWORK IS THE NORM

7.5.2 Dealing with COVID-19

As mentioned in chapter 2.1.2, the current demand for the public transport network has seen a big decline due to the COVID-19 pandemic and its regulations. The traveller need in the roadmap is now avoiding the high quality public transport network. Also, the traveller has a bigger need for individual mobility as that feels safer. Next to this, the trend less travelling has started as people realise they can also do a lot from home.

It is expected that only in 2025 the level of travel distance with the public transport network will be the same again (KiM, 2020). However, this will not happen spontaneously; the traveller will need to be able to have trust again. Interventions are needed by stakeholders in the public transport network to gain this trust. For example, by raising awareness about the positives of public transport, like sustainability (Holmgren, 2007), and efficient travel time while also showing its safety. It would be wise to put these into the initial certification requirements of B1-net see paragraph 7.1.3.

However, this will not be easy. Changing one's habit is often quite difficult and maybe more interventions will be needed. Suggestions of literature for these interventions to convince travellers to the public transport network are free or discounted public transport tickets, an event aimed at interrupting the travel habit and the provision of additional travel information materials aimed at car users (Redman et al., 2012).



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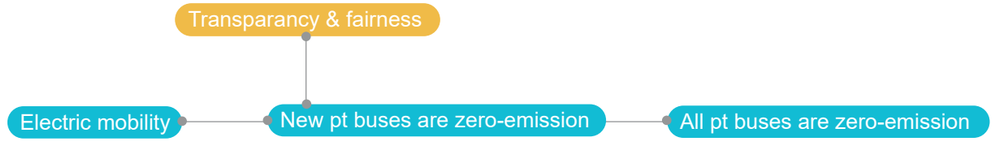
7.5.3 Sustainability

We are faced with the challenge of radically reducing CO2 emissions and public transport can play an important role in this, see paragraph 2.1.1. The current trend of electric mobility supports this challenge to reduce CO2 emissions.

To create an even bigger impact, the regional public transport authorities in the Netherlands have signed a board agreement with two pillars relevant to the public transport network (CROW, 2020):
- from 2025, all new public transport buses are zero-emission
- from 2030, all public transport buses are zero-emission.

When communicated to the travellers, they are helped with the need for transparency and fairness by the public transport network organisations.



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7.5.4 Launch strategy

The communication to the traveller is an important aspect to make the new public transport network a success. The vision of the launch strategy is ‘Every Dutch citizen knows B1-net’, which is needed to achieve the final future vision ‘Commuting with the high quality public transport network is the norm’.

There are different steps in the launch strategy. First, the information to the traveller needs to be prepared, for example a website and social media content. With this, the concept of B1-net can be tested and insights about what appeals to the audience, the traveller, can be found. Also the insights about the customer service will contribute to this.

After testing the concept and knowing what appeals to the audience, B1-net will be launched. The first target group of the launch strategy is the current public transport users. They are easier to target as the communication of B1-net can be applied in the public transport network.

The second target group will be the car users in order to convince them to make use of the public transport network. This can work with similar interventions talked about in paragraph 7.5.2. But also with the help of company and municipality collaborations. Creating a new habit is easier than breaking and changing a habit. Therefore, applying interventions with commuters who move to a new home or have a new job have a bigger chance of success.

The last target group is specific users who are not reached yet. However who they are will need to be researched after the other campaigns.

An option for a campaign of B1-net is the #benikbij campaign. ‘Ben ik bij’ is a common saying among young people when they ‘will be there’. Targeting these young people is beneficial, as they will be the future commuters. See figure 62 for an example about how the campaign could look on Instagram.

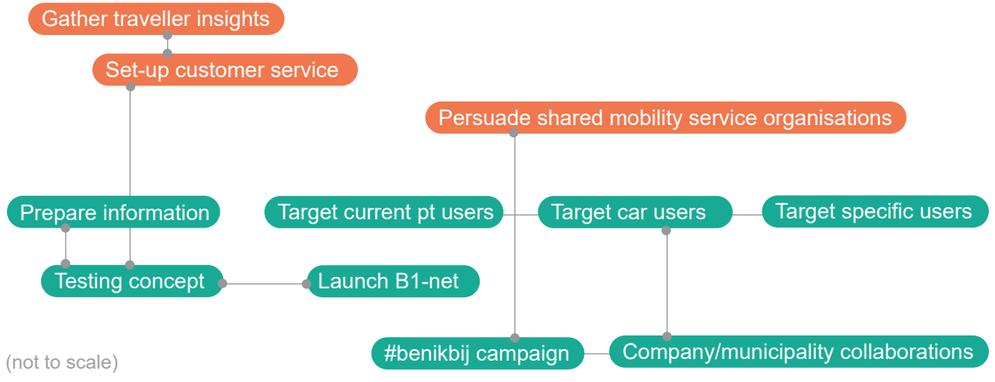

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Figure 62: Example of instagram post with the #benikbij campaign

7.5.5 Conclusion

A roadmap was made to create an overview of the strategy towards the future vision of the high quality public transport network. The roadmap shows four elements; the traveller needs, trends & developments, the organisation strategy and the launch strategy and how they are connected to each other. Three aspects from the roadmap were highlighted, the first being dealing with COVID-19 in which the current situation was explained with suggestions about how to do deal with it. The second was sustainability with zero-emission buses. The third was the launch strategy in which the suggestions for the different target groups and campaigns were explained.

7.6

Stakeholder validation

The concept of B1-net is validated with multiple stakeholders to find their opinions and recommendations. In this chapter, the method of the validation is described and the results. A conclusion closes the chapter.

7.6.1 Method

In-depth discussions

To evaluate the final concept and implementation strategy, the project was presented and discussed with multiple stakeholders in the high quality public transport network. On average, the discussions lasted about 40 minutes. Most stakeholders contacted were already interviewed at the beginning of project which created a bigger involvement. The stakeholders involved in the validation sessions were:

- three commuters
- two public transport developers EBS
- public transport developer RET
- policy officer Ministry of Infrastructure and Water Management.
- project leader/policy officer DOVA
- public transport advisor VRA
- communication advisor province Zuid-Holland / R-net
- supervisor R-net

Knowledge sharing session lab

Furthermore, the final future vision, concept of B1-net and the implementation strategy were validated with the members and partners of the Seamless Personal Mobility Lab. In this session, 3 partners were present from RET, Rover and DOVA. Also 6 members of the lab provided feedback. The different elements of the project were presented and the participants were asked to fill out a Google Form.

7.6.2 Results

Concept name and logo

In general, the stakeholders were surprised by B1-net. Especially how the bee integrates the whole journey and talks to the traveller. Also the name and bee appealed to them.

> I really like the bee and the different possibilities it brings with it. I already can think of some campaigns, like playing with 'bee there' of #beecool etcetera. It inspires me. I also associate the bee with sustainability which I like.
> - communication advisor province Zuid-Holland / R-net

> The name does not feel like just another operator like R-net does now. This is a positive. - member mobility lab

However, not all stakeholders find it likely R-net would change their name.

> We have invested so much already in R-net and its branding. And we're busy trying to create a better emotion with R-net by a new brand strategy. - supervisor R-net

Others thought the name could bring new opportunities. They liked the idea that B1-net wouldn't

> 'just be a cosmetic overlay'. - public transport developer RET

B1-net providing certainty

The commuters liked the feeling of certainty and felt they would easier choose for public transport instead of taking the car. However, this certainty needs to be proved to them in order to believe in it.

> I do believe I would choose more for the public transport network when this concept would be real. The bee feels like a TomTom what creates ease. I know I will be on time for work and it creates flexibility so on the way back I can indeed pick up my son. However, I do need to be sure there will be such a cargo bike on my way back, what happens if they are not available? - commuter 1

Customer service

Having one channel for customer service was also an interesting point for the stakeholders with some different opinions. For the commuters, this part was very desirable.

> It is actually weird this is not the case now right? If R-net provides this service and represent a quality brand, I would expect to be able to talk to them when I need it - commuter 2

Also R-net and EBS see customer service as an important aspect in the future.

> This is one of the most important aspects lacking in the current collaboration of R-net. - supervisor R-net

> This would be very helpful as the traveller now does not seem to able to find EBS. - public transport developer EBS 2

The RET provided an argument against using one platform for customer service.

> As the identity of the different operators are visible, I feel like this could also be done by us. This would also save governmental costs.
> - public transport developer RET

Because of this last argument, the reasons why using one platform for customer service needs to be clearly communication by B1-net. Furthermore, the organisations still have a role in the customer service. For example, B1-net could refer to them to help the traveller when needed.

Certification structure

The second important aspect of providing certainty is the certification structure. In the discussions with the stakeholders this topic was received positively. Some even said they were most enthousiastic about this part of the concept and found it promising.

> Using this certification structure will create intrinsic motivation to create high quality public transport instead of the authorities making this decision. - public transport advisor VRA

> The constant revisement of the requirements of the certification structure is an important aspect of this concept. The world is constantly W and we need to keep this dialogue open. Furthermore the enforcement of the certificates is good. - public transport developer EBS 2

Stakeholders also had some other inspiring ideas for the certification structure which could be researched further.

> Maybe in the future you can have different premiums, like people who want a very sustainable journey or a certification for tourists for routes which are attractive for them. - policy officer Ministry of Infrastructure and Water Management.

> Maybe the responsibility of this certification structure can be of the traveller. So they can rate their route and share this in the platform and because of this a route can get a certain certificate. - partner lab from Rover

Collaboration ecosystem

The collaboration was seen as a bottleneck for multiple stakeholders. They questioned the support is will get by for example the NS, the Ministry and shared mobility service organisations. The collaboration between different parties, who maybe even consider themselves competitors, is always a challenge. However, multiple concepts have proven it is possible, for example MedMij.

It seems what the different parties need for good collaboration is to work towards the same goal and therefore align their interests. In the case with MedMij, this is the patient owning their data. In the case with B1-net, this is the experience of the traveller in the high quality public transport.

When the stakeholders saw the mobility roundtable they were excited. The operators would like to have a say in decisions.

> I believe it is good to have each others input and perspectives on certain things. However, it seems difficult to make decisions, how do you make sure it isn't just talking? - public transport developer RET

Seeing the traveller at the mobility roundtable was a positive aspect of the concept. However there seems to be a struggle to find representative travellers. This will be an important consideration when selecting people to join the roundables.

> How do you get the representative people in the mobility roundtable? What you see now is that mostly people with a disability join those things, which is of course important, but not representative of the 'normal' commuter. - public transport developer EBS 1

MaaS concept

The stakeholders thought the movie about B1-net travelling with the commuter was a good presentation about how MaaS should really work and a good target image.

> I have noticed everybody talks about MaaS, but actually they are not talking about the same thing. I think this movie explains it in an easy way. It puts the traveller at the center who has a seamless travel experience with one integrated platform - public transport developer RET

> I believe this concept provides a good target image we all should work towards. I do really hope we will be able to give this seamless experience to the traveller in a high quality public transport network. - public transport advisor VRA

Implementation

The roadmap and organisation strategy seemed to provide a good overview for the stakeholder. They could imagine it happening this way. They especially liked the analogy with the bee and were more engaged because of it.

However, there were also some remarks.

> The process seems a bit long. I assume that the operators and shared mobility services organisations can be persuaded from the beginning and start together?
> - member mobility lab

This could be true, however it was chosen to take it slow and first make some good process before integrating the shared mobility services so they will be easily persuaded with proof of concept. But by evaluating how this is going, it could be decided to start earlier with this process.

The time-pacing of the implementation seems also the right fit with R-net.

> I think it's a good idea to take incremental steps in the implementation. This also worked pretty well with R-net in the beginning and feels right for us.- supervisor R-net

Scope

Another aspect mentioned by the stakeholders was the scope of the project. The scope is the Randstad, see introduction. This means a high capacity of traveller, or what the stakeholders called 'thick lines'. But the stakeholders were wondering if the concept of the high quality public transport network also works in less populated areas, with 'thin lines'. This is an important aspect to consider by B1-net. For example, by thinking about what high quality means in those areas.

7.6.3 Conclusion

The concept was validated by multiple stakeholders in the high quality public transport network. It was found that they were enthousiastic about the concept. For example about the bee, the customer service and certification structure. However, also doubts came to light about the complexity of the collaboration, the time pacing of the implementation and the suitability for a bigger scope. Those points are important to take into consideration.

7.7

Final evaluation

The final part of chapter 7 is about the final evaluation of the future vision, concept and implementation of B1-net. They are first evaluated on the design goal and second on their desirability, feasibiilty and viability, see figure 63.

7.7.1 Evaluation on design goal

The future vision, concept and implementation strategy of the high quality public transport network in 2040 are designed with the help of the future requirements found in the context analysis in chapter 2 and the strengths and weaknesses of R-net from chapter 3. A special focus was on creating certainty and addressing the fundamental needs of the commuter in the high quality public transport network, see design goal in chapter 4. Combining these aspects makes sure that commuting with the high quality public transport network is the norm.

Future requirements of CH2

An indication how the future high quality public transport of B1-net scores on the future requirements of chapter 2.5, can be found in Appendix L. In summary, most requirements are reviewed positively. Some are directly implemented in the design of the high quality public transport network, like a door-to-door travel experience by combining different means of transport, make use of a certification structure to allow third parties to join and facilitate collaboration through a roundtable structure. Others are likely to have a positive review, but need to be tested to know for sure, like the requirement that the future high quality public transport network should convince car users to switch to a public transport commute.

Strengths and weaknesses of CH3

B1-net is created with the strengths of R-net in mind as it builds on the strong foundation and knowledge of R-net.

The weaknesses of R-net are all addressed in the new concept of B1-net. In the new concept, B1-net will be in direct contact with the traveller and explain what B1-net is and stands for in a well organised launch strategy (W7) (W9). Furthermore, B1-net will provide customer service (W8).

With the mobility roundtable structure, the collaboration will have a structure to make overarching decisions (W2) in which also operators will have a say in the decisions made (W3). The innovation roundtable will make sure B1-net will not become outdated (W4).

Because B1-net will have a full-time commitment, the organisation will have B1-net as their top priority (W1). The future vision of Jerry in the high quality public transport network will create aligned interests of the stakeholders to put the traveller at the center (W1).

Lastly, because B1-net will be visible for the users with the help of digital features and the organisations can keep their own identity, implementing B1-net will get less resistance, of for example the urban operators (W5). This also makes B1-net less confusing because it does not look like just another operator (W6).

7.7.2 Evaluation on desirability, feasibility and viability.

Desirablity

The current high quality public transport network is organised and implemented by R-net. However, the current network is not seen as high quality by the travellers, see paragraph 3.4.1. With the certification structure the high quality will be better visible. Furthermore, in the current situation with R-net the traveller is confused. They do not know what R-net is and stands for. With the launch strategy of B1-net this will clearly be communicated and creates therefore more value for the traveller.

In the end, the traveller will have a better experience with the high quality public transport network. B1-net will provide them certainty and address their fundamental needs. With the integrated network, a seamless travel experience will be created. This will make commuting with the high quality public transport network the norm. More commuters will choose for this public transport network instead of their cars. This is desirable for reaching societal goals, like sustainability and less congestion on the roads.

However, there is a chance not all commuters will see the benefits of the high quality public transport network and would still prefer the car. Nonetheless, this is maybe not that big of a problem, because it is not realistic every commuter will travel to work with the public transport network.

The collaboration ecosystem of B1-net also provides value for other stakeholders. Being part of this network creates opportunities for them to grow and attract more travellers. Furthermore, they will have a say in the mobility roundtable instead of just carrying out tasks like is happening now with R-net.

B1-net is not just valuable for commuters. Also a lot of other people would benefit from their service. Think for example of the low literate or tourists who will be helped by the guidance of the bee from B1-net.

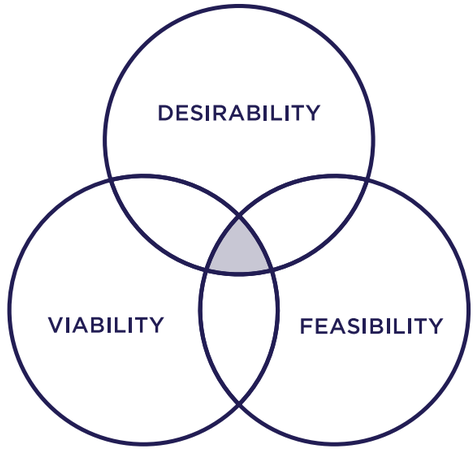

Figure 63: Desirability, viability and feasibility

Feasibility

The feasibility of the future vision of the high quality public transport network is considered high by the stakeholders, see paragraph 6.1.4. They found this a likely representation of what they are working towards too.

The technologies used, as data sharing and making use of the platform, will also be feasible in the future. This is currently already being implemented and worked with, especially with the MaaS pilots. The suggested projection technologies are less feasible. However, those are mostly used to create an imaginative future vision. It is also possible to use other technologies to achieve their functions, like a smartphone.

Doubts were raised by the concept of B1-net. Especially the support base for the collaboration in the network. However, interestingly the stakeholders mentioned each other about who were most likely not willing to join. They did not mention themselves. It seems there are assumptions of the other parties about this which may be not true. However, this needs to be further investigated.

Another means to make the collaboration more feasible is the use of incremental steps. First the current stakeholders already connected to R-net will be persuased to join. When a proof of concept with this is created, other stakeholders are more likely to join. Furthermore, the enablers for networked innovation can make the mobility roundtables a better succes.

Viability

The new concept of B1-net will need a new organisation with employees. They will do new tasks like facilitate collaboration, be in direct contact with the traveller and offer customer services. Also the new platform of the MaaS technology will need to be paid. This all will cost money.

However, the organisation of R-net at the moment also costs a lot of money. For example they need to subsidise the operators who need to transform their buses into the R-net style and make a new route and schedule. With B1-net, this will not be needed anymore as the operators can keep their own identity and are more responsible. So this money can be used to organise the new organsation. The current business model of R-net is not clear so only speculations can be made about if this is enough.

Still, investing in B1-net will create more value compared to R-net now as R-net is not that valuable for the traveller nor the operators. B1-net is more future proof and will help the governenment reach its societal goals, like CO2-reduction. These benefits make the concept of B1-net and the proposed high quality public transport network more viable. Furthermore, it can attract travellers again to the public transport network after the COVID-19 pandemic allows this again and can help speed up recovery.

Discussion

8

The last chapter of this report first describes a short discussion in which the results are illustrated and the relevance of those results are explained. This is followed by the limitations of this project. The third paragraph explains the recommendations for the future execution of B1-net, for R-net, and for the public transport network in general. After this you will find the conclusion and finally, a personal reflection will give insights into my personal ambitions and other learnings.

8.1 Discussion

Results

The project was about designing a vision and strategy for a user-centred high quality public transport network in 2040 in the Randstad. The goal was to make commuting with the high quality public transport network the norm. A seamless door-to-door travel experience was designed to improve the current high quality public transport network. The results are, see also figure 64:

- A future vision with the help of the scenario of Jerry commuting to work. It shows the future high quality public transport network with its trends and needs.
- The new concept of B1-net proposes a new role for R-net to become a facilitator for collaboration in the high quality public transport network
- An implementation strategy to demonstrate how to reach the future vision and concept. The strategy is in the form of a roadmap with the help of a bee analogy.

Relevance

The results of this project serve multiple purposes:

Inspire about the future | The results can inspire the stakeholders in the public transport network about the future. It makes the future more imaginable and manageable about what challenges and opportunities are to come.

Encourage long-term thinking | Furthermore, it can make the stakeholders encourage to think more long-term. This long-term thinking is important because the time-pacing in the public transport sector is relatively slow. So investments need to be made now in order to make this vision and concept a reality in 2040.

Stimulate discussion | The vision, concept and implementation strategy can stimulate discussion between the stakeholders in the public transport network. Discuss what of the results they like and do not like in order to make decisions about this. Discuss what the priorities are and where they want to go. It can help mobility policymakers give insight into what choices are to be made about what is possible and desirable.

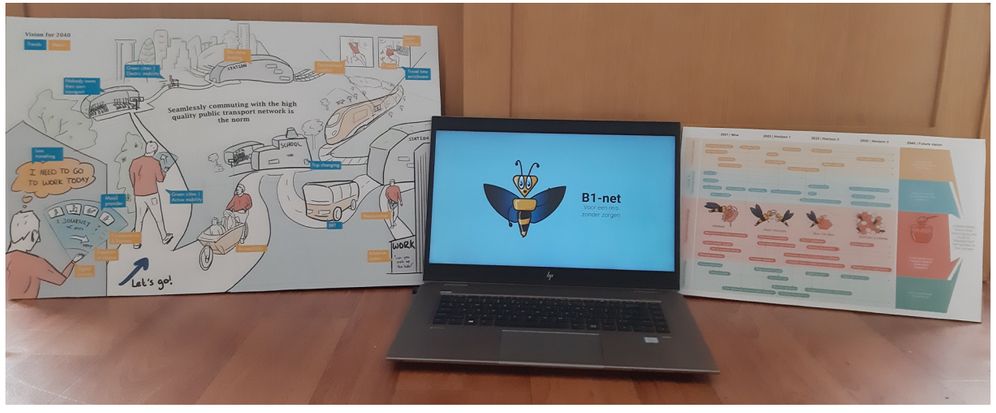

Figure 64: Final results: future vision, B1-net and roadmap

8.2 Limitations

User-centred mindset | The travellers are considered as the most important stakeholders in the high quality public transport network and it's important for all stakeholders to remember this. Addressing their (fundamental) needs and providing certainty are implemented in the vision and concept to create focus on the traveller. These are concrete action points the other stakeholders in the network can take in order to improve the current public transport network and therefore make it more attractive.

Inspire about the MaaS governance strategy | The last point of relevance is for the future MaaS providers and the current MaaS pilots. B1-net can be compared to a MaaS provider. However, the concept is made from another point of view, that of the new role of R-net. Nevertheless, the concept can inspire the upcoming MaaS providers and the MaaS pilots into the future governance strategy. In the MaaS pilots in the Netherlands, they are just at the starting point of the governance strategy (MaaS Kenniscafé, 2021). B1-net provides a concrete example of how the MaaS governance could look like.

COVID-19 | This project was executed during the COVID-19 pandemic what brought some limitations, especially during the context analysis. User-research like the interviews were conducted online. Also, some commuters did not have the opportunity to fill out the sensitising booklet. Furthermore, field research was nearly impossible, so travelling with R-net and talking to people there did not happen. All of this made it harder to emphasise with the context and see for myself what would work and what not in the high quality public transport network.

Time restrictions vs complexity | The high quality public transport network in highly complex with a lot of stakeholders. Due to the time restrictions of the project, some priorities were made regarding which stakeholders to include in the process. For example, authorities and operators were closely involved and provided insights and validation. However, other stakeholders, like municipalities, road administrators, MaaS technology providers or the shared mobility service organisation, were not involved. Instead, assumptions were made about them. It would be wise to validate these assumptions and include them in the future design of the high quality public transport.

Design perspective | Within the project, the vision, concept and implementation were created with a design perspective. It mostly provides a general overview and detailing like finance and technology were less of priority. To implement the concept, this will need to be further detailed.

8.3 Recommendations

Three different kinds of recommendations are proposed in this report. The first recommendations are about the execution of B1-net. The second recommendations are for R-net about how to improve their current organisation. The last recommendations are about the future public transport network in general and are therefore relevant for multiple parties.

Execution B1-net

Get to know the shared mobility providers | As mentioned in the limitations, priorities were made about which stakeholders to involve in the project. Therefore, insights about the shared mobility service providers were not gathered. They are a big player in the execution of B1-net and therefore it is important to get to know them, their interests and their concerns in order to convince them to join B1-net in the future.

Smartly involve the ministry | The ministry is open and useful to help in the collaboration of B1-net as they are now with the MaaS pilots, see paragraph 7.3.1. However, exactly what role they can play was not detailed. It is a good idea to make use of their assets and have conversations with them.

Business model | Due to the focus and time restrictions of the project, the business model of B1-net has not been a focus. However, new business model plans could make B1-net even more attractive. For example, have traveller subscriptions or work with allowances.

Take inspiration from success stories | B1-net is a collaboration within a complicated environment with both public and private parties who also can be seen as competitors from each other. In this project inspiration was taken from one success story outside the mobility sector, namely MedMij. However, most likely there are more stories in other sectors or in other countries to take and example of to improve B1-net.

Make mobility roundtable triumph | As mentioned before, the collaboration of the high quality public transport network is complex. In this project a start was made with the mobility roundtable to facilitate this collaboration. Some enablers were proposed to create a better chance of succeeding, see paragraph 7.3.2. However, more research needs to be collected to really make the mobility roundtable triumph. Also testing and iterating the roundtable can help with this.

Dutch name | For the purpose of this graduation project, the name B1-net was chosen. However, in reality a Dutch name would be more suitable for the future high quality public transport network collaboration.

Detailing roadmap and roles | During this project the future roles and responsibilities of the different stakeholders are described. However, the tasks of the stakeholders in the roadmap are missing. Those will need to be included in the execution of B1-net.

R-net

From a realistic point of view, there is a low chance of R-net becoming B1-net as proposed in this report. However, there are main recommendations from this project for the organisation of R-net. These are the most important ones:

Customer service | Concluding from all the research with commuters and their needs, customer service of R-net is really missing. Also the supervisor of R-net acknowledged this and the other stakeholders found it desirable. This could be a first good step to really improve R-net and R-net providing certainty to their travellers.

Strengthen collaborations | From the internal analysis it was found that the collaboration with the current stakeholders of R-net has much room for improvement. It is recommended to change to a full-time commitment and step into that facilitator role to stimulate better collaboration. The mobility roundtable is a good foundation for this.

Find future vision | The original future vision for 2028 with the Olympics has been wiped away. A new aligned future vision can stimulate collaboration and motivation to work together towards the same goal and having the same interests. The recommended vision is the future scenario of Jerry to put the traveller at the center.

Traveller at the center | Putting the traveller at the center has been said to be important in multiple meetings of R-net and other stakeholders in the public transport network.. However those words need to be taking into action. Concrete action points to put the traveller at the center are needed, for example by addressing their needs, like facilitating travel time enrichment.

Innovate! - If R-net wants to be seen as a premium brand and quality mark for high quality public transport, they will need to innovate. Now they are becoming outdated. It is recommended to use the innovation roundtable or hire some designers to make innovation happen. A change of mindset is required.

Explain R-net to the traveller - It seems simple, but the traveller needs to know what R-net is in order to make it valuable for them. Update the website and start social media again to communicate this to the traveller. Also an overarching branding strategy is recommended.

Use the proposed standards | At the moment, R-net is in the process of formulating requirements for the upcoming years till 2028. The standards proposed in paragraph 7.1.3 for the certification structure can make these requirements more user-centred and valuable for the traveller.

Monitor requirements | When proposing new requirements, also keeping track of what routes become R-net needs to be monitored. Also enforcing those requirements is important to maintain the credibility of R-net and aligning the stakeholders.

The public transport network in general

The last recommendations are about the future (high quality) public transport network in general.

Consider first and last mile as part of the public transport network for a door-to-door experience | Most of the time, the first and last mile are not considered as a part of the public transport journey. However, for the traveller the first and last mile are important and a part of their complete travel experience. Especially the last-mile is considered a crucial moment as this is most remembered, see peak-end rule in paragraph 2.4.1. It is worth considering for the public transport network providers to collaborate with each other to create this seamless door-to-door experience.

One public transport authority | During the research of this project, multiple stakeholders were talking about changing the whole organisation of public transport. Having only one public transport authority in the Netherlands, or the Randstad, could make the organisation easier. Now the ministry, regional authorities and municipalities / road administrators all make decisions about the public transport network. However, sometimes this results in working against each other and making each other's lives more difficult. One authority, like the Transport for London, can oversee everything and make more general decisions.

Invest in the ecosystem instead of the MaaS pilots | It is worth considering if, just as in MedMij, the mobility sector could benefit from a central ecosystem with an agreement framework in which third parties can join. MedMij has decided to invest in the ecosystem rather than in separate (technological) platforms (Vonk Noordegraaf et al., 2020). This could be the same in the mobility sector to invest in the facilitation of the mobility ecosystem (and mobility roundtable) instead of, or next to, the MaaS pilots.

Coming out stronger after the pandemic | At the moment, the public transport network losing money and scaling down in their services, due to the COVID-19 pandemic. However we need to remember that when the traveller can travel again in public transport, this needs to be facilitated. Also, the traveller will need to be able to trust the safety again and will need to be convinced to use the public transport network again, see paragraph 7.5.2.

8.4 Conclusion

Commuting with the high quality public transport network is the norm.

The final result of this project is a vision and strategy for the high quality public transport network in the Randstad in 2040 in order to make commuting with the high quality public transport the norm.

The future vision and concept show how Jerry commutes to work with a seamless door-to-door travel experience with B1-net. The fulfilment of the fundamental needs of the commuter in 2040 are implemented in the vision and in the end, Jerry can travel with certainty without the need to worry in the high quality public transport network.

B1-net is created on the basis of R-net, which is the current high quality public transport network in the Randstad in the Netherlands. B1-net builds upon the strengths and knowledge of R-net, while dealing with its current weaknesses. In 2040, B1-net will be the facilitator of collaboration in the high quality public transport network with the help of a mobility roundtable structure. B1-net will create certainty to the traveller by being in direct contact with the traveller and using a certification structure.

The organisation strategy of B1-net is created with the help of the analogy of how bees make honey. B1-net needs to prepare, start the process, seal the deal, nurture and expand until in the end the honey is made representing a high quality public transport network collaboration ecosystem.

This vision and strategy can help R-net by inspiring about this vision and create alignment again in their collaboration. With the help of the roundtable structure, overarching decisions can be made about innovation, implementation and communication. These were important elements in the problem definition in the design brief

In the end, the traveller will experience a higher quality public transport network which will attract more/a bigger share of travellers. This is beneficial to reach the societal goals, like CO2 reduction. It is hoped that this project inspires stakeholders about the future, encourage long-term thinking and stimulate discussion. It is relevant to put the traveller at the center and it can inspire in the future developments with, for example, MaaS.

8.5 Reflection

In this reflection, I will look back on my initial personal ambitions found in the graduation proposal, see Appendix A, and other learnings in my graduation.

Personal ambitions

Gain confidence in approaching people to involve in my project | Generally speaking I love working with people, however I am quite nervous about these meetings. Approaching people, especially those who work in a serious environment, is a big obstacle for me to overcome. In this project, I wanted to get this right. And I can proudly say that it was a challenge, but it went really well! I presented my project multiple times in the knowledge sharing sessions of the Lab and managed to speak to many commuters and stakeholders in the public transport network. I even found the right person from R-net who I convinced to become involved in the project.

Facilitation | I wanted to develop my skill in facilitating co-creation sessions. Due to the lockdown, these needed to be held online. I still managed to facilitate two successful co-creation sessions in which I tried some new methods. These learnings I can take with me in the future.

Visual thinking | Only a year before this project, I never made a lot of visuals. However, I got to see the strength of visual thinking during my internship and wanted to hone this skill. Therefore, I tried to make a lot of visuals to help convey the message. I believe my visual thinking skills have become a lot better and I am especially proud of my future scenario of Jerry.

Other learnings

Graduating in lockdown | Almost during the whole time of my graduation, we were in lockdown due to COVID-19. Working from home in the beginning was a struggle, especially having to motivate myself. Living by myself was not an advantage in this. However, I managed to find a good balance: I could go to the faculty two times a week and studied together with friends. Furthermore, I followed a running schedule to keep up with my psychical and mental health.

Mental health | During my whole project I kept saying to myself: “It doesn’t need to be perfect”. However, at some moments, especially near the end, this was difficult to remember. Managing stress and mental health during graduation is, I believe, always a struggle, and in lockdown this is even more challenging. I wanted to be open about how I was feeling with others and I heard a lot of other people struggling. Therefore, I lived by that quote of not being perfect during this graduation and most of the time it helped me.

In conclusion, I learned a lot in this graduation project, even more than I could have imagined. It was quite a hard time, but I also had fun and positive moments and I am proud of what I have achieved. Thank you for reading.

The End

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Appendices

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