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Master's Degree in Management

DOUBLE DEGREE PROGRAM IN INNOVATION

"ANALYSIS OF INTER-ORGANIZATIONAL DYNAMICS IN MOBILITY AS A SERVICE NETWORKS."

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ABSTRACT

In transport and mobility industries, in recent years, there have been numerous innovations that have certainly had a major impact on the lives of citizens and their habits. The advent of new technologies and the importance of staying connected especially when travelling have opened the door to numerous innovations that are changing the concept of mobility inside and outside urban centers. Mobility as a Service is one such innovations, giving companies an opportunity to integrate and create a totally new, flexible and efficient mobility service. For the consumer this translates into a free choice of means or ways to travel through the use of a digital platform, all respecting his/her personal needs and preferences.

This issue has aroused enormous interest especially in the Scandinavian countries, so much so that the first organizations dedicated to MaaS were born in Sweden and Finland. In collaboration with the consulting company "First to Know" based in Gothenburg, the author was able to learn more about this topic, using the company network and experience to get more in-depth information and thus to start looking for ideas and perspectives on which to base his thesis work.

The analysis of Mobility as a Service fell back into its organizational scheme and how it works. Since this service is guaranteed by the collaboration between different companies, what is being created is a real network where different realities, even those not directly belonging to the mobility sphere, try to integrate to provide the end customer a new mobility experience. The importance of the dynamics, usually found in networks, has given rise to an analysis based on an understanding of them in order to know better how they affect the effective implementation of MaaS in Sweden.

The end result is that there are usually dynamics that occur in MaaS networks and that are more or less recognized by the companies that are part of them. These include organisational dynamics, roles, objectives or external factors and regulations. All this leads to understand the importance of a well-defined strategy for the MaaS provider, which must be translated into a well-defined business model designed to cope with these changes and to seize opportunities by reducing risks and errors during this path.

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Göteborg, 06/06/2020 *Enrico Giuseppe Bonito*

To Mom and Dad,
this thesis belongs to you as it
belongs to me;

To Assunta and Antonio;

To Irene,
with love.
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I. INTRODUCTION

1.1. Project Out line

This thesis project is the result of the interaction between the author and First to Know's owner and founder Per Östling. First to Know is a consultancy company based in Gothenburg that is involved in many projects related to the *Göteborg 2035* objectives. The working style of this organization includes different meetings and workshops with the University of Gothenburg business school regarding different themes, more or less linked with smart cities, innovation and sustainability. In one of these occasions the author met this company and started to discuss about potential arguments that could be analysed in this master thesis project, considering the major studied: Innovation and Industrial Management.

The first researches related to the topic started thanks to information given by Per Östling regarding innovation in mobility, given the importance of this argument related to *Göteborg 2035* vision. This, in fact, is regarding the implementation of some innovative solutions involving different aspects of the social activities in the urban area. There are different fields touched by this perspective, starting from real estate and arriving to mobility and transports.

Mobility as a Service in this direction was representing the perfect match between research and reality, given the scarce literature based on it and the actual implementation of this innovation in Sweden. The network of First to Know helped the author to have some preliminary information and data regarding the topic chosen, thanks to some meetings in *the 360 Hub* (an innovation hub owned by FTK). In one of these there was the interview with UbiGo, that is a start-up operating in the MaaS context and providing it in different cities in Sweden, included Gothenburg.

Starting from these premises the author has built the interview network, composed by different companies' figures involved in MaaS, and has started the research work to prove the importance of the interorganizational dynamics on the effective implementation of mobility as a service in Sweden and in Gothenburg.

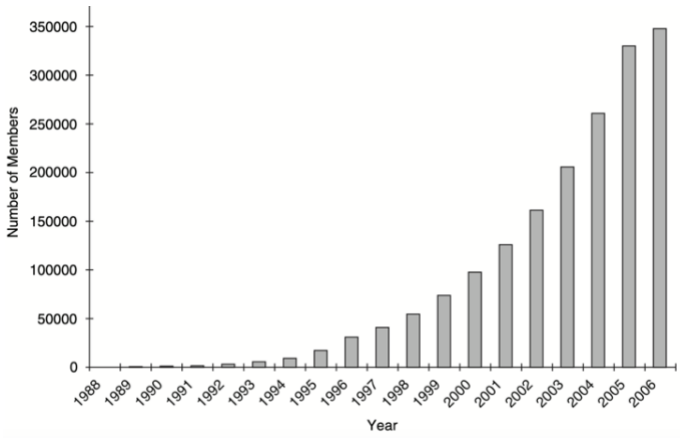
1.2. General Background

In a world that is continuously changing, different industries are facing innovative thrusts to adapt to new contexts, mutating the environment where they are operating and also affecting the habits of the customers. In the mobility sector there are different factors that have to be considered at the bottom of the innovation processes, sustainability surely is very relevant nowadays, but also technological factors or societal ones. Innovations are going to revolutionize the way people are moving in urban areas, affecting directly the customer's life. During the ages mobility has changed many times: for example in 19th century, there is the

advent of the industrial age with the main usage of trains as principal mobility vehicle; going to the 20th century with the arrival of the car that has made easier the way how the people move, starting the era of the owned-mobility; finally, the 21st century is representing the digital age, innovations are not just related to mobility vehicles (electric cars, autonomous drive), but also to connectivity between different users and different way to move inside or outside the city. (Deloitte, 2017)

In this way new business opportunities arose, trying to go beyond the traditional concept of owning a car, giving a flexible mobility service to the customer to meet its new needs. It's also worth considering that the needs of the customer are continuously changing, the lifestyle of a person in our age is completely different from a lifestyle of a person that lived 20 years ago. People now are connected, fast-moving and usually living in urban areas. This last aspect is representing a relevant social input to mobility's innovation, giving a completely new focus on customer's preferences. The growth of car sharing during the years is perfectly demonstrating this concept. (Shaheen, S.A. et al.) (Figure 1)

Figure 1: Growth of car-sharing worldwide



Source: *Shaheen, S. A., & Cohen, A. P. (2007). "Growth in worldwide carsharing: An international comparison".*

So, the basic concept in mobility is completely changed, it's not just to provide a service, but it's an important change on people habits regarding mobility, that has to be efficient, convenient and flexible. That's why the concept of *Mobility as a Service* (MaaS) has been developed during the years, because it's a perfect combination of different mobility providers to give to the customer a final service that will satisfy its needs. The complexity of the service leads to focus first on the situation of urban areas and on the awareness of the customers then on the different technological factors that are important to provide the service and to create the platform (app) to do it, at the end the focus has to be on mobility providers, public or private, and so on the automotive sector with its innovations. (Deloitte, 2017).

Finally, the sustainable impact of MaaS has represented a relevant point of strength of this innovation, matching perfectly with the directives of the countries involved about CO2 reduction related to mobility and transports, above all can be mentioned the Swedish case that is representing one of the leader's nations in the implementation and on the development of this phenomenon.

1.3. Research Objectives

The objective of this thesis is to analyze the inter-organizational dynamics that usually happen in MaaS networks and to understand if they are influencing the effectively implementation of Mobility as a Service in Sweden. The main goal will be to study the effectiveness of these dynamics, described in literature, in a real network as the MaaS one. The importance of this perspective is given by the numerous difficulties that a network could find internally and externally relative to its functioning and regarding different aspects of its working life (Majchrzak et al., 2015)

This research objective passes through different sub-objectives that help to arrive to the final answer and solution to the research question. First of all, is interesting to understand which are the more frequent inter-organizational dynamics that usually happen in this network. After reviewing the information achieved by literature, there have been identified roles, goals and structure as the main dynamics in network functioning. This analysis won't mean only to describe which of these are more frequent, but also to understand the reasons behind them, having so a complete understanding of MaaS organization and functioning. Secondly, there will be an analysis of the effects of these dynamics on the network and so on if these are representing a problem in a view of MaaS effective implementation. Lastly, the research will focus on the perceptions of the actors involved in this service, to understand different opinions about MaaS and if, for them, the entire business model chosen appears appropriate or not to be effectively applied in the real society.

In conclusion, due to the particular situation in which the entire world is living, there will be an analysis of the potential effects of Covid-19 pandemic outbreak on Mobility as a Service network, that could be affected or not by the restrictions and by the changes in customer needs, influencing also the real goals of the MaaS organizations. This is aa current topic and it is difficult to find actually a proper literature background, but it could be identified as an external factor that could represent a source of dynamics in the network, following the Majchrzak et al. (2015) analysis information. The approach of the author will be completely dedicated to the analysis and comprehension of the interviews, trying to contribute in a small way to the understanding of a completely undiscovered situation and to define the effect of this on MaaS network in terms of dynamics and implementation.

1.4. Research Question

The research question is important for the entire process of the thesis and for the development of the work. A well-formulated RQ is contributing actively to organize in a proper way the research work, to choose properly the literature, to conduct effective interviews without losing a clear direction dictated by the goals of the thesis.

The research question has to be able to include, in the answers that will be provided by this thesis, all the information regarding the topic chosen, providing an exhaustive outline that is important to consolidate the validity of the entire project. (Bryman and Bell, 2011)

The finding process of the research question has passed through a scrupulous analysis of the literature relative to the argument, combined with numerous meetings with First to Know to understand how that knowledge could be improved practically. The result of this route is a well-defined RQ that will provide a clear direction also to the entire thesis process.

The research question identified is:

How are inter-organizational dynamics in Mobility as a Service networks affecting their effective implementation?

The analysis that follows will be based on the comprehension of the common dynamics present in MaaS networks and their effects on the functioning of the network itself. The study will start defining the common dynamics present in Mobility as a Service networks and trying to understand if these dynamics are affecting the implementation of MaaS or if there are other aspects that have to be included, considering the difficulties that MaaS projects are facing in their effective implementation phase. To help the author answering effectively and completely the main RQ, other sub-research questions could be identified:

1) How can Mobility as a Service be defined?
This question is useful to understand properly what Mobility as a Service is, considering the scarce literature on this argument and the absence of a unique definition of it. The analysis phase has to start with this section also to give the reader preliminary information that could be useful later to understand the reasons behind some choices of organizations involved in MaaS that usually are a source of dynamics. Understanding the principles behind MaaS concept and definition there will be a clearer vision of the reasons behind the strategies and the choices of companies involved in this mobility projects.

2) How appropriate are the business models of MaaS providers for the effective implementation of this mobility innovation?
This question will help the author on understanding in a better way the difficulties related on the implementation of Mobility as a Service. Before arriving to network analysis, it is important to study if there are problems related to the strategy and to the definition of an appropriate business model for these organizations. All of this could represent a reason behind some dynamics, especially considering the structural ones, that has to be studied and considered when answering the main RQ.

3) Which are the characteristics of the MaaS' value network map?

This sub-research question represents a fundamental step in analyzing MaaS network. The understanding and the creation of a value network map is useful to study the network structure, the network relations and the network exchanges. In this direction, this question is representing a base on which the dynamics' study has to start, providing the author and the reader a clear scenario on which different changes could occur, with different effects on the case studied, that in this thesis is the Mobility as a Service.

5) How the Covid-19 pandemic is influencing or will influence the MaaS network?

This last sub-research question is important considering the Coronavirus-19 outbreak as an external dynamic force, that is going to change the environment related to mobility and so will have effects also in the MaaS network, this approach will follow the Majchrzak et al. (2015) dynamics' analysis method. Given the actuality of this argument and the relevance of this situation, this information will help answering the main research question, considering an additional dynamic source that will affect surely the future MaaS strategies, organization and implementation.

1.5. Research Limitations

Mobility as a Service is a current argument that involves different organizations with different objectives and perspectives. It is important to consider this not only underlying the necessity of a wide analysis, but also to underline and define some common problems that occurred during the research and analysis process.

The first and most important limitation is given by the actual worldwide situation. Numerous industries are suffering the diffusion of the pandemic and the restrictions used by the government to stem the diffusion of the virus. Even if in Sweden these measures are not too much invasive in society, they are limiting the daily works of the companies, pushing them to a partially or complete re-designing of some processes. This made difficult sometimes to reach the interviewee, sometimes there were late answers to mails or other times the interviews were rescheduled due to important reasons. All of these partially re-defined the interview scheme and the selection of the actors interviewed, reducing the number of interviews and increasing the importance of the single meeting in terms of data collection.

Another limit is represented by the scarce knowledge of the Swedish language of the author, even if English is spoken by all in the society, there were some difficulties in reading reports or reaching figures that were not able to properly answer in English and had to speak in Swedish. This limit has been partially dammed by FTK help and knowledge.

The last limit is regarding the continuously changing and recent argument chosen for the interviews. There is not too much awareness of what is happening and, when companies had the right information, was not easy to have a complete sharing of that. The topic chosen is regarding strategy and organizational fields that are surely arguments that are usually protected by companies. This made the research difficult but also exciting, considering the importance of the topic chosen and the applicability of the future results of this thesis.

1.6. Research Structure

The following master thesis project will follow the subsequent scheme:

I. Introduction;
II. Literature Review;
III. Methodology;
IV. Empirical Findings;
V. Data Analysis;
VI. Conclusions.

The introduction part is including the future structure of the work and also the definition of the purpose of this research, explaining the reasons and the concepts behind the research question choice and definition. The main objectives of this thesis are defined also in this first chapter.

The literature review part will study in a preliminary way the Mobility as a Service topic, trying to find a proper definition to it and explaining this argument in an exhaustive way. The second part will cover the theory of business model and business model innovation, fundamental not just to introduce the main argument of this thesis (networks), but also to give a theoretical framework to potential business model's problems that could be discovered by the research and analysis phase. The last paragraph will cover the network analysis theory and the inter-organizational dynamics definition that are representing the main theoretical argument of this thesis project.

The methodology will define the methods used to collect, analyze and study data. The methods used both for the finding of literature review material and also for the defining of the interview part. There will be a choice of different methods of analysis that could be applied to reach the main goals of the thesis.

The empirical findings part is regarding the collection of data by the interviews. It will be divided in different paragraphs, considering the different companies and realities interviewed. Therefore, there will

be also a division of the argument mainly regarding MaaS theme and network analysis and dynamics themes, trying to have an orderly structure of the data collected.

The data analysis part will follow the schemes defined in the methodology and will cover the study of the data collected to reach an exhaustive answer to the RQs. It will also be divided in different paragraphs following the main themes achieved applying the Gioia's data analysis scheme.

The conclusions will give a final point of this work, trying also to provide some answers to arguments that are related to the principal research question. It will be important to close properly and in a well-defined way the whole master thesis project.

II. LITERATURE REVIEW

This chapter of literature review will address the theoretical issues underlying our analysis of Mobility as a Service (MaaS). Will be structured in three paragraphs: the first one concerning MaaS, the second one concerning the theories related to business model and business model innovation, with a particular attention to business models related to services and innovations, and finally the last one concerning the analysis and description of networks, with a focus on interorganizational dynamics.

1. MOBILITY AS A SERVICE

Mobility as a Service is an integrated way to organize and provide different transport system in the urban area but also outside it. Is based on the concept of a single provider that is placed in the middle of a network composed by different actors that are operating in the mobility industry. (Laine et al., 2018)

Giving this definition may mislead the reader, because considering companies involved in mobility means to open this definition of all the actors included in new cities' organization projects. Starting from transport providers and arriving to other organizations regarding different fields, examples of that could be technology providers or real estate provided. The common aspects are that these companies are actively participating on a complete revolution of the mobility concepts, providing the chance to new business models to organize more efficient, organized and integrated alternatives for the citizen to move.

The literature review starts with the awareness that is important to analyze different trends regarding new mobility alternatives, giving a precise background to the context where Mobility as a Service is inserted.

1.1. Mobility as a Service Trends

The analysis of Mobility as a Service needs the usage of a holistic approach to understand the different factors that contributed to the emergence of this mobility innovation. These factors have to be studied from different perspectives, considering the nature of the actors involved in MaaS and the various areas included in the providing of this service.
The next paragraphs will focus exactly on this kind of analysis, in order will be analised factors regarding urbanization, technology, customer needs and economics. All of this will contribute to have a complete idea of the scenario where Mobility as a Service is being developed and implemented.

1.1.1. Urbanization trends

Cities nowadays are facing a continuous process of innovation driven by different needs, for example the increasing attention to sustainability, that are going to change completely the organization of these

realities. Urbanization changes are becoming an important trend worldwide, these innovation waves are present mostly in the majority of the cities, starting from European ones and arriving in Asia or North America (Holmberg et al., 2016). All these changes contributed to the creation of a perfect environment for the implementation of some innovations in terms of urban mobility, included the MaaS.

The structure of the city is going to change due to the objectives and the ambitions of the different countries or regions, in this way the example of Gothenburg could represent a relevant case to demonstrate this reasoning. Thinking about mobility doesn't mean to analyze just the transport innovations, but to study and go deeper also in other sectors that are related to the mobility one. The concept of urbanization involves different actors that are going in the same direction with a unique final objective that is to give the correct structure today for the better city of tomorrow.

Real estate companies, in this sense, are going to invest more in new urban plans, with new sustainable and ecological structures that will give advantages also in terms of mobility. In fact, in this direction, there is a strong reduction of the parking slots available for owned cars in the new buildings, trying to incentivize the usage of shared mobility, leaving the car home and so reducing the pollutions and the traffic in the city center. Thinking in a practical sense, the Gothenburg case could be an example of this, in fact, the city center will be changed in the next years and the situation of the city will be strongly different from the actual one. The population will be centered in the city center, more than 150.000 people will arrive and so the urban area has to be ready to avoid traffic congestions and increasing of pollutions. New buildings' parking slots are built with the philosophy explained above and new opportunities for mobility are coming (Hellberg et al., 2014).

The concept of the *self-driving smart city* explained will increase the importance of the servitization concept behind the MaaS and will change also the dynamics of the prices for buildings in the city (A.D. Little, 2018). Using the Gothenburg example, there will be some incentives to move from the suburbs to the city center, with convenient prices that will be different in the different zones of the city. Pushing on this redistribution of the population in the urban area, with all the innovations that are related to this, is going to prepare the perfect environment for the implementation and the effective functioning of the new concepts of shared mobility and also of the Mobility as a Service one.

1.1.2. Technological innovations

Mobility nowadays is strongly related to connectivity. New ways to connect different transports providers have revolutionized completely this industry and also the way how people move inside or outside the city. Different technological innovations are happening and happened in these years, some of these have influenced not only its industry of reference but also some other related sectors in a direct or indirect way. It's the case of the implementation of the 5G technologies, with an increase of the amount of data that could be exchanged in a certain time, so the connection has to be considered faster. In this sense, the advantages with automotive and mobility sectors are numerous, the autonomous drive

is one of the innovations that take most advantage from the 5G technology because it needs a fast data exchange to work and to face the complex reality where the car has to "live" (Krasniqi et al., 2016). Also, in terms of reduction of pollutions and traffic jams, the autonomous drive vehicles could represent an important innovation to reduce the wastes of time and resources, for example in public transportation. In Lindholmen Science park (North-West area of Gothenburg) there are numerous tests in this direction, some of these are proving very effective. But it's not a matter that is regarding just Sweden, there are a lot of examples worldwide that could be cited: Easy Mile in Asia, or other initiatives in Europe or America (A.D. Little, 2018).

But connectivity could be referred also as the relation that the customer has with the vehicle, more flexible experiences of driving and moving are taking place in cities. It's the case of car-sharing, that is changing the experience of the customer in terms of moving into the cities in a more efficient way, without wasting time, paying no parking fees or gasoline, so an experience of complete freedom of using the car (Bardhi et al, 2012). This innovation doesn't regard just the customer side but it is affecting also the automotive sector in terms of selling the product, innovating the OEMs also in terms of servitization (Verstrepen et al., 1999). Finally, the effects of sharing vehicles in the urban center are relevant also in terms of traffic reduction and CO2 emission, advantages that are sought after by the municipalities or by the region, trying to adept to the newest laws about emissions (Katzev et al., 2003).

Managing data is fundamental also for the development of the platform to let the user use the service. In the majority of times the platform is an app that the customer could use from its mobile phone. This means that some personal data are involved and are important to let the service work properly, examples of this could be the driving license, the ID card or the method of payment (usually credit card, debit card or PayPal). The treatment of this information is representing an important argument of discussion in terms of protection of them from some illegal or excessive usage. Data are important for companies for many reasons, like having direct information about the user, and so are representing a source of wealth for the firm itself, that's why they are more susceptible to be used in an inappropriate way. In this direction some regulations and laws have been made, to protect customers from illegal or excessive usage of data by the firms, and this is a process in continuous development due to the increasing amount of technological innovations (Tari et al. 2015).

These technological innovations are some of the most important ones that are affecting the Mobility as a Service implementation. MaaS has to be seen as the point of union between different industries and different technologies, the platform, the vehicles (sharing services), the customers or the actors (public providers, private providers). A good integration between these technologies could lead to a good service provided, it's the case of a network where different actors are innovating in a separate but coupled way.

1.1.3. Cultural Factors

Underlying the concept of Mobility as a Service there is the customer, his needs and behaviour. Every person has some preferences that are influenced by its cultural background and that, in this case, will result in different attitudes towards mobility or transport systems. The selection between the different ways to move in the cities has always been an important starting point to understand what can be improved in mobility and how. Behind this cultural background there are different situations that the customer could live, in different parts of the world, that will condition its future or present choices.

For example, the behavior of the MaaS user in Sweden or Scandinavia could be completely different from the one in Italy or another nation. That's because the level of the services provided by the society, and the effectiveness of these, varies country by country. Mobility as a Service needs not only to be an alternative to public transportation but to be a connection between the different ways to move in the city and the mind of the citizen, that have to perceive the service flexible, convenient and so efficient (Sopjani et al., 2019). But the culture of the customer can easily be influenced by some external factors or perceptions, the real challenge is to understand it and be ready to provide an offer that is in line with its expectations.

The actual society is seeing the majority of the people that is anchored with the concept of the owned-car, making MaaS implementation very difficult in terms of changing culture (A.D. Little, 2018). This is because in most of the cases analysed the cost of ownership is always hidden, and the perception of freedom given by the owning of the vehicle is high (Laine et al., 2018). But this concept is being tested and challenged by new ways to have the same advantages with more flexibility and efficiency. People can move with shared vehicles in the cities and this, mixed with sustainable advantages, could be a revolution in the next years in terms of culture related to transports. Precisely, car-sharing users will grow from 34,8% until 2024, arriving at 42% in 2030 and finally 53% in 2050 (A.D. Little, 2018). Theory confirmed also by other reports made by Deloitte and McKinsey.

The impact of mobility innovation in short distance movements is being more significant every year, shared cars now are connected also with shared bikes, mopeds or scooters. Naturally, all depends by the conditions of the environment, during the Swedish winter the usage of the shared-bikes is reduced by the cold weather giving an advantage to the public transportation, thus confirming the importance of the coordination of different services in a unique platform like the MaaS one (ibid.).

Mobility as a service, in conclusion, is in between of a complete cultural revolution or evolution. It's not all to delete the past, but to deal with it to provide a more efficient service to the customer. People's cultural differences are not set aside, but are set together to avoid inefficiencies in the transports market and so to guarantee a better future in terms of mobility. The real challenge seems to be the reduction of the costs of the service, in fact for the customer the costs related to the shared mobility are even higher than the one related to public mobility, this could influence the attitude towards the MaaS and so the success of it.

1.1.4. Politics and Legislation

Legislation and politics represent two important interrelated factors that have to be mentioned when we analyze Mobility as a Service. Governments or legislative authorities have the power to set the different conditions of the MaaS environment, influencing directly the outcome of this mobility innovation.

As mentioned above, one of the most important trends in automotive is the car electrification. This important innovation couldn't be possible without a proper legislative framework that incentivizes companies to invest in this change. Electric vehicles will contribute to reduce CO2 emissions in the cities and so to have a more sustainable way to move, considering the actual importance of the concept of the owned car (Sopjani et al., 2019). Examples of this are the future Diesel bans measures that will occur in countries in the next years: Netherlands 2030, Norway 2035, Great Britain 2040 (A.D. Little, 2018).

Furthermore, new mobility services were born during these years, car-sharing is one of them and is representing a complete revolution of the habits of the user. But to make this service efficient there has to be a reduction of costs for the provider, otherwise it could be a non-profitable business. Authorities, in this direction, are thinking to reduce the taxation relative to the providing of car-sharing, trying to incentivize the offer of this service and so pushing towards an important change in urban mobility. (Laine et al. 2018). But legislative framework and incentives have not to be referred only to car-sharing providers, but also to the entire environment that surrounds them. In the urban factors part there is evidence of the importance of the parking spaces question. In this direction could be useful to consider car-sharing as part of the concept of future smart cities incentivizing real estate companies to build parking slots dedicated to this service, giving them the perfect environment and the appropriate help to work properly. (Le Vine et al., 2014)

But Mobility as a Service isn't regarding only the private actors but is involving also the public ones. Public transport providers are playing an important role in this game, covering the protagonist part in the concept of urban mobility. Also, in this direction the vehicles used are sustainable and the costs, thanks to the incentives, are mostly reduced. All this framework could contribute to create barriers to the collaboration between public and private companies, affecting the effective capacity of the MaaS to work properly. (Sopjani et al., 2019)

Another important role in urban mobility and also in Mobility as a Service is played by the taxi services and by new private ventures in this sense like for example Uber. In many countries there are legislations to protect this class of workers, in others instead there is the freedom of the market that is contributing to create alternatives to the classic taxi transportation, abetting the rise of companies like Uber. But also in this way, there has to be a collaboration between parts, allowing to MaaS provider to rely on a network that is free to collaborate, trying to give the user the best service possible. (ibid.)

In conclusion, as mentioned in the technology part, there is the protection of the private data used to make the service work. Numerous authorities are involved and are working in this direction and the General Data Protection Regulation (GDPR) is the result of this.

Resuming, MaaS is based on collaboration, efficiency and freedom in the market. It's not just innovation but a complete revolution of the dynamics related to urban mobility, instead of different conflicts there have to be different relations and so a complete collaboration of all the actors involved. Authorities have to work in this direction, trying to provide to the Mobility as a Service provider the best context and situation to cope with.

1.2. Definition of Mobility as a Service

Mobility as a Service is given by the development of the technology available and by a radical change in habits of customers that usually move in the urban area. For its continuously changing nature, MaaS is not easy to define or to explain. Several studies have shown that there is not just one definition of Mobility as a Service, but there are more perspectives or points of analysis that have to be considered to properly understand the case (Sochor et al., 2018). All these definitions have some common words that could help to have a perception of what MaaS is. In Sochor et al. (2018) work these have been identified and resumed, the more recurrent ones are service, user-centric, integration, public-private, personalization, flexible, ecosystem.

These common features can give a better idea of what MaaS is: an integrated platform where the user can choose different modalities of transports to move inside or outside the city. But even with this definition is hard to properly understand what makes this service different from a common multimodal transportation provider. Kamargianni et al. (2017) identified in the customer the main difference, in fact with Mobility as a Service there is a complete centrality of the user and its needs, given the scope of the service to be efficient and convenient. Only understanding the necessities of the user there could be a proper MaaS service, otherwise, the definition would flow in a simple multimodal transport organization. An example of this could be found in a test of MaaS in London, where it emerged the necessity for the provider to properly understand the customer to offer a valid service to the user. (Kamargianni et al., 2017)

Another strong difference has to be found in the centrality of the organization of the service, with MaaS the choice of the different mobility types is not that important, it's relevant the way how the provider organizes and deals with all the mobility actors. So, the way how the service is organized and managed. (Sochor et al., 2018). The centrality of the provider or MaaS operator could be another key characteristic of this service. There is one provider of Mobility as a Service and different providers of mobility (Kamargianni et al., 2017).

Resuming, the centrality of the customer and the singularity of the provider are two of the main concepts to remember to understand properly the Mobility as a Service peculiarity. Considering the providing of MaaS there have been identified four levels of implementation (Sochor et al., 2018):

1. Level 1: level of information and integration. Mobility actors provide information that can be utilized in a centralized way, for example with a multimodal travel planner. The difficulty of this level is to

convince the different actors to open their information to each other, creating a service that could be optimal for the customer;

2. Level 2: integration of booking and payment. On this level, there is the first integration of payment methods, the organization of this is really difficult to manage. Also, there is the centralization of the booking of the services in a single platform, usually an app. For the provider there could be high costs and complexity of integrating many different suppliers;
3. Level 3: integration of the offer. The service that MaaS provider is offering is completely integrated. The relations between parts are managed usually with contracts. This is the actual level of mobility as a service;
4. Level 4: integration of societal goals. The service provided by MaaS has repercussions on the society, reducing the emissions, reducing the traffic jams or increasing the quality of the movements of the customer. The objectives in this phase are not just related to a single actor, but to all the network that takes advantage of MaaS finalization.

In conclusion, Mobility as a Service could be seen as a complete revolution in mobility, inside or outside the cities. This phenomenon could be seen as a complete integration of different mobility solutions (inside or outside the city) to provide the customer a flexible, efficient and convenient travel experience. Customers, in fact, are playing a central role in it, defining the needs to fulfill and so the objectives of the providers. These objectives are not just related to profits, but also to societal goals that could make the life of everyone better. There are some obstacles in reaching the final level of MaaS but the efforts and the evolutions made in these years are a significant signal that all of this will happen soon.

1.3. Sustainability & MaaS

Sustainability is certainly an argument that has a relevant importance nowadays. This is due to the climate change of these years that has been a topic sensitized by governments or personalities. The reduction of the CO2 emissions is a central theme of this discussion, in this way the mobility industry is being affected by numerous changes that will conduct to the sustainability direction and that have been an important input to different innovations. On the other side, the real efforts made by the governments are few, not encouraging enough the population to change their habits, having irrelevant effects on personal behaviours relative to mobility choices (Santos et al., 2018).

The word *sustainable* can have different meanings referred to different industries or actors involved. With transports is relevant to the choice of the vehicle, not just in terms of buying but also in terms of usage. In fact, regarding the private transport systems, it's not important to know if the vehicle has been normally bought by the customer, or if it has been leased, it's more relevant to the power of the vehicle. Electrification has been a complete revolution for mobility industry, giving a solution to the increasing

pressure on CO2 reduction. Recently also governments have focused their attention on the incentive systems towards the electric vehicles, trying to have in the next years a shift from the normal ignition ones. (ibid)

Shifting the analysis to the Mobility as a Service, it's relevant to the type of shared mobility chosen for the movements. Electrified cars, bike-sharing and public transportation are representing now the most sustainable solutions, matching perfectly with the requests of the governments (ibid).

But to gain the attention of the public authorities MaaS providers have to demonstrate effectively the effects of this innovation on the urban area, trying to underline the advantages in terms of sustainability and in terms of a reduction of traffic in the cities, to have access to a dialogue with public authorities, gaining from them not just political support but also a financial one. (Sochor et al., 2018)

The concept of MaaS is relevant to sustainability when it is linked with the achieving of societal goals, so on Level 4 explained in the previous paragraph. It's not just the achievement of a level, but it's the perfect alignment of the private and public scopes into a sustainability one. (ibid)

Finally, there are four activities that have to be considered to understand the important actions that can be used by the MaaS provider to match with some sustainability objectives (ibid):

1. Strategic activities: all the strategic moves that will give to the network (and to the service) a long-term vision, that can match perfectly the requests of the market in terms of service provided and sustainability;
2. Tactical activities: are important to link the different actors to the vision of the provider. To give them a reason to operate in a certain way, clearing the vision and the objectives that the MaaS provider wants to reach in the future;
3. Operational activities: aim link the activities made by the provider and by the actors with the long-term vision. For example, conducting tests or experiments to have some data to use for the implementation of a service that in future could represent an advantage for the network;
4. Reflexive activities: is referred to the activities that are going to evaluate the work of the network and so the effects on the service provided. All the measures or controls that the MaaS provider could use to understand if there are problems in the service or the network.

The usage of these measures it's important for the correct functioning of the MaaS, in this case ensuring a correct effort in terms of sustainable offer to the market. These actions could be used to manage a relationship with a private but also a public actor, to manage and control the efforts of the actors in the network or to define and sustain the strategies that in this case have to conduct to a more sustainable scheme of mobility.

1.4. Applications in Sweden

The concept of Mobility as a Service has its roots in the Scandinavian countries, like Finland and Sweden. Numerous projects are present in this area that are contributing to conduct tests and collect data to understand if this concept could be effectively applicable or not.

With the "flexible traveler" project there is the first occasion to test and analyze a new integrated model referred to mobility, this is the first phase of development and happened in 2011 in Sweden. In the next years, the term Mobility as a Service started to be pronounced after the Helsinki's case of analysis (Heikkilä, 2014). After this, in Finland there has been a second phase with the introduction of Whim!: a MaaS platform, based in Helsinki.

The situation therefore in Sweden is similar, after the "flexible traveler" project the concept has been developed through a workshop called Go:Smart, which collected data and applied practically MaaS. Also in Sweden in 2014 started the second phase of development, with the introduction of the UbiGo project based in Gothenburg. This test produced good results also in terms of collaboration with public providers (Vasttraffik), that started to consider this new way to move in the city. UbiGo soon became a real company and moved to Stockholm to develop more the idea, meanwhile, the hub in Gothenburg is still active and is still working to improve the MaaS service. (Smith et al., 2018)

In conclusion, the context in Sweden is favorable to the development of Mobility as a Service. The conditions in terms of technology, urbanistic plans and also investments are good enough to encourage and push through the development of this project, giving the chance to the first companies operating in this direction.

2. BUSINESS MODEL

To analyze properly the structure of the network of MaaS there have to be a focus on business model theory. This is because the choice of the right business model will enable the provider to organize well the business and in this case the network, to have a correct structure for the functioning of a complex system as Mobility as a Service.

The literature will start with a definition of business model from different authors and different perspectives and will lead us to the analysis of the MaaS business model. Also, will be included the theory regarding the business model canvas, the business model innovation and the product-service-system business model (PSS) to underline the differences between a traditional product-centered BM and an innovative service-centered one.

1.5. Business Model Definitions

Having a great product or service to offer the customer it's not enough to guarantee the success of a company, in fact there has to be a proper organization to transfer the value to the market and so to have

success in it. Companies define their organization and their strategies in a business model (BM), giving an order to their ideas and having a clear working system that has the goal to deliver value in terms of product, services or experiences to the customer.
Starting from the 90s the literature began to study deepener this subject, giving the result of different definitions that have to be attributed to a different point of analysis of the argument. In this section will be analyzed some of these to give a brief basic representation of the definition of business model.
A definition that can explain properly the concept of business model is the one included in the *Business Model Generation* work by Alex Osterwalder:

"*A business model describes the rationale of how an organization creates, delivers and captures value".*

(Osterwalder et al., 2011)

The organization is not isolated in its environment, but it's continuously dealing with other actors to capture, create and deliver the value. Later, Osterwalder analyzed from a working perspective this concept, and the result was the definition of 9 elements that are fundamental for the functioning of the business model and that will be analyzed in the next paragraph dedicated to the concept of business model canvas:

"A business model is a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital, to generate profitable and sustainable revenue streams".

(Osterwalder et al., 2005)

The company has to organize and deal with all these 9 elements to properly work with the value and to give the correct representation of it to the customer, avoiding value losses during the operations. (Osterwalder et al., 2005)
A part of some definitions, business model theory has been studied from different perspectives, giving different results in terms of defining clearly what a business model is. In addition to Osterwalder's works there have to be cited also the definitions of Applegate (2000), the works of Smith (2005) or the statements of Stewart (2000). Business model literature sometimes explains some concepts related to this argument without giving a proper definition of it, because this definition is varying to different situation and because some authors take for granted it. (Zott et al., 2011)
The functioning of an organization depends on a well-defined strategy that gives the possibility to deliver the value to the customer and to be ready and prepared to catch. All these definitions give us a clear

statement on the centrality of the business model in terms of organization and innovations. In the next paragraphs will be explained and listed the elements that compose a business model and the understanding of that is important to have a clear scenario in case of changes due to innovation.

2.2. Business Model Canvas

The studies relative to Business Models are not just referred as the finding of a proper definition, but are continuing improving the way how the Business Models are interpreted and used by the organizations to reach their goals. In this way numerous ways to understand and use the BM have been implemented during the years and one of them is the concept of Business Model Canvas (BMC).

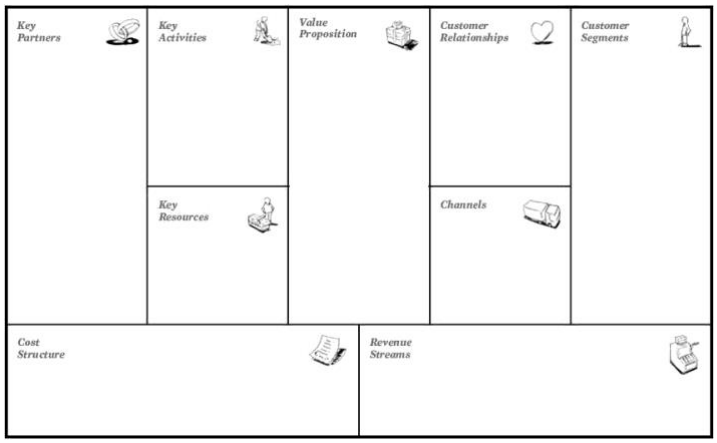
BMCs have been found by Osterwalder and are useful to have a clear understanding of the dynamics behind the functioning of an organization, giving a way to interpret the scenario in which they operate and the way how they do it. It's useful to understand the problems or the links in the company's network and, if there are problems, to identify immediately where the obstacle is to get over it. In addition to this they are useful also in terms of innovations of companies, underlying where the company has to invest to create and deliver the new concept of value (Bocken et al., 2014):

"Firms can use one or a selection of business model archetypes for shaping their own transformation, which are envisaged to provide assistance in exploring new ways to create and deliver sustainable value and developing the business model structure by providing guidance to realise the new opportunities".

(Bocken et al., 2014)

Osterwalder in 2005 defined nine elements that are important to have a clear scenario of the business model of an organization. From these elements a framework has been done and so the theory of BMC started to grow. In the next figure (Fig. 2) is illustrated this concept:

Figure 2: business model canvas example



Source: Osterwalder, A., Pigneur, Y., Oliveira, M. A. Y., & Ferreira, J. J. P. (2011). Business Model Generation: A handbook for visionaries, game changers and challengers. African journal of business management, 5(7), 22-30.

From this table there could be identified nine core elements that constitute the BM:

1. Customer Segment: the segment of the customer chosen to deliver the value and so the product/service. It is important to identify the correct segment to avoid value losses and to gain all the advantages in terms of sales, fidelity or profits.
2. Value Proposition: the value proposition is referring to what the company can offer to the customer. It is relevant to properly understand the needs of the client to deliver the correct product/service and to guarantee him the maximum value deliverable.
3. Channels: this element defines where the company relates to its customers, so what channels it uses. Often organizations utilize more channels to have a correct delivering of the value to the customer and to adapt it to the different interactions that the company could have with him. It is important to underline that sometimes one channel can be used to interact in different ways.
4. Customer Relationship: describes how the company interacts with the customer. The interaction could be personal, self-made, automated or co-created. In the last case the customer is actively participating in the creation of the output for the company. This last approach will have relevance when will be discussed the concepts of business models and value chain relative to services.
5. Revenue Stream: this element refers to the way how the organization generates revenues and so profits. The sale of the product is just one type to do it, companies in fact could generate revenues even with fees relatives to the utilization of some assets, with advertising or licenses for example. The numerous ways how the firm is generating money reflect the complex system in which the organization is operating and the different strategies that could choose.
6. Key Resources: are the resources that are fundamental to the functioning of the organization. These could be physical resources, intellectual resources, human resources or financial ones.
7. Key Activities: what the organization has to do to interact with the client, so as to understand and deliver value to him.
8. Key Partners: the partners that are essential for the functioning of the business model. This could be suppliers or dealers and play a central role in the value chain.
9. Cost Structure: to make all this environment work there has to be a clear structure referred also to costs. These could come by different sources and have to be controlled and maybe reduce to make the business sustainable and profitable.

All these elements have to be seen together to understand the width of the concept of BM and BMC. Changing one element means also to change all the BM, the implication of one action are relevant in all the scenario, and this is a question to consider most when the organization deals with innovations. (Osterwalder et al., 2005)

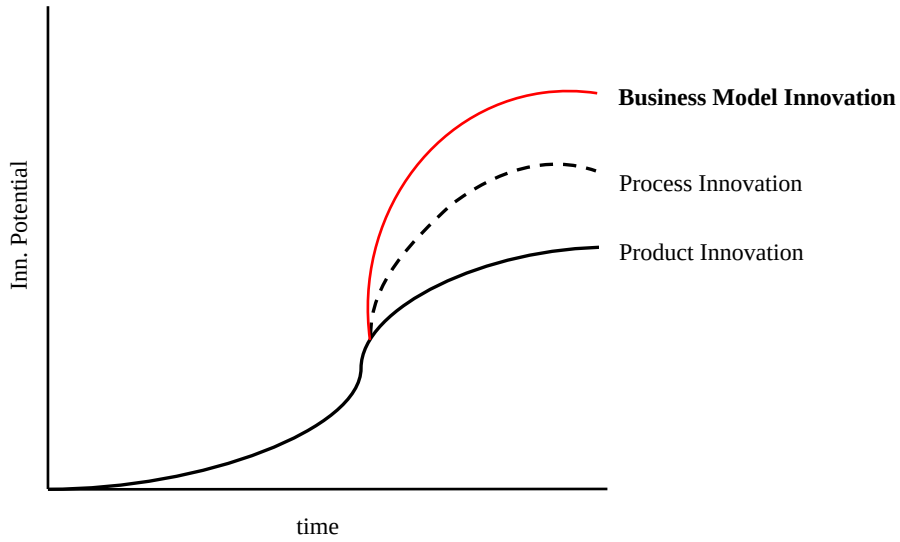
Business model canvas theory represented also a point of start for other studies relative to business models. It all depends on the goals of the organization and by how it will go and will work to reach them. In this way is relevant to the work made by Joyce (et al.) to adapt the BMC concept to other

situations relative for example to sustainability and so innovation. Considering the importance of sustainability in these years, this work has contributed giving an important background in terms of literature to the innovation of the BMC framework. The concept of *"Triple Layered Business Model Canvas"* (TLBMC) delineates a framework where more layers could work together to walk in a unique direction. The elements of the canvas have been updated and new frameworks started to be born to be adapted to sustainability and innovative environments. Layers relative to Environment and Social Value creation are an example of it. In conclusion, the TLBMC gives a horizontal coherence between different layers fundamentals to reach a unique objective. (Joyce et al., 2016)

2.3. Business Model Innovation

Customer needs are not fixed and stable during the time, instead, they are continuously changing. To adapt the offers to the requests of the client, companies have to manage a precise and focused process of Innovation. This process could lead to new products/services, to better offers or to new ways to interact with the customer that gives a competitive advantage to the organization. (Goffin et al., 2010)
To complete correctly these works companies have to adapt their business model, so they have to act a real business model innovation (BMI). This type of adjustments are regarding not only single processes but the company from a holistic perspective. The advantages of business model innovation compared with a normal process innovation are greater and more relevant in terms of future flows with the customer, giving the organization an important competitive advantage. (Gassmann et al., 2014) (Fig. 3)

Figure 3: differences between process innovation and business model innovation.



Source: Gassmann, O., Frankenberger, K., & Csik, M. (2014). The business model navigator: 55 models that will revolutionise your business. Pearson UK.

Thinking about innovation sometimes leads to consider technology advantages and changes, that are important in terms of product/service innovation but are not the only way to innovate. Changes could be made in different areas of the company, regarding different functions.

Fundamental is that the company has to accomplish the two main functions to have competitive advantages: create value and capture value. To capture value is important the attention to the customer, the understanding of its needs, while creating value is important to the organization of the processes. All these elements are included in the business model concept and properly in business model innovation. To these two tasks of the firm has to be added a third one, delivering value. In the value chain the company can be linked not only with suppliers but also with dealers, that have the task to deliver the product and transfer the value to the customer. So, a holistic view of the business model concept is central to a valid innovation strategy. (Chesbrough et al., 2007)

In this direction a business model framework was identified and studied by Chesbrough to give a sequence of possible business model evolution, from the most basic ones to the more advanced ones. So, the evolution of business models can be identified as:

- Type 1 BM - undifferentiated business model: for different products companies are not articulating different business models;
- Type 2 BM - differentiated business model: the company started to differentiate its business model to guarantee to the customer different products or services;
- Type 3 BM – segmented business model: is used by companies that want to compete not only just with a different offer but on a different segment;
- Type 4 BM – externally aware business model: the company started collaborations with outside, opening itself to have new inputs and gain innovative and competitive advantages;
- Type 5 BM – integration of innovative business model: the business model in this phase plays a key role in integrating all the value chain of the company, to innovate properly and gain advantages from this integration;
- Type 6 BM – adaptive business model: is the more adaptive business model structure, opened and ready to change or to adopt different structures to test and experiment solutions.

The important mindset that an innovative organization has to have is the continuously evolving projection. The company has to continuously improve its BM and this framework represents a sequence of improvements that could be useful to orientate the process of innovation. It’s important to be competitive not only in the present but also in the future.

Even if this process could seem as simple and intuitive it’s not like that. Not all the organizations tend to be innovative and not all the business models are adapted innovatively. The barriers to innovation are referred to different actors and situations in the normal life of an organization. The first one is the lack of leadership, there is the absence of a leader that guides the process of innovation and that gives the right impulses to start or follow a precise process of innovation. There is the difficulty to identify the leader or to avoid conflicts to gain that position. In this case the solution could be to create a figure that

has the scope to innovate the company, avoiding conflicts and giving clarity to the entire process. An example of this could be IBM.

Another barrier to innovation could be the resistance of the present business to the introduction of a new one. Sometimes the current business is profitable and efficient, so the company is blind to innovation, some other times the current business enters into a conflict with the old one and this rivalry doesn't allow the company to proper innovate. The solution to this problem could be to test different situations and understand which one is better for the situation, for example sometimes it is worth separating the new part to the old one, maintaining links only in the top management, to avoid conflicts and bad influences. (Chesbrough et al., 2010)

All these variables, all these business models choices and problems related to them give the intuition of the difficulty of the innovation process for the companies and the importance of a good basic organization that allows these to innovate. Only applying these methods, following the frameworks and understanding from errors a company could innovate or try to properly do it.

1.6. Product-Service-System Business Model

The traditional definition of business model usually refers to a product-based offer, where if there are services are just related to it and are not playing a central role in the offer. With the saturation of the markets and the increase of competition, organizations started to analyze how to differentiate their offer to gain competitive advantages. Innovative offers could be referred as new products, with new technologies, but also to new offers intended as a combination of product and services. For exampl in the automotive industry the increase of competition and the high costs to innovate technology pushed the OEMs to add services to their offers, servicing the industry and creating a new complete way to gain an advantage in terms of customer satisfaction and perception relative to value delivered.

From this perspective the traditional concept of business model appeared to be inappropriate and needed to be updated to include properly also the service in the value chain, not considering it as an additional element but as a core one. Numerous researches have been made in this direction and the final result was the introduction of a new business model concept: the product-service-system business model (PSS). With this configuration of BM there is the centrality of the offer intended as a combination between products and services where the central scope has to be the creation and the delivery of value. The company in this way has to be able to work with value to create and manage activities that will give a valuable product to the customer. To do it some considerations have to be made in terms of the position of the company in the value chain/network, barriers to access to the market and contribution to the innovation of the company.

From a MaaS perspective the concept of the network (as will be studied in the next chapter) is central to the organization of the business model. The provider of this service is placed at the center of the network and has to be able to capture the value to deliver it and manage it. So, the creation of the value in PSS is

relevant not only in terms of understanding and finding it but also in terms of managing it. (Tukker et al., 2004)

Researchers studied deeply the concept of PSS and found three main categories of differentiation of this type of business model (Behrend et al., 2003):

1. Product-oriented services: the product is central to the offer and the services will add value to the customer. The product is normally sold to the client and from its usage, there will be the perception and the delivery of the value;
2. Use-oriented services: it's the case of some products that are used by the customer thanks to different services provided. In this case it's fundamental the experience of usage and the flexibility/efficiency of this experience. In this category there could be found product lease, product sharing or product pooling that are playing an important role in our case of analysis, the Mobility as a Service;
3. Result-oriented services: the final goal of the company in this case is the final result given by the experience with the offer.

In conclusion, the PSS business model has completely changed the traditional view on this subject, adapting the normal concept of BM to new needs and innovative offers. The phenomenon of servitization is representing an important way how companies try to differentiate their offers. At the extreme side of this concept there is the MaaS that is representing a completely new experience of mobility based on a new vision of service-providing offer. In this direction the PSS business model is representing the right way to configure the BM of a network, providing a new vision to the functioning of the organization and underlying the crisis of the traditional view of the concept of the value chain.

1.7. Mobility as a Service business model

Megatrends in transports are changing the current industry's environment and structure, bringing out new business models that will help companies to innovate and compete in it. The attention on sustainability, efficiency and new technologies with new vehicles and new modalities of organizing trips is contributing to create new opportunities for the organizations and to catch them they have to re-organize themselves thinking on new ideas and so new business models. (Kamargianni et al., 2017)

Mobility as a Service is representing the perfect example of all of this, the mix of new technologies and new organization modes is bringing to the market new types of business models, where the provider is playing a coordinator-role instead of a productive one. The real service in this case is the

coordination between different service actors to give the customer a chance to organize efficiently his movements, inside or outside the city. (ibid)

With MaaS the traditional concept of value chain, and so the traditional supply chain and value creation paths, have to be totally reconsidered, thinking about a co-creation concept and so a network organization. In the network the provider will play a central role, where will coordinate different actors from different industries to give the customer an efficient service. (ibid)

It will be interesting to analyze how the network is created, what are the dynamics inside it and so how the different actors are managed and controlled to guarantee the correct execution of the service.

All these arguments will be studied in terms of literature in the next chapter.

2. VALUE NETWORK ANALYSIS

In services the classical concept of value chain explained by Porter started to find some difficulties to be applied properly with concrete cases. That's because in this model the service is just an addition to the main product and so to the principal offer. while in the MaaS example is almost the opposite, assuming the service at the center of the proposal. Considering the increasing of the importance of *servitization* concept, the Porter's vision of value chain started to appear obsolete. For example, in MaaS the service provided is at the center of the proposal stating that the Porter's definition may be obsolete if referred to this kind of organizations.

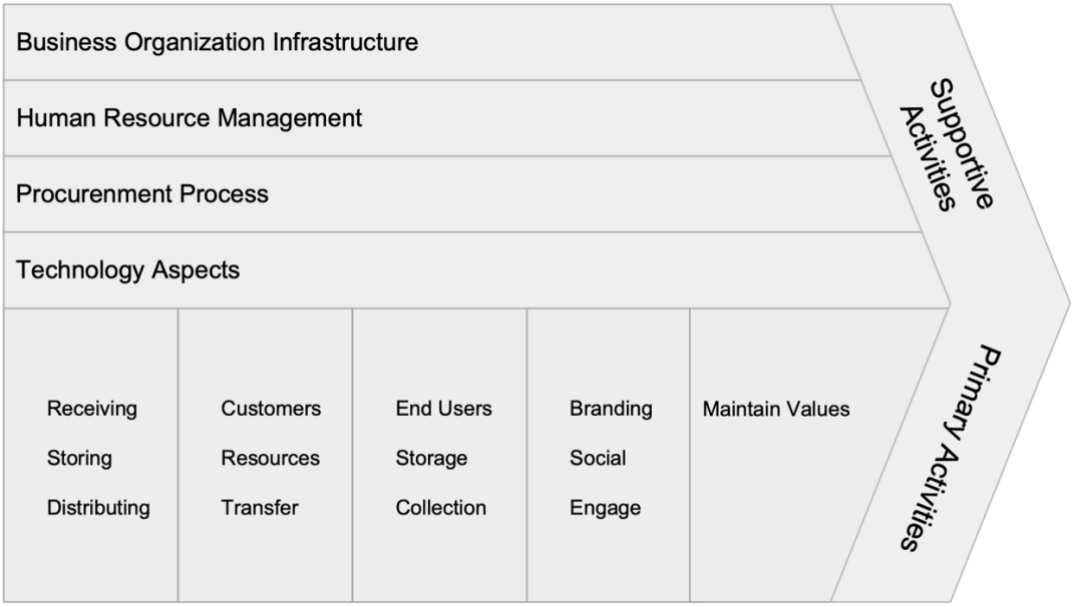
From this perspective there have been numerous literature studies that found new theories and concepts related to value chain, starting from the value chain in service-based business models and arriving to the most innovative concepts of value network and business ecosystem.

In this chapter will be explained all this literature evolution and the focus will be on the concepts of value network and value network analysis, considering relationships in the network as a key point to understand the limits and the challenges for Mobility as a Service.

3.1. Overcoming Porter's Definition of Value Chain

The concept of the value chain was introduced in the 1980s (Porter 1985) and, since then, has been studied and developed into the most recent adaptations. The point of departure of this is Michaels Porter's book *Competitive Advantage* (Porter 1985), where the concept of Value Chain was introduced. (Fig. 4):

Figure 4: traditional value chain framework



Source: Porter, M. E. (1985). Value chain. *The Value Chain and Competitive advantage: creating and sustaining superior performance*.

In Porters (1985) framework the value chain is composed of primary activities and support activities needed to deliver the value of the offer to the customer. Primary activities include fundamental actions that the organization has to consider to properly create and deliver the final offer to the client. Starting from the managing of the logistic area, passing by the operating area and the sales one, and arriving finally at the service part that usually is seen as a complementary or added part of the main offer.
Support activities, instead, include all the elements that are not central in the strategy of the company but are fundamental to achieve and to guarantee the correct functioning of all the phases included in the primary activities part. Examples could be the firm infrastructure, HR management or the R&D (Technology Department). (Porter, 1985)

To innovate and properly deliver the value to the customer the organization usually passes through three phases of value conversion:

1. Idea generation;
2. Idea conversion;
3. Idea diffusion;

For each of these points there are difficulties and challenges that the organization has to overcome by organizing properly its structure and its processes. This concept is particularly significant in a view of value chain innovation, giving some guidelines to the organization of how to pass the difficulties related to each of these phases and how to organize well the company to be ready to properly innovate. (Hansen et al., 2007)

All these theories had one common point: the marginal consideration of the service in the value chain concepts. On this argument Theodore Levitt expressed his perplexities, considering that customers rarely base their judgments only on the product delivered, instead they are considering the whole experience of usage, where services are playing an important part.

The need for a new consideration of value chain concepts began to be relevant and, in this direction, numerous theories emerged, giving a new aspect to the value chain literature background. There is a real overcoming of Porter's concept of the value chain that leads to new theories where the service is co-created with the customer and is not just at the end of the value creation, but it's central in this process. (Chesbrough, 2011)

Resuming these concepts, there is the overtaking of the classical value chain consideration, arriving at a new concept where the value is created also by services and these services are not playing a marginal role to the offer, but are at the center of a process where also the customer is continuously involved.

An example of all this speech is given by the *Service Web* concept that will be explained in the next paragraph.

3.2. Service Value Web

The classical concept of value chain is based on different processes that contribute to transforming inputs into products. This vision of the argument includes different actors that have to collaborate to give the final product to the customer, trying to satisfy his needs. In this scheme the customer appears only in the phases of value discovery and value delivery, while the value creation part is merely worked by the organization internally. (Porter, 1985)

The dynamics of the market and the high competition usually are pushing companies to avoid spreading of information outside their borders, to prevent the diffusion of some relevant data that could maybe be used by competitors to gain a competitive advantage. With the evolution of the customer's needs and the increasing competition, services started to gain importance becoming soon a key asset to manage to differentiate the offer and increase the value for the customer. Contrary to the products, customers usually have less knowledge about their needs in case of services, this is because the experience is important to determine the value of the offer delivered. Considering this, more service-based innovations have been made and the need for a value chain innovation that considers the centrality of this kind of offers becomes to be relevant in an organizational and strategic view. The customer in this sense will experience different situations relative to services and the value will be delivered and perceived in different ways. It's important for the company to understand these dynamics to adapt the organization to guarantee a stable and efficient service-based value experience to the client. (Drucker, 1999)

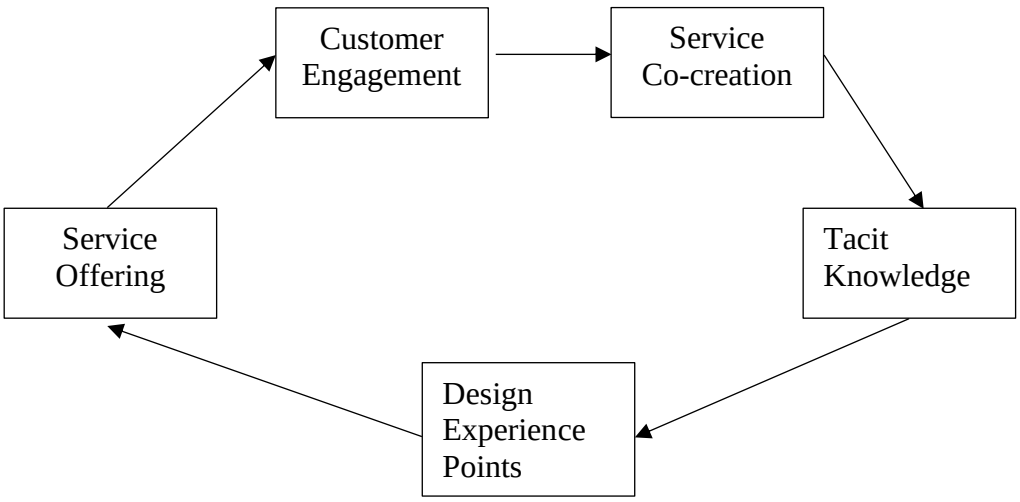
The studies conducted to a new scheme relative to the value chain where the customer actively participates in the process, contributing in all the phases relative to the value-working, understanding and delivering process.

This, called Service-Value-Web (Fig. 5) is composed of different phases, where the customer participates actively (Chesbrough, 2011):

- Customer Engagement: the phase relative to the catching of value, where the customer is for the first time in contact with the offer. In this case, the company has to be able to collaborate with the customer to understand the needs of him and to properly organize the process to satisfy them;
- Service Co-Creation: in this phase, there is the collaboration in the creation of the service, where the contribution of the customer is important mainly to avoid common errors that could deviate the value of the offer from the initial objective;
- Elicit Tacit Knowledge: during these processes there are some tacit exchanges of information that are important for the organization to gain new knowledge that normally is not available. On the other side, the advantages for the customer are relative to the knowledge of the service, avoiding all the bad effects relative to the first time of use;
- Design Experience Points: in this case, the collaboration and the exchange of information between the company and the customer are important to create a proper design of the service that will be delivered;
- Service Offering: the collaboration in this phase is fundamental to understand how/when to deliver the product, to the choice of the right channels and modes to properly give the value to the final customer.

As mentioned above, it is an iterative process where the role of the customer and its engagement is central to the scope of the organization. The advantages are on both sides giving the opportunity to innovate the company and learn from outside knowledge. (Chesbrough, 2011).

Figure 5: Service Value Web



Source: Chesbrough, H. W. (2011). Bringing open innovation to services. MIT sloan management review, 52(2), 85.

The base concept behind this new value philosophy is the co-creation of the value, where the process is entirely created thanks to a collaboration between the customer and the organization. Avoiding so mistakes and errors that could be made during the service ideation or creation and that could deviate the final value perceptions

from the final customer. The experience of this kind of organization leads to some considerations about the open innovation concept, considering fundamental for an organization that wants to innovate the opening culture to the outside to gain advantages and knowledge that could be important to correctly innovate.

3.3. From Value Chain to Value Network

The concept of value chain has always been anchored to an industrial and classic conception of organization. This vision of the concept in fact finds relevance and importance mostly in companies that use a traditional or conventional organizational chart and strategy, producing products without any innovation in production line or in the whole value path. But these characteristics are representing not only an advantage and a scheme to follow and analyze for some types of organization, instead, they are mostly a limit for companies that want to innovate trying to open the structure to the outside, accessing to new knowledge and advantages. With value chain there is the control by the company of the entire process of creating and delivering value, with a more or less hierarchical/fixed structure in the entire path. This scheme is not adaptable easily to changes and this represent a big limit for companies, especially now in a world that is running fast. (Allee, 2000)

All these limits have shown the necessity to find and analyze new organizational and strategic forms that are more open to collaboration and that could be applied even in environments that are dynamic. An answer to all of this could be the concept of *value network* where the organization is at the center of a constellation of partners fundamental for the entire working of the project. There is not a rigid control of the roles, but a tight collaboration where there are exchanges of different assets, useful to reach the final organization's goals. Value, in networks, is created by a complex process of collaborations and exchanges. These could refer to tangible or intangible assets and, for each of these elements, there are different actions that the provider could do to manage properly the situation. Resuming the main assets that could be exchanged (Allee, 2000):

- Product/Services: there is the exchange of a product or of a service in the network. The case applied to MaaS could be a car-sharing company that provides the service, and so the cars, to the central mobility provider, giving the customer an additional service to choose from. Generally, these situations are controlled and managed by contracts, given the more or less stable and tangible (in case of products) nature of the exchange;
- Knowledge: in this case there is the exchange of some intangible assets that are important to make the entire service work properly. Knowledge represents an important asset to adjust errors and mistakes but also to innovate the offer. In MaaS an example could be the providing of information from the public authorities to the service provider. This exchange usually is managed and controlled by the creation of a collaborative design;
- Intangible benefits: are the benefits that are usually outside the traditional border of the classical assets of the network. Could include some important aspects as customer loyalty that could represent an

advantage in a competitive market like mobility and that are regarding directly the core functioning of the entire organization.

The exchange concept is representing certainly a core element in the value network theory, where the real importance of collaboration lies in the trade of intangible elements, that could represent an important asset for the organization. The way how the network participants are relating each other is an important point of analysis, where the real opportunities and problems of the network come from. Value network in this sense are complex systems, with more simple parts to analyze and others that are complex due to the intangibility of the asset exchanged. The position and importance in the network counts as an important factor and, to deeply understand that, it's fundamental to have a clear map of all the stakeholders in the network to proper analyze it. (ibid)

3.4. Value Network Analysis

Organizations operating with networks usually work with different actors with the exchange of tangible and intangible assets. From these elements there is a collaboration between all the single companies in the network to work and provide the customer the final value in the right proposition. From this perspective it's not useful only to understand the nature of the networks, but also to analyze the aspects that are important and that characterize the value working process. This direction is called value network analysis and is based to understand the dynamics and the functioning of the network, even to avoid and prevent errors.

The evolution of the products offered, the composition of the new offers and the organizational design of companies give importance to both tangible and intangible elements inside the network. From the tangible part is useful to analyze the contracts and the ways how the parts are relating this exchange, but this reasoning can't exactly be applied to intangible assets. In this case the analysis has to consider them as something that can be traded or exchanged, an example could be the knowledge that could play an important role in a network. In MaaS knowledge is needed by all the mobility providers and by the central one to coordinate and manage the entire service, representing so a fundamental asset to trade and exchange.

A part of the assets used the analysis has to involve also the roles inside the network and inside the organizations. People has not to be considered as part of a single company but have specific role and importance also in the network. These roles usually fit each other, but sometimes could differ and a proper analysis could be important to understand these dynamics. In a scenario of value conversion, people are fundamental for the success of the entire process, each company's role has to operate not only from a company perspective, but also from a network one, creating and providing value that is shared in the whole structure. (Allee, 2008)

In the next sub-paragraphs a focus on mapping concepts and analysis of the maps will be made, trying to complete the scenario of understanding the value network models.

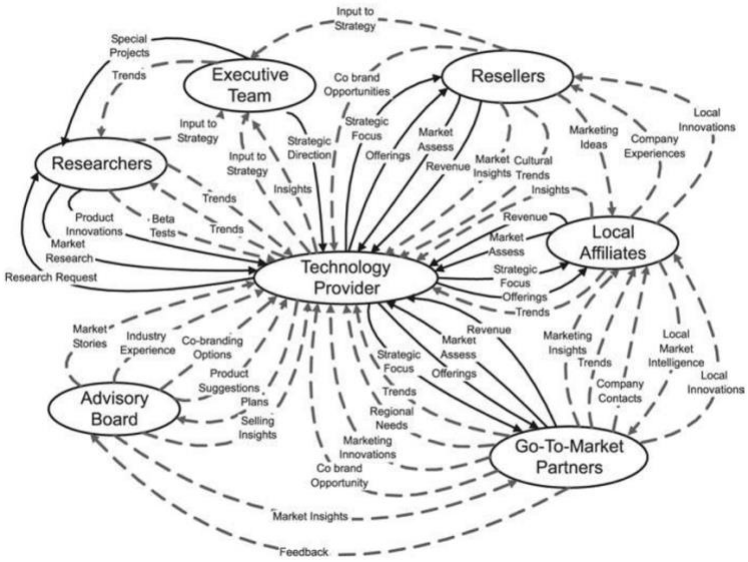
3.4.1. Value Network Maps

Value network maps are useful to understand the dynamics in the network and to conduct an appropriate analysis. This type of mapping is based on the identification of three fundamental elements (Allee, 2009):

1. Roles: the roles are referred to who is playing a part inside the network, in this case can be a person, a group of people or an entire company. Roles are important to identify who has the power in the network, so where the decisions come from. Understanding these figures in the organizational chart could be useful also to identify some problems, like the excessive power of a specific actor that is going to damage the entire network;
2. Transactions: is the exchange of intangible or tangible assets. As mentioned above there are different types of transactions and different regulations for them. There could be an exchange of material assets, financial ones or intangible ones like culture or knowledge. Is important to understand which assets are more important and from where they come from;
3. Deliverables: are the things that have been exchanges in the transaction part. As mentioned in the previous point, there is a variety of assets that could be exchanges, usually the most valuable ones are the intangible ones because it's difficult to reply them.

This analysis will provide us a map that includes all the elements that are fundamental for the functioning of a network. In the next figure (Fig. 6) is shown an example of Value Network Map, where the transactions are represented with arrows and it's referred to the external market for a technology company:

Figure 6: example of value network map



Source: Allee, V. (2008). Value network analysis and value conversion of tangible and intangible assets. Journal of intellectual capital.

3.4.2. Analysis of the Value Network

The analysis of the value network aims to understand the dynamics that are emerging between the members and also the importance of each role in the working process of value. In the network, as mentioned above, there could be different exchanges made by different roles that are going to create or, in the worst cases, destroy value. Understanding the dynamics of these situation is representing an important point to avoid errors or to change structure to the network. In this scenario people or roles are playing an important part, creating and working with value. So their understanding their importance and their values is fundamental to analyze the network context. (Allee, 2008)

The analysis of the networks passes by three different levels: exchange analysis, impact analysis and value creation analysis. Each of these ones is going to analyze a different aspect of the network that is important for the objectives mentioned above. Particularly these three steps of analysis can be explained as (Allee, 2008):

- *Exchange analysis:* is going to analyze the different exchanges that occurs in the networks identifying between tangible and intangible assets exchanged and comparing the ratios of these transactions. An example of this could be the SMART evaluation made by the European Commission, useful to understand the innovation networks in the member states of EU.
- *Impact analysis:* roles have a specific importance in value conversion and its useful to analyze these to understand the process of value creation. This can be done with an impact analysis, where there will be a comparison between costs and advantages generated by each role. Thanks to this process there will be clear the structure of the network in terms of importance of people and roles in it. To do this type of analysis usually is used a spreadsheet useful to work and analyze data collected. (Fig. 7) (Sveiby, 1997)

Figure 7: example of Impact Analysis

Transactions			Impact Analysis							
Deliverable	From	To	What activities generated	Impact on financial resources	Impact on intangible assets			Overall cost/risk	Overall benefit	Perceived value in view of recipient
					Human Compe-tence	Internal Structure	Business Relationships			+2 +1 Neutral -1 -2
Intangible										
Tangible										

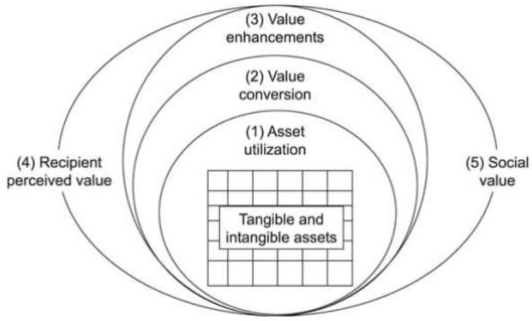
Source: Sveiby, K. E. (1997). The intangible assets monitor. Journal of Human Resource Costing & Accounting.

- *Value creation analysis:* useful to understand how each role is going to add value to the network. In the value chain, in every step, there have to be an adding of value to arrive at the final value proposition. In this view roles are playing an important part and understanding this is a good point of analysis for a network. The analysis goes through how much value each role can add in terms of

output, and how much value can gain in terms of input. This could be studied with a cost/benefits analysis using a specific chart.

The dimensions of the value creation analysis are usually five: asset utilization, value conversion, value enhancements, perceived value and social value. Asset utilization gives and indicator to the utilization of the asset analysed, to understand which ones are important in the process. Value conversion analyzes the way how the assets generates an output in terms of value. Value enhancement is studying all the features that make the final output valuable. Perceived value is going to analyze the offer effectively perceived by the customer and social value is going to study the societal impact of the value offered. (Allee, 2008) (Fig. 8)

Figure 8: dimensions of Value Creation



Source: Allee, V. (2008). Value network analysis and value conversion of tangible and intangible assets. Journal of intellectual capital.

This last analysis can be made studying the value network maps, understanding the value of different roles and focusing on the activities that generates more value for the network and so for the customer.

In conclusion, these methods usually are not used singularly, but have been combined each other to have a wider point of analysis. The combination of impact analysis and value creation analysis can be effectively done and is giving good results in terms of network's dynamics understanding.

3.4.3. Interorganizational Collaboration Dynamics

The analysis concepts explained in the previous paragraphs are usually referred mainly to a stable situation, where there aren't significant changes in the network and the results of the analysis are valid for different situations. The concept of stability is not appropriate when referred to network organizations, because these are an instable reality that usually changes because of different factors. This is the concept of network dynamics that is going to change all the analysis of this strategic figure, an additional focus has to be referred to situations that usually change and so the interorganizational dynamics. (Van de Ven & Poole, 1995)

Changes can have qualitative and quantitative effects. In the first case there is change in qualitative variables of the network, for example in roles or functions. In the second case there is a change in quantitative variables, an example could be the variation in the number of jobs, of employees and so on. From this perspective is

clear the wide nature of the dynamics of a network that could change completely the context and the organizations studied. On this direction numerous literature studies have been made and the result was a more or less complete list of possible changes that could occur in network dynamics (Majchrzak et al., 2015):

- Goal dynamics: the goals of the network or of a member of the organization are changed. This will lead to numerous variations in the nature of the network that have to be considered in the analysis phase.
- Contract dynamics: the contracts that are regulating the relations between different actors in the network have changed. The nature of the working of the entire network is changing too and this will have deep consequences on the analysis.
- Interaction-style dynamics: this change is referred to a behavioral change between the actors, the nature of this voice states clear links with the previous one.
- Decision-making dynamics: usually in the network the decisions are made by some agreements between organizations and the center of the network. This process could see different changes in the authorities for the decision making and this has big effects on the network functioning.
- Structural and actors composition dynamics: the change in the composition of the network, with the change of the structure or of the number/nature of actors.

The description of the different type of changes in the dynamics of a network gives us a clear scenario about these shifts. To expand the level of the analysis some sources of these dynamics have been found. The reasoning could start by *partner differences*, when in the network there are differences in terms of partner's nature and interests. This makes possible the emergence of conflicts that could lead to changes in networks and so in dynamics. Usually partner differences are the most common sources of dynamics in networks. *External factors* also have influence in these changes, the environment of the network plays an important role in terms of dynamics, contributing to direct the efforts and the directions of the strategy for the entire organization. Finally, *internal factors* are playing an important role too, including all of that changes that comes from the inside and that will lead to different dynamics as change in actors composition or changes in internal agreements and contracts. (Majchrzak et al., 2015)

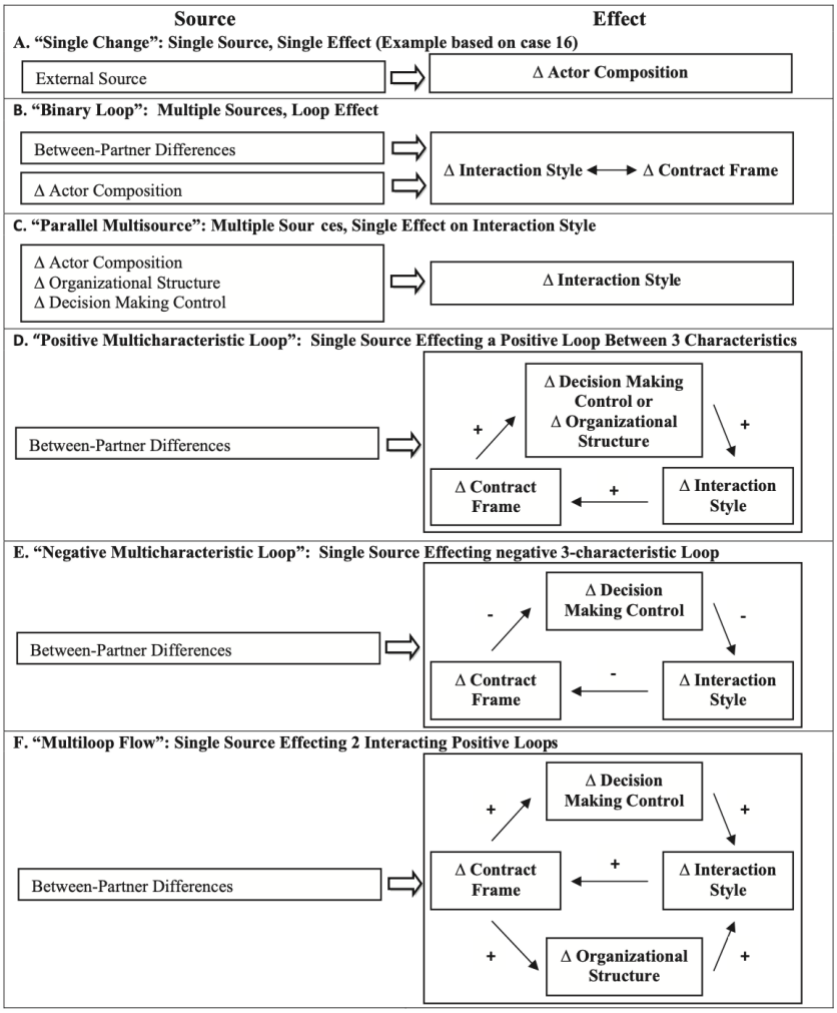
In addition, there have been identified some patterns referred to interorganizational dynamics in the networks, these schemes try to give a clear vision of how these dynamics work and how are going to change the nature of the network. In the article of Majchrzak et al., (2015) there are six main patterns that describe different dynamics in the network, these could be useful to better understand the functioning of these dynamics and could be listed as follows:

1. Single change;
2. Binary loop;

3. Parallel multisource effect;
4. Positive multi-characteristic group;
5. Negative multi-characteristic group;
6. Multi-flow group;

To give the reader a better idea of what these patterns mean there is a table included in the same article that is giving a representation of the dynamics in each of these patterns (Figure 9):

Figure 9: patterns of dynamics in the network



Source: Majchrzak, A., Jarvenpaa, S. L., & Bagherzadeh, M. (2015). A review of interorganizational collaboration dynamics. Journal of Management, 41(5), 1338-1360.

These patterns are just a representation of the different dynamics of the network, the way how they are describing these changes is a clear example of the multitude of the types of shift that a network could suffer. The relation between source and effect is fundamental to understand in phase of analysis how the network is changed and why it happened.

III. METHODOLOGY

1. Research Strategy

In order to introduce the topic of the research strategy, the author considers important a brief introduction on the concept of grand theories and middle range theories (Merton, 1967). We consider as *grand theory* a theory that explains in general a topic, so that from a very broad view of it. On the contrary, a middle *range theory* is seen as a theory that is a bit more specific, where the topic is treated in a more precise way. Speaking in terms of management researches, it will certainly be more significant the second type of theories than the first one. This is because of a more precise indication of the topic you want to study. (Bryman and Bell, 2011).

In this thesis work the theory regarding the argument chosen is not abundant, mostly because of the recent nature of the subject chosen. Mobility as a Service is a phenomenon that is being developed and implemented in these years, making difficult the process of creating theories related to it. In this direction, in fact, the information collected are coming by case studies that are evidencing some important aspects of the argument, contributing to formulate some first steps of theory. Naturally, in this thesis MaaS is representing the case of study, the method of analysis is related mainly to network analysis and, in addition to this, there are some considerations related to business model theory and innovation, considering their effects on networks' strategies and organizations.
The approach that will be followed during the research will be mostly an inductive approach where, based on the research results, the author will try to find appropriate answers related to practical and theoretical aspects. The author will also use an iterative method to proceed, where the analysis will be more focused thanks to the data collected in the interviews, shrinking the research focus in relation to data collected and processed. Considering what mentioned before, only deepening the knowledge on Mobility as a Service there could be a proper focus of analysis. The absence of strong theoretical foundations on the subject will give importance to the phase of data collection, underlying how from this process will be possible to overcome this literature composition.

The research strategy can be defined as the orientation of the research work and therefore the choice of different methods to arrive to a specific thesis goal. Could be recognized two main methods of data collection (Bryman and Bell, 2011):

1. Qualitative method: qualitative interviews;
2. Quantitative method: analysis of data that can be collected in different ways, e.g. questionnaires.

In the first method, therefore, importance is given to concepts, words over numbers. In the second method,

on the other hand, the data collected represent the pivotal point of the research, so we will be faced with an analysis focused more on analytical and numerical factors.
The pros and cons of both methods are therefore linked to their nature, certainly a quantitative analysis leads to more objective results, but it lacks depth, due to the absence of interaction between the interviewer and the interviewee, so there is no real dialogue and you cannot get to the bottom of the topic. As far as the qualitative method is concerned, however, it can be problematic that the data collected can be influenced by several factors, such as personal impressions on a topic, and therefore can be somewhat distorted and will not be very objective.
In order to overcome this problem and to exploit the strengths of the two methods at best can be mentioned a new research strategy that combines qualitative and quantitative methods to obtain the final results: the mixed strategy. (Bryman and Bell, 2011).
Of course, in this case the challenge is represented by the coordination of the two research methods that will have to give results compatible with the final objective.

In this thesis work the theoretical framework related to the case studied is recent and continuously changing, given the dynamics of the mobility industry. This means that the first data collected have to be used to understand better the case and to adjust the theoretical researches made in this direction. The choice regarding the strategy of this work is based on qualitative analysis to better understand the theoretical basis of the topic, to have a first smattering of data and then have an initial impression on the research demand. Subsequently, to better answer to the research questions, a round of interviews will be made, focusing properly on the argument of the thesis thanks to the knowledge acquired in the previous phases.
The strategy chosen in this work is a qualitative one, given the importance of the information regarding this method in terms of appropriateness for the research goals and also for the interviewed actors. In fact, the argument chosen is regarding some strategic and organizational aspects of MaaS that could be discussed only by few corporate figures, only a qualitative interview could be appropriate to this purpose with this scenario.

In conclusion, the results obtained will have to be analyzed and studied considering the various distortions related to personal opinions and other factors that may alter the final results. Surely the qualitative data will have to be analyzed in this sense, underlying the differences between different realities analysed and different figures interviewed. The perspective of the interviewed actors are multiples and are contributing to give this work a dynamic point of view where the argument is analysed considering the differences in terms of organizations, strategies and needs regarding the profile interviewed.

2. Research Design

Once the focus on research strategy is complete, the analysis will shift on the research design choice. The scope of this paragraph is to have a clear understanding of the choices regarding the research design made by the author to achieve its purposes. In literature can be distinguished different types of research design, each of which represents a different way to set the research work and thus to obtain the desired results. Listing briefly the different research designs methods, the author could choose between (Bryman and Bell, 2011):

- Experimental design;
- Cross sectional design;
- Longitudinal design;
- Case study design;
- Comparative design.

Each of these methods represents a different way of organizing work and therefore a different design for the thesis work, so depending on the subject matter, on the information available and on the working method the author will choose the most appropriate design to use for this master thesis project.

MaaS is an argument that, as mentioned in the previous paragraphs, has recent literature data that is not structured effectively. The developments in mobility industry are continuously adding theories on this subject, making the previous knowledge obsolete. For these reasons the choice of the right research design is important. Precisely most of the thesis work can be carried out thanks to interviews and therefore thanks to the analysis of concrete cases. Considering this, the focus can be referred to a *cross sectional design* that has different interviews and cases studied and observed to understand from them the common aspects of this argument. Considering the cross-sectional design there could be listed different precise characteristics of this method (Bryman and Bell, 2011):

- *A constant comparison between different cases*: for example, in this thesis the author will try to compare the different points of view of automotive OEMs and also of the different stakeholders, in order to have a clear vision of the subject and to try to overcome the absence of theory;
- *The data collection takes place in a precise time frame*: for example, in this thesis the data will be collected in periods entirely dedicated to interviews and so to data collection, that will be scattered during different months. This is because with several interviews in different time periods the author

will try to have a more dynamic view of the topic and so how the MaaS network changes with common mobility dynamics;

- *The choice between qualitative or quantitative data*: in this work the qualitative data collected from the interviews will fundamental as it will be difficult to collect quantitative data from large companies operating in the mobility industry and also because the RQ of the thesis needs more a qualitative approach than a quantitative one;
- *Study of variables*: the variables will be compared to understand and study the relationships between them in order to answer to the RQ. In this thesis project to understand how the dynamics of a network are influencing the organization of the network itself.

A fundamental concept when applying a cross sectional design analysis is certainly that of the validity of the results. In fact, it should be assumed that the cases analysed represent a significant sample of results and can therefore be taken into consideration to develop a theory on the subject. The question however will be answered in the next paragraphs that will be properly related to this topic.

In conclusion, cross sectional design seemed to me an opportune choice to analyze a complex topic like MaaS, where different realities are interfacing each other creating different working links. In order to make the work wider and therefore to try to get more information about it, it is certainly useful to have a longitudinal vision and method, which considers different situations at different times in order to actually understand the changes of the companies considered over time, and therefore the way they innovate their business model according to the cases analyzed.

3. Research method

In defining the methodology, the author defines the methods for the data collection and the reasons that led to the following choices. Surely, the analysis will have to start from a theoretical foundation, so the literature review has to provide the necessary elements for the development of the next phases of the study, giving the proper knowledge on which, the research work has to be based. The collection of information, in fact, will follow the scheme selected for the theoretical framework considering these arguments as the basis of the thesis project.

In this work will be followed a strategy where the qualitative data are representing the main source of data to use to answer to the research question.

This method has been chosen because of few theoretical foundations referring to the subject, in fact an analysis of this type can be an excellent way to search for the principles and fundamentals behind the mobility as a service mobility innovation and especially the choice of this integrated-mobility mode by the

customer.

The objective of qualitative interviews is therefore to understand the impact of such a change at network level and organizational level, trying to analyze the impact of the dynamics of mobility in MaaS network and how these have a proper impact on the roles, goals or structure of the network itself.

Given the recent knowledge on the subject, the author decided, in a first moment, to leave the interview without a rigid or defined structure. The interview method chosen for the first meetings could be defined as unstructured interviews, i.e. a real conversation between me and the interviewee. In this way the direction of the thesis project will be clearer, and a defined direction will be taken to formulate and answer to the research question. In any case, it will be important to consider the concepts of internal and external validity during the construction of the speech, and then to analyze data that are significant in any case.

When the thesis will have a defined structure, and the argument will be clearer, there will be the main phase of interviews that will be useful to answer to the research question and also to properly do the thesis work. These interviews will be semi-structured and will mainly follow the structure of the literature review, trying to analyze the elements that could contribute to networks dynamics. The interviews are following a semi-defined structure and are adapted in relation to the person interviewed in terms of position covered in the company or also in terms of company's nature. Generally, a scheme of the arguments threated in this section could be made:

1. General analysis of the company;
2. General of the position covered by the interviewee, considering also his/her cultural background;
3. Analysis of mobility as a service knowledge, including definitions and previous experiences in mobility area;
4. Analysis of the network-functioning knowledge, trying to collect data relative to the company's network (if possible);
5. Analysis of common traits of network organization;
6. Analysis of network dynamics in terms of strategy and organization;
7. (If possible) links to dynamics referred to actual Covid-19 outbreak and its impacts on mobility and on networks of new mobility.

The structure used is trying to answer to the RQ collecting information from different perspectives, given the nature of the interviewee. In the next paragraph, regarding the primary data collection, there will be a clear definition of the criteria used for the selection of the profiles interviewed in order to give a broad vision to the argument studied, not focusing only from a single reality perspective.

In conclusion, the selection of the survey design will be of fundamental importance, as it can be crucial for the data collection and the quality of the data collected (Bryman and Bell, 2011). The methods just mentioned will therefore have a fundamental value for the thesis work. Innovation in mobility represents a great challenge that can also be analyzed through the observation of concrete cases not focusing the analysis from one single perspective but studying different realities that are collaborating for the same service.

3.1. Secondary Data Collection

This paragraph of the methodology will cover the collection of secondary data, given the importance of these for the planning of the research work and also for the defining of the research question. Literature has to be seen as the basis of the entire thesis project, giving basic information regarding the argument chosen and helping the author to identify a proper point of analysis. (Bryman and Bell, 2011)

Thanks to the information collected in literature was possible to formulate a proper research question, given the complexity of the argument and the wide variety of analysis that could be made. First, the information gained were useful to have a proper knowledge about the Mobility as a Service concept and about what could be the possible point of view to start the analysis process. Then, the importance of innovation in the topic chosen pushed the author to collect data also on innovation in business models. This was made to have a clear understanding of the differences between the classical product-based business model and the new service-based ones. The differences and the information gained in this direction were fundamental to shift the analysis in the direction useful for the research question formulation: the networks organization. Network's researches started with the overcoming of literature of the classic value chain concept made by Porter, the interests for the topic and the coherence of this argument referred to MaaS gave the possibility to find the network analysis direction and to follow this process also in literature research.

To do that were used and identified some keywords that were useful to find articles, reviews or books. Starting from what is known by the research and arriving on what can be added and analyzed from this thesis project (Bryman and Bell, 2011). The keywords used to find literature could be resumed as: Mobility as a Service, innovation in mobility, general trends in mobility, Mobility as a Service cases in Sweden, Swedish transports structure, Mobility as a Service business model, business model analysis, business model canvas, business model value chain, business model innovation, value chain, service value web, networks, ecosystems, networks analysis, networks dynamics, interorganizational dynamics in network.

The platforms used to find articles and to collect data were mainly the ones that the author knew. Starting from the Luiss Library platform, used also in other research projects, arriving to Web of Science and also Gothenburg University Library. Google and Google scholars were useful to find relevant articles regarding

the MaaS themes, in addition to this the author used also some consultancy companies' database, overall the McKinsey one. The research was also guided by the help of the Swedish and Italian supervisor, Prof. Sven Lindmark and Prof. Luca Giustiniano, given the contribute in terms of arguments and keywords to use. Finally, the research was coordinated also by First to Know, to have a clear direction of the work in terms of future interviews that have to be found.

In conclusion, the articles have been selected not only by the results of the keywords used, but also by the relevance of the article itself. Two indicators of this are the number of citations and the existence of peer reviews of the literature selected.

3.2. Primary Data Collection

Primary data collection represents for this thesis project the main way how to collect empirical data and to answer the research question. The method used to do this research work is the interview one, important not only to collect information about the argument, but also to have different opinions or points of view that I phase of analysis could be important to understand better the entire context (Bryman and Bell, 2011). In this direction, in fact, the purpose of the author is to have a detached perspective related to realities analyzed to properly be able to understand the differences in these realities and to promote their opinions in the analysis phase.

The scope of the interviews was to understand in a first moment the MaaS situation in Sweden, to have a clear idea of this argument and continue in the research job. Then, the author focused on the analysis of the MaaS from different perspectives given by the different actors interviewed. The scope of this is to understand if the dynamics that usually happen in a network could represent a problem in terms of organizational aspects or strategies. In addition to these, a focus on innovation valence of these dynamics has been made and, when was possible, also the topic of how Covid-19 situation will impact on mobility was touched.

The interview type chosen is the semi-structured one, thanks to the attitude of this type of interview structure to flexibility in terms of data collected and to free-speech advantages in terms of information gained. This in a thesis project where the environment analysed is really dynamic could make the difference. Also, during the interview process were considered the different errors or distortion that could happen in the semi-structured ones, trying to avoid all of this and to have collected valid and consistent data. (Bryman and Bell, 2011)

The structure of the interviews, as said above, is semi-structured, the interviews were adapted considering the figure interviewed, the company to which belongs or the knowledge of the argument of the interviewee.

To give a better understanding of all this method the different interview guides will be present in the appendix.

The selection of the cases used in the project was at the beginning focused on MaaS providers and then shifted on different actors that have been or are working in mobility as a service networks. The actors were identified thanks to First to Know contacts, in the figure of Per Östling, using all the industries that are involved in mobility projects: automotive, technology, research and innovation hubs and finally also public sector actors.
All of this to have a well-structured network of cases analyzed that could provide this project the information useful in terms of analysis. A convenience sample was used to find interviews having access to company's information and easily findable contacts. (Bryman and Bell, 2011).

As mentioned above the managers interviewed are belonging to different industries, involved in mobility projects. To give a clear identification of the figures interviewed, these are listed below:

- Markus Aarflot – Business Developer @ *UbiGo*(30 mins interview) – General/Initial Interview;
- Jonas Mårtensson – Head of strategy @ *Care by Volvo* (50 mins interview);
- Per Gyllenspetz – Owner of *Yacht and Cars* (40 mins interview);
- Christian Reidl – Project Manager @ *MobilityXLab* (50 mins interview);
- Lars Erik Lindberg – Innovation Leader @ *Ericsson Garage* (30 mins interview);
- Anders Tärnell – Head of Digital Sales @ *Hertz* (30 mins interview);
- Hans Arby – Founder of *UbiGo* (50 mins interview);

4. Data Analysis

The data analysis will initially focus on understanding the direction of the thesis project, focusing then on the identification of common arguments referred both to interviews and literature review, following the Gioia's scheme. (Gioia et al., 2013)

Starting with qualitative analysis, the author will use the method of thematic analysis with specific reference to grounded theory (Glaser et al., 1990). In this sense the text will be analyzed first to choose the most significant data of the interviews, then eliminate superfluous information or information that is not relevant to the purpose of the interview itself. Then the work will move on to the *coding* tool phase, concepts that are repeated during the interviews and that can be considered separately to make more clarity. In this sense can be quoted Strauss and Corbin's theory (1990), where three levels of coding are

distinguished:

1. Open coding: the process by which codes are identified, then the interview is dissected according to the codes identified;
2. Axial coding: after being split, the codes are merged again to search for matches or relationships between them;
3. Selecting coding: the codes are then divided into categories. These are used to consider and group codes that perhaps deal with the same subject and can therefore be considered together.

Another useful grounded theory tool is the *constant comparison*, the data obtained from interviews should be continuously compared in order to have an updated theoretical basis after each interview. This is because, as already mentioned, the literature review represents in the case of mobility a static approach to the topic that can be useful when referring to a preliminary knowledge of the subject. Since we are talking about innovation in mobility with mobility as a service, a continuous comparison between theoretical data and interviews is representing a relevant method to learn more about the dynamic's effects in networks.
The final output will therefore consist of concepts that will be analyzed and studied, thus having information that can then be grouped into categories, which can then be studied. The properties of the categories themselves will then be grouped understanding the thematic common with these categories, useful at a later stage for the formulation of hypotheses that will subsequently lead to the study or formulation of theories. (Gioia et al., 2013)

5. Research Quality

Quality represents an important aspect to take in consideration when referred to researches' works. In order to understand and verify properly the quality asset in this thesis work a brief reference to this theory has to be made. To define the quality of a research job there are different requirements to take in consideration (Bryman and Bell, 2011):

1. Validity: referred to the accuracy and to the correctness of the research results and information. In this thesis two concepts, present in the different validity classifications, will be important:

1. *Construct validity*: i.e. the search for hypotheses theoretically relevant to our research question from interviews;
2. *Convergent validity*: in this way we compare the results obtained with different interview methods, it is important when integrating the amount of data collected through qualitative interviews with those collected through quantitative interviews.

2. Reliability: referred to the capacity of repeatability of the research document, do indirectly to its overall

quality;

3. Replication: referred on the repetition of the same methodology of the work, obtaining the same results in terms of research and quality of the job.

Applying these elements to a qualitative research needs some adjustments, in this direction a reference to internal and external validity has to be made. The first one is referred to the quality of the work itself, giving the same conditions another analysis will conduct to the same results or conclusions of this thesis work. The second one instead is expanding this definition not just to the researchers' world but also to the real one, considering the conclusions of the research process applicable also in the real society. (Bryman and Bell, 2011)

Considering the peculiarities of the qualitative research method there are other studies and theories that are going to validate this thesis perspective and that have to be cited in this methodology. Trustworthiness is the main element to refer when considering a qualitative research, in fact validity and reliability usually fit better with quantitative research, that are following fixed and established techniques and metrics.
Referring to trustworthiness means to refer mainly to the following three points (Anney et al., 2014) (Bryman and Bell, 2011):

- *Credibility*: the work and its results have to be credible. This means that there have to be a specific effort in the selection of the arguments in terms of research question and in terms of literature review. In this thesis the research work started with an initial analysis on mobility innovation and arrives to network analysis of this industry and environment. There has to be also a valid research of the interviewees, their figures have to be valid in terms of the thesis purpose and also in terms of final goals. To do this the selection was based on career information, mobility experiences and some additional knowledge about the interviewee given by First to Know employers.
- *Transferability*: the conclusions of this thesis work could be applied also in other situations, contexts or environment. It's about the generalization of the results of the research that have to be valid not only referred to the research conditions, but also in other situations.
- *Confirmability*: it's about the detachment of the author and of the results from any personal influences. The research work has to be more objective as possible, starting from the identification of the first literature review documents and arriving to the last interview session. Obviously, this thesis won't have any quantitative or "sure" data but will be based on opinions of different actors involved in MaaS. The choice of a multi-lateral analysis is trying to remedy to this qualitative researches' characteristic, providing a final and fair-minded thesis.
- *Dependability*: the results of the analysis of the study will be completely based on the information

gathered during the interviews' processes. All the adjustments that have to be made to maintain a clear direction in this thesis work will come from an evidence obtained from the understanding of the interviews, in doing so the entire work will adapt to the real-society circumstances.

In conclusion, the methods just mentioned will therefore have a fundamental value for the thesis work. Innovation in the mobility and especially in MaaS network represents a great challenge that can also be analyzed through the observation of concrete cases trying to understand the dynamics and the real functioning of a recent and interesting argument.

IV. EMPIRICAL FINDINGS

1. Volvo Cars Interview

Volvo Car Corporation is an automotive company based in Sweden that produces cars since 1927. Actually is owned by the Chinese group Geely and is operating not only in the automotive sector, but also in transports in general.

The production of Volvo is very varied and goes through cars, trucks and other industrial transports. The Swedish company is based mainly in Göteborg, but other locations are present mostly in all the world, respecting the presence of this OEMs in other markets.

The spot of Volvo is *"designed around you"* but has been famous for years to be really consistent in terms of security of its vehicles, becoming leader and innovator in this characteristic. Then, with the increase of competition and also with the growing of the car market, Volvo cars started to be seen as a quality product, appreciated not only for safety but also for other aspects like the premium quality of the components and of the cars. This introduced Volvo in the premium market of the automotive industry, with prices of cars that could be easily compared with its competitors that are Mercedes-Benz, BMW or Audi.

Volvo is representing perfectly the Swedish culture for innovation, being actively involved in some solutions for the new mobility generation. Starting with the introduction of SunFleet, that provided a car-sharing service for some Swedish cities like Stockholm or Göteborg and arriving to M by Volvo and Care by Volvo. These last two projects are representing the main innovations (excluding the vehicles related one) that are affecting the business model of the Swedish automotive company, introducing new lines of business and new ways to manage and work with the value chain. Explaining these two services there is M by Volvo that is a premium car-sharing service based on information gained from the experience of SunFleet. The difference with the previous model is the organization of the service in terms of fleet available and usage that is making this innovation very competitive in this industry. The second, Care by Volvo is a completely new experience of selling and using cars, based on the concept of the servitization of the vehicle offer and so on the concept of the vehicle or mobility as a service.

This last point represented the main focus of the interview that has been made to Jonas Mårtensson, head of strategy for Care by Volvo department. Jonas worked for ten years in automotive companies, the roles covered are regarding the electrification, the innovation of business model or the transformation of business models, arriving at the end to business development positions. Then he joined Volvo Cars in 2016 working on corporate strategy and, from 2019, is at the head of Care by Volvo strategy.

1.1. Mobility as a Service

The interview started with the analysis of Care by Volvo that was representing a typical example of actor in new mobility concept and in mobility as a service. Jonas Mårtensson explained that Care by Volvo is mainly three things:

1. A MaaS offer there is a monthly fee that has to be paid to the provider, in this case Volvo, to have the access to an offer that will be a completely new experience for the customer. In fact, behind the normal usage of the car there will be a complete maintenance, insurance and all the services related to that product that are included in the one monthly fee paid. All of this configures Volvo as a car-as-a-service provider, being at the center of his own network and operating to guarantee the customer a complete integrated experience of usage of the vehicle.
2. A new way to sell the product: there is not the centrality of the dealer anymore, but there is Volvo that is interacting directly with the customer. In this direction there have to be a complete revolution of the dealer's organization structure, because they are going to lose most of their selling power. In this direction the importance is to consider a new role for them, useful for example for fleet management, that is going to include the traditional dealers into the new service offer.
3. Direct contact with the customer: the company, that usually dealt only with dealers, now is in direct contact with the customer, having to consider so new things in the value chain and in the BM organization that will provide the effective value, and so the right service, to him/her.

The attention then went to the identification of Care by Volvo in the mobility as a service area. Jonas underlined the links between a car-as-a-service offer and a mobility-as-a-service one. This link is the experience of the customer that is not owning directly the car anymore but is only using that for a defined time frame. Importance is given to the experience of the customer that in this case has the flexibility, integration and efficiency characteristic of an integrated system of mobility as a service, even if in this case is more appropriate to say car-as-a-service. Volvo also could be considered a MaaS provider, if considered the different services in which is involved in, like for example car-sharing (M by Volvo). So is present a real network in which the company is at the center, facing with all the dynamics and the problems of the functioning of it. The final aim is to provide the customer a choice of different methods to have the access to the vehicle, just as the mobility as a service traditional concept, but applied just for a private OEMs company.

1.2. Value Network Analysis

Care by Volvo can be seen as a strategy where the company enters in contact with a combination of service providers, exchanging tangible or intangible things and so forming a network. The exchanged things are important to define the structure of this network and so the roles that companies are playing in it. Examples of intangible and tangible components of the offer have easily been made: maintenance (tangible) and insurance (intangible).

In general, the main actors involved in the network of Care by Volvo are:

1. The retailers/dealers: are representing the way how physically the car is delivered to the customer, the importance of these is mostly about CRM, trying to make confident the customers with the product (service) offered and trying to be a part of the complete process to gain the fidelity of the client.
2. The maintenance: these actors are the ones that provide help to the customer in case of some ordinary or extraordinary accidents. Usually every 30000km cars need maintenance and with the Care by Volvo offer this is completely included in the price.
3. Insurance companies: are playing an important role in the network because of the importance of the services provided. The insurance payments are one of the most relevant costs that a customer considers when uses the car, including it in the offer make this service very attractive and competitive in the industry. Volvo Cars usually have different insurance companies depending on which market is operating.
4. Logistic companies: this segment is important in two phases of the service life. First when the car leaves the factory and has to be delivered the customer, second when the experience of the customer finishes and the car has to return to the dealer or to the factory. These companies are usually providing these types of services allowing Care by Volvo to work effectively.

All these relations mainly are managed with contracts, in this case the main focus is on direct payments to have the performances. An exception could be made for the insurance companies where, a part of the monetary part, there are agreements on the quantity of the vehicles per year that Volvo has to provide to the insurance company. Contracts dynamics are the most frequent ones and the importance has to be focused on the contents of these contracts that could vary and could change the network conditions.
The main goals of Care by Volvo program are related to the customer experience. Is important for Volvo to have loyal customers that are more profitable and easier to manage and attract respect to new ones. So, the most important focus of the network can be the centrality of the CRM and of the customer's experience that has to be preserved and studied to obtain the best results for the entire network.

The Care by Volvo environment is a dynamic one, given the continuous innovations that are occurring in this segment and giving the customer preferences that are always changing. Considering the network studied in this interview the main dynamics could be referred to the retail sector and to the objectives of the company in terms of the way how the profits are generated.
For the first one there is a shift from the traditional way of selling cars to the new experiences that usually haven't the owned vehicle concept but the usage of the vehicle concept. The way how dealers are managed and treated has changed as their tasks, giving more importance to the central company. There is a real centralization of the interests of the program that has to be considered when talking about the Care by Volvo horizon. For the second one, there is a shift of interests of the company that before wanted just to sell the cars

to make money, giving importance to some indicators like the number of cars sold, and now are considering the portfolio of customers as a profit source. Customer in fact if managed well will give returns to the company, so the scope of the entire goal of the network is completely changed and, with it, the strategy of the network. The owning of a profitable portfolio of customers could represent a big advantage in terms of profits and future strategies for the company.
These changes perhaps have important effects in terms of innovation and growing of the projects. Jonas defined them as the *pains for transformation.* A company deals everyday with new ideas that leads to new concepts of business models and this is not just something that could damage your realty but also is something that is going to create opportunities. To catch these opportunities there have to be the predisposition for the company to change and to adapt to these stimuli. The dynamics seen for the network of Care by Volvo are an example of this and are representing a way to better adapt the structure/goals of this network to new necessities and so to new opportunities.

The concept of an integrated version of mobility as a service is gaining importance today, this will require an integration between different actors that could collaborate to give the final customer a completely new experience for moving in and out the city. This view is representing a big challenge in mobility world and in the future will be important, will represent surely something that will happen and will change our habits.
The expectations are that the public authorities will forbid more and more mobility options for the future, considering for example sustainability regulations, and in this case the mobility as a service will become a fundamental way to organize the traffic in the urban areas. Being part of it could be a big opportunity for both private and public actors. In conclusion, all will depend also by the countries because the transportation system in Sweden is completely different from the one of Asian countries or of the US, where different actors could play important roles in mobility.

2. MobilityXlab Interview

MobilityXlab is a three years old hub based on the needs of different key mobility companies in Sweden. The aim of this organization is to give a chance to these companies to embrace the innovation process and to involve in this process also start-up companies. The difficulty of the innovation process in big companies sometimes is related to the myopia that these organizations have, avoiding contacts with other realities and basing their processes merely on internal competences. The strength of the Lab is to push forward this process and to create the collaboration between big and small companies, trying to make the innovation process more open to external sources. Usually the teams are composed of six organizations and are managed by a project

management team. MobilityXlab is seen more than a simple incubator of ideas because is connecting effectively different realities providing them the capacities needed to succeed in their innovative processes.

Our interviewed is Christian Reidl, project manager for MobilityXlab with many experiences in automotive sector and in mobility. Giving some more information, Christian has been collaborating for Volvo Cars, and has founded some important start-ups in Sweden. Its experience gives him the knowledge to manage the relationships between the different organizations in the MobilityXlab environment, trying to conduce innovative projects to the realization and collaborating with many realities to share knowledge and resources useful for this aim. Christian defined the MobilityXlab projects as different ecosystems where companies could grow and innovate, his role is in the middle of the ecosystem trying to give a direction and to protect the spirit of collaboration that is central in the innovation processes.

2.1. Mobility as a service

Mobility as a service process is important in terms of integration between different realities and surely in the future will provide a better alternative to move inside and outside the cities. The difficulties in this scheme are in the nature of the mobility market and in the effective collaboration between different actors involved in this new type of network.

Regarding the transports market, the environment is not stable in terms of vehicles and technologies, in this field there are a lot of opportunities for companies to disrupt with an innovation the market. In terms of habits this is different, the market is not changing easiliy and needs some important efforts to make this happen. Collaborations between different realities are important in terms of innovation but the projects have to be well implemented in realy, where the situation is completely different. The result is a complex system of elements to control properly and so a difficulty to implement the service in short times, but in long times maybe the situation will change and there will be more opportunities also for these projects. MaaS providers are good in data collection and in customer needs identification but they need more to be successful, this is not enough to create a real disruptive innovation. There is the need to find a proper BM for MaaS, to let these collaboration dynamics be more effective and not problematic, this is the real challenge for Reidl.

2.2. Network analysis

MobilityXlab is more than a simple network, is defined by Christian a “club” of companies that want to innovate in mobility. The main element exchanged is the knowledge and some resources that usually are not available for small companies. Also, the effective collaboration between small and big companies is problematic, it’s difficult to have a contact with established big realties and to collaborate with them. In this case there could be an advantage in participating in a reality like MobilityXlab that provides a proper collaboration, regulation and incentive to start an effective and successful innovative process.

Usually the network of MobilityXlab is composed by six companies that are chosen in an application process where the profiles are evaluated to understand if they are good in terms of characteristics to participate in the project. Is important the role played by the project management team that is located in the center of the network, maintaining stable links between the organization and regulating the exchanges between them. The most exchanged thing is knowledge, so the intangible assets are representing an important element to be protected and exchanged. In this sense the partecipants of the project are accepting rules and fulfill the duties relative to the correct functioning of the network.

What emerged by the interview is the hierarchical perception of the network organization and the need to restrict this in order to avoid vertical types of relations that could damage the innovation process. The relations of the network have to be protected and horizontal, the role of the MobilityXLab team is a coordination role, to protect and manage the innovation process.

Dynamics are present continuously in the network and are characterizing the entire functioning of it. In the case of MobilityXlab the main changes are in the roles that are involved in the process of innovation. Company's role turnaround, especially for young profiles, are very frequent and are representing a big challenge for networks in terms of dealing with dynamics. Innovation/project managers are rotating quickly in different projects and this could represent a limit for the entire network because could damage the continuity of the innovation process. This speech is corroborated by the fact that the most exchanged element is knowledge, hardly to substitute and to replicate. The solution to this could be a proper regulation in the network that could give a stable environment to the organization to continue and implement the innovation funnels.
Another dynamic that happens usually in the MobilityXlab network is the regulations one. Christian refers to the author that the automotive industry is one of the most regulated sectors in the market and these regulations could change giving the networks dynamics that have to be faced and managed to create opportunities and avoid errors. The increasing level of regulations and standards is a big challenge for the startups, that's why the collaboration part in the network is very important.

In conclusion, dynamics have to be managed with attention, avoiding errors that could damage the entire innovation network. They are representing a big opportunity to grow and to change, but it's very difficult to create a really disruptive innovation for the market. That's why there have to be a big care referred to the processes and to dynamics to not damage the innovation process but, if this happens and is worth to do it, to disrupt it.

3. Yacht and Cars Interview

Yacht and Cars is a company based in Gothenburg that is involved in different innovative projects regarding automotive industry and mobility. The vision of this organization is to create the perfect environment for the creation of a new sustainable way to move, reducing pollution and traffic jams and increasing the awareness of the customer for these themes. The main results of this type of work are different and are spacing from automotive innovations like the collaboration with Volvo Cars and the studies in autonomous drive technologies and advantages, arriving to different mobility innovation where there are some initiatives that would change aspects of transports and logistics inside and outside the urban area. Actually, this company is involved in the *Göteborg 2035* project. Thanks to this, the Scandinavian city will change drastically in the next years aiming to become a greener and more sustainable city in order to improve the quality of life of its citizen and also local economy.

The figure interviewed is Per Gyllenspetz, a manager with experiences in automotive companies like Volvo Cars, operating in the strategic part, and the founder of Yacht and Cars. Talking with this profile it's clear the vision of the entire company, the interests about new mobility solutions and also about the future of automotive industry. Actually Per is working on new automotive and mobility ideas, trying to give the Swedish cities some initiatives that are increasing the sustainability of transports in the urban area, an example of this could be represented by the attention on electrification and automatization of the vehicles, that is one of the main interests of the founder of Y&C.

3.1. Mobility as a Service

Mobility as a Service is a new and complex topic, there isn't a single definition but there are more explanations that have to be adapted to different cases. In general, MaaS means integration of the transport systems giving the customer a new experience of travelling. The sustainability effect of this is relevant, in fact considering a proper integration of different transport modes there are advantages in terms of reduction of traffic in the urban areas and also in terms of pollutions. There have to be a collaboration between different actors, involved not only in mobility, to make this service work properly.

The real problem of the implementation of this service is the creation of a proper business model, considering that now it is just more than an idea. MaaS is a great innovation in mobility but needs to be practically implemented, to do this there has to be a proper organization of the business that now is absent. In fact, now this is representing just a theory, an idea, that, a part of the network created and existent, needs a business model that considers all the aspects of the MaaS journey to make it profitable. Per concluded talking about this argument saying that MaaS is good in theory but in reality, there are not too much proofs of it, this is the confirmation of the embryonal state of this business that needs to be developed to be actively implemented. In this direction the efforts of the provider and also of the members of the network are important.

3.2. Network Analysis

Different actors are involved in MaaS, some of these aren't part of the mobility industry but are belonging to sectors that are related to the main one. Examples could be the involvement of a real estate company in the project, with the importance of the right urban structure of the city also in terms of parking slots. The composition of the network is not too relevant to Per, that collaborates with UbiGo some years ago. What is important is regarding the different elements that are fundamental for the analysis of the inter-organizational dynamics of the network: roles, goals and structure.

Regarding the first ones, there is a problem given by the fact that usually there are not too much efforts in companies for these types of innovations. This is due partially for the absence of roles dedicated to these projects and this is avoiding the company from having a correct structure and involvement in innovative projects like MaaS. In addition to this argument the collaboration between different roles, inside and outside the companies, seems to be problematic sometimes. Every unit in the organization has its objectives to follow, sometimes this leads to different interests that are obstructing the effective collaboration in innovative projects. There is the need to a proper orientation of the entire company, with the right roles, to innovation and in the case of this thesis in MaaS.

In relation to what sentenced by Per Gyllenspetz before, there is the absence of a collaboration and innovation spirit that is reflecting on goals of the company. Companies usually are focusing only on their single interests, avoiding the involvement in projects that are regarding something bigger as a societal innovation. Profits are more valuable than future advantages for the society and this is reflecting also in the fact that in MaaS the main difficult is to assure the organization involved a concrete perspective of revenues, considering the high costs that these companies have to face in this project. In this direction there has to be a tendency to work together in the organizations and in the network. Covid-19 pandemic is a big lesson on this direction, the importance of being together and work together is underlined by the difficulties of our times, highlighting the difficulties of the companies to work and act as a single entity also in a network perspective. This could represent an obstacle to the network's objectives and goals that have to be integrated and unique.

Intangible assets are representing an important element exchanged in the network, given the importance of additional knowledge regarding the service and also given the importance of data. This second element is surely a fundamental asset in a network functioning perspective, data are useful not just internally but also externally. In this direction, the understanding of customer needs is a relevant competitive advantage to use in Mobility as a Service initiatives. This is also defining the different relevance of the organizations in the network, considering the increasing power of companies that have access to important data. Data has to be

considered as an important asset, but also as something very delicate that has to be threated in a secure way to avoid abuses of information regarding the privacy of the customer.

Networks has to be well-managed and coordinated, especially in MaaS these actions are important to handle different organizations that have to collaborate for a unique objective. To do this the most used expedient are contracts that are defining the roles and the interactions between companies inside the network. In Mobility as a Service, and in general in innovative networks, contracts are defining the correct functioning of the entire project and have to be carefully created and composed by legal departments. The relations between these departments are important in terms of collaboration and definitions of the network's goals. All of this gives to legal parts of the organization a special power to be preserved and managed carefully to avoid conflicts and to promote collaboration, innovation and a unique goal that in Mobility as a Service has to be an integrated efficient and customer-friendly mobility system.

4. Ericsson Interview

Ericsson is a multinational company that is operating in different industries regarding technologies or communication systems. The headquarters of this organizations are in Sweden and the Swedish mindset regarding innovation is perfectly reflected in its structure. Ericsson is participating in different projects with different initiatives, starting from the development of new technologies regarding different sectors, improving some important innovations in terms of communications and data, like the 5G, or investing in initiatives that are regarding mostly the concepts of smart cities, included the mobility ones.

The figure interviewed is Lars Erik Lindberg, the head of innovation in *Ericsson Garage*. This part of the Swedish company is regarding the efforts and investments in new business areas, finding the ones that have more potential in terms of revenues and innovation processes and investing in them. In these innovative hubs are included numerous initiatives regarding the mobility sphere, providing this industry new technological platform that could push forward a process of innovation of the providing of the transports.
During his career Lars worked for different positions in Ericsson, understanding the innovative background that the Swedish company is providing to its employees. The roles covered in the organization started from the project management, going through innovation management and arriving at the direction of the Ericsson Garage area. This expertise made him know different sectors in which the Swedish company is involved, included the mobility area.

4.1. Mobility as a Service

Ericsson is involved in different projects operating in different industries, this is underlying how the technology provided is diffused in the economic structure, especially in Sweden. The investments are regarding also the mobility industry, analyzing this from different perspectives. The importance for the customer to be connected is the starting point of the actual studies, developing technologies that could facilitate the diffusion of a shared mobility, including integrated ways to do it like Mobility as a Service. Mobility innovations have to be effective also in terms of environmental effects and sustainability, researching continuously solutions that could give advantages in this sense. The 5G connection could be an important innovation for transports, providing the technological base for data exchanges and also for the development of new technologies like autonomous driven vehicles, that could represent a big change in the transport structure especially considering the public area. In fact, Ericsson is involved in a project with the public transport provider of the city of Gothenburg to track data from the public vehicles to analyze how the service could be provided in a better and improved way. Also, regarding the new mobility, the Swedish company is developing a technology to control the maximum speed of trams, buses or other public transport system in the city, avoiding and reducing accidents due to the excessive speed in the urban area.

It's difficult for Lars to give a clear definition of what Mobility as a Service is. From his opinion is better to divide this argument into different areas of interests in which companies are interested. Ericsson for example have interests in find new business opportunities providing its knowledge and expertise in terms of technology. An example is the collaboration between Ericsson and Volvo for the development of a car-sharing project. Naturally, the vehicle part was covered by Volvo and the technological part was covered by Ericsson. The development of an app dedicated to this service was one of the tasks of the Swedish technology company. The synergies in this sense are important, in this case a part of the common Swedish attitude, there is a logistical similarity given by the locations of the factories in Gothenburg areas.
The real challenge, from Lars perspective, is the understanding of the customer. This is happening by the managing of data, giving Ericsson a remarkable importance based on its knowledge of this topic. Understand and change people's need has to be fundamental to have success in an integrated mobility perspective.

4.2. Network analysis

Ericsson is involved in many innovative networks regarding different industries. In the case of this thesis, the Swedish company is being part of different network of mobility providing different services. The main aim of mobility projects is to create a dynamic-based mobility concept, where the customer can decide personally what transport system is going to use and can manage by itself the way to do it. This requires a strong adaptability of the mobility systems, arriving to an integrated phase that could be the Mobility as a Service one. In this direction actors of the network could be Volvo Cars or Västtrafik, the public transport provider in Gothenburg. Also, is present the technological innovation part with partners like EinRide, a company based

in Sweden that provides new technologies for movement and that actually is collaborating with Ericsson for many different projects regarding autonomous driven vehicles, where the 5G part of Ericsson could play a fundamental role for the effectiveness of the entire service.

The Ericsson's network is continuously expanding, so has to be considered as dynamic. Lars mentioned the example of the structure of 4G network, underlying how this is changed due to the introduction of 5G projects with the entrance of new actors and new interests and goals that are pushing the network to change continuously.
The assets that usually are exchanged in the Ericsson's network are mostly intangible, considering the nature of the technologies offered. An example could be the 5G offer, some companies haven't enough knowledge to applicate and use correctly 5G, Ericsson is providing them this knowledge in exchange of ways to test and develop this technology. This is representing a strong challenge for them that has to be managed with the best actions possible. Also, a small part of what is exchanged are some tangible parts like structures or infrastructures that are usually strongly related with the main businesses of Ericsson and so with the previous category of assets.
Ericsson usually manage these transactions with an informal structure of relations, considering this way as most appropriate to maintain flexibility and speed of change in the network structure. Only when the business is defined and developed in a better way there are some business deals, where are discussed all the revenues and collaboration parts in a stricter way, using contracts and consolidating the collaboration relationship.

Roles are representing a fundamental part in a network. The predisposition of companies for innovation is given also by the roles that are responsible for these kinds of tasks. In the case of Ericsson this problem is not present, in fact there is an entire structure of the company that is dedicated to innovation and to development of new businesses. What is usually happening is that some partners don't have the right people in the right roles to have efficient contacts with Ericsson, regarding this Lars made the example of some companies operating in the health care industry that sometimes haven't enough knowledge about the innovation itself, contributing to not helping properly the entire network in its functioning and in its innovative scope.
Goals also are changing usually related to customer needs that are influenced by multiple factors. Companies usually are adapting the offers to the customer and, by doing this, are putting dynamics inside the network because with the changes of internal goals there are external effects that will regard also the network functioning. Is something that usually happens, and companies have to be prepared for it, even if it is difficult.

These dynamics are representing a big drive for innovation, adapting the network to new opportunities and pushing forward the organizations through new objectives. In these times is very important to do it, things are changing continuously, and the Covid-19 pandemic is a perfect example of what is happening. For Ericsson this is representing a big challenge, people spend more time at home and so the need of an advanced

technological structure is important to guarantee the people to stay connected even if they are physically divided. The consume of data is transferred home from the offices, where the technological infrastructure is more advanced, Ericsson and other technology providers need to work in this direction to assure a stable connection and a good home environment in this "isolation" times. This is happening also in work environment, where there are smart-working solutions and the importance of an appropriate technology is the base of the functioning of this way to work. In mobility there could be also big opportunities, the public transport providers are working effectively but with the pandemic it's difficult for people to take the vehicles calmly. This is a big chance for new mobility concepts to rise, for example with bike sharing or integrated mobility as MaaS is.

There are different changes and Ericsson is working on that direction, helping the customers to have a stable environment to work with, avoiding technological failures and pushing through innovations where the lifestyle of the person could be drastically changed, MaaS is one of this.

5. Hertz Interview

Hertz is an American company that operates in the mobility industry providing rental services and, since many years, leasing plans. The business is perfectly related to the requirements of the travelers that usually need the flexibility of a car due to different reasons, pleasure trips or business trips. The different profiles of cars offered is underlying the vastity of the bundles that this company could offer. Starting from small vehicles with low prices and arriving to luxury and big vehicles with high prices, trying to satisfy all the needs of the customer. The introduction of the leasing formula is matching perfectly with the evolution of the retail sector in the automotive industry, the reduction of direct sales and the increase of indirect one is the representation of the continuous innovation that this industry is facing. With its business hertz is managing more than 9 billions of dollars, becoming soon leader of this kind of services.
This American company has expanded soon worldwide, arriving in all the countries of the world and creating an enormous turnover. In Sweden Hertz has different offices in all the major cities, included Gothenburg, and is participating in numerous initiatives related to new mobility concepts and sustainable transport systems development.

The figure interviewed is Anders Tärnell, the Digital Sales and communication manager for Hertz Sweden and Denmark. The experience of this manager started in the strategic part of Hertz, passing rapidly into the marketing area and communications one. The experiences included also an experience in Volvo Cars as consultant and project manager for the *Care by Volvo* project, these jobs are giving him knowledge and experiences in the new mobility environment, with a deep knowledge of the innovations in this field. Actually,

he is the digital sales and communication director for Hertz, working on innovations of this business and also on what Hertz is trying to participate now: the mobility as a service project.

5.1. Mobility as a Service

Anders explained that giving a definition to the Mobility as a Service concept is difficult due to the different perceptions and considerations about this argument. There is not a unique definition but there is a general understanding of what this innovation is, how it will change the mobility in the future and so the importance of a similar mobility development. Hertz is involved in many MaaS projects, globally and in Sweden. What Hertz is doing, more or less, is an as a service offer because is giving to the customer a service that is integrating different actors of the mobility, let's think about insurance or car companies for example. Actually, this company is collaborating in many MaaS projects in UK and in Sweden is involved in the UbiGo network, that is the company that introduced first the concept of MaaS in this Scandinavian country.

The involvement of Hertz in MaaS started a couple of years ago, thanks to the collaboration between this rental car company and some local authorities. An example is that they provided a fleet of cars to Vinnova employees and they were employed to maintain the car in a good condition, in this way there was a collaboration between private and public actors to provide a new service to the city and first to the employees of Vinnova.
These kinds of relations were useful to build a network of organizations that have to collaborate to give the customer an efficient and good final service, the next paragraph will talk and explain better this argument.

5.2. Network Analysis

Given the structure of the business of Hertz is normal to consider this American company as involved in a network of organizations that have to collaborate to provide a final service to the customer. Given the information provided the author by Anders, the network is composed by different types of actors that usually are a combination of private and public companies. Vinnova and local authorities like Göteborgs Stad are some of these that has been present in the network of the previous Hertz MaaS projects.

The importance of the roles in the network is underlined by the creation by Hertz of a dedicated department that had to work in MaaS and new mobility projects. It is important because it gives the right commitment of the companies through the projects and through innovation providing an entire working part dedicated to it. Unfortunately, now this department is not existing anymore, but the culture of innovation and new mobility opportunities is always present in Hertz company's mindset and culture.

Culture is important for innovation, there has to be a proper innovative culture in the DNA of the companies, pushing them to invest and take risks by these initiatives or projects. Hertz has this mindset for twenty-five years and is continuing to do this in all its areas. There have to be a vision for long-term investments focus that have to push the company through new initiatives considering that the results will arrive in the long term, not immediately. It is important the vision of the owners of the companies and of the leaders, because the effort and the right mindset to innovate has to start from them. Anders referred that Hertz is doing this every day and the MaaS concept is present in Hertz company from the beginning. More than roles in this network there has to be culture and right mindsets, only with this there could be right people in right roles and so successful projects.

The nature of the environment of the network usually is stable, because it is related to the needs of the customers. Customer needs and behaviors are something difficult to change and when it happens usually needs more time, giving the network a stable structure that is evolving slowly due to these conditions. But this traditional situation changed with Covid-19 pandemic, giving an important shift of customer behaviors and pushing networks to a fast change that is needed due to actual social conditions. In fact, this could be a big opportunity for innovations in mobility, because can provide a more secure and efficient way to move for the customer, considering the needs of social distancing and the mindsets of people related to this virus diffusion.

The assets that usually are exchanged by Hertz in its networks are both tangible and intangible, considering the variety of the offers of this company. From the tangible parts there is the importance and the breadth of the car fleet. From the intangible side there is the knowledge of this segment, the data and the knowledge regarding the customers that are representing a big advantage when the offer has to be defined and delivered. The customer base of this company is representing a relevant advantage in this way. Also the brand is important, Hertz is providing a service that is guaranteed by its name and its quality standards, this is something very valuable in a network or collaboration perspective, because of the perceptions of the customer that in relation of these kind of services are influencing its choices.
Usually contracts are used to define the relations between the actors in the Hertz network, these agreements are updated usually after meeting with the other parts if there are some changes that have to be applied. An example of this could be the contract that this company has with UbiGo regarding MaaS.

Dynamics are usually always present in networks, these could regard regulation, taxes or technical changes. These are representing a big improvement opportunity for the network when are adopted in a proper way, but when the network is not well structured and is not inclined to innovation this could represent a problem. It is important all the previous information to understand how the organization of the network is fundamental for its future success and for the correct facing of changes and dynamics.

6. UbiGo Interview

UbiGo is a mobility as a service provider based and born in Sweden. This project started with a collaboration between different mobility providers that were interested in MaaS project. The offer is based on an integrated app of different transports alternatives that could allow the customer to choose the best choice for his movements inside and outside the urban area. At the center of this organization there has to be a collaboration between different companies that are operating in the mobility industry, examples of this are Volvo Cars, Hertz or Cabonline. Also, there is a strong involvement of the public providers, considering the experiences in Sweden.

This company actually is based mainly in Stockholm, where the project has been launched officially in 2019 and now it is involving different actors of local (not only) mobility. Even if this city is representing the future and the present of the operations, the offer was tested and developed first in Gothenburg, where this MaaS perspective took shape.

The figure interviewed is Hans Arby, the actual CEO and the founder of UbiGo. Hans has a deep knowledge of the mobility industry due to its involvement in many innovation projects in this field. This knowledge is not just referred to the private sector, but it is also included the public one, given his experience in Trafikkontoret, a public organization that is operating in mobility industry investing in different projects.

After a brief experience in consultancy, Hans decided to create his own company, studying and developing one of the topics that was studied some years ago: the mobility as a service.

The project of UbiGo started in 2014 and arrived to be effective in 2019, from that year there have been the development and the launch in Stockholm of the MaaS platform.

6.1. Mobility as a Service

It is difficult for Hans to find a proper definition of what Mobility as a Service really is. The term itself maybe can lead to wrong considerations, for example even the on-demand mobility apps like Uber in the US could be seen as MaaS, but they really aren't. Mobility as a Service is an integrated offer of mobility where different companies are coordinated each other and are participating in a network where at the end the MaaS provider will offer the integrated mobility offer to the customer. It is not just this, but is also a complete commercial integrated system, where the customer knows how much to pay every month and pays the sum at the end of the month, when the bill from UbiGo arrives.

It has to be a service that has to be easy to use for the customer, to do this there is the need of a complete integration, higher is the level of integration, easier the service will be for the client. Actually, in Sweden UbiGo is providing the service at the "Level 3" of MaaS, where there is a high integration, but the entire organization could be managed and integrated better to have also strong and effective social changes.

The aim of UbiGo is not just to offer the service, but to replace the classic conception of the owned car. Changing the customer habits and mind is important and it is the real objective that UbiGo is following, to have also sustainability and better situations in the urban areas. In this direction there is the collaboration with different companies or public administration that are coordinating and defining the regulations for future mobility. The final aim is to change the customer, not creating concurrence but making companies collaborating each other.

Covid-19 situation is representing a big challenge for UbiGo, the quality of the transports has to be preserved together with the safety for the customers. In this case some models like car-sharing or public transports may face some difficulties in terms of service provided. The costs are more or less the same, but the amount of service offered has been reduced with this pandemic, and this is representing a big problem for mobility industry and also for Mobility as a Service projects.

6.2. Network Analysis

Starting from the Kamargianni model (2017), there are different levels on which the network is built. At the center there is the value chain, where are present all companies that are fundamental for the service functioning and offering. In this circle there can be found car-sharing companies, rental-cars companies or public transports providers. In the case of UbiGo are not included the bike-sharing companies in this network. Examples of organizations involved in this circle are Volvo Cars, Hertz or Västtrafik. In the second circle there are companies that are important for the functioning of the MaaS packages, these could be technical platform providers like Ericsson or Banks that have to guarantee the safety of payments for the service. An important figure of companies included in this circle could be the marketing ones, so the companies that are in the network to fill some market improvements. An example of this could be given by real estate companies, that usually deliver a proper urban area structure in terms of parking slots in exchange of being included in this mobility network.

The last circle of stakeholders is the one that is including all the organizations or institutions that have interests in MaaS but are not participating actively in the providing of the service or in the platform development and management. These could be cities authorities or Universities with their research activities. Included in this area there are also private organizations that are conducting researches on this topic and are providing precious information to the MaaS provider and to the entire network.

In terms of roles it is important the people component of this project more than the organizational one. It is not fundamental to have a dedicated division in the organization that has to work on this project, but it is important to have the right people in the right roles. It is important first of all the culture of the CEO that has to be reflected in the company and has to push through a continuous effort and commitment in the innovative project. With the right culture in an organization it’s not a problem if the roles are changing fast, because the

innovation culture is almost the same. Roles are important for the definitions of objectives and for the work on the project, but what really matters is the culture of that people, culture that has to come from the high management or from the CEO or founder/owner of the company. An example of roles that are changing is given by Hertz, that changed a significant part of its structure and people in its structure recently.

Goals are also an important aspect to consider when talking about MaaS. Hans referred the author that the mobility industry is more or less a stable environment, where it's difficult to really disrupt the market with new initiatives. Even the most innovative apps that people usually are using are just a reinterpretation of a classical concept of mobility that was present even before in the market and now is offered in a different way. For these reasons sometimes the goals of the companies are not the same, and in case of MaaS it is difficult to convince mobility organization to believe in this project. It is important the times of the decision-making process and, in this way, it is fundamental also the definition of the right roles for the company, as mentioned above. The lack of innovative goals makes the alignment of the objectives of UbiGo and the industry environment very difficult because also of the different time frame of the goals. UbiGo has to be seen as a future disruptive innovation that requires investments and commitment now, to develop the project, test it properly and continue the work in a future mobility vision. Meanwhile many of the mobility companies that are present now in the market have a vision that is based on present revenues and costs considerations, given the particular and delicate structure of this sector. An example of this dynamic in the UbiGo network is represented by SunFleet by Volvo, with the replacement of the project with M-Volvo and so the change of a company goal that reflected in the structure of UbiGo's network.

Mobility as a Service network and in general mobility networks are almost a stable environment for Hans. This is due to the difficulties to convince companies or actors to believe in the project. In this industry people are looking for profits, revenues and so good projects to achieve this, UbiGo needs a future perspective and the consideration that the effort made now may can give numerous advantages in the future, this is a risk that not all the companies are ready to face.
The main problem is represented by the competition between the different mobility companies, Hans gave the author the example that if a person now decides to take a car-sharing offer instead of a taxi one the taxi have the perception of the loss of the customer. With a complete integration this has not to happen because every customer that takes a mobility solution gives an advantage to the entire network. In addition to this, there is the importance of the shift of the customer behavior regarding the usage of the car, so there will be a new customer base that could be used and could give advantages to all the actors present in the network. This is more or less the big advantage that companies have to understand, to collaborate each other is the solution. The overcome of the competition concepts between this companies are a difficult thing, only with a new consideration of this there will be advantages for all the network.

Examples of changes in network structure are:

- Some energy providers that decided to leave the network;
- Some connection providers like Telia that decided to leave;
- Car-Sharing companies that changed their business models and so their participation in MaaS projects, Volvo Cars is one of these.

The assets usually exchanged are first of all the service components, considering the taxi services or car-sharing offered. In exchange the companies will receive information about the customers and so new data that in a competition way are very relevant. Hans said that nobody except the MaaS provider has a deep knowledge of the conditions and information about the mobility industry. In addition to this there is the revenues part that has to be considered.
There is also the exchange of knowledge, for example with researchers or the external part of the network participants. In this direction the results of the research's works are shared with the provider that could understand how to better organize and better fit to the customer requirements and so how to improve the network and the offer.
A last category to be mentioned are the public transports that are representing a particular case. In fact, in this case there is the importance of the delivery of a new sustainable mobility solution to the city in exchange to the participation in the network. This could fit perfectly with the innovation plans of the urban areas like Göteborg 2035 one.

Usually the value chain actors are managed with contracts, also some others relative to the technological part are managed by this instrument. While, the researches' institutes usually have a more informal agreements due to their funding systems that usually are related with national or European funding activities.

Dynamics are usually representing both an innovation pattern and also are a limitation of this project. There are different areas of improvement in the network, from the service one to the marketing one. It is important how to develop a better strategy to better meet the requirements of the customer, in this direction the dynamics could represent a big opportunity to do it. But the other reasons mentioned above, one over all the increase of competition between the actors involved in MaaS, are breaking this process making difficult the network managing activity and also the development of new initiatives.

V. DATA ANALYSIS

In this chapter the author will analyze the data collected by literature and interviews to answer to the research question and to the sub-research questions. The main objective of this section is to analyze the mobility as a service in its organization, studying the networks' dynamics that usually are happening in it and defining some implementation problems related to some aspects emerged in the interviews part. At the beginning there will be a focus on what mobility as a service really is, trying to overcome the definition's limits found in literature and to understand the key factors that are behind this mobility innovation. These information have relevant importance in terms of value network analysis because are providing a general scenario picture that is fundamental to understand the goals, the strategies and the values present in the MaaS network.

After that, the analysis will study business models in MaaS organizations, given the importance of these elements in terms of organizational and strategic decisions. This part of analysis, for the reasons mentioned before, is related with network organization and dynamics, and is representing a valuable point of view to better understand the network functioning.

The third section of the analysis will focus on value network analysis and dynamics' analysis, trying to answer to the main research question with the data collected in the interviews' process. At the beginning there will be a definition of a value network map, that is representing the point of start of this thesis analysis, and then there will be a focus on dynamics that are present in this network considering which are the most common ones and if they have a particular effect on Mobility as a Service effective implementation.

The method used to conduct the analysis is the Gioia method that is a codification of the data collected to define main themes and dimensions that have to be analyzed. The table (Figure 10 in Appendix) is divided in:

1. 1st order concepts;
2. 2nd order concepts;
3. Aggregate dimensions;

In the first order are grouped different information gained from the interviews regarding a common argument, giving a first level of codification of the data collected to divide information regarding different aspects of the analysis. In the second order are identified different themes emerged by the first order concepts. Finally, in the aggregate dimensions are listed the main themes faced on this thesis that emerged from the interviews, in this work case these are Mobility as a Service theme and Network Analysis theme.

Using this methodology, the author will be able to identify the most common themes discussed during the interviews. These are going to give a definitive direction to the analysis trying to achieve the goals of this research. In fact, this chapter will follow exactly the structure of the coding themes, giving the analysis a precise structure based on the methodology chosen.

1. Mobility as a Service

1.1. Mobility as a Service Definition

From literature can be deduced that it is difficult to provide a proper definition of what Mobility as a Service is. It is due mostly to the fact that it is a very recent topic that has been developed and tested for the first times in these years (Laine et al., 2018). In addition to this, there is a very innovative idea at the base that is changing continuously in order to satisfy new customer needs and also to be ready for new environmental requests. For UbiGo the definition of Mobility as a Service concept is difficult to find, but it is based on an more or less, it depends by the level, integrated mobility offer where different actors, also not operating in the mobility industry, are collaborating to provide the customer a new travel experience. For Ericsson the argument has to be divided in base of the different interests regarding the companies involved. Making the process of finding a proper definition someway superfluous. These hypotheses are accepted also by Hertz, underlying the importance not just to have a proper definition of MaaS, but to understand deeply the concept and how it is organized to deliver the value to the customer. Concluding this definition part, there is the Yacht&Cars interview that is accepting the fact that there is not a unique definition of what MaaS is, but there are different explanation of a shared and well-understood concept.

In Sochor et al. work (2018) have been identified some key elements useful to get us closer to a complete understanding of what MaaS is. The elements listed are flexibility, personalization, integration and continue through numerous voices that practically haven't been found in the interviews. In this direction, Volvo Cars identified flexibility, integration and efficiency as key elements to provide an efficient Mobility as a Service output. The experience on the field given by the initiatives in car-sharing with SunFleet and Care by Volvo are adding values to these information, considering the importance of data collected by these projects that are representing in this case a big competitive advantage that will have repercussions also in terms of network power. Care by Volvo is representing a perfect integrated offer where, a part of the car, there is a combination of different additional assets that are adding value to the final offer. The advantage is also in the method of payment, that is representing a perfect commercial integration between the different companies involved and that is the same as the MaaS one: a fixed monthly fee. Also, Hertz is corroborating the integration elements, considering it as important for their own offer. In fact, the rental cars example is perfect to underline the necessity of collaboration between different actors to provide a unique service. In this case the collaboration has to provide not just the car to the customer but also some additional but essential services like insurance or maintenance that represent a big asset for the entire offer and also for the entire company.
For MobilityXLab the main asset to focus on is the integration of different mobility alternatives, considering that a proper MaaS offer has to deliver the mobility package to the customer in different way. Integration that is underlined also by UbiGo, a Swedish Mobility as a Service provider. The importance of integration is supported in this case not only by just a mobility vision or perspective but have to be wider to let the project

mover toward the MaaS Levels identified by Sochor (2018). Actually, in Sweden they are in Level 3, where the integration of the services is almost complete, there is also a commercial integration that is going to let the MaaS network grow, including also non-mobility actors like for example some banks or credit institutions for the management of the payments. There has to be a complete coordination between different actors that have to collaborate properly to provide a single service to the customer, this integration is representing the main pillar on which the concept and the definition of MaaS is based.

Another thematic faced in literature is the centrality of the customer. Customer has to be the force that shapes the entire service during its development and its needs have to be at the center of the offer of the provider. In this sense can be remembered the works of Kamargianni et al. (2017) where the centrality of the customer was underlined and showed. UbiGo is confirming this theory going to explain that for the entire Mobility as a Service functioning is necessary not only to have a great customer base, provided by the different mobility companies involved, but also to change the habits of the customer to leave the concept of owned-car mobility and start to be oriented toward an "as a service system". This could be reconducted as a customer change in behaviors and needs that could represent not only a big advantage for the project but, sometimes, also a big challenge that needs competences and capacities to be overtaken. In this direction the service has to be user friendly, easy to manage and to control to avoid losses of quality in the usage period from the not-trained people.

Mobility as a Service is representing a new experience for the customer, that has to fit perfectly to what the customer considers more convenient to use regarding transports and mobility inside and outside the urban area. Yacht&Cars underlined these aspects, focusing on the importance of the perceptions of the customer related to new experiences. In fact, it is not enough to have a complete-new experience of travelling, but it is necessary to guarantee a well-working travel experience where all the services used are provided a good quality and where the offer proposed is representing a valid alternative to the ones that are existing now. Considering this speech in Sweden the quality of transports is high and this could be an advantage for the experiences that the customer will live with this new way to move.

Related to this new customer experience idea there is also Volvo Cars that underlined this in a Care by Volvo perpective. Care by Volvo is representing a complete revolution in the retail sector of automotive, considering the offer as car-as-a-service based. The new experience of the customer has to be central to the offer that have to propose a completely different and convenient alternative to access to mobility that has to have the power to change customer habits. It is certainly not simple, but it is something that Volvo is understanding with data collected by previous experiences and also with direct contacts with customers to understand what they want and how they want. It is crucial for MaaS to be ready to offer the customer an alternative to existing mobility solutions, this alternative has to be convenient and has to represent a novelty for the customer experience that is, in this case, strongly influenced by elements of quality of the service that are depending not just by a single company, but by a combination of companies that has to deliver a completely new service.

Another aspect that has to be underlined is the sustainability of MaaS. Considering new regulations and trends that are pushing cities and citizens to be eco-friendlier, this new mobility alternative has to represent not just a new mobility solution, but also a more sustainable solution. This is adding another difficulty in a field that is difficult to discover, giving the chance to disrupt the market but preserving the planet. In this direction the works of Santos et al. (2018) and Sochor et al. (2018) are confirming the relevance of Mobility as a Service also in terms of sustainability inside cities. There is the big need to reduce the traffic jams and the pollutions, especially in big cities with millions of people that are moving every day. The coordination between different mobility services could be an innovation in this sense, reducing the usage of the own-car and shifting to a concept of shared mobility that is reducing the number of vehicles that are circulating in the urban area.
On this topic the interview with Yacht&Cars was relevant to understand that it is not all about the reduction of owned cars in a city but have to be considered also the different alternatives that are provided to the customer. If a bike sharing offer can be seen as an alternative this could lead to a real sustainable solution. In this sense there is the importance of governments to invest in new public transports vehicles that have to be sustainable, preferably electric of hybrid. But it is not just a provider game, it is also a customer responsibility. There is the need of a re-education about sustainable aspects, including mobility, only by changing customer preferences there could be a more sustainable solution. In this way, MaaS has the big advantage to let the customer choose and from this choice will depend the sustainable effect of the entire project.

In conclusion, finding a proper Mobility as a Service definition appears to be very difficult due to the nature of this mobility innovation and also to the enormous and continuously evolving amount of information that are regarding it. But, considering the elements analyzed above, there is a clearer conception of what this innovation really is. Generally, what is clear is that MaaS is representing an alternative for customers to upgrade their travel experiences, making them cheaper, more efficient and faster by a combination of different mobility providers. All of this has to be supported by other non-mobility providers that are going to provide some essential services in the offer that are going to guarantee the safety of the usage of the service, an example of this could be banks, credit institutes or insurance companies. The general context has to be a complete integration and collaboration between these actors that have to follow their own objective but also to help in the main MaaS network unique objective. Only through an active collaboration and a real integration there could be a final service that is new, convenient and efficient for the customer. This collaboration mentality will be reflected in terms of strategies and goals of the companies involved, having important effects in terms of network participation and network commitment, contributing to create the perfect context for the dynamics that will be studied later in this analysis.

1.2. Mobility as a Service Business Model

Mobility as a Service is representing an innovation that could definitely disrupt the mobility industry, to do that the need of a proper business model is clear. In this direction, in literature, there is the focus of Gassmann et al. (2014) about the importance of business model creation and innovation. The advantages in this sense are going to touch every aspect of the functioning of the offer, giving the possibility to the entire project to have success in the market where they are competing. Without a proper business model, or a proper business model innovation process, it is very difficult to achieve the goals fixed during the planning of the activities. There is the need of a well-defined organizational structure, with defined objectives and strategies to avoid mistakes and be prepared to face problems during the effective running of the activities.

In the interviews this thematic seemed to be relevant because Mobility as a Service seems to lack of a proper business model with a long term-vision. For MobilityXLab the problem is to find a right business model to let the collaborations be more effectives. The organization of the service providing system, the shared strategy in the network are going to give stability to the entire project, letting the companies to focus only on important things, rather than wasting time avoiding strategic or operational errors. In addition to this, there have to be a right vision of the network, that will be defined by the process of business model innovation. The route for the future has to be clear, innovation is important to continue to improve the service and to not focusing objectives only on short terms indicators like revenues or costs ones.

Even for Per of Yacht&Cars the main problem is the business model definition and innovation process. For this company MaaS now it is just more than an idea, even if it has been tested and partially launched in these years. This is because there is not a clear strategy for the future, there is not a clear direction of what MaaS will be in the next years. This could represent a big limit also in terms of revenues, in fact for Yacht&Cars there aren't actually big revenues flows at this moment in MaaS, the long-term vision is important but when the revenues are missing there is a lack of business model that has to be fixed. Revenues are important for Per also to involve companies inside the project because are the prove that the idea is working and could be a big incentive for companies to come in.

From a MaaS provider perspective the business model is relevant, but there are practical problems in developing or innovating it related to difficulties of involving companies. UbiGo confirms that the main problem is to find and engage a new partner that could represent a big innovation in the business model of the company, giving advantages that will reflect soon on the service provided. The difficulty part is to convince them on the validity of the project, not on the concept. The concept of MaaS, when explained, is representing a big opportunity for all the realities that could be involved. The limit is on its horizon that is focused on a long-term vision without any short-term indicators. The alignment of the companies' visions is important to participate in a common strategy with common objectives that are going to compose a proper business model.

The difficulty is in the need for companies to generate immediate revenues from the projects where they are investing, this is a right company perspective, but sometimes it is not appropriate with the definitions of a business model innovation, where there have to be taken some risks in order to have and gain future advantages and also revenues.

These difficulties could be identified for the author not in a complete lack of a business model, as thought by some interviewed figures, but in a low level of development of that business model that is not innovating enough to provide concrete advantages to the company and to MaaS project. According to Chesbrough et al. (2018) the conception of business model innovation passes through different levels of it, defining the passage at the higher level as the maximum innovation objective for a company. Mobility as a Service now is overcoming the type 4 business model, with external collaborations and partnerships that are managed right now. The real need is the sharing of objectives between these companies, there have to be a unique vision that has to overcome all the limits regarding operating and engaging new companies. Levels 5 and 6 are more appropriate for an innovation of this type. With the first one there is a proper innovation and integration of the value chain, having all the advantages of this case. The last level is representing all the solution to all the innovation problems mentioned by UbiGo. In this case, there is an opener business model to change and innovation, ready to change structure and organization to face the future challenges and to gain future advantages. This business model innovation and development limits are representing an obstacle for the network organization and structure, hindering usually the development of this project and the right decisions in terms of goals from the companies involved.

In conclusion another literature concept could be included in this speech regarding the choice of a proper business model for Mobility as a Service initiatives. In Tukker et al. (2004) works there is the evidence to select the right business model composition based on what type of service or product has to be delivered to the customer. In MaaS case there is a complex mix between products and services that has to be delivered, the concept of Product Service System in this vision gained importance. In particular the use-oriented services BM seems to be really appropriate to the case studied providing an appropriate structure to MaaS.

2. Value Network Analysis

In this paragraph the analysis will focus the Allee et al. (2008) and Kamargianni (2017) schemes referred to Mobility as a Service networks. It is important to analyze the network starting from their structure to understand how they are composed, and which are usually the actors involved in. The possibility to interview some mobility companies and also a real MaaS provider gave the chance to the author to develop a sample of MaaS network map.

Thanks to this approach will be possible to identify the assets that usually are exchanged in Mobility as a Service networks, defining a precise exchange situation that is an important step for the analysis of this thesis work. Then, the attention will shift on the dynamics identification and analysis, based on the method studied by Majchrzak et al. (2015). In this part the common dynamics in MaaS network will be identified and there will be considerations on the importance of these dynamics on the normal functioning and development of the network, including so the effects of this on the implementation of MaaS in Sweden. This analysis structure fits with the main objective of the thesis, to analyze the networks of MaaS and its internal dynamics to understand the potential limits regarding Mobility as a Service effective implementation.

2.1. Value Network Map

The importance of analyzing networks lies in their particular organizational design. As from definition a network is a very not hierarchical organization, where the actors involved are usually companies that are operating in different sectors or industries, having different tasks and objectives. The aim of the network is to build a net of contacts between these companies spreading assets that are fundamental for the entire network functioning.

The analysis of the network has seen different methods in literature, in this thesis the method studied is the Allee et al. (2008) method. In this work the point of start to analyze a network is the understanding of its structure. The actors involved sometimes are different and various and knowing how they are insert in this scheme could make the future analysis clearer and simpler.

For Mobility as a Service a sample network structure is given by Kamargianni et al. (2017) work, where it is defined the network as an eco-system of different companies involved in this mobility innovation. This shape of the MaaS structure has been faced with the reality of the companies interviewed in this thesis work, contributing to the creation of a MaaS network map, where different areas and actors are identified and studied.

The analysis could start from the Volvo interview, where there is in Care by Volvo a real necessity to build a network to provide the customer a bundle of services a part of the car. In this case in the network are participating different actors from different industries, starting from retailers or dealers of the cars that are losing their power due to this new “as a service” innovation. Then, also maintenance companies are involved to provide the customer an all-inclusive experience also in case of failures of the vehicle. Insurance companies are also in the network for the same reasons of the category mentioned above, to provide a complete coverage of the customer in case of accidents. At the end there are also the logistic companies that are contributing to move the vehicles in some dealerships where the customer is waiting the car. At the center of this process there is Volvo Cars that is providing the vehicles and also knowledge of the customer, that is representing a big competitive advantage. This is due to the enormous customer base that Volvo Cars has in the automotive and in the mobility industry, and this, as it will be defined, will provide the Swedish company a big advantage in participating in MaaS projects and networks.

For the service provided, MobilityXLab is building networks where companies can collaborate to create innovation projects in the mobility industry. These networks are composed by six companies and at the center there is a project manager of MXL that has the objective to coordinate and facilitate the working processes of the network. The big advantage is to link different realities, with different objectives, that usually won't have been linked each other. In fact, it is difficult for a start-up to obtain a collaboration with a big company, MXL is a facilitator in this, adding to this offer knowledge and expertise in the field. Understanding this sample structure and this network offer it is difficult to define the actors involved, because they are continuously changing, but in general there are actors that are interested in mobility projects and that want to collaborate to have innovation advantages in this sense.

A reality that traditionally is not belonging to mobility is Ericsson. But being a technology provider means to be involved in different projects, also in mobility, to provide the technology used to make the entire structure work and to deliver the value to the customer. Ericsson in fact defined its network as a continuously expanding network, where the objectives are usually changing fast, so the participations. The actors involved in these projects are different because of the versatility of the technology offered, usually in mobility projects are involved automotive companies, that could be advantages in terms of 5G connections for example, or public transport providers, with the control systems that nowadays are being more and more sophisticated. Ericsson is part of these project, part of the structure, but not as a mobility provider, but as a technology and data provider, showing how it could be varied the composition of the MaaS network.

An actively company involved in the main operations of MaaS is Hertz that is providing the service a rental-cars offer that the customer could choose. Also, for the delivery of the service itself Hertz has a need to build a sort of MaaS network, where different actors have to collaborate to create a comfortable experience that the customer has to live driving a Hertz car. In addition to this variety of actors involved there is an entire department dedicated to the operations in the network, underlying how this company is organized and inclined to work in these environments. The structure, as mentioned above, is composed by different actors, that could belong to public or private sphere. Usually in MaaS projects are involved public authorities that are investing in new projects that could have strong impacts on the society, MaaS is one of this and the numerous advantages also in terms of sustainability are explained in the previous paragraph dedicated to the definition of it.

The interview that has contributing most to the definition of the Mobility as a Service structure is the one with UbiGo. UbiGo is representing the perfect case of a MaaS provider that is operating to build and manage a complex network of different companies. The interview was particularly successful because of the opportunity to speak directly with the CEO of the company, having direct information on the companies involved in this structure. The first element to consider is the Kamargianni et al. (2017) definition, where there are different

levels of actors involved and the network is structured respecting these “divisions”. The levels in which the companies are collocated, in base of their importance and tasks in the network, are three:

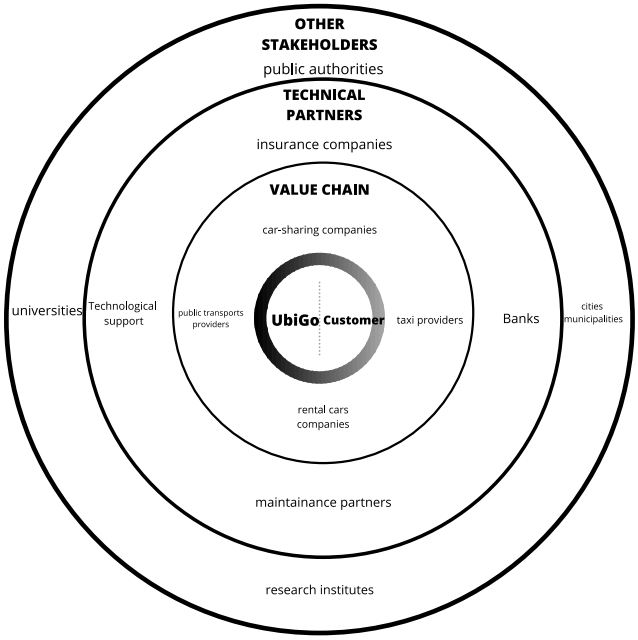
1. Value Chain Level: where are involved the mobility providers, or the companies that are fundamental to the functioning of the service;
2. Technical Partners: companies involved in MaaS that have some technical tasks;
3. Other Stakeholders: the part of the network where are involved companies or institutions that give some knowledge advantages to the MaaS structure, examples of this are Universities.

At the center of this structure there has to be the customer, that has to be the main objective of the entire network. Dealing with this organization UbiGo is mediating between these different partners, providing the opportunity to invest in this project and to be part of it, in addition there is a big customer base due to the participation of some big partners like Volvo Cars or Hertz that are operating in the mobility industry as leaders of the market.

With the information gathered from these different actors, and with the help of UbiGo, it is now possible to have a clear understanding of how a MaaS network is structured. The variety of companies or institutions involved give the importance of the theory of networks underlining how the collaboration between different realities that are belonging to different industries is possible with these structures.

Thanks to all of this it is possible to draw a sample of Mobility as a Service network map, knowing the continuously circumstances that are changing in actual mobility industries. Figure 11 represents a sample of how it is organized a MaaS network and it is based on the example of UbiGo, as a Swedish MaaS provider.

Figure 11: Mobility as a Service Network



Source: produced by the author.

2.2. Exchange Analysis

After the complete mapping process, relative to the Mobility as a Service case, the analysis will study the exchanges that usually occur in the network. This approach is underlined in the Allee et al. (2008) work, where are defined different approach to follow to properly conduct an effective network analysis. These approaches are focusing on different aspects of the network functioning, including the collaborative nature of this organization, where the importance of roles in it mostly are defined by the assets exchanged and by their importance in the creation of the final value.

Usually the assets that frequently are exchanged are typically of two types: tangibles and intangibles. In the first category there are some physical exchanges inside the network, usually these are representing the main elements that will be used to create the final value. The intangible assets are completely different, are not referring to physical objects but to abstract but important elements, examples could be knowledge or brand image. Understanding which of these assets are more frequently exchanged in the MaaS network is important to define and analyze the characteristics of this network from an organizational and strategic perspective.

In addition to this analysis it is relevant to consider the way how the transactions are managed and regulated, usually are used contracts but other types of informal agreements could be easily found in networks. From understanding this, a clear picture of how the MaaS network is organized and is functioning is given.

Care by Volvo, as mentioned in the previous paragraphs could be involved in Mobility as a Service networks and for different reasons, like the characteristics of its offer, could be considered as an “as a service” offer. In this network usually are exchanged both tangible and intangible assets. Example of tangibles could be the providing of the vehicles by Volvo Cars, or the maintenance provided usually from different workshops that could belong directly or indirectly to Volvo company. These elements are generally the core part of the offer, representing physically the object and the services that the customer uses during his experience.

Intangible elements have different roles and importance, the understanding of the customer needs or the knowledge in terms of technical aspects of the service are representing an important part to consider in MaaS and in this project. Also, having a brand name like Volvo Cars is going to give the customer right perceptions about the service offered, influencing his initial thoughts about the project. This is representing a big advantage in the network. Brand image and data collection are fundamental to have more information than others and to use them to gain importance in the organization.

Usually, all these transactions have to be regulated and managed to avoid chaos and disorders inside the network. This could be done with formal and informal methods and agreements that are going to define the working environment and the transactions that will happen between the parts. The most used methods in Care by Volvo are contracts because of their safety and clarity. But these methods seem to be inappropriate when dealing with some intangible assets, in this case more informal agreements have to be found to be added or to substitute the traditional contracts.

The importance of the intangible assets is underlined in the Ericsson interview. Tangible assets are fundamental to the effective working of the service, but intangibles could give enormous advantage to the companies that are going to manage them. The example of Ericsson is perfect in this sense because the technology provided by this Swedish company would be useless without the right knowledge to apply on it. This knowledge is representing a big competitive advantage for Ericsson, also in mobility and in MaaS networks. This is because these projects are using platforms and connections that are created from the Swedish company, that is providing also the support to properly develop and use them, providing so knowledge that is fundamental to let the service work properly. Beyond this, there is also the name of the brand that is known in all the country and mostly all over the world, this is representing an important element to consider because of the importance and of the advantages relative to a strong brand image.
All of this is representing a big competitive advantage that usually is managed through contracts and formal regulation methods, where the only updates to these have to follow the formal way, updating the previous contracts. This is representing the line followed by Ericsson, given the safety and transparency of the formal control methods.

The experience of UbiGo on building and managing a proper MaaS network is confirming the variety of the assets exchanged in the network. Tangible assets are important to physically provide the service, but intangibles are fundamental to improve the service knowing better the customer and also the technology used. The most exchanged thing in this network is knowledge, that in a project that is continuously developing is representing an important asset to learn and improve what is already existing. Usually the partnerships, in this MaaS network, are managed with contracts for the same elements listed previously. The only difference is emerging when considering the different circles that are composing the structure of the network (Figure 11). For the most central and important ones, contracts are representing a way to protect the provider, in this case UbiGo, from the freeriding of the partners. But going in the external circle, there are institutions that merely are representing a resource in terms of knowledge but are mostly paid by public authorities like EU or nations. In this case the contract method could represent excessive and other informal agreements could be used to manage and regulate the transactions.

The importance of these last transactions is underlined by Per Gyllenspetz in the Yacht and Cars interview. Knowledge is representing, in Mobility as a Service networks, a big competitive advantage, because is going to improve the existing conditions and is going to give more awareness to the customer. In Mobility as a Service networks are more important the intangible assets in this sense than the tangible one. With the experiences of Volvo Cars, Ericsson and Ubigo emerged that a relevant asset, exchanged and regulated, is the data component. With data there could be advantages in terms of functioning of the service, customer needs and also other aspects where the entire network could be improved. Y&C is confirming this hypothesis, underlining the importance of knowing customer preferences when launching an innovative project in a stable

industry like the mobility one. Only providing an efficient and correct offer there could be a real disruption of the market.

In this analysis emerged some key characteristics of the Mobility as a Service network. Starting with the assets exchanged, there is a presence of both tangible and intangible assets. While the first category is important for the service provided, the second one is fundamental for the developing of the project and for the complete implementation of it. With new technologies it is possible to collect data regarding the customer and from using them numerous competitive advantages could be achieved. This particular situation is drawing a variety of providers that have different importance in the network, depending from the resources and from the assets exchanged, defining a sort of power structure in the network that is relevant also in terms of companies behaviours and strategies, underlying differences that will contribute to the creation of internal dynamics.
To manage the entire process is needed a good contractual structure, to give the MaaS project the right guarantees to be safe in the present and be projected in the future. For the intangible assets other methods could be used in addition to these, informal agreements could represent a way to adapt better the relations in the network and to include also companies that are not relating directly to it.

2.3. Interorganizational Dynamics

In this paragraph the author is going to analyze the interorganizational dynamics that are usually happening in Mobility as a Service networks. The importance of this topic is underlined by the work of Majchrzak et al. (2015), where are identified and studied some main dynamics that usually are happening in networks and the different classification of effects of them.
Starting from the identification of the dynamics, there are different changes that usually could happen in a network and usually the difference in these lies in the causes of the variation. There could be goals dynamics, when referred to changes in terms of goals, for the companies involved or for the entire network. There could be contracts, regulations or taxations dynamics, where the change is due to major variation in laws or contracts that will have effects in the entire network by influencing the operations of the single companies involved. Lastly, there are some structure dynamics due to roles and network composition. In these cases, the network is changing because of the variation of its organizational structure, in this dynamic are very important the roles of organizations involved in the project.
The understanding of these dynamics will help the author to start answering the research question, that is regarding how these changes are going to affect the final implementation of the MaaS project. Only having a clear knowledge of the importance of the categories mentioned above could conduct to a proper network dynamics analysis.

The dynamism of the Mobility as a Service environment is underlined by Ericsson, considering the evolving of the technologies that are involved in this project. Generally, mobility is representing an industry where the

products are really complex to develop and to invent, the importance of a new technology is underlined also by this characteristic, understanding how these dynamics could have a big effect in all the mobility industry.
Some relevant dynamics identified in interviews are involving the structure of the network, the culture, the goals and the regulation changes. This is going to confirm the Majchrzak theories about the classification of main dynamics causes for these organizations. In mobility networks this is confirmed by Yacht and Cars, that focused on the importance of the considerations about these elements to properly analyze the dynamics that usually are happening inside the network.
As mentioned also in Majchrzak et al. (2015) works, in addition to these dynamics causes could be identified external and internal forces that are going to push towards changes regarding the entire network. Some information about this argument have been collected with the interviews of Hertz and Ubigo. In these cases the environment has to be seen as usually stable, where it is difficult to disrupt the industry due to the complexity of the products and of the services offered, in this case the only external forces that could be find in this network are the ones regarding new regulations and projects that are going to incentive changes in mobility involving also for example MaaS networks.

Structural components, as mentioned above, are important to be considered referring to network dynamics. The structure of the network could be instable or stable and sometimes could represent the start of an entire process of change. In mobility networks, as mentioned by MobilityXLab, it is important to develop and manage the organization of the network in the most horizontal way possible. This is because the collaborations between the companies have to be incentivized by this structure, avoiding any hierarchical problems due to more vertical organizational charts. In this direction has to be underlined the importance of the expansion of the network. Especially this argument, that is not shared by all the MaaS actors, is valid for Ericsson that is a technology provider, considering the continuous improvements regarding technologies and connections in this industry. To manage this expansion, and also in general the network, there have to be the right people in the right roles. Efforts are made by companies to fulfil these challenges, for example Hertz created and entire department that has to work with Mobility as a Service projects, underlying the importance of roles and structure in these dynamics. This organizational aspect is underlined also by UbiGo, with an additional aspect that is the real commitment and efforts that companies and people in the roles cited are putting in the network. It is important to have a high efforts structure, where every company involved has to guarantee a high commitment in the project. Lastly, this is not representing a simple task, because it is difficult to find the right people to insert in this scenario and this is actually representing a limit for the developing of the entire service, considering also the turnaround of the roles in companies that are not guaranteeing the continuity of the efforts in MaaS network.

These difficulties and these structural aspects are usually coming from not just an organizational analysis, but also from some cultural distances between the companies and between the people involved in MaaS projects.

Hertz underlined the importance of the cultural aspects behind the collaboration process, explaining how culture has to be seen as an important asset to be considered when talking about networks and networks dynamics. Without a proper collaboration and innovation culture there couldn't be important changes regarding industries, and, in this case, networks related to MaaS. This is because without a proper understanding of the argument and of the situation it is difficult to put and guarantee the right efforts in the project. Culture has to come from the top management or from the CEO of the company, that has to represent an example of the implementation of new strategies and of new investment plans that will conduct to dynamics and network changes. This is a concept underlined more times by UbiGo, considering the importance of the complete understanding of the MaaS project, first from CEO and companies directors, to pass the right inputs to people involved in this network.

The cultural sphere is also influencing the objectives that a company defines during its activities. Goals are representing a variable that is almost central in network dynamics, considering the changing of them as one of the most frequent causes of variations in terms of network strategies and organization. From the experience of UbiGo there is a massive misalignment of objectives between the companies involved in the network and in the project. Usually organizations involved in these projects are following both network and own objectives, trying to combine them sometimes. When this is not happening the difficulties start, arriving to different outcomes that are going sometimes to change the actions taken in terms of participation in networks. Example of companies' goals could be given by the experience of Volvo Cars, that is defining a good customer experience as the main objectives of its projects. This could be useful to gain information and data from the customer that could be important for implementing future initiatives or correcting the actual ones. But these companies' interest and goals could represent a problem when, for example, the information gained has to be shared with others. This is the case mentioned by Yacht and Cars, where the goals and the interests of a single company are going in contrast with the ones of the network, making impossible the convivence between these two organizations. This will lead to changes and to dynamics in networks' structure or goals, depending by the importance and so by the relevance of the companies involved.

In conclusion, a last consideration has to be done on changes that will affect contracts validity and efficiency, influencing the structure of the network and starting a dynamic's process. On this side could be located the environmental changes mentioned above, let's think about some new regulation about emissions in the urban area and how this could affect mobility and MaaS. With these dynamics there could be new opportunities, that has to be translated in dynamics in terms of objectives and regulations internal to the network. New circumstances will lead to new contracts' needs, and this could represent a big incentive to variation in a network. Another situation that could figure in this speech is the increasing of power in the network by one of its members, in these cases some things have to be re-discussed, like contracts and agreements, arriving to another conclusion that will lead surely to an internal dynamic. An example of this is given by the experience

of Hertz, given the continuous adapting of this company to new regulations and government initiatives, re-discussing the objectives of the company and the positions on which the company is involved, trying to adapt the previous situation to the new one.

2.3. Interorganizational Dynamics Analysis

Starting from literature studies and findings, networks usually aren't stable environments, but are realities that are facing continuously with different types of dynamics that are influencing its structure, actors' composition or goals. Majchrzak et al. (2015) identified different types of dynamics that usually are present in a network, considering the findings regarding the topic studied in this master thesis, the most common are:

- Goal dynamics;
- Structure dynamics;
- Contracts or regulations dynamics;

The causes behind these changes could be different, starting from partner differences and arriving to internal or external factors. The differences between partners in MaaS networks are numerous, considering the variety of the actors involved in the project, with this consideration also different goals have to be considered because are going to play an important role in dynamics and their effects in the entire network. Regarding the external factors, examples could be changes in regulations that could affect and also variate the structure or the functioning of the network and, in mobility industry, this last thematic is very relevant.

Starting from this last point, the analysis could refer to the experiences of Hertz and Ubigo that referred, for different reasons, the almost stability of the mobility sector and environment. From the car-rental perspective, this is an industry that is difficult to disrupt and to change, there are different innovations that are going simply to improve maybe a service that is already existing without disrupting it.

UbiGo has the same opinion of this environment, considering that also in terms of networks it is difficult to convince partners to join new projects because of the almost absence of sure future revenues. This aspect could seem as a limit for the MaaS network innovation and implementation, and something to overcome this problem has to be found, for example showing evidences of the social advantages that companies and citizens could have with the implementation of a similar service.

A discordant note in this argument is added by MobilityXLab because they are considering the networks and the mobility environment as continuously affected by dynamics, that sometimes are not efficiently used and understood by the companies involved. There are different opportunities for changes and the ability has to be to innovate collaborating with different realities that could be involved in these projects. Ericsson is having the same opinion on that, considering the mobility environment as a very dynamic one. The technologies involved are very innovative and are creating big opportunities for growth and innovation. In addition to these there are the numerous mobility projects in which Ericsson is involved that are confirming this network dynamics tendencies.

A confirmed type of dynamics presents in MaaS networks, and in general in mobility networks, are the roles ones. The increasing importance of people involved in these projects is underlined by UbiGo, giving a clear focus on the capabilities and on the motivation that the CEO or the managerial figures have to transmit to the entire companies, having at the end project-motivated people involved. Yacht and Cars is underlying that sometimes this process could be difficult to implement, this is because there is not enough commitment from the companies involved, given the difficulties to earn immediate revenues and profits from MaaS networks. MobilityXLab is adding to these perspectives the consideration that there is a continuous company's turnaround that is impeding people being completely and continuously involved in networks projects, changing continuously positions and not acquiring the needed knowledge to properly work in innovative realities. This is confirmed also by Ericsson that, during the interview, listed the difficulties to work in networks sometimes because of missing or continuously changing roles that are impeding a constant working process for the entire project.

These roles considerations are usually reflecting directly to the structure and to the organization of the entire network, there are example of companies like Ericsson or Hertz that are well organized to work in these organizations, creating dedicated departments to these projects and so guaranteeing a constant commitment in the network. UbiGo is underlying the importance of this aspects considering that the most frequent variations in the network are regarding changes in the structure and so in the partecipants. Examples of these dynamics are given by companies that for different reasons decided to leave the project or to change the nature of their participation. The experience of Volvo Cars is a clear example of this, considering the initial SunFleet involvement in the MaaS UbiGo's network and the following change in direction related to the introduction of new projects and new objectives, that actually have the name of a new shared mobility project called M-by Volvo.

Completing the analysis of roles and structural dynamics have to be identified the reasons behind these changes. Usually these are represented by some companies' goals shifts that are going to influence also the strategies of that organization and so the investments and participations in projects.

Ericsson confirmed how goals in companies, and in networks, are continuously changing usually trying to follow customer's preferences. Considering the variability of customer's needs, it is important to understand how the variations of goals in the companies are influencing the goals and the participation on project of them. A practical example of this speech is given by UbiGo and Volvo Cars. The Swedish OEM was initially involved in the UbiGo's network with the car sharing project called SunFleet. After some years this collaboration was interrupted by the change of the objectives of Volvo Cars, that was starting to launch a new project called M by Volvo. The new goals of this company actually are to understand better the customer and too manage data about it. Data are important to focus on right objectives and could represent a big competitive advantage to understand if a project could be effective in terms of customer satisfaction or not. In addition,

the big customer base that Volvo has is constituting a great element that confers to the Swedish company a great power in the network, that in the MaaS case was representing, maybe, a limit for the entire project.

Another dynamic that is present in MaaS networks is the regulation and contract one. Changes in these elements have usually big effects for the entire network structure and sometimes for the goals of the companies and of the network. Considering the mobility industry as a stable one doesn't mean that there are not incentives to change, in this direction numerous are the initiatives in terms of sustainability or new smart mobility implementation made by public authorities. These are going to give a big input to change the objectives and to adapt and properly use the new rules to gain some advantages. This speech is confirmed by MobilityXLab and Hertz, underlying the importance of these external elements in the definition of internal goals and dynamics. In this direction contracts have to be re-discussed frequently to adapt also the contractual structure to the new needs of the entire organization.

Returning to the Majchrzak et al. (2015) work, there could be identified different types of dynamics that have been summarized in some main categories. The complete identification of all the dynamics present in MaaS is difficult to obtain, considering the limit of information given by the companies that sometimes tend to protect their strategies and knowledge. In general, in this thesis, have been identified the most common dynamics schemes present in these kinds of networks. In general, talking about changes schemes, the common categories involved are the single change and the binary loop. The first one is referred to a direct relation between the cause and the effect of a single change, in Mobility as a Service network and experience an example is given by the roles' dynamics. In UbiGo these dynamics lead sometimes to changes relative to actors' composition, examples could be Volvo Cars and Telia that left the network after participating in it.
Another dynamic category faced during this thesis work is the binary loop one, considering how some elements together are giving the network different effects in terms of composition and structure. In this case, for example, the change of regulations and goals led to a change in roles and actors' composition, with a binary effect that changed in an important way the entire network composition.

Dynamics have been defined by Jonas of Volvo Cars as "pains for transformation". These processes are difficult to manage and to properly face but are necessary to having a proper innovation-based organization. Dynamics are for Ericsson a big chance to innovate and to face new opportunities, also Hertz agrees with this aspect considering changes at the base of a bigger innovative process. UbiGo, instead, is agreeing with this speech but is defining some limits of the good effects of dynamics, especially in Mobility as a Service networks. In this direction there has to be a proper structure of the company that has to be ready to face changes and to properly innovate, in this direction having a well-defined and structured business model could help the organization in facing innovations and in developing them. Without this predisposition these dynamics could represent a limit for the organization because usually are going to drastically change elements that are

fundamental for the correct functioning of it. In conclusion, also MobilityXLab is doing a similar consideration of networks dynamics, considering that to have advantages in this direction, especially in MaaS organizations, there have to be a really well-organized process, able to catch advantages from these dynamics, meanwhile maintaining a stable structure and strategy to guarantee the entire process to have a clear direction, independently from new opportunities and new reads that could be travelled. Dynamics usually are representing a big innovative drive for networks. Companies have to be able to organize themselves and to collaborate to properly catch these opportunities and avoid risks that could damage the entire process and project.

2.4. Covid-19 dynamic and effects

The Coronavirus outbreak is totally changing, directly or indirectly, different aspects of the society including the mobility one. People have to consider the restrictions and the precautions that are needed to avoid the spreading of the virus and, in doing this, are changing their habits. Mobility industry, and also mobility innovations like MaaS one, are affected by these changes with important effects in terms of future organization, strategy and objectives.

This situation enters perfectly in the external dynamics' factors, included in the Majchrzak et al. (2015) work. In this case the spreading of the virus has led to different actions by the government to restrict, in different ways, the movements and the contacts between people. This is acting as a big change that is influencing from the outside different mobility networks, included the MaaS one. Some effects of these changes have been identified and analyzed by the author in collaboration with the companies interviewed.

Representing a MaaS provider, Ubigo is the point of start of this analysis. In fact, the Swedish company thinks that the Covid-19 situation will represent a big challenge to improve and to innovate the service, but also to change people's habits, that is more or less the main aim of this organization. On the same side there is Hertz, that is considering this situation as a perfect environment to introduce new technologies that could help people to fit perfectly with the new lifestyle. This is the main point, to change customer habits and minds. Before the virus outbreak it was a difficult process, where companies had to understood perfectly a way to interact with customer trying with direct or indirect strategies how to change their habits. With this worldwide situation people are forced to change their lifestyles providing companies and organizations different new opportunities that maybe could help with the implementation of some innovations. Also, as referred by Ericsson, the new ways of organizing work are representing a new challenge for many industries, including the mobility one. It is important to consider that for the urban area movements there will be significant changes that could represent a limit or an opportunity for MaaS providers.

Linking with this last argument UbiGo referred how it is important to reconsider some models or organizations regarding mobility. It is time to re-think the network also in terms of organizational aspects, considering that the situation is rapidly changing, and people needs too. An example could be the reconfiguration of some

aspects of public transports that have to deal with higher costs given by a smaller part of population that will use these vehicles.

It is also in terms of costs that could be done a last consideration regarding this argument. There is a high importance of the right collaboration schemes that could reduce costs thanks to synergies, according with Yacht&Cars. UbiGo is considering the costs reduction perspective as the most important one together with customer changes. What is clear is that this situation is going to change every aspects of the society, actively participating in it means to be prepared and well-organized to reduce errors and catch innovative opportunities, this is not easy but in MaaS it is something that is worth to deal with.

VI. CONCLUSIONS

This master thesis project had the objective to understand and analyze the dynamics that usually are happening in MaaS networks. In addition to this, a special focus has been on the implementation effects of these dynamics trying to define if they are representing a barrier for the development and for the implementation of the service, or not. The network analysis method studied in literature was fundamental to identify the key elements of these organizations and to understand how these dynamics are present in them.
Arriving at this point, a complete understanding of what Mobility as a Service concept is was considered important in order to analyze the general scenario, goals and values that are present in MaaS networks, and also considering the initial difficulties to find a proper definition of the argument found in literature. The other sub-research questions added important information about the research topic, considering business model's aspects and difficulties for mobility organizations involved in MaaS, and also the identification of a proper value network map that is representing the starting point of the network dynamics analysis. The final sub-research question, about the Covid-19 effects on MaaS networks, is based on external factors dynamics concepts studied by Majchrzak et al. (2015) and is helping to answer the main research question adding present and future perspectives on the MaaS network changes.

This last chapter will explain the main conclusions of the thesis work giving also the author perspective on some important aspects in the network analysis. It will be given a resume of the main results, divided in sub-research question and main research question areas, trying to follow the methodology scheme identified at the beginning of this work. In conclusion, the author will provide future arguments or research's areas that could be studied in the future regarding the MaaS topic and its effective implementation, considering the expected mobility situation and the future Mobility as a Service developments.

1. Sub-Research Questions

Different sub research questions have been identified to help the author having the right information to answer to the main research question. These sub-RQ are initially considering the principles behind the concept of Mobility as a Service, then are analyzing some business models' difficulties for MaaS organizations, arriving to value network analysis fundamental elements, like value network map and exchange analysis. A last focus is on external factors that could influence the MaaS network, in this thesis case the Covid-19 outbreak and its effects on mobility. In this paragraph a conclusion on these first sub-research objectives is given by the author, considering the results of the analysis and the importance of these for the main research question answer.

1.1. Mobility as a Service

The first sub-research question is regarding the problems in the identification of a clear definition of Mobility as a Service, considering that in literature this concept had different point of views and so a lack of a unique perspective, the question is:

- *How can Mobility as a Service be defined?*

It is relevant to understand which are the main principles and concepts behind this mobility concept to poperly understand what is MaaS and how it is functioning. From the interviews different aspects were given by the companies, all important to understand what this mobility innovation is. These elements sometimes represented a discordance between the views of the interviewees, respecting the different backgrounds and companies' values that are conditioning the opinions on this topic. What has emerged as relevant was the integration concept that is meaning not only a simple coordination between different mobility providers, but a deeper collaboration that has to regard different aspects related to the effective providing of the mobility as a service platform, an example could be the integration of the commercial payment systems or of the technological platforms to create the app that the customer has to use to have the access to the service. Being integrated could give these organizations an important chance to collaborate using business synergies to reduce costs, that is representing a central theme considering the difficulties for shared mobility models to achieve profits or revenues goals.

Maybe it is not important, as mentioned also by UbiGo, having a single definition. It is important to understand what Mobility as a Service is and what kind of principles reside behind this concept, to align the goals and the efforts of the companies in the right areas and in the right way. It is important to consider this mobility revolution as an integrated concept of transports, where different alternatives of travelling are given to the customer with a single platform and to do that companies have to unify objectives and efforts in a MaaS unique direction.

The second research question is related also to the Mobility as a Service concept but is considering the difficulties in finding a proper business model that is going to facilitate also the development and innovation processes. The question is:

- *How appropriate are the business models of MaaS providers for the effective implementation of this mobility innovation?*

In fact, it is underlined in literature the importance of having the right business model to create and transfer properly the value to the customer. From the interviews it was difficult to identify a business model that usually was applied in MaaS projects. This could be due to the fact that this argument is recent and is being

implemented right now, not giving the space to the effective study of theories regarding the business models selected. What emerged also by some of the interviewees is the lack of a definition of a proper business model used by the MaaS providers, that actually have not been well structured yet. There is an effective lack of a well-defined business model innovation process, that is central in the development of the strategies, the objectives and the structure of this mobility innovation. This situation could represent a problem for the effective implementation of the service, making difficult the process of understanding and dealing with the customer and his needs. This problem is affecting indirectly also the network dynamics' one, considering that without a proper business model it is difficult for companies involved in MaaS to find and define right goals and objectives. This will lead organizations to choose maybe other projects, contributing to structural changes in MaaS networks and to difficulties in hiring new partners for the development of this mobility concept. In this direction, literature could represent an important source for the choice of different BM alternatives that could be adapted to the MaaS case. The experiences of the Service Value Web, and also the overcoming of some Porter's concepts, is representing an important input for the usage of new business model concepts, where the service provided is fundamental and central for the organization and for the strategy. These theories maybe could be useful for companies to find some interesting things that could be practically applied to Mobility as a Service etworks, helping the development of well-defined and functioning business model innovations.

1.2. Value Network Analysis

The last two sub-research questions are regarding some important aspects of the value network analysis of the MaaS organizations. These are important to provide the author information useful to answer the main research question, representing two important steps of the entire value network analysis. The first one is regarding the identification of a value network map and the second one is regarding the analysis of an external factor that is contributing to determine some of the dynamics present in the Mobility as a Service network.

The first sub research question was regarding the identification and the analysis of the value network map. The question is:

- *Which are the characteristics of the MaaS' value network map?*

It was important to do this work to identify the actors involved in the MaaS and the exchanged assets that usually are defining also some main dynamics that are influencing the network functioning.

The actor interviewed were sometimes very different between each other, but the participations in MaaS network was giving them the common knowledge that has been useful to identify and understand how the network of a MaaS provider is structured. The interview with UbiGo introduced a concept that in this research has been fundamental, the network is divided in different relevance areas, in the central one there is the

particular ambivalence between a classical value chain relation and also an innovative network collaboration. The stratification of the network was also useful to identify the companies that could have been interviewed, trying to have for each circle of the structure some information given by the actors that are participating in it.

The assets that usually are exchanged in these networks are both tangible and intangible. The real advantage seems to be the knowledge and the data about the customers. These assets were representing a big competitive advantage, defining also the power hierarchies present in the network, for example Volvo Cars with its big customer base was representing a very powerful actor that was operating in the value chain circle. In terms of dynamics, the importance of this structure and these assets will be relevant considering the changes regarding roles, structures and goals and their effects on MaaS network and projects.

In conclusion, given the importance in literature of external aspects that could represent a dynamic in network, a consideration about the Covid-19 outbreak could be mentioned to provide information on dynamics for the main research answer and also for future thesis or studies input ideas:

- *How the Covid-19 pandemic is influencing or will influence the MaaS network as an external network dynamic?*

In this direction there is a general understanding of the changes that this virus outbreak are taking to the mobility environment and to the society. Even if sometimes the mobility industry has been seen as stable and difficult to disrupt, with this new situation, and with these forced changes in customer habits, some big changes will happen. Mobility has to be re-thinked almost to reduce the costs that with the actual situation are not sustainable in some cases, public authorities could incentivize the usage of different mobility alternatives, and MaaS could represent the perfect vehicle to do all of this and to let the customer choose between different mobility alternatives. This is representing a perfect scenario for mobility companies involved in MaaS to adjust or change their goals, having direct repercussions on the structure or on the objectives of the network. These dynamics could represent a big opportunity for the Mobility as a Service organization to grow and to develop the business but could be also very tricky when there isn't a proper structure that is making the entire network ready to innovate and change.
What is needed is a deeper organization structure, integration and common goals definition, to be ready to accept and face this changing, starting innovation processes and collaborating inside and outside the network. In an industry that actually is based on short-term profits visions this situation could represent a big incentive to shift in a wider long-term vision that could help the development of the entire Mobility as a Service project, facilitating the entrance of new partners and the innovation of the entire structure.

2. Main Research Question

The main research question is regarding the analysis of the inter-organizational dynamics, usually present in networks, and if these are influencing and affecting the effective development of this mobility innovation. The question is based on the knowledge acquired during the collection of the literature section:

- *How are inter-organizational dynamics in Mobility as a Service networks affecting their effective implementation?*

Starting with the analysis of the information gathered, some common dynamics were identified in MaaS network, considering the different categories listed in the Majchrzak et al. (2015) article. There is the presence of actor composition dynamics, with an environment that is almost stable, but with a network that is continuously seeking for new companies or partners that could be useful for the implementation of the MaaS in Sweden. The goals dynamics are strictly related with the previous ones, considering the different alignment of interests that companies have and also the different time visions regarding the objectives followed by them. In particular, from the interviews, emerged a difference between companies that usually are seeking for short term objectives and advantages, avoiding long term projects as the MaaS one. This was confirmed also by the researchers in this field (i.e. Yacht&Cars), that considers this point fundamental for the missed implementation of the service in Sweden.
Contracts and regulations are also important in a network perspective, because they are defining the directions and the objectives of some important actors like public administrations or public transports providers. In addition to this, the incentives of nations to new mobility are continuously pushing through innovation, and this could be seen as an advantage in terms of mobility as a service development. To do this there has to be a proper organization and an effective business model that has to transfer and transform ideas and efforts in values that are perceived by the customer. Also, the new restrictions with the spreading of the Covid-19 are representing an important regulation shift, with customer that are directly involved in this process by changing their habits.

The organizational dynamics part has a central importance in the analysis and in the implementation of the service, this is because of the various composition of the mobility as a service network that is making this entire organization very difficult to manage and control. There is the need of dedicated departments that have to work on this project, but only some companies like Volvo, Hertz or Ericsson have it, leaving the rest of the organizations involved with the usual problems of internal turnaround of positions that are surely influencing the effective implementation of the project by taking away this network from a unique long term perspective. With the change of the organizational structure it is relevant and linked the goals dynamic, that in interview was mentioned as one of the main causes for the organizational change, surely the misalignment between the different companies objectives is not helping MaaS providers to build a stable structure or to develop and

implement a stable service. From these aspects the importance of a greater level of integration emerged, only with an effective collaboration there could be advantages for the network development and strategy, avoiding the continuous turnaround of companies involved and the misalignment of goals between the organizations. All of this could make the processes easier to conduct and innovate, and with the chance to exploit in the correct way the resources and the advantages of an effective collaboration.
External forces also have importance in these dynamics, considering that mobility innovation is incentivized mostly by national or European (in the Swedish case) changes in regulations and directions. In addition to this, the information gathered from the sub-research question, related to Covid-19 effects, are useful to confirm the importance of a stable structure of the network, with well-defined goals and with a high level of integration. Only with this approach the advantages of these new opportunities could be exploited, emerging the concept that without a long-lasting structure and strategy it is difficult to disrupt effectively the mobility market.

In conclusion, from the analysis have been identified the main dynamics that are present in MaaS networks, especially in Sweden. These changes could represent a big opportunity to catch, to innovate and disrupt an industry that more or less is stable since years. Considering the mobility sector, in fact, the concept of the service provided is almost stable, even with the more innovative projects, what is changing is the way how the customers could approach and interact with that offer. A Mobility as a Service project is representing a chance of collaboration and innovation in this sector, but to use properly these opportunities there has to be a well-defined and integrated structure, with long term horizons and alignment in objectives of the companies involved. The organizational charts have to be well defined as the business models to create a concrete and long-lasting strategy that could give the MaaS provider the right stability to develop and effectively launch this new concept of mobility.

3. Implications

This thesis project could help in having another point of analysis of a recent and evolving topic like Mobility as a Service. The experiences of the companies involved could represent an important source of additional knowledge that could explain better what MaaS and some basic aspects or elements of it. This is underlined by the importance that this work is giving to some fundamental elements that have to be considered to properly understand what MaaS is, making the finding of a definition not having a central role in this process. Adding information on this argument could mean also to expand the existing data on Mobility as a Service, giving literature more potential aspects to consider for future analysis.

Network analysis is having an ambivalent role, starting as a way to understand the cases and studying them, and representing a clear example of how the theoretical part could be applied to understand some practical, and merely unknown, concepts as Mobility as a Service could be. The dynamic aspects and analysis cited by

Majchrzak (2015), and the way how these elements could be identified and studied, has represented a clear direction on how the argument could be analyzed. In this way, another implication of this work could be giving a practical example of how the theory explained in literature could be effectively present in the real world, underlying the importance of this knowledge to clearly analyze the topic chosen. The identification of the main dynamics present in MaaS network is providing also a general scenario in which service providers have to collaborate and there is the clear need of a complete integration between the companies involved. The complete understanding of these aspects could give advantages for the future organization and strategies of the network and also for the resolution of problems relative to these dynamics.

In conclusion, theory could represent also a source of inspiration for MaaS providers also in terms of business model chosen. Considered the importance detected in business model area, regarding Mobility as a Service, this thesis project could be considered as a starting point in this direction giving some initial information that maybe could be useful for MaaS organizations.

4. Future Researches

Mobility as a service is representing a project that is born recently and is actually being developed, tested and launched. These characteristics are representing the point of start for many other researches objectives that could help literature to define and study the main aspects of this argument, but also could help companies in having additional knowledge to use for improving the existing project.

The analyses that could be made in future are spacing in different fields, with different subjects and areas interested, this is because there is a lot to discover and to improve when talking about innovations and mobility.

An interesting point of analysis could be linked with costs, understating how to reduce them with strategic, organizational or financial improvements. Reducing costs could represent an important advantage for the entire MaaS network, making the service more profitable and increasing the appeal for external partners that could definitely join with better revenues conditions.

Another interesting research aspect could be related to marketing and to customer needs. As often mentioned in this thesis, the complete understanding of customer needs and how they are changing with the time could represent an important advantage. For literature could be an improvement, adding maybe knowledge on customer habits, for companies could represent a way to improve the service to better fit with customer requests, delivering a service that will be qualitatively perceived better from the customer.

The strategic field could represent also an important starting point for future projects, considering the necessity to find a proper business model and to define new strategies that could be helpful for companies. Business model is the way how the organizations are understanding and delivering value to the customer, so it could represent an argument that is strongly related with the previous one (related to marketing), giving the chance to make the study field wider and cross-functional.

In conclusion, the actual worldwide situation related to Covid-19 outbreak is representing the start for a new way of living that could be the source of new opportunities and innovations, especially in mobility industry. New research's topics could be related to this argument and to the necessity in finding a proper organizational stability and strategy to be ready for starting innovation projects.

Mobility as a Service is representing something new in an industry that is almost stable and traditional. The need for innovation and change has to be linked with a strong organizational and strategical understanding that future research's proposals could analyze providing the networks involved in these projects new useful knowledge. Innovation linked with fresh knowledge could represent a great base to contribute in making this mobility revolution happen.

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Appendix

Volvo Cars Interview Guide

Jonas Mårtensson – Head of *Care by Volvo* Strategy

- Introduction of the topic;
- Brief summary of the purpose of the study;

About Volvo Cars and BM.

- Brief overview of the company;
- Introduce yourself and your role in Volvo.
- In which areas/departments you worked before?
- What are your tasks now?
- What is Care by Volvo and how fits with the strategy (BM) of the company?

About the concept of Mobility as a Service

- Can you provide us a definition of mobility as a service concept?
- How Care by Volvo can be defined as an "as-a-service" offer?
- What are the state of works of Care by Volvo in Sweden?

About networks dynamics and composition.

- Do you know the concept of network?
- How it can be applied to Care by Volvo?
- Do you think that the network of Mobility as a Service has to be seen as a stable environment or a dynamic one? Why?
- Which dynamics can you identify in your environment/network?

Inter-organizational Change Dynamics Analysis

- What are the results of these dynamics in terms of: network organization (also contracts), roles and goals?
- Give some example of important changes that regarded your network and their effects.
- Do you think that these dynamics are representing a limit for the "as a service" complete implementation?

Interview Guide Yacht and Cars

Per Gyllenspetz– Owner of Yacht and Cars Transportation Strategies

- Introduction of the topic;
- Brief summary of the purpose of the study;

About MobilityXLab Project and BM.

- Brief overview of the company;
- Introduce yourself and your role in your company;
- In which areas/departments you worked before?
- What are your tasks now?

About the concept of Mobility as a Service

- Can you provide us a definition of mobility as a service concept?
- How Yacht and Cars can deal with it? Accelerate the processs.
- What are the state of works of MaaS in Sweden?

About networks dynamics and composition.

- Do you know the concept of network?
- How it can be applied to Mobility as a Service for you?
- Do you think that the network of Mobility as a Service has to be seen as a stable environment or a dynamic one? Why?
- Which dynamics can you identify in your environment/network?

Inter-organizational Change Dynamics Analysis

- What are the results of these dynamics in terms of: network organization (also contracts), roles and goals?
- Give some example of important changes that regarded your network and their effects.
- Do you think that these dynamics are representing a limit for the “as a service” complete implementation?

Interview Guide MobilityXLab

Christian Reidl – Project Manager MobilityXLab

- Introduction of the topic;
- Brief summary of the purpose of the study;

About MobilityXLab Project and BM.

- Brief overview of the Lab;
- Introduce yourself and your role in MobilityXLab
- In which areas/departments you worked before?
- What are your tasks now?

About the concept of Mobility as a Service

- Can you provide us a definition of mobility as a service concept?
- How MobilityXLab can deal with it? Accelerate the processs.
- What are the state of works of MobilityXLab in Sweden?

About networks dynamics and composition.

- Do you know the concept of network?
- How it can be applied to Mobility as a Service for you?
- Do you think that the network of Mobility as a Service has to be seen as a stable environment or a dynamic one? Why?
- Which dynamics can you identify in your environment/network?

Inter-organizational Change Dynamics Analysis

- What are the results of these dynamics in terms of: network organization (also contracts), roles and goals?
- Give some example of important changes that regarded your network and their effects.
- Do you think that these dynamics are representing a limit for the “as a service” complete implementation?

Interview Guide Ericsson

Lars Erik Lindberg – Innovation leader at Ericsson Garage

- Introduction of the topic;
- Brief summary of the purpose of the study;

About Volvo Cars and BM.

- Brief overview of the company;
- Introduce yourself and your role in Ericsson.
- In which areas/departments you worked before?
- What are your tasks now?

About the concept of Mobility as a Service

- Can you provide us a definition of mobility as a service concept?
- How Ericsson offer can be combined with a mobility as a service offer?
- Are you involved in any mobility as a service project?
- How Covid-19 outbreak changed your environment? There are some advantages for you in shared mobility (networks) or not?

About networks dynamics and composition.

- Can you explain me the structure of your strategic network?
- Do you think that your network has to be seen as a stable environment or a dynamic one? Why?
- Which dynamics can you identify in your environment/network?

Inter-organizational Change Dynamics Analysis

- What are the results of these dynamics in terms of: network organization (also contracts), roles and goals?
- Give some example of important changes that regarded your network and their effects.
- Do you think that these dynamics are representing a limit for the “as a service” complete implementation?

Interview Guide Hertz

Anders Tärnell– Head of Digital Sales at *Hertz*

- Introduction of the topic;
- Brief summary of the purpose of the study;

About Volvo Cars and BM.

- Brief overview of the company;
- Introduce yourself and your role in Hertz.
- In which areas/departments you worked before?
- What are your tasks now?

About the concept of Mobility as a Service

- Can you provide us a definition of mobility as a service concept?
- How Hertz offer can be defined as an "as-a-service" offer?
- Are you involved in any mobility as a service project?
- How Covid-19 outbreak changed mobility? There are some advantages in the shared mobility or not?

About networks dynamics and composition.

- Can you explain me the structure of your strategic network?
- Do you think that the network of Mobility as a Service has to be seen as a stable environment or a dynamic one? Why?
- Which dynamics can you identify in your environment/network?

Inter-organizational Change Dynamics Analysis

- What are the results of these dynamics in terms of: network organization (also contracts), roles and goals?
- Give some example of important changes that regarded your network and their effects.
- Do you think that these dynamics are representing a limit for the "as a service" complete implementation?

Interview Guide UbiGo

Hans Arby– Founder of UbiGo

- Introduction of the topic;
- Brief summary of the purpose of the study;

About UbiGo and BM.

- Brief overview of the company;
- Introduce yourself and your experience with UbiGo
- In which areas/departments you worked before?
- What are your tasks now?
- What is UbiGo doing now?
- What are the difficulties of implementing MaaS now?

About the concept of Mobility as a Service

- Can you provide us a definition of mobility as a service concept?
- What are the states of works of MaaS in Sweden?

About networks dynamics and composition.

- How the concept of network dynamics can be applied to UbiGo network?
- Which dynamics can you identify in your environment/network?
- In general, is it a stable or dynamic environment?

Inter-organizational Change Dynamics Analysis

- What are the results of these dynamics in terms of: network organization (also contracts), roles and goals?
- Give some example of important changes that regarded your network and their effects.
- Do you think that these dynamics are representing a limit for the “as a service” complete implementation?
- Covid-19 for you is representing a dynamic in mobility but also in MaaS?

Table 10: coding of gathered data

Companies interviewed	1st Order Concepts	2nd Order Concepts	Aggregate Concepts
Volvo Cars	• monthly payment offer; • new customer experience; • revolution of retail sector; • direct contact with the customer; • integration, flexibility, efficiency in the service;	**Mobility as a Service Definition**	**MOBILITY AS A SERVICE**
MobilityXLab	• integration between different realities;		
Yacht&Cars	• not a single definition but different explanations of the same concept; • new customer experience of travelling; • Sustainable alternative;		
Ericsson	• divide the topic in different interest areas for the companies involved;		
Hertz	• not a single definition but a general understanding of what MaaS is; • Integration of different actors involved in mobility		
UbiGo	• MaaS itself is a wrong definition because could lead to wrong considerations. It is better to call it an integrated mobility alternative; • coordination between different actors involved; • complete commercial integration; • easy to use for the customer; • replace the owned car concept from customer habits; • customer change; • Level 3 in Sweden.		
MobilityXLab	• need for MaaS providers to find a proper BM to let the collaborations be more effective; •long time horizon is needed in MaaS;	**MaaS Business Model**	
Yacht&Cars	• the real problem is the creation of an effective BM • now it is just more than an idea; • BM has to make able the network of MaaS to make profits;		
UbiGo	• difficulty in finding partners related to short-term visions of companies; • need of alignment of objectives.		
Volvo Cars	• combination of different service providers; • maintenance, retailers/ dealers, insurance companies, logistic companies;		

Companies interviewed	1st Order Concepts	2nd Order Concepts	Aggregate Concepts
	• advantage of knowing and owning vehicles and knowledge;		
MobilityXLab	• club of companies; • generally are six companies involved; • small and big companies; • providing knowledge and possibility to collaborate with big companies;	**Value Network Map**	
Ericsson	• continuously expanding network; • different actors involved because of the versatility of the technology offered;		
Hertz	• combination of public and private actors; • dedicated department in Hertz to manage mobility networks;		
UbiGo	• different levels of network; • value chain, technical partners, other stakeholders;		
Volvo Cars	• intangibles and tangibles assets exchanged;	**Exchange Analysis**	
	• generally the transactions are managed by contracts;		
	• there are exceptions, where contracts are mixed with other informal agreements;		
Yacht&Cars	• intangible assets are generally more important;		
	• importance of the data exchanged;		
	• contracts used to manage networks transactions;		
Ericsson	• usually are exchanged both intangible and tangible assets;		
	• data are really important;		
	• usually are used contracts to manage the exchanges;		
	• when needed, contracts are updated after meetings;		
UbiGo	• usually tangible assets are referred to the providing of the service;		
	• data are representing a big advantage to understand the customers;		
	• usually the main partnerships are regulated with contracts;		
	• partnerships with the external circle of the network are managed with informal agreements (i.e. Universities).		
	• different companies playing different roles are involved in the network;		

Companies interviewed	1st Order Concepts	2nd Order Concepts	Aggregate Concepts
Volvo Cars	• goals are usually related to the customer experience. The main objective is to conquer the customer and gain his fidelity;	**Inter-organizational Dynamics**	**VALUE NETWORK ANALYSIS**
MobilityXLab	• need of horizontal structure;		
Yacht&Cars	• different actors involved in the network;		
	• roles, goals and structure have to be considered when talking about network's dynamics;		
	• usually companies involved have different goals;		
Ericsson	• dynamic-based concept of mobility;		
	• network continuously expanding;		
	• importance of roles in networks;		
Hertz	• importance of roles in networks;		
	• need of right commitment to the project;		
	• importance of culture;		
	• usually stable environment;		
	• importance of taxes and regulations when referring to dynamics;		
UbiGo	• importance of roles in terms of people involved;		
	• importance of culture that has to be implemented by CEO or management;		
	• difficulties to disrupt the environment;		
	• missing the alignment of goals of companies involved;		
	• difficulty to convince new partners.		
Volvo Cars	• dynamics referred to retail sector;	**Dynamics Analysis**	
	• dynamics referred to changes in goals;		
	• dynamics as pains for transformation;		
	• important effects in terms of innovation for the network;		
MobilityXLab	• dynamics always present in MaaS networks;		
	• changes in roles;		
	• changes in regulations;		
	• big opportunity to innovate;		
Yacht&Cars	• roles dynamics;		
Ericsson	• dynamic environment;		
	• missing of the right roles in companies' structures;		
	• goals are continuously changing;		

Companies interviewed	1st Order Concepts	2nd Order Concepts	Aggregate Concepts
	• big innovations opportunities;		
Hertz	• stable environment;		
	• dynamics in regulations;		
	• technological dynamics;		
	• improvements opportunities;		
UbiGo	• stable environment;		
	• dynamics in network composition and structure;		
	• companies changing their goals and objectives;		
	• dynamics as a limit and an advantage in terms of innovation.		
Yacht&Cars	• Covid-19 is representing a big lesson for this industry;	**Coronavirus external dynamic**	
Ericsson	• Covid-19 is a big challenge;		
	• change in people's habits;		
	• change of working environments;		
Hertz	• difficulty of changing customer behaviours overcame by Covid-19;		
UbiGo	• Covid-19 is representing a big challenge;		
	• change in some models of mobility;		

Source: created by the author using the Gioia et al. (2015) scheme.

UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

Master's Degree in Innovation and Industrial Management

LUISS Guido Carli
LIBERA UNIVERSITÀ INTERNAZIONALE DEGLI STUDI SOCIALI

Master's Degree in Management

DOUBLE DEGREE PROGRAM IN INNOVATION

"ANALYSIS OF INTER-ORGANIZATIONAL DYNAMICS IN MOBILITY AS A SERVICE NETWORKS."

SUPERVISORS

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Thesis Summary

Introduction

This thesis is the result of the collaboration between the author and First to Know, a management and strategic consulting firm based in Gothenburg. The visions and the innovative objectives of this company characterize its modus operandi and above all its network of knowledge, useful to identify and deepen a possible thesis topic. Mobility industry represents a segment subject to continuous innovation, which tends to have real impacts on the consumer's life and the way he moves. Given FTK's interest in new mobility plans, mainly related to the Göteborg 2035 project, the author has been able to explore innovations in this sector, identifying the concept of Mobility as a Service as the central topic of the thesis and therefore of the analysis.

Mobility as a Service stands for a new concept of mobility, which is based on the integration of several services to provide the end customer with a new experience of movement inside and outside the urban centre. This phenomenon is conditioned by multiple factors, starting from organizational dynamics and arriving at European and state investment plans that very often define the pace of innovations, especially regarding new urban projects. An example of this are the Scandinavian countries and especially Sweden with the city of Gothenburg. In fact, in the capital of the Swedish West Coast, there are many urban development plans that also include projects related to new mobility, all this has actually made it possible to develop innovations, such as Mobility as a Service with the birth of UbiGo. The latter represents a Swedish company, based in Gothenburg and Stockholm, which is actually testing and developing the new mobility, linked to the MaaS concept. The study of UbiGo, and similar realities, led the author in defining Mobility as a Service as the central topic of the thesis, thus shifting the focus on how to analyze this innovation related to mobility.

The identification of the way to analyse this topic has gone through different literature studies and different points of view. In collaboration with the supervisors Luca Giustiniano and Sven Lindmark it was decided to analyze MaaS through the study of its network, focusing on the inter-organizational dynamics that are present in it. To do this, it was fundamental to understand which inter-organizational dynamics are defined within the MaaS network and how they should be studied. The article by Majchrzak et al. (2015) on the study of the dynamics within networks and their identification, especially at the level of strategic and organizational effects, was useful for the analysis.

After going through this path, the author identified his own research question, which is useful to analyze in depth the chosen topic and therefore give an exhaustive answer for the thesis work (Bryman and Bell, 2011). The main research question of this thesis is:

- *How are inter-organizational dynamics in Mobility as a Service networks affecting their effective implementation?*

In this sense it is fundamental to understand which are the most common inter-organizational dynamics within MaaS in Sweden, and above all which are the reasons behind these dynamics. Therefore, it is important to

understand whether these factors may represent a limit for the implementation and development of MaaS or not.
In order to answer exhaustively to the main objective of this thesis, the author has also identified four sub-research questions, which are directly related to the main RQ and will therefore help in answering it. These further research objectives are:

• *How can Mobility as a Service be defined?*

This question is useful to identify the general principles and therefore the fundamental elements behind the concept of Mobility as a Service, thus understanding how they influence the choices, strategies and objectives of the companies involved in this project. In this way, a clearer context of the topic is provided to the author and will be useful for the understanding of some dynamics present within the network.

• *How appropriate are the business models of MaaS providers for the effective implementation of this mobility innovation?*

This question is useful to deepen the strategic aspect of the organizations involved in MaaS projects, this aspect has a direct influence on the company's choices and also affects the network. It will therefore be useful to understand any gaps or limitations of MaaS projects in strategic and organizational terms that directly affect the structure and objectives of the network itself.

• *Which are the characteristics of the MaaS' value network map?*

This sub-research question represents an important point in terms of network analysis and therefore of understanding it. Only through the identification of an appropriate value network map it will be possible to identify the type of actors that are involved in these projects and especially the dynamics of exchange within the network, which define its characteristics.

• *How the Covid-19 pandemic is influencing or will influence the MaaS network?*

This last question is part of the identification of dynamics, operating outside the network, that influence and therefore change its structure or objectives. From the perspective of inter-organizational dynamics, external dynamics are also mentioned in the article by Majchrzak et al. (2015) and therefore, starting from these assumptions and considering the current situation, the Covid-19 outbreak is an example of this. It will be useful to understand its immediate effects and possible future effects in the internal dynamics of the MaaS network.

Concluding this introductory chapter of the summary, the structure of the thesis work will follow a precise order, where this introductory chapter will be followed by literature review, methodology, empirical findings, data analysis and conclusions.

Literature Review

Mobility as a Service

Mobility as a Service Trends

As already mentioned in the introduction of this summary, Mobility as a Service is a concept that arises from different dynamics that occur in society and that directly or indirectly affect the mobility sector. In this sense we can identify several trends that are at the basis of the concept of MaaS and that must be considered in order to better understand its origins, functioning and characteristics.

The first trends that are reported in this thesis are those related to new urbanization processes. In this sense, cities change and evolve in order to improve the quality of life of citizens and therefore to respect some regulations related to recent and relevant issues such as mobility. (Holmberg et al., 2016)
An example of this is *Gothenburg 2035* plan, which represents an innovative project for this Swedish city, where certain urban aspects, including mobility, will be decisively revolutionised.
The concept of smart city is becoming more and more popular and the effects are aimed at changing some aspects of citizens' life, some of their habits, for the common good and to have cities that are more ecological, sustainable and therefore better in many ways. Improving mobility means in a way changing the way the consumer moves around the city, using shared-mobility services, making public transport more efficient and sustainable, or implementing new mobility concepts that integrate all these aspects (A. D. Little, 2018). Among all these concepts there is the Mobility as a Service one.

Technology represents another very important trend, both for the effects on the consumer's life in general, but also for mobility projects. A new technology means new opportunities for mobility providers, who will be able to take advantage of a more developed technological environment to innovate with new services on the topic of transport. In the case of MaaS it is important for example the implementation of the 5G network, considering its advantages and especially the various implementations in Sweden by Ericsson. (Krasniqi, 2016)
Linked to technology there is also the issue of data management, which in the perspective of Mobility as a Service and innovation can represent a significant competitive advantage, going to understand through the study of the consumer his preferences and changing the service offered on them. (Tari et al., 2015)

Also important for the concept of MaaS is the cultural aspect, given the importance of re-educating the consumer towards a more responsible use of transports. It is therefore necessary to change consumer habits and bring them to the consideration of sustainable mobility alternatives (Sopjani et al., 2019), creating space for innovation in this segment and therefore for new ideas as MaaS could be.
One of the limits in this sense is the link that currently exists between consumer and owned-car mobility. Going beyond this concept would bring many advantages, perfectly marrying the perspective of the city and

citizen of the future and giving importance to the correct choice of different means of transport that can support the MaaS perspective. (Laine et al., 2018)

These trends are stimulated and supported by political activities and government initiatives that encourage change in cities or in specific sectors such as transport. The effects of these initiatives are important because they outline the regulatory framework of the issue and are a strong input for new projects and innovations. Examples of this could be regulations on CO2 reductions, or opening up some usually closed markets, such as taxis, to external competitors, or collaborations between public and private companies, in our case for mobility. (Sopjani et al., 2019)

All these trends define an environment that should stimulate innovation in transport, giving rise to new businesses and new concepts. Mobility as a Service represents one of them and is continuously stimulated by these factors that also influence its implementation and development.

Mobility as a Service Definition

The study of the literature that refers to this topic shows the difficulty of finding a single definition that can include all aspects of Mobility as a Service. This is because in the case of this concept it is difficult to identify all the variables that characterize it, and perhaps this process may also be superfluous since the context and organization of MaaS changes very frequently. (Sochor et al., 2018)

It becomes therefore relevant to identify some elements that may have a certain centrality within the MaaS study. In this sense the final consumer becomes a fundamental element for this type of organization, going to define the objectives and directions that MaaS must follow. The important thing is to understand the needs of the consumer and then go on to change his habits through the use of the service itself. (Kamargianni et al., 2017)

Another important element in this sense is the integration between services and companies involved within this concept. There must in fact be an effective collaboration between them that leads to a final service, which the client will use through an efficient, integrated and functional platform (app). It is therefore important to define the different levels of integration, which start from a simple strategic collaboration between companies (level 1) and arrive at a complete organizational, economic and social integration (level 4). The objective is that of maximum integration in order to offer the client a service that can change his habits in terms of mobility and that can also have an impact on society. (Sochor et al., 2018)

Sustainability and Swedish Situation

As mentioned earlier, one of the relevant factors when talking about innovations in terms of mobility is certainly sustainability. Considering the attention that institutions are placing on this issue, Mobility as a Service should have clear effects in this sense, highlighted by this net change in the organization of urban mobility. The effects of this innovation can be relevant first of all for the reduction of traffic within urban areas, by encouraging the use of alternative means of transport during peak hours, for example. The means of transport chosen by the customer certainly defines the impact on the sustainability of MaaS. However, the provider could opt for sustainable alternatives also concerning traditional mobility in order to expand the effects of this mobility innovation in society. In this sense, the different activities that can be implemented to have a greater degree of sustainability and integration in this sense are important. These can be strategic, tactical, operational and reflexive activities. (Sochor et al., 2018)

In conclusion, in Sweden, Mobility as a Service is one of the most important issues in terms of mobility. Many investments are being made in this direction and organisations are moving toward this vision also to organize their own businesses. It is no coincidence that one of the first MaaS providers, UbiGo, is located in this Scandinavian country, representing perfectly the efforts and attention to this mobility innovation. (Smith et al., 2018)

Business Model Literature

This part of the literature is useful in order to be able to respond adequately to the second sub-research question and therefore also to collect information about a central theme in the organization and strategies of Mobility as a Service network, which will be relevant also in terms of the dynamics existing in it.

Business Model Definitions

To start talking about business models, it is appropriate to define what these models are and how they affect the objectives and strategies of companies. In particular, the concept is that an organization needs well-defined strategies and organizational schemes in order to deliver and work with value, and the customer perceptions and needs in this direction are fundamental. Central, therefore, are the processes of understanding and delivery of the value required by the customer, to ensure that all intermediate processes are oriented efficiently and correctly on objectives and directions aligned with those of the company. (Osterwalder et al., 2011)
In this sense, a relevant definition of business model can be found in the work dating back to Osterwalder et al. (2011):

"A business model describes the rationale of how an organization creates, delivers and captures value". (Osterwalder et al., 2011).

On this way, the processes of value creation, delivery and capture are fundamental, as already mentioned in this summary. In conclusion, this definition is relevant in this topic, but in literature it is possible to find several others, mentioned in the extended version of this thesis file, that could add elements to this argument or could define the business model according to different perspectives and directives.

Business Model Canvas

In addition to defining what a business model is, it is important to know how to correctly create and use it to achieve business objectives. In this direction can be mentioned a very important framework that has been studied by Osterwalder et al. (2005), breaking down the concept of business model into nine main elements that together have direct and indirect effects on business strategies.

Considering the Figure 2 in the complete thesis, the nine fundamental elements are: customer segment, value proposition, channels, customer relationship, revenue stream, key resources, key activities, key partners and cost structure. All these elements are explained in detail in the extended thesis file.

What emerges is the importance of this concept in terms of innovation and strategies for the development of the company. In fact, when considering all of this, is correct to think that each change to one or more elements consists of a general change of the whole picture. The effects are therefore total in the company and must be considered in the appropriate way, especially when referring to the innovative sphere. (Bocken et al., 2014)

Business Model Innovation & Product Service Systems

The concept of business model innovation is closely linked to the continuous change in consumer needs, which make some business strategies temporary, pushing towards continuous innovation in terms of business models. (Goffin et al., 2010)

Business model innovations usually lead to much more evident results than other types of innovation, because they include different aspects of the company's organization and strategies, thus having more important repercussions (Gassmann et al., 2014).

In this sense, different types of BMI can be identified, considering different levels of innovation and development of business strategies. More precisely, in the extended thesis file, six types of BMI are explained in detail. These represent increasing levels of innovation, reaching the last stage, the type 6 where the company is ready to collaborate and open up to the outside world, accessing new opportunities, and information, fundamental to the innovation process. (Chesbrough et al., 2007)

An example of this can be the Product Service System business model. In this case, in fact, there is the overtaking of the classic concept of business model linked to the offer of a product and an offer that includes a bundling between products and services, in order to adapt the entire offer to the consumer and his needs. (Tukker et al., 2004)

The concept of adding services to the offer must make the final product thought as a set of experiences and points of contact with the customer, where the physical phase of the offer no longer has a solitary central position, but is flanked by additional services that differentiate its value, adding to the original offer a dynamism linked to the final needs of the consumer (ibid). In this sense, the relationship with partners and collaboration with customers becomes important. A network of stakeholders is being created and leads to the definition of a new ways of understanding the organization and business strategies, giving importance to the consideration of value management methods alternative to the classical ones, such as the value network that will be analyzed in the next paragraph.

Mobility as a Service Business Model

The new needs of mobility lead to a broader understanding of the actors involved in this sector and therefore of company strategies. The organization of a business model that includes different actors, also belonging to different sectors, is difficult and there is not always clarity on future objectives. In this sense, the business structure will behave on different levels of importance, reflecting a structure similar to the one of ecosystems, which includes the effective collaboration on different levels of the different categories of actors involved. (Kamargianni et al., 2017)

Value Network Literature

Taking up the concepts mentioned in the chapter on business models, with reference to Mobility as a Service, it is evident the need for a new concept of value chain, going beyond the traditional one. In this last theory, in fact, the value chain consists in a real succession of activities, which can be primary or supportive, and which go to identify the entire process of understanding, processing and delivery of value for the consumer. (Porter 1985)

Considering the developments in the mobility sector, where the product is very often accompanied by services that acquire more or less relevance within the offer, this vision of value chain seems outdated and there is the need to find new frameworks that can help in the identification and study of realities. (Chesbrough et al., 2011)

Therefore, when talking about services, it is important to focus one's value chain on their particular and fickle characteristics, based above all on an experiential factor. The consumer acquires a very important role, which can help companies to better define the value needed and to work better with it, delivering then a final service that is certainly better. With regard to this topic, the concept of Service Value Web is central, which defines a new scheme related to value that includes customer interactions in each phase of understanding, processing, delivery and post-delivery. (Drucker, 1999)

Considering all this, it is possible to precisely identify a scheme related to the concept of Service Value Web, identifying five fundamental phases in it, where customer and company actually collaborate. These phases are customer engagement, service co-creation, elicit tacit knowledge, design experience points and service

offerings. All these phases are analyzed in detail in the complete file related to this thesis. (Chesbrough et al., 2011)

Considering therefore a collaborative vision, not only at the level of the final consumer, but also at the level of companies, the concept of value network is becoming central in this thesis topic. This consists of a structure with a horizontal organization, based on collaboration and integration between different actors involved, with the aim of creating value through these processes. Therefore, the collaborative themes present in the network are important, as well as the particular network structure, which highlights the need for coordination and the importance of the continuous exchange of tangible and intangible assets within the network. (Allee, 2000)

Value Network Analysis

The process of analysis of the network passes through various methodologies, identified in the literature, that allow the author to better understand the functioning, and some characteristics, of these organizational forms. The analysis starts with the identification of a value network map, where different actors involved in the network are identified to better understand the nature of this structure. In this sense, the roles of companies and individuals within the network acquire value. The different structural power that companies can hold within this organization is also relevant in terms of organizational dynamics. Another element to consider are the transactions, which define the direct or indirect exchanges between the different actors in the network. Therefore, there are tangible or intangible assets and according to their importance these could define a power structure within the network useful for analysis purposes. (Allee, 2008)

After the definition of the value network map another analysis step can be made, considering three main elements: exchanges, the importance of roles in value creation and a general analysis of the value creation processes within the network itself. In this sense there is of exchange analysis when we analyze the assets exchanged within the network and the related consequences in terms of importance and role power within the network itself (Allee, 2008). Impact analysis, on the other hand, specifically analyses the contribution of figures and roles to the value creation process, identifying which figures are fundamental for the success of the strategies of this structure in terms of costs and profits generated (Sveiby, 1997). In conclusion, the value creation analysis assumes a role similar to the previous one, considering the importance of the roles in value creation and therefore in the contribution in all those processes that lead to it.

Inter-organizational Dynamics in Networks

Considering the innovative nature of networks, especially in relation to a topic such as Mobility as a Service, a further point of analysis concerns the dynamics that these structures face and their effects on strategies, organizations and objectives. It becomes therefore important to define what these dynamics are in order to

better understand certain strategic and structural situations that condition future and present objectives. (Van de Ven & Poole, 1995)

The dynamics can therefore have qualitative and quantitative effects. The first ones are to mark changes in roles functions or other qualitative variables. The second, on the other hand, concern quantitative variables such as number of employees or number of jobs. (Majchrzak et al., 2015)

The most common dynamics that occur in the network can therefore be identified: goal dynamics, contract dynamics, interaction-style dynamics, decision-making dynamics and structural dynamics. All these changes refer to different elements of the network and in different ways have direct effects on strategies, goals and structure of the network. In addition to these, there can also be different partners and external factors, which contribute to change the network conditions in a more or less direct way. (Ibid)

In conclusion, there have been identified some patterns referred to interorganizational dynamics in the networks, these schemes try to give a clear vision of how these dynamics work and how are going to change the nature of the network. In the article of Majchrzak et al., (2015) there are six main patterns that describe different dynamics in the network, these could be useful to better understand the functioning of these dynamics and could be listed as follows: single change, binary loop, parallel multisource effects, positive multi-characteristics groups, negative multi-characteristics groups e multi flow group. Queste categories sono spiegate nel dettaglio nella versione completa della tesi. (Majchrzak et al., 2015)

Methodology

In this section of the summary is reported the methodology used to carry out the thesis work and therefore to set this process correctly. Concerning the **research strategy** this thesis uses a qualitative method for data collection, considering the advantages of this method and its adaptability to a variable and recent context such as Mobility as a Service. In this sense, in order to better grasp the information, also considering the temporal change of the information, a precise period of time has been identified where to carry out the interviews, trying to limit the process of information change. The approach chosen is the inductive one, where thanks to the answers obtained from the interviews the author will try to give conclusions on theoretical and practical aspects of the analysed topic. In this sense the **research method** will be composed of secondary data and primary data. The first one concerns the data collected by the literature review section, mentioned in the previous paragraph. The second one is referring to data collected from semi-structured interviews where topics related to MaaS, business model and network analysis and dynamics analysis are respectively addressed to answer the main research question. The interviewed actors belong to companies involved in MaaS projects in Sweden, which represent different perspectives on the topic that are useful for the author to reach more exhaustive conclusions. The companies interviewed are: Ericsson, Volvo Cars, UbiGO, Hertz, MobilityXLab and Yacht&Cars. A sample of interview guide is present also in the Appendix section of this thesis resume.

Considering the type of study that will be carried out, composed of the analysis of different companies, the data collection defined in a precise moment in time and then the constant learning through qualitative interviews, the **research design** chosen for this thesis will be cross-sectional. The **data analysis** will be carried out following the coding scheme illustrated in the article by Gioia et al. (2013), where the information contained in the interviews are divided into: 1st order concepts, 2nd order concepts and aggregate concepts. The analysis therefore perfectly follows the coding structure, identifying Mobility as a Service and Value Network analysis as aggregate concepts from which paragraphs will follow one another that will reflect the structure of the 2nd order concepts, helping the author to have a clear direction of the work done in order to be able to answer correctly to the research questions. The scheme used in this thesis is present also in this resupe Appendix.

Research quality represents an important aspect to take in consideration when referred to researches' works. In order to understand and verify properly the quality asset, in this thesis work a brief reference to this theory has to be made. To define the quality of a research job there are different requirements to take in consideration (Bryman and Bell, 2011): validity, reliability and replication. Applying these elements to a qualitative research needs some adjustments, in this direction a reference to internal and external validity has to be made. The first one is referred to the quality of the work itself, giving the same conditions another analysis will conduct to the same results or conclusions of this thesis work. The second one instead is expanding this definition not just to the researchers' world but also to the real one, considering the conclusions of the research process applicable also in the real society (Bryman and Bell, 2011). In conclusion, considering the peculiarities of the qualitative research method there are other studies and theories that are going to validate this thesis perspective and that have to be cited in this methodology. Trustworthiness is the main element to refer when considering a qualitative research, demonstrating the quality and effectiveness of the data collected and of the method used to collect data. (Anney et al, 2014)

Thesis Results and Conclusions

This last section of the resume will explain the main results and conclusions of the thesis work giving also the author perspective on some important aspects in the network analysis. It will be given a recap of the main results, divided in sub-research question and main research question areas, trying to follow the methodology scheme identified at the beginning of this work. Thanks to data collected in the empirical findings part and to the analysis made in relation to this, was possible to understand and study the dynamics that usually are present in MaaS networks and their effects on the implementation of the service. Important for the analysis was the coding method chosen (Gioia et al., 2013), present in the Appendix of this summary, that has allowed the author to follow a precise analysis route, making this process structured and easier to approach. Arriving at this point, a complete understanding of what Mobility as a Service concept is was considered important in

order to understand the general scenario, goals and values that are present in MaaS networks, and also considering the initial difficulties to find a proper definition of the argument found in literature. The other sub-research questions added important information about the research topic, considering business model's aspects and difficulties for mobility organizations involved in MaaS, and also the identification of a proper value network map that is representing the starting point of the network dynamics analysis. The final sub-research question, about the Covid-19 effects on MaaS networks, is based on external factors dynamics concepts studied by Majchrzak et al. (2015) and is helping to answer the main research question adding present and future perspectives on the MaaS network changes.

Sub-Research Questions

The **first sub-research question** is regarding the problems in the identification of a clear definition of Mobility as a Service, considering that in literature this concept had different point of views and so a lack of a unique perspective, the question is:

- *How can Mobility as a Service be defined?*

Maybe it is not important, as mentioned also by UbiGo, having a single definition. It is important to understand what Mobility as a Service is, and what kind of principles reside behind this concept, to align the goals and the efforts of the companies in the right areas and in the right way. Therefore, becomes relevant to understand which are the main principles and concepts behind this mobility concept. From the interviews different aspects were given by the companies, all important to understand what this mobility innovation is. What has emerged as relevant was the integration concept that is meaning not only a simple coordination between different mobility providers, but a deeper collaboration that has to regard different aspects related to the effective providing of the mobility as a service platform, an example could be the integration of the commercial payment systems or of the technological platforms to create the app that the customer has to use to have the access to the service. Being integrated could give these organizations an important chance to collaborate using business synergies to reduce costs, that is representing a central theme considering the difficulties for shared mobility models to achieve profits or revenues goals.

The **second sub-research question** is related also to the Mobility as a Service concept but is considering the difficulties in finding a proper business model that is going to facilitate also the development and innovation processes. The question is:

- *How appropriate are the business models of MaaS providers for the effective implementation of this mobility innovation?*

In fact, it is underlined in literature the importance of having the right business model to create and transfer properly the value to the customer. From the interviews it was difficult to identify a business model that usually was applied in MaaS projects. This could be due to the fact that this argument is recent and is being implemented right now, not giving the space to the effective study of theories regarding the business models selected. From the interviews emerged also an effective lack of a well-defined business model innovation process, that is central in the development of the strategies, the objectives and the structure of this mobility innovation. This situation could represent a problem for the effective implementation of the service, making difficult the process of understanding and dealing with the customer and his needs. This problem is affecting indirectly also the network dynamics' one, considering that without a proper business model it is difficult for companies involved in MaaS to find and define right goals and objectives. In this direction, literature could represent an important source for the choice of different BM alternatives that could be adapted to the MaaS case. The Chesbrough et al. (2007) work could be useful to identify the level of business model innovation needed, to adapt the MaaS organization to this and to develop a more precise and better strategy.

The last two sub-research questions are regarding some important aspects of the value network analysis of the MaaS organizations. These are important to provide the author information useful to answer the main research question, representing two important steps of the entire value network analysis. The first one is regarding the identification of a value network map and the second one is regarding the analysis of an external factor that is contributing to determine some of the dynamics present in the Mobility as a Service network.
The **third sub-research** question is regarding the identification and the analysis of the value network map. The question is:

• *Which are the characteristics of the MaaS' value network map?*

It was important to do this work to identify the actors involved in the MaaS and the exchanged assets that usually are defining also some main dynamics that are influencing the network functioning.
The actor interviewed were sometimes very different between each other, but the participations in MaaS network was giving them the common knowledge that has been useful to identify and understand how the network of a MaaS provider is structured. The interview with UbiGo introduced a concept that in this research has been fundamental, the network is divided in different relevance areas, in the central one there is the particular ambivalence between a classical value chain relation and also an innovative network collaboration. The stratification of the network was also useful to identify the companies that could have been interviewed, trying to have for each circle of the structure some information given by the actors that are participating in it. (Fig. 11)

Figure 11: Mobility as a Service Network

Source: produced by the author.

The assets that usually are exchanged in these networks are both tangible and intangible. The real advantage seems to be the knowledge and the data about the customers. These assets were representing a big competitive advantage, defining also the power hierarchies present in the network, for example Volvo Cars with its big customer base was representing a very powerful actor that was operating in the value chain circle. In terms of dynamics, the importance of this structure and these assets will be relevant considering the changes regarding roles, structures and goals and their effects on MaaS network and projects.

The **fourth sub-research question** was formulated given the importance in literature of external aspects that could create dynamics in networks:

- *How the Covid-19 pandemic is influencing or will influence the MaaS network as an external network dynamic?*

In this direction there is a general understanding of the changes that this virus outbreak are taking to the mobility environment and to the society. Even if sometimes the mobility industry has been seen as stable and difficult to disrupt, with this new situation, and with these forced changes in customer habits, some big changes will happen. Mobility has to be re-thinked almost to reduce the costs that with the actual situation are not sustainable in some cases, public authorities could incentivize the usage of different mobility alternatives, and MaaS could represent the perfect vehicle to do all of this and to let the customer choose between different mobility alternatives. This is representing a perfect scenario for mobility companies involved in MaaS to adjust or change their goals, having direct repercussions on the structure or on the objectives of the network. These dynamics could represent a big opportunity for the Mobility as a Service organization to grow and to develop the business but could be also very tricky when there isn't a proper structure that is making the entire network ready to innovate and change. What is needed is a deeper organization structure, integration and common goals definition, to be ready to accept and face this changing, starting innovation processes and collaborating

inside and outside the network. In an industry that actually is based on short-term profits visions this situation could represent a big incentive to shift in a wider long-term vision that could help the development of the entire Mobility as a Service project, facilitating the entrance of new partners and the innovation of the entire structure.

Main Research Question

The main research question is regarding the analysis of the inter-organizational dynamics, usually present in networks, and if these are influencing and affecting the effective development of this mobility innovation. The question is based on the knowledge acquired during the collection of the literature section:

- *How are inter-organizational dynamics in Mobility as a Service networks affecting their effective implementation?*

Starting with the analysis of the information gathered, some common dynamics were identified in MaaS network, considering the different categories listed in the Majchrzak et al. (2015) article. There is the presence of actor composition dynamics, with an environment that is almost stable, but with a network that is continuously seeking for new companies or partners that could be useful for the implementation of the MaaS in Sweden. The goals dynamics are strictly related with the previous ones, considering the different alignment of interests that companies have and also the different time visions regarding the objectives followed by them. In particular, from the interviews, emerged a difference between companies that usually are seeking for short term objectives and advantages, avoiding long term projects as the MaaS one. This was confirmed also by the researchers in this field (i.e. Yacht&Cars), that considers this point fundamental for the missed implementation of the service in Sweden.
Contracts and regulations are also important in a network perspective, because they are defining the directions and the objectives of some important actors like public administrations or public transports providers. In addition to this, the incentives of nations to new mobility are continuously pushing through innovation, and this could be seen as an advantage in terms of mobility as a service development. To do this there has to be a proper organization and an effective business model that has to transfer and transform ideas and efforts in values that are perceived by the customer. Also, the new restrictions with the spreading of the Covid-19 are representing an important regulation shift, with customer that are directly involved in this process by changing their habits.

The organizational dynamics part has a central importance in the analysis and in the implementation of the service, this is because of the various composition of the mobility as a service network that is making this entire organization very difficult to manage and control. There is the need of dedicated departments that have to work on this project, but only some companies like Volvo, Hertz or Ericsson have it, leaving the rest of the

organizations involved with the usual problems of internal turnaround of positions that are surely influencing the effective implementation of the project by taking away this network from a unique long term perspective. With the change of the organizational structure it is relevant and linked the goals dynamic, that in interview was mentioned as one of the main causes for the organizational change, surely the misalignment between the different companies objectives is not helping MaaS providers to build a stable structure or to develop and implement a stable service. From these aspects the importance of a greater level of integration emerged, only with an effective collaboration there could be advantages for the network development and strategy, avoiding the continuous turnaround of companies involved and the misalignment of goals between the organizations. All of this could make the processes easier to conduct and innovate, and with the chance to exploit in the correct way the resources and the advantages of an effective collaboration.
External forces also have importance in these dynamics, considering that mobility innovation is incentivized mostly by national or European (in the Swedish case) changes in regulations and directions. In addition to this, the information gathered from the sub-research question, related to Covid-19 effects, are useful to confirm the importance of a stable structure of the network, with well-defined goals and with a high level of integration. Only with this approach the advantages of these new opportunities could be exploited, emerging the concept that without a long-lasting structure and strategy it is difficult to disrupt effectively the mobility market.

In conclusion, from the analysis have been identified the main dynamics that are present in MaaS networks, especially in Sweden. Mobility as a Service is representing a chance of collaboration and innovation in mobility sector, but to use properly these opportunities there has to be a well-defined and integrated structure, with long term horizons and alignment in objectives of the companies involved. The organizational charts have to be well defined as the business models to create a concrete and long-lasting strategy that could give the MaaS provider the right stability to develop and effectively launch this new concept of mobility.

Implications and Future Researches

This thesis project could help in having another point of analysis of a recent and evolving topic like Mobility as a Service. The experiences of the companies involved could represent an important source of additional knowledge that could explain better what MaaS and some basic aspects or elements of it. Adding information on this argument means also to expand the existing data on Mobility as a Service, giving literature more potential aspects to consider for future analysis.
Network analysis is having an ambivalent role, starting as a way to understand the cases and studying them, and representing a clear example of how the theoretical part could be applied to understand some practical, and merely unknown, concepts as Mobility as a Service could be. The dynamic aspects and analysis cited by Majchrzak (2015), and the way how these elements could be identified and studied, has represented a clear direction on how the argument could be analyzed. In this way, another implication of this work could be giving a practical example of how the theory explained in literature could be effectively present in the real world,

underlying the importance of this knowledge to clearly analyze the topic chosen. The identification of the main dynamics present in MaaS network is providing also a general scenario in which service providers have to collaborate and there is the clear need of a complete integration between the companies involved. The complete understanding of these aspects could give advantages for the future organization and strategies of the network and also for the resolution of problems relative to these dynamics. In conclusion, theory could represent also a source of inspiration for MaaS providers also in terms of business model chosen. Considered the importance detected in business model area, regarding Mobility as a Service, this thesis project could be considered as a starting point in this direction giving some initial information that maybe could be useful for MaaS organizations.

Mobility as a Service is representing a recent and variable topic and the **future researches** in this field could space in different areas, with different subjects and objectives. An interesting point of analysis could be linked with costs, understanding how to reduce them with strategic, organizational or financial improvements. Reducing costs could represent an important advantage for the entire MaaS network, making the service more profitable and increasing the appeal for external partners that could definitely join with better revenues conditions.

Another interesting research aspect could be related to marketing and to customer needs. As often mentioned in this thesis, the complete understanding of customer needs and how they are changing with the time could represent an important advantage.

In conclusion, the actual worldwide situation related to Covid-19 outbreak is representing the start for a new way of living that could be the source of new opportunities and innovations, especially in mobility industry. New research's topics could be related to this argument and to the necessity in finding a proper organizational stability and strategy to be ready for acting the innovation processes and disrupting an industry that is almost stable and traditional

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Appendix of the Summary

Interview Guide UbiGo

Hans Arby– CEO and Founder of UbiGo

- Introduction of the topic;
- Brief summary of the purpose of the study;

About UbiGo and BM.

- Brief overview of the company;
- Introduce yourself and your experience with UbiGo
- In which areas/departments you worked before?
- What are your tasks now?
- What is UbiGo doing now?
- What are the difficulties of implementing MaaS now?

About the concept of Mobility as a Service

- Can you provide us a definition of mobility as a service concept?
- What are the states of works of MaaS in Sweden?

About networks dynamics and composition.

- How the concept of network dynamics can be applied to UbiGo network?
- Which dynamics can you identify in your environment/network?
- In general, is it a stable or dynamic environment?

Inter-organizational Change Dynamics Analysis

- What are the results of these dynamics in terms of: network organization (also contracts), roles and goals?
- Give some example of important changes that regarded your network and their effects.
- Do you think that these dynamics are representing a limit for the “as a service” complete implementation?
- Covid-19 for you is representing a dynamic in mobility but also in MaaS?

Table 10: coding of gathered data

Companies interviewed	1st Order Concepts	2nd Order Concepts	Aggregate Concepts
Volvo Cars	• monthly payment offer; • new customer experience; • revolution of retail sector; • direct contact with the customer; • integration, flexibility, efficiency in the service;	**Mobility as a Service Definition**	**MOBILITY AS A SERVICE**
MobilityXLab	• integration between different realities;		
Yacht&Cars	• not a single definition but different explanations of the same concept; • new customer experience of travelling; • Sustainable alternative;		
Ericsson	• divide the topic in different interest areas for the companies involved;		
Hertz	• not a single definition but a general understanding of what MaaS is; • Integration of different actors involved in mobility		
UbiGo	• MaaS itself is a wrong definition because could lead to wrong considerations. It is better to call it an integrated mobility alternative; • coordination between different actors involved; • complete commercial integration; • easy to use for the customer; • replace the owned car concept from customer habits; • customer change; • Level 3 in Sweden.		
MobilityXLab	• need for MaaS providers to find a proper BM to let the collaborations be more effective; •long time horizon is needed in MaaS;	**MaaS Business Model**	
Yacht&Cars	• the real problem is the creation of an effective BM • now it is just more than an idea; • BM has to make able the network of MaaS to make profits;		
UbiGo	• difficulty in finding partners related to short-term visions of companies; • need of alignment of objectives.		
Volvo Cars	• combination of different service providers; • maintenance, retailers/ dealers, insurance companies, logistic companies;		

Companies interviewed	1st Order Concepts	2nd Order Concepts	Aggregate Concepts
	• advantage of knowing and owning vehicles and knowledge;		
MobilityXLab	• club of companies; • generally are six companies involved; • small and big companies; • providing knowledge and possibility to collaborate with big companies;	**Value Network Map**	
Ericsson	• continuously expanding network; • different actors involved because of the versatility of the technology offered;		
Hertz	• combination of public and private actors; • dedicated department in Hertz to manage mobility networks;		
UbiGo	• different levels of network; • value chain, technical partners, other stakeholders;		
Volvo Cars	• intangibles and tangibles assets exchanged;	**Exchange Analysis**	
	• generally the transactions are managed by contracts;		
	• there are exceptions, where contracts are mixed with other informal agreements;		
Yacht&Cars	• intangible assets are generally more important;		
	• importance of the data exchanged;		
	• contracts used to manage networks transactions;		
Ericsson	• usually are exchanged both intangible and tangible assets;		
	• data are really important;		
	• usually are used contracts to manage the exchanges;		
	• when needed, contracts are updated after meetings;		
UbiGo	• usually tangible assets are referred to the providing of the service;		
	• data are representing a big advantage to understand the customers;		
	• usually the main partnerships are regulated with contracts;		
	• partnerships with the external circle of the network are managed with informal agreements (i.e. Universities).		
	• different companies playing different roles are involved in the network;		

Companies interviewed	1st Order Concepts	2nd Order Concepts	Aggregate Concepts
Volvo Cars	• goals are usually related to the customer experience. The main objective is to conquer the customer and gain his fidelity;	**Inter-organizational Dynamics**	**VALUE NETWORK ANALYSIS**
MobilityXLab	• need of horizontal structure;		
Yacht&Cars	• different actors involved in the network;		
	• roles, goals and structure have to be considered when talking about network's dynamics;		
	• usually companies involved have different goals;		
Ericsson	• dynamic-based concept of mobility;		
	• network continuously expanding;		
	• importance of roles in networks;		
Hertz	• importance of roles in networks;		
	• need of right commitment to the project;		
	• importance of culture;		
	• usually stable environment;		
	• importance of taxes and regulations when referring to dynamics;		
UbiGo	• importance of roles in terms of people involved;		
	• importance of culture that has to be implemented by CEO or management;		
	• difficulties to disrupt the environment;		
	• missing the alignment of goals of companies involved;		
	• difficulty to convince new partners.		
Volvo Cars	• dynamics referred to retail sector;	**Dynamics Analysis**	
	• dynamics referred to changes in goals;		
	• dynamics as pains for transformation;		
	• important effects in terms of innovation for the network;		
MobilityXLab	• dynamics always present in MaaS networks;		
	• changes in roles;		
	• changes in regulations;		
	• big opportunity to innovate;		
Yacht&Cars	• roles dynamics;		
Ericsson	• dynamic environment;		
	• missing of the right roles in companies' structures;		
	• goals are continuously changing;		

Companies interviewed	1st Order Concepts	2nd Order Concepts	Aggregate Concepts
	• big innovations opportunities;		
Hertz	• stable environment;		
	• dynamics in regulations;		
	• technological dynamics;		
	• improvements opportunities;		
UbiGo	• stable environment;		
	• dynamics in network composition and structure;		
	• companies changing their goals and objectives;		
	• dynamics as a limit and an advantage in terms of innovation.		
Yacht&Cars	• Covid-19 is representing a big lesson for this industry;	**Coronavirus external dynamic**	
Ericsson	• Covid-19 is a big challenge;		
	• change in people's habits;		
	• change of working environments;		
Hertz	• difficulty of changing customer behaviours overcame by Covid-19;		
UbiGo	• Covid-19 is representing a big challenge;		
	• change in some models of mobility;		

Source: created by the author using the Gioia et al. (2015) scheme.