

Aalto University - Department of Communications and Networking

ELEC-E7830 Value Network Design for Internet Service

Case: MaaS Global

20 February 2018

Tuomo Kivekäs, tuomo.kivekas@aalto.fi, 476980

Niko Rasi, niko.rasi@aalto.fi, 356673

Yunfei Xue, yunfei.xue@aalto.fi, 663159

Tuomas Isola, tuomas.isola@aalto.fi, 429144

Abstract

This report presents the results of analysing mobility-as-a-service company MaaS Global and their service Whim using three methods. Mobility-as-a-service can be seen as a new solution to tackle increased urbanisation and increased demand for services during the era of digitalization. Mobility-as-a-service combines different methods of transportation into single service.

We used three different methods for the analysis. With scenario planning method, we create scenarios that help understand the possible challenges in the future, and prepare for them. With the Value Network configuration analysis, we show that there are different options for MaaS Global to create value in different scenarios, even if the current model becomes unsuccessful. Finally, with the Business Model Canvas, we create the business strategies for our different scenarios.

We propose MaaS Global options what they can do in certain futures. If constructed scenarios become reality, there is an idea what MaaS Global could do. MaaS Global can use these proposals as guidance.

Table of Contents

Abstract	1
Table of Contents	2
1. Introduction	4
2. Methods	5
2.1. Scenario planning analysis	5
2.2. Value network configuration	7
2.3. Business model canvas	8
3. Case description	10
4. Scope and Timeframe	12
5. Scenario Planning Analysis	13
5.1. Key Trends	13
5.2. Key Uncertainties	14
5.3. Scenario Matrix	16
5.4. Scenario 1 - High Competition	17
5.5. Scenario 2 - One App per TSP	17
6. Value Network Configurations	18
6.1. Current VNC	18
6.2. VNC1 - MaaS Global adding own vehicles	19
6.3. VNC2 - MaaS G being transportation planning provider	20
7. Business Model Canvas	22
7.1. Current Business Model Canvas	22
7.2. BMC1 - MaaS Global adding own vehicles	23
7.3. BMC2 - MaaS G being transportation planning provider	24
8. Conclusions	27
References	29
Feedback for the course	30

1. Introduction

Finland is facing a trend of urbanisation and especially Helsinki area is growing rapidly. Simultaneously, mindset of people is shifting from products towards services, and digitalisation is affecting transportation industry. Smartphones have become common part of most people's lives, providing opportunities for new types of services. One such service, is Whim by MaaS Global.

MaaS Global is the world's first mobility operator with the aim to provide people an alternative to owning a car. They have created the mobile application Whim, that integrates different ways of transport into one service. Users can use the application to plan their trips, and choose the best possible transportation service provider (TSP) or combinations of different TSPs to execute the trips. MaaS Global is enabling a future of easy, sustainable, and efficient mobility, by fulfilling people's everyday travel needs.

In this report we use different methods to analyze different aspects of the company in different scenarios, and attempt to provide insight and solutions to some challenges they are facing. We consider both the business case and the technical details of the service. We start by presenting the methods and models used to explore the case. In chapter three and four, we describe the case in more detail, and discuss about the possible competition in Finnish market. Next, in chapter five, six and seven we go deeper into the case company, and analyse it using 3 different methods and models which are Scenario Planning, value network configuration (VNC) and business model canvas (BMC). In chapter eight we conclude the report and present ideas for further research.

2. Methods

In this work we use three different methods to analyse the case company. Each method has its unique approach and output, but they are used together to gain a complete perspective of the company's challenges, markets, infrastructure, and business strategy. They provide a view of the case company both from the outside and the inside. Scenario planning analysis (Schoemaker, 1995) provides a way to find out and prepare against possible challenges; Value network configuration (Casey et al., 2010) helps to identify different actors and their roles in the value network of the case company; Business model canvas (Osterwalder et al., 2010) assists in aligning the case company's activities by illustrating potential trade-offs. These three methods are thoroughly explained next in top down order.

2.1. Scenario planning analysis

Scenario planning analysis is a tool for strategic thinking. It provides a limited amount of possible states, that each tell how various elements might interact under certain conditions. Scenarios are created based on key uncertainties, in the chosen scope and time frame. The method is meant to capture the range of possibilities that would otherwise be ignored, and organize them in a way that is easy to understand. (Schoemaker, 1995).

Scenario planning analysis consists of three steps. The first step is to define the time frame, scope, and decision variables, that will be used for the analysis. Also, the major stakeholders should be identified in this step.

In the second step, the key trends and uncertainties are identified. Key trends are important forces whose consequences have not yet unfolded, and key uncertainties are important forces whose outcomes aren't very predictable. These are identified by evaluating the topic from four perspectives: political, economical, social, and technological, using the PEST framework.

The third step is the scenario construction. In this step, two most important key uncertainties are selected, and a scenario matrix is created with them as shown in figure 1. The chosen key uncertainties create the two axes of the matrix, and the scenarios develop on the four areas divided by the axes.

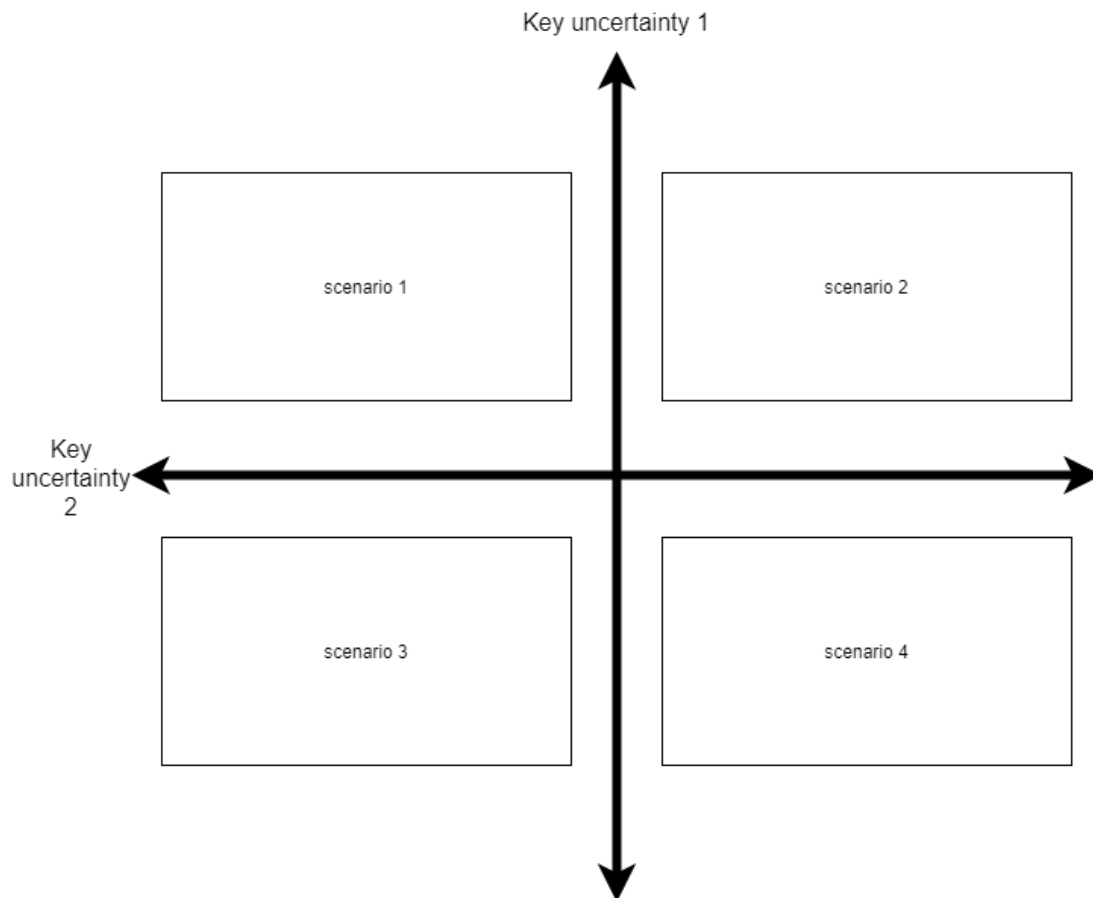


Figure 1. The scenario matrix

The resulting scenarios can be used to make individual decisions. The most beneficial use of them is in strategic planning and vision building. The technique can be used in any situation in which a decision maker wants to imagine development of the future. However, the results of this method are not predictions of the future but means to vision what the future might bring. (Schoemaker, 1995)

2.2. Value network configuration

To explain the method of value network configuration (VNC), the concepts of value and value network should be briefly explained first. Value is the trade-off between benefits and sacrifices. Profit for instance is an example of value, and it is the trade-off between revenue and cost. Value network on the other hand, is a network of actors that interact with each other to create value for the entire network. The value creation happens through exchange between the different actors.

The VNC method is for visualizing and optimizing value networks, and understanding the value creation of assets in the whole system. A value network consists of technical components and their business roles related to the system, that are linked through technical interfaces. Different actors in the value network are in possession of these different roles, and are connected through business interfaces. Figure 2 shows a building block of a VNC, and how the interfaces are connected. (Casey et. al., 2010)

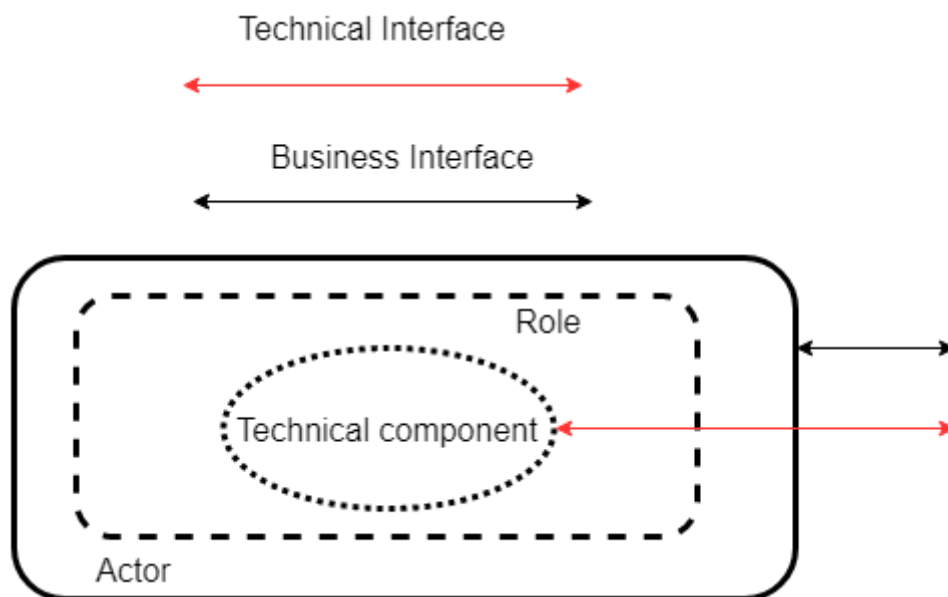


Figure 2. VNC building block

The process of building the VNC consists of six design steps. It starts with listing the existing actor types that are relevant to the case. Next step is to draft the technical architecture of the case, first in free format. On the third step, the VNC technical

architecture is created using technical components, and linking them with technical interfaces. After the VNC technical architecture is done, the key protocol names are added to technical interfaces in the fourth step. The fifth step is about adding business roles for technical components. Usually there is one business role for each technical component, and the role surrounds component as shown in figure 2. In the sixth and final step, the different VNCs are created by using different actors for different business roles (one or more). Different VNCs can be created for example, using the scenarios developed through the scenario planning analysis. Figure 3 presents a general VNC for wireless local access provisioning by Casey et. al. (2010).

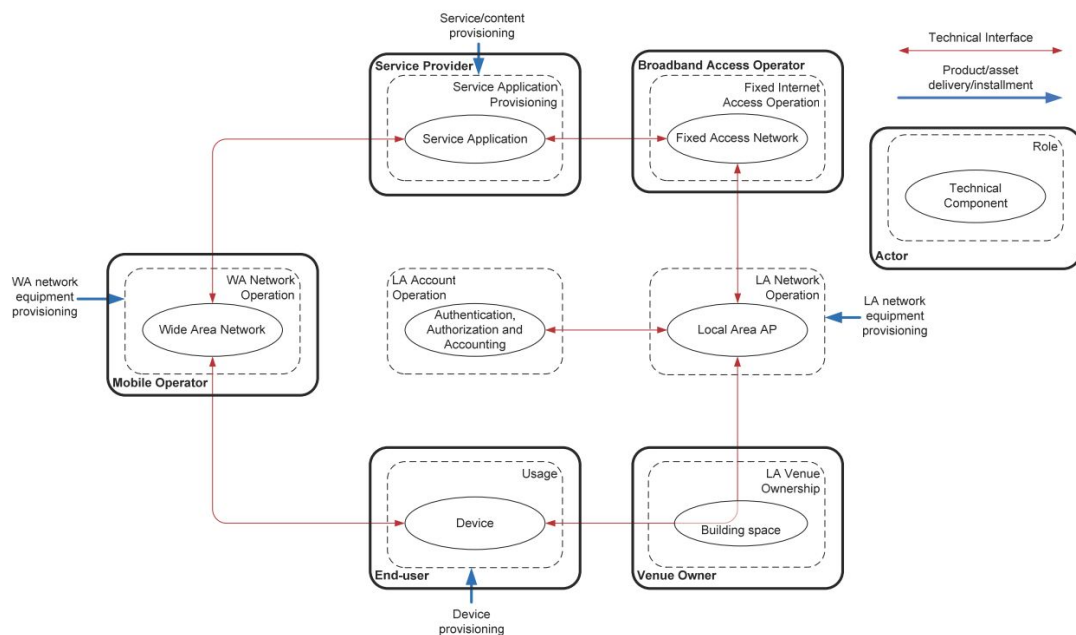


Figure 3. general VNC for wireless local access provisioning (Casey et. al. 2010).

2.3. Business model canvas

Business model canvas (BMC) is a tool for developing new or documenting existing business models. It is a visual chart with nine building blocks that show the logic of a company's plan to make money. These building blocks include the four main areas of business, that are customers, infrastructure, offer, and financial viability. The BMC is basis for the strategy that is implemented for the business. (Osterwalder et al., 2010)

Figure 4 presents the basic BMC template. It consists of the nine building blocks that are logically organized in different sizes of areas. The different building blocks in the filling order are customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships, and cost structure. Each of these blocks are filled with the information of the case company's business model.

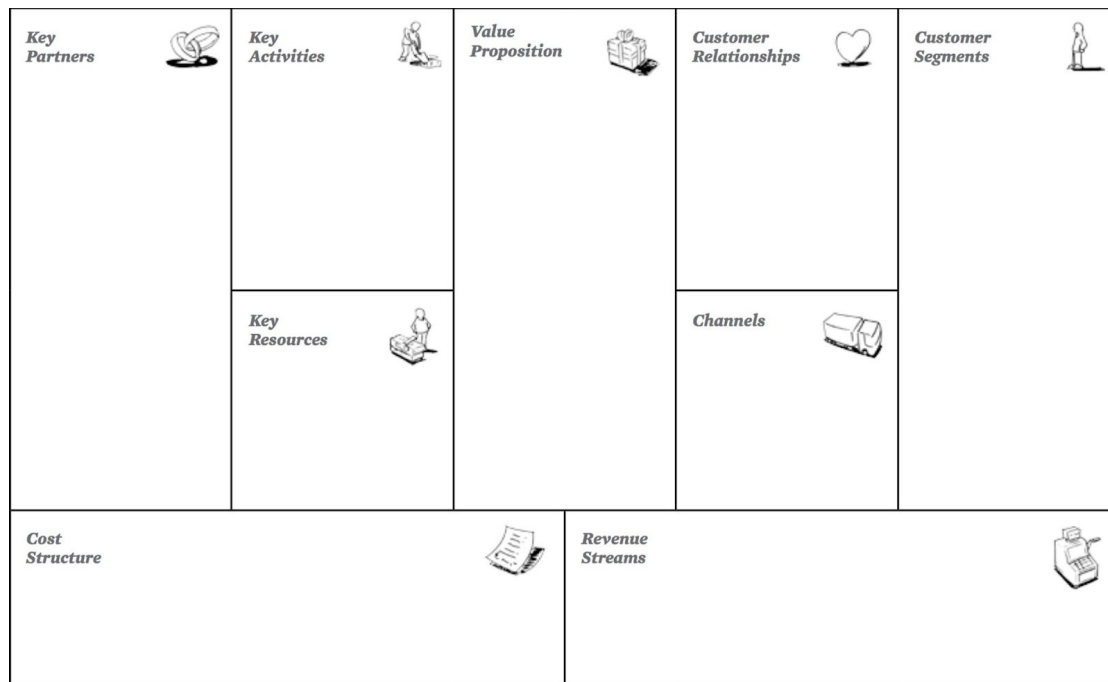


Figure 4. Business model canvas (Osterwalder et al., 2010)

After the blocks are filled, it should be checked that there is linkage between the different propositions of the blocks. For instance, customer segments should link with value propositions and revenue streams; and key activities should link with key resources, key partners and key costs. If a link missing from something, it might mean that the business plan is not complete.

As with the VNCs and scenarios, BMCs are also connected with the other methods. Different BMCs can be created for different scenarios and different VNCs. This will help in developing a business strategy for different use cases and preparing against challenges that might come forth in the future.

3. Case description

In this work we look at a Finnish company called MaaS Global and its mobility-as-a-service (MaaS) solution Whim. MaaS Global is a startup and the world's first mobility operator. They believe it's time for transport to get smarter and move on, and they are trying to create the biggest change in transport for a while. (Maas Global, 2018).

Whim is a platform connecting users with different transportation services. It provides integrated transportation solution via trip planning, booking and payment. Depending on the subscription, it offers different pricing and different transportation opportunities for the users. Currently there are three available subscription models: Whim to go, no commitments and pay per ride; Whim Urban, 49€ per month with flexible use of cars and taxis occasionally; and Whim Unlimited, 499€ per month with unlimited use of transportation services according to daily needs (alternative for owning a car). (Whim, 2018).

User has two ways to book the trip. User can first type the location and from there select the method of transportation. Another option is to first select the method and then the destination. Once the user has booked a trip, the ticket is stored in the app. It can also be used to find the locations of car rental services.

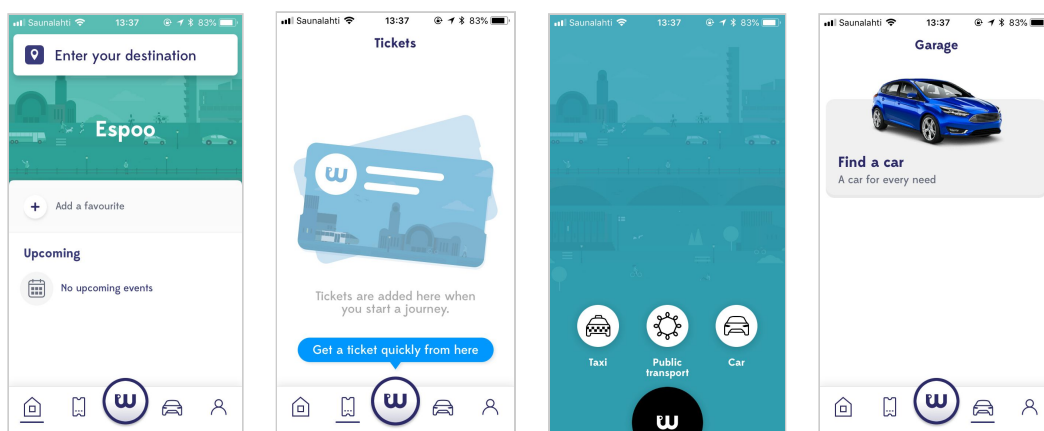


Figure 5. Screenshots of Whim application

MaaS Global is currently the only company that is providing mobility-as-a-service in the Finnish market. There are no matching value propositions. The competition comes from different parts of the market. Whim is a platform business, and it is highly dependent on indirect network effects. Because of that, the competition for MaaS Global comes from the transportation service providers (TSPs) and the users. If the TSPs are not willing to join the Whim-platform, it lowers the value of the service for the users, and vice versa, if the users are not willing to use the platform, it lowers the value of the service for the TSPs.

4. Scope and Timeframe

For this analysis, we have set the scope to be Helsinki region area and timeframe to seven (7) years. We define Helsinki region as cities of Helsinki, Espoo, Vantaa and Kauniainen. We selected this area due to three factors. First, this is the area MaaS Global is operating (they also have operations in West Midlands, UK). Second, Helsinki area is currently facing big growth and thus interesting target for this kind of analysis. Third, we as a group live in this area and are used to move around the area.

Timeframe is set to be seven years. Transportation industry is facing big changes as autonomous vehicles become common, but we believe that such change won't happen in next seven years. We want to focus to the time before that change in transportation industry and have therefore selected the timeframe of seven years.

5. Scenario Planning Analysis

In this chapter, we will present the results of scenario planning. First, we present key trends and uncertainties for the business environment MaaS Global is focusing at. Then, we will present scenario matrix based on two key uncertainties and take a further look at two of the four scenarios. These two scenarios are further analysed using Value Network Configurations and Business Model Canvas.

5.1. Key Trends

Trends considered important in this case are:

T1. Urbanization increases

People moving from countryside to cities will increase. Helsinki and its surrounding are among cities with highest forecasted percentage growth. (Statistics Finland, 2013)

T2. Aging of population

Finland is currently facing a problem of aging population. (Statistics Finland, 2013)

T3. Awareness for privacy increases

Awareness for privacy has been on the rise. For example, passing of EU data protection directive and recent Facebook scandal can be seen as proofs for the rise.

T4. Cities are budget limited

Cities and municipalities are financed with tax money. The amount of money that can be used for transportation will thus continue being budget limited.

T7. Mindset shift from products to services

The importance of services compared to products has been on the rise. More and more consumers are looking to use something instead of owning it.

T8. Amount of electric and hybrid vehicles increases

The number of electric vehicles has been on the rise in Finland (Trafi, 2018). We expect this to continue and hybrid vehicles being an important middle step in a process of electrifying transportation.

T9. IoT Solutions increases

IoT has been a buzzword lately and it is expected that in our timeframe IoT solutions will become common.

T10. Environmental thinking rises

As global warming continues, more and more people are concerning the environmental impacts of their decisions.

5.2. Key Uncertainties

U1. Cooperativeness of TSPs

MaaS is heavily based on co-operation with TSPs. If TSPs are not willing to join MaaS, there is no way to establish MaaS.

U2. Structure of the market

Are there multiple players on the market that people choose from or use them to complete each other, or is there a dominance on the market? The amount of players and the power each player has on the market, affects the way MaaS should be implemented.

U3. Car ownership level

MaaS can be an alternative to owning a car. Attractiveness of MaaS is affected by car ownership level. In the other hand, car ownership level is affected by quality and usefulness of other options, for example MaaS.

U4. Environmental oriented political decision making

MaaS has lot to offer from the environmental perspective. Will there be regulation that guides consumers to environmentally better choices is a question that affects both the attractiveness of MaaS and the way MaaS should be implemented.

U5. Urban oriented political decision making

Will there be political decisions that accelerates the rate of urbanisation? Will tax money be targeted more towards cities or rural areas?

U6. Aged populations willingness to use MaaS

Are older people willing to try something new? Are they willing to use something that is heavily relying on a smartphone?

U7. Social acceptance of car sharing

For many people, car is a status symbol. Will it continue to be so, or will car sharing service become socially acceptable for the big crowds?

U8. Impacts of electric vehicles

Will electric vehicles change the way cars are used? Will cars become a lot cheaper or more expensive? There are still many questions about what will happen as electric vehicles will become more common.

U9. Smartphone as a dominant hub

Smartphone has been a dominant digital hub of our lives for only a short period in time. It might change as quickly as it started.

U10. Synergies between private and public sector

How well does private sector complement the weak spots of public sector in transportation?

5.3. Scenario Matrix

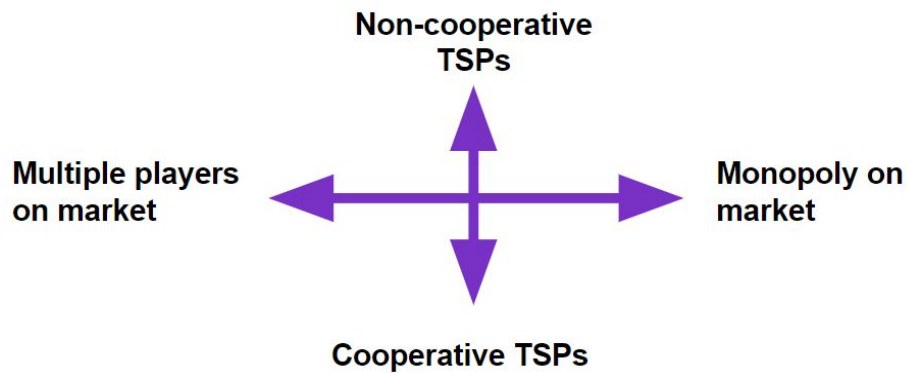


Figure 6. Scenario axes

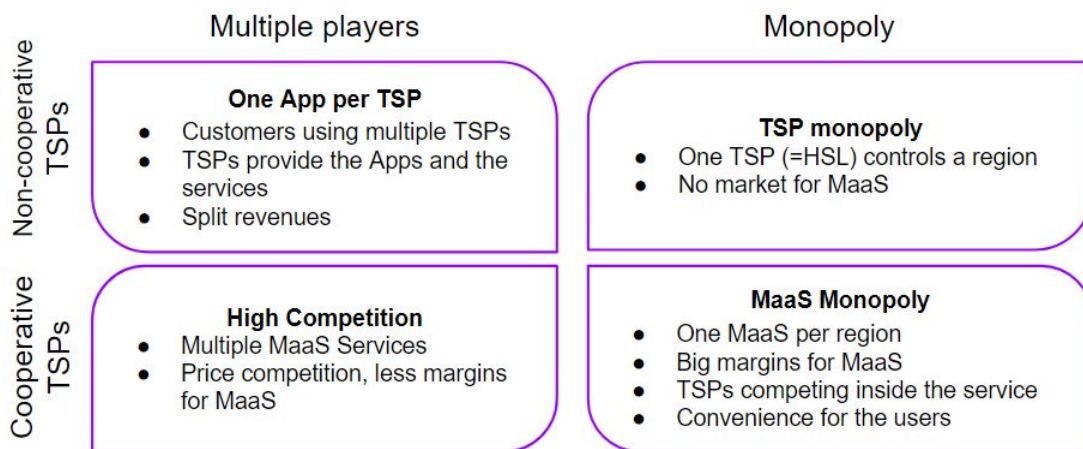


Figure 7. Scenario matrix

Scenario axes (Figure 6) are based on uncertainties U1 and U2. From scenario matrix (Figure 7), we selected two scenarios for further analysis: **One App per TSP** and **High Competition**.

5.4. Scenario 1 - High Competition

In the **High Competition** scenario TSPs are willing to cooperate with MaaS service providers and there are multiple MaaS service providers. Playing in such a highly-competitive market, it is bound to have price competition and less margins for MaaS Global. MaaS Global need to stand out from other MaaS service providers in order to compete with them and make profit. Our proposed solution is a **differentiation through adding own vehicles** for MaaS Global. MaaS Global can think about offering unique, exclusive service to distinguish itself from other MaaS companies and gain customers.

5.5. Scenario 2 - One App per TSP

In the **One app per TSP** scenario it becomes really difficult to make profit as a MaaS company. As the TSPs are not willing to open their platforms for other players, it is impossible to create a Whim like service. Our proposed solution is a **data-analysis driven transportation planning service** for B2B market. MaaS Global can utilize its unique expertise in analytics and research in order to create value for the TSPs that they are incapable or unwilling to create themselves.

6. Value Network Configurations

In this chapter, three value network configurations are presented: the current situation, MaaS Global adding own vehicles and MaaS Global being transportation planning provider.

6.1. Current VNC

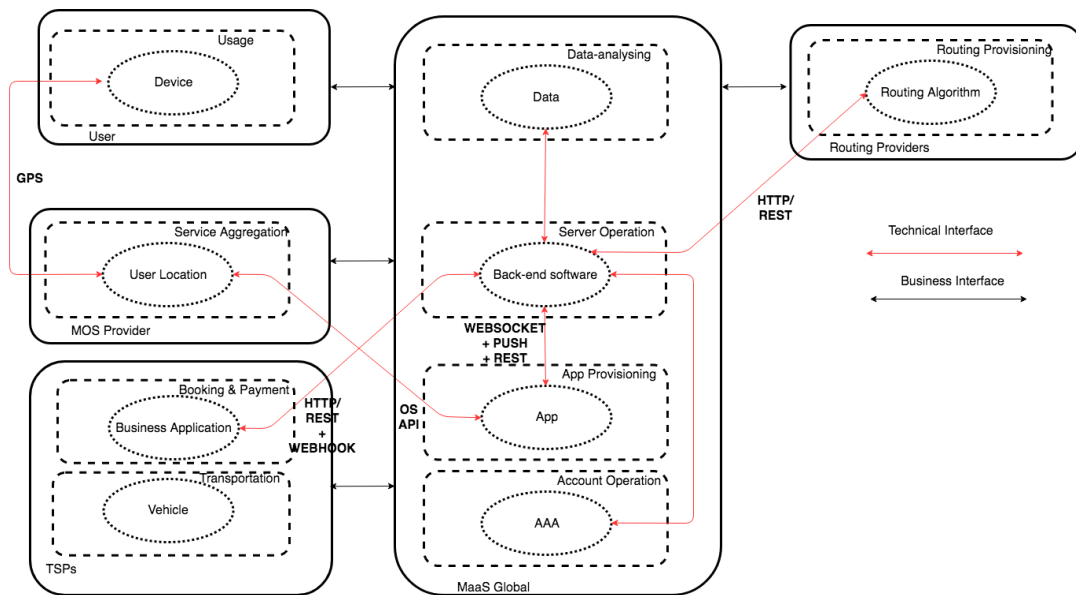


Figure 8. VNC of the current situation

The first VNC represents the current situation. The current situation is presented in figure 8. MaaS Global is in the middle. The business roles of MaaS Global are data-analysing, server operation, app provisioning and account operation. MaaS Global has their own back-end software, which connected to App with Websocket, Push and/or REST. MaaS Global is doing data-analysing to the data their back-end server has gathered and they are also doing the authentication, authorization and accounting operations.

The app is connected to mobile operating system via OS API. The mobile operating system is provided by mobile operating system provider and the technical component

needed for MaaS Global is the user location. The user location is formed by the user device using GPS.

MaaS Global's back-end is connected via HTTP/REST to TSPs business application for booking and payment. TSP is also handling the transportation with its vehicles. MaaS Global works with multiple TSPs, but to increase clarity, only one is drawn here. MaaS Global's back-end is also connected to routing providers routing algorithm via HTTP/REST.

In current situation, there are four types business interfaces, in all of which MaaS Global is the other party. First, there is one to the user, as user needs to pay for the service. Second one is to TSP as MaaS Global has deals with TSPs they work with. Third is the business interface to MOS provider, as they have a power to take the app out of their app stores. The last interface is for the right to use the routing algorithm.

6.2. VNC1 - MaaS Global adding own vehicles

As indicated by the title, the solution we put forward to deal with the High Competition situation is **adding own vehicles**. Thus, as is shown in the purple circle in the figure 9, the value network configuration is exactly the same as before but adding vehicles as new technical component to the actor MaaS Global and the business role of it is transportation.

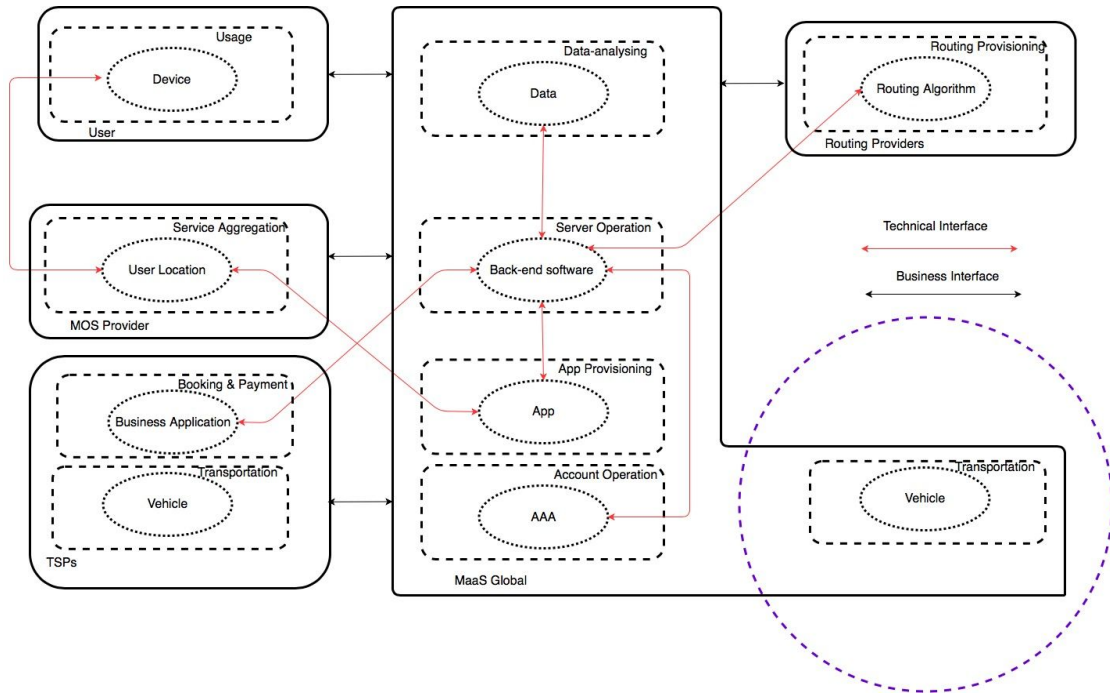


Figure 9. VNC of adding own vehicles

The vehicles can be for example car, ferry, or helicopter etc. which offer the user with high-quality, exclusive or even luxury user experience. The significance of adding own vehicles lies in its adding-on value to the customer. The value that they can obtain only by subscribing with MaaS Global, not other MaaS companies.

6.3. VNC2 - MaaS G being transportation planning provider

Our solution is to offer a **Data-analysis driven unified transportation planning solution** as presented in the figure 10.

Maas Global is in the upper right corner of the VNC. The most important change in this configuration is that MaaS Global does not have a direct business relationship with the end user.

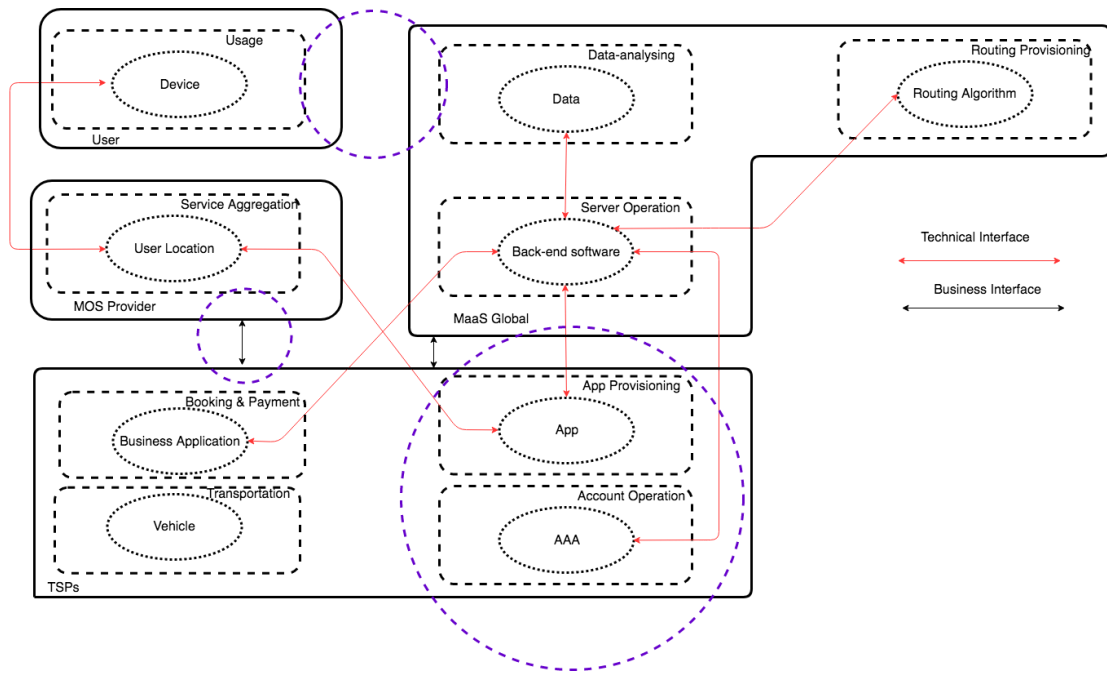


Figure 10. Data-analysis driven VNC

Instead Maas Global is utilizing its expertise in data analysis and research by offering the TSPs transportation planning. TSP utilizes the Maas Global API in their app. Maas Global collects data and offers the TSPs an access to their custom routing algorithm.

7. Business Model Canvas

In this chapter, three business model canvases are presented: the current situation, MaaS Global adding own vehicles and MaaS Global being transportation planning provider.

7.1. Current Business Model Canvas

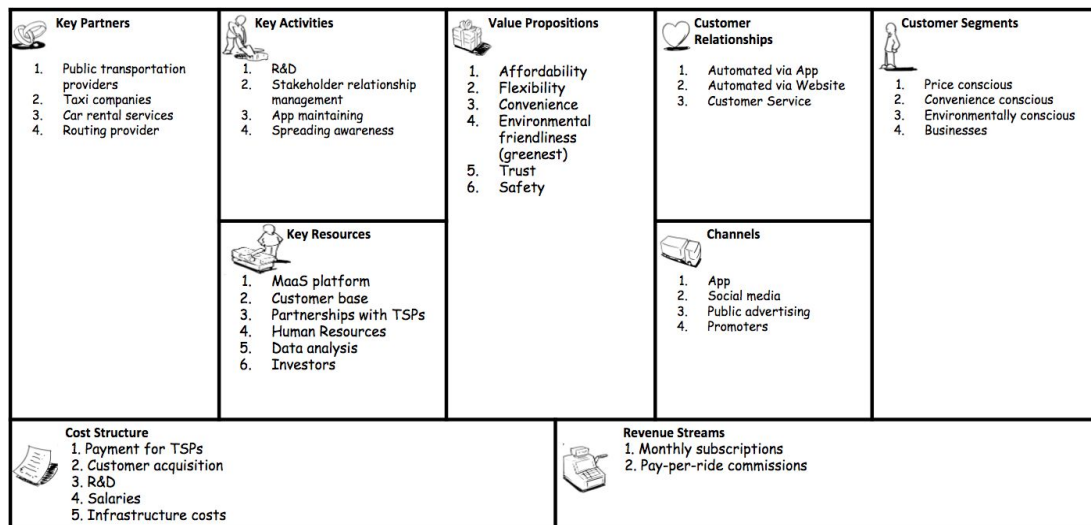


Figure 11. Current BMC

Business model canvas of the current situation is presented in figure 11. Clear connections between different segments of the canvas can be found. Value proposition of affordability is for the price conscious customers. Flexibility is for the convenience conscious customers and environmental friendliness is environmentally conscious customers. For business customers flexibility, affordability and trust are most important value propositions. The value proposition of safety is targeted for all customers.

Key activities can also be connected with value propositions. R&D is currently focusing on increasing convenience and flexibility. Stakeholder relationship

management is done for the sake of affordability, convenience, trust and safety. App maintaining targets convenience and flexibility. Spreading awareness is about promoting all value propositions.

Activities and costs are also be linked. Spreading awareness causes customer acquisition costs. R&D has its own costs. App maintaining and spreading awareness requires workforce leading to salary costs.

7.2. BMC1 - MaaS Global adding own vehicles

Business model canvas of the solution 1 **MaaS Global adding own vehicles** to deal with scenario 1 is presented in Figure 12.

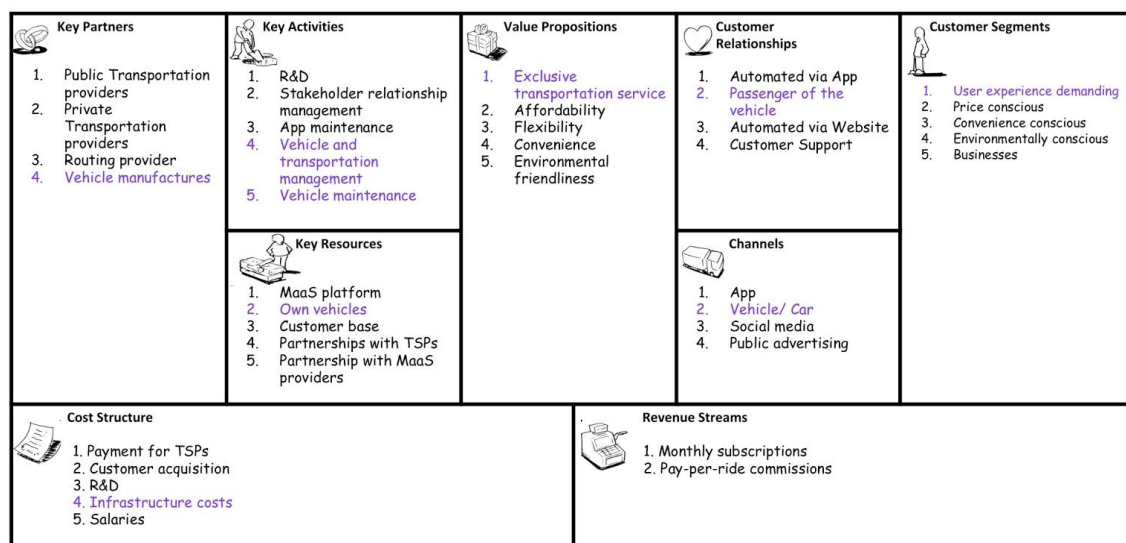


Figure 12. BMC of MaaS Global adding own vehicles

Playing in such a highly-competitive market, the point to stand out from other MaaS service providers is to capture user experience demanding user and offer unique, exclusive service to serve their needs. Thus, in this scenario, the user experience demanding customer segments are put at the 1st place showing the importance. Accordingly, the most important value propositions is exclusive transportation service now. As the business model of MaaS service keeps still, the revenue streams stays the

same. In this scenario, the value propositions (especially exclusive transportation service) are driven by customer segments (especially the user experience demanding users) through the revenue streams.

By adding own vehicles, the vehicle itself becomes one of the channels between the company and customer. Their relationship is like this, MaaS Global serves as the vehicle provider and customer are the passengers of the vehicle. As the main business of MaaS Global isn't change, we put the adding-on vehicle on the second place according to the importance.

For the company's operating part, own vehicles become one of the key resources, vehicle manufactures might become one of the key partners and thus vehicle and transportation management and vehicle maintenance become one of the key activities. MaaS Global might either handle these activities by themselves or outsource these to other companies which will still lead to some internal activities of the company.

Another point is the cost structure, as the company is owning vehicles, infrastructure costs for example for vehicle and transportation management and vehicle maintenance become one important part of the cost.

7.3. BMC2 - MaaS G being transportation planning provider

Business model canvas of the solution 2 is presented in Figure 13.

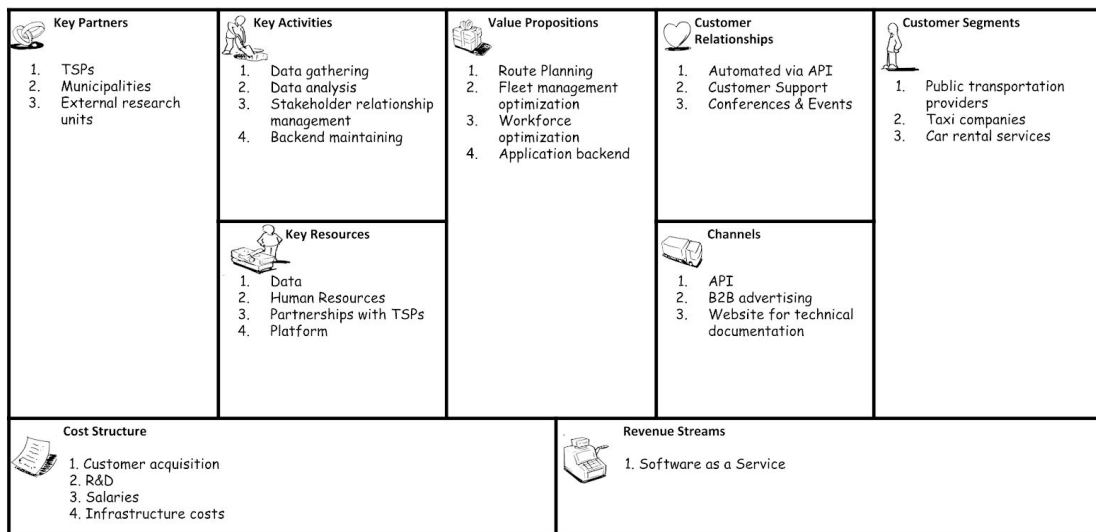


Figure 13. MaaS Global being transportation planning provider

The business model of Maas Global is now B2B as seen in the Customer Segments. The revenues come from a Software as a Service model. This is an attractive proposition even for smaller TSPs as no upfront investment or a long commitment is needed.

The value proposition is extensive. Maas Global serve does not only offer the route planning needed for the app of TSP but workforce optimization and fleet management through demand forecasting and customer behavior analytics. The service is based on data analysis and research based proprietary algorithms, therefore the business is very scalable.

The most important resources is data. When offering a service for multiple TSPs can Maas Global gather large sets of data about vehicles, traffic and customer behavior. As the number of TSPs in the service increases the amount of data used for the analysis increases. The more there is data the more accurate is the service. When handling data about users Maas Global needs to take laws and regulations into account.

Human resources are also very important for the service. Maas Global is already employing some top experts in transportation research. The importance of research and knowledge base becomes even more significant in this solution. Partnering with municipalities and external research units is an effective way to grow the knowledge base of the company.

8. Conclusions

In this report we analyzed the Whim service from company MaaS Global. With this service, MaaS Global aims to provide its customers an integrated transportation solution, that handles everything needed for efficient and easy transportation. Whim is a platform service that is built on the existing transportation infrastructure with various different possibilities of transport for the users.

Altogether the trends seem to support a Whim like service. MaaS Global needs to pay attention to large data driven companies like Google that has the potential to develop same type of service with a very competitive pricing as their business model is based on advertising. MaaS Global can find a competitive advantage through research and specialization as proposed in section 7.3.

Another threat for MaaS Global are the TSPs willingness to sacrifice the direct customer relationship. In entertainment companies like Netflix have moved from only offering content of another companies to making their own programming. Same kind of development in transportation would prevent the comprehensive Mobility as a Service implementations and force MaaS Global to business model as presented in section 7.2.

For Scenario Planning, we generated scenario matrix based on two uncertainties **Cooperativeness of TSPs** and **Structure of the market**. Then we selected two scenarios for further analysis: **One App per TSP** and **High Competition**. We explored the possible futures of mobility-as-a-service in Helsinki area, identified potential challenges and proposed solutions for MaaS Global.

For Value Network Configurations, we presented three value network configuration: one for current situation, one for **adding own vehicles** and one for **data-analysis driven transportation planning service**. The amount of changes required to move

from current situation in to either of the proposed ones is quite small. Small changes in configurations can have big impacts to the company.

For Business Model Canvas, we started by presenting current business model canvas and then presented canvases for our solutions. The BMC's show that with approximately the same key resources, it is possible to do different kinds of operations by implementing different activities.

For future research, the effects of EU Data Protection directive to proposed **data-analysis driven transportation planning service** should be studied. There might be some restrictions that affects the feasibility of such service.

References

- Statistics Finland, 2013. *Population projection 2012 – 2040*. [internet] Available at: http://www.stat.fi/tup/julkaisut/tiedostot/julkaisuluettelo/yvrm_vaenn_2012-2040_2013_9843_net_p2.pdf [Accessed 14 April 2018].
- Finnish Transportation Safety Agency Trafi, 2018. *Lk-ajoneuvojen käyttövoima tilastot*. [internet] Available at: https://www.trafi.fi/tietopalvelut/tilastot/tieliikenne/ajoneuvokanta/ajoneuvokannan_kayttovoimatilastot/sahkokayttoiset_autot [Accessed 16 April 2018].
- Schoemaker, P. J. (1995). Scenario planning: a tool for strategic thinking. *Sloan management review*, 36(2), 25.
- Casey, T., Smura, T., & Sorri, A. (2010, June). Value Network Configurations in wireless local area access. In *Telecommunications Internet and Media Techno Economics (CTTE), 2010 9th Conference on* (pp. 1-9). IEEE.
- Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: a handbook for visionaries, game changers, and challengers*. John Wiley & Sons.
- MaaS Global, 2018. [internet] Available at: <https://maas.global/> [Accessed 19 April 2018].
- Whim, 2018. [internet] Available at: <https://whimapp.com/> [Accessed 19 April 2018].

Feedback for the course

The workload of the course was suitable for the amount of credits. Workload was quite evenly distributed which helped personal scheduling. The time window between method (BMC, VNC etc.) lecture and the deadline of corresponding presentation could be increased. This would help with the sponsor meetings and personal scheduling.

The four hour tuesday lectures are very long and it was easy to see that many students could not anymore concentrate to the last presentations. Also early morning theory lectures are never optimal. Otherwise the lectures were very good.

The methods were extremely interesting. It was very interesting to see how the case opened up in a new way when approached from a systematic angle. Some of the methods require a quite a bit of creativity though. It would be interesting if some tools for this could be offered. Engineering students does not always have that much creative confidence.

The best part of the course were the discussions after the presentations. Even though they made the sessions really long and sometimes offered very little to the ones not presenting. The discussions gave the students a possibility to ask about the methodology and challenge the teachers approach. It was very refreshing that the teachers encouraged this type of learning.