

Milka Holmberg

# Last Mile transport solutions in Scandinavian coastal city areas

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<p>This thesis was written based on the project assistant work as a part of the “Last Mile” project. This project seeks for smart mobility solutions for tourists, commuters and residents in Helsinki metropolitan area. It is funded by European Regional Development Fund as part of the Six City Strategy for years 2017-2019. The city of Vantaa, Forum Virium Helsinki, Espoo Marketing, Aalto University, Metropolia UAS and Demos Helsinki are involved in the “Last Mile” project. Metropolia UAS implements benchmarking studies of mobility solutions in natural parks, city archipelagos and airport areas as part of the “Last Mile” project.</p> <p>The city of Espoo is interested in innovative mobility solutions which potentially could improve the accessibility of its coastal line (“Rantaraitti”) and its city archipelago. Therefore, this thesis studied and analyzed last mile transportation services that operates in Scandinavian cities which have coastal line and archipelago.</p> <p>Cases were studied through four questions of which one question was studied through an operating model canvas. The questions studied the services’ qualities, success, journey chain and operations.</p> <p>The analysis of the cases was implemented by SWOT. All innovative mobility cases in this study were based on sharing economy. Some services like BoatFlex were founded on the idea to decrease costs of owning private whereas other services like UbiGo were founded on the idea that mobility of today do not require owning private.</p> <p>This thesis offers some ideas for Espoo city to continue researching the most suitable transport method for its coastal area and city archipelago.</p>	
Keywords	Last mile, smart mobility services, transport in Scandinavian coastal city areas, mobility in Scandinavian coastal city areas

## Contents

1	Introduction	4
1.1	Background of the “Last Mile” project	4
1.2	Objective & Scope	4
1.3	Methodology	5
2	Transport market	9
2.1	Urban mobility	9
2.2	Actors in mobility	12
3	Trends in mobility	15
3.1	Global megatrends in transport and logistics	15
3.2	European Union’s transport policy	17
4	Espoo	18
4.1	Espoo Rantaraitti	18
4.2	City transport service in Espoo city	19
5	Stockholm	25
5.1	“Move About”	25
5.2	UbiGo - app	28
6	Copenhagen	29
6.1	DriveNow	29
6.2	GoBoat – rental boats	32
6.3	BoatFlex	34
6.4	Bycyklen	36
7	Analysis	38
8	Conclusion	44
9	References	47

# 1 Introduction

## 1.1 Background of the “Last Mile” project

This thesis was initiated from a Last Mile –project which is seeking smart mobility solutions for tourists, residents and commuters in the Helsinki metropolitan area. The project is focusing in areas of Jätkäsaari and Ruoholahti in Helsinki, the national park of Nuuksio and coastal line Rantaraitti in Espoo and in the Aviapolis area in Vantaa. European Regional Development Fund funds the Last Mile project as part of the Six City Strategy for years 2017-2019. It is implemented by Metropolia University of Applied Sciences, the city of Vantaa, Espoo Marketing Ltd, Forum Virium, Aalto University and Demos Helsinki. It started 1<sup>st</sup> September 2017 and ends 31<sup>st</sup> December 2019 (Metropolia, n.d.).

I have been working with the Last Mile project as a project assistant in Metropolia UAS. I have been doing research related mostly for Helsinki and Espoo part of the project. Work tasks have included participating in both planning, executing and analysing questionnaire made for terminal passengers in Jätkäsaari, Helsinki. I also researched transport solutions in Scandinavian cities in order to analyse innovative ideas in transport for Espoo’s Last Mile in its coastal line (‘Rantaraitti’) and its archipelago. Results of my work for the project have been used as the basis of this thesis.

## 1.2 Objective & Scope

The main objective of this thesis is to study and analyze last mile transport service solutions in Scandinavian cities, which have coastal area and city archipelago. With help of this benchmarking study and analysis of some case examples, the writer wants to provide the city of Espoo innovative ideas of smart mobility services. The scope of the thesis includes city of Stockholm and Copenhagen. The city of Espoo is interested in mobility solutions which have been extended in co-operation between private and public companies and stakeholders. The city of Espoo is interested in opportunities to improve the accessibility of its coastal line (‘Rantaraitti’) and its city archipelago. Espoo’s coastal line (‘Rantaraitti’) and city archipelago is a relaxing area to spend time in and its beauty attracts people especially on warm summer days. The city’s coastal area, ‘Rantaraitti’



was bought as public property for the inhabitants to enjoy. However, there has been arising certain difficulty of reaching the coastal line. This decreases inhabitants' opportunity to enter the city's recreational areas which the city has been putting effort on.

Espoo coastal area and city archipelago can be almost reached by the subway line. A person who seeks to travel to the coastal line 'Rantaraitti' by public transport, needs to take the subway. However, there is still some distance from the subway station to Rantaraitti and archipelago. This is referred as "Last Mile" in the project and in this thesis. The difficulty of reaching the "Last Mile" from subway to coastal line has become a problem Espoo seeks to resolve in co-operation with private actors (Pettersson, 2018).

The cases were chosen to meet the following criteria

- Applicable transport services for city coastal line or archipelago are provided
- The transport services are either offered by private actor or by minimum in co-operation between public and private actors
- The cities or service providers have the willingness and aim of developing innovative solutions in mobility on coastal area of city archipelago
- The cities have already comprehensive supply of public transport

### 1.3 Methodology

This thesis is qualitative research and based mainly on analysis on few case studies and secondary data. Using secondary data means finding data that has already been collected for a research. Secondary data can be both raw but also already published data for example in summaries (Saunders, Lewis & Thornhill, 2006). Sources from quality newspapers, different studies, reports, books and surveys were used in this thesis. Also Lennart Pettersson, from city of Espoo was interviewed for this research in January 2018. Lennart Pettersson is working for the development of Rantaraitti in the city of Espoo.

Secondary data can be categorized under three main-subgroups: documentary data, survey-based data and data compiled from multiple sources, as seen in figure 1 (Saunders et al., 2006).

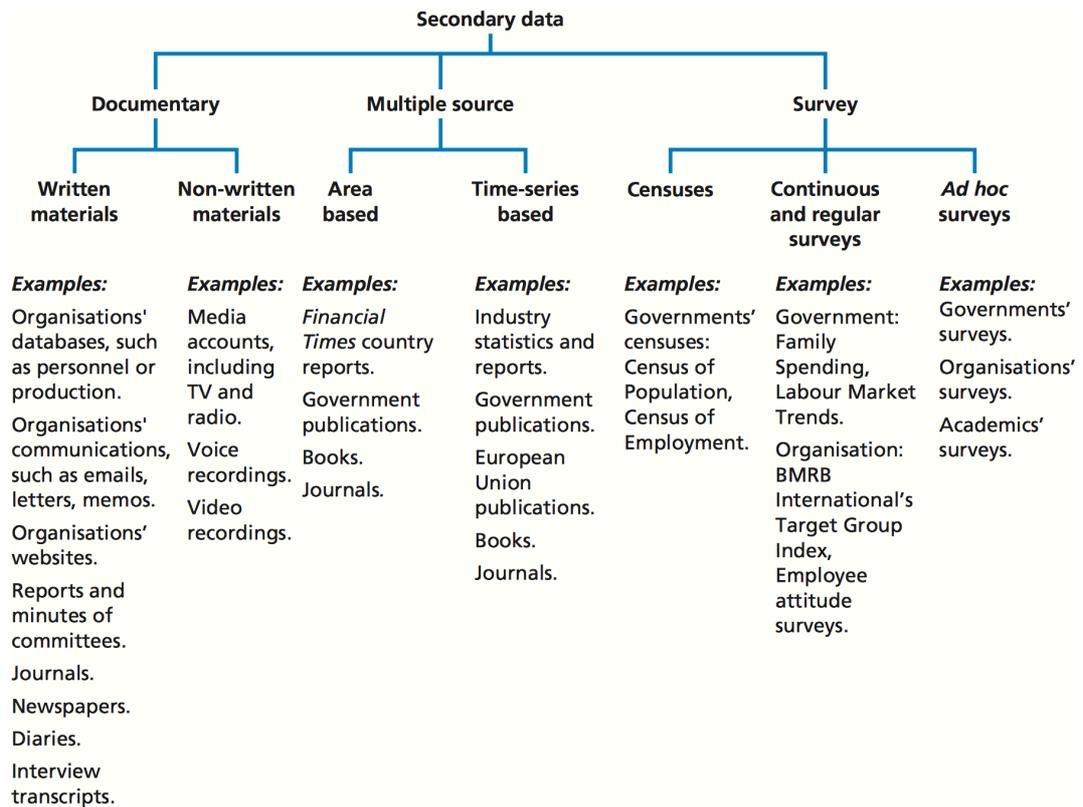


Figure 1 The difference between data gathered from the three main-subgroups (Saunders et al.,2006).

The fundamental meaning of qualitative data is to deeply understand the core of the researched object, to know it on a deeper level (Cooper & Schindler, 2013). The research method in this study includes gathering qualitative data through secondary data analysis. Building a case study through gathering secondary data is a qualitative method of research. The study aims to fundamentally understand the cases of the mobility services through theory and analyzing these cases in order to construct applicability of these services of Espoo.

Benchmarking is commonly understood as a study method where practices suitable for comparison with one's own practice are researched and compared. One can also mean by benchmarking finding the one best method within the markets and comparing it to one's own to learn what it takes to improve. However, this perspective is more outdated and benchmarking is nowadays used for simply comparing (Kantola, 2003). Cases in this thesis are studied and evaluated through benchmarking. The aim is to improve the quality of offered mobility services in Espoo coastal area and archipelago through finding successful practices and services in mobility services.

The main research problem of this thesis is:

*“What innovative “Last Mile” mobility solutions exist in Scandinavian cities with coastal area and city archipelago and how applicable are they for the city of Espoo?”*

This problem is studied with help of four sub-questions:

*1. What kind of mobility services are offered to customers and what is included in the service?*

It is essential to understand the service and why it exists. This question examines how the transport services have geographically been executed in a respective place. This question discusses also the innovations behind the offered services. Even though this tries to benchmark areas similar to Espoo’s coast and archipelago, the areas will have their unique differences.

*2. What are the journey chains?*

This question examines where the mobility services are offered and what kind of journeys they offer for their customers. Some services have specific journey chains whereas others offer limit free transport experience with certain conditions.

*3. By whom are these services offered and how successful are they?*

Gathering data of practices’ satisfaction levels is important in order to understand if the offered services are prosperous. The study will use data when found from customer profiles, of utilized capacity of the services, satisfaction level of customers, growth rate and future strategies to examine the success rate.

*4. What are the operating models behind these services?*

This question seeks for the operating model behind the mobility service, thus, the business opportunity. The operating model was in this thesis established by using the new value canvas which was originally created by the Finnish Transport Authority (Trafi) (Trafi, 2017). Trafi’s model has been project has modified the canvas from the original in order to suit it better for the benchmarking purposes of this thesis. The canvas now includes the different areas of analysis described in figured 2 and are as follows:

City	Picture	Customer	Tourist (Leisure, business), Local (Resident, Commuters)	
Name of the area		Market Place		
Name of the case		B2B/ B2C / B2E / B2G / B2M / C2B / C2C / G2B / G2C / G2E / G2G / P2P...		
Description of best practices		Mobility Systems		
<ul style="list-style-type: none"> <li>• <b>Type of service/package</b></li> <li>• Purpose and type of approach</li> <li>• Volume of users</li> <li>• All-year around or seasonal</li> <li>• Funding model of service (share of stakeholders in the project if known)</li> </ul>		What technologies are required for the service to function		
Idea for Espoo Archipelago		Transport Modes/ Mobility Services		
		What transport modes or services are used in the case		
		Needed Infrastructures		
		What infrastructure is required for the service to function		
		Stakeholders		
		Private	Public	
		Private stakeholders	Public stakeholders	
Subcategory of Cases	City archipelago	Required indirect services in order for the service to run		
		Supplementary Markets		
		Author of the Card		
		Milka Holmberg		

Figure 2 the operating model canvas for benchmarking

- City. The city where the benchmarked mobility service is located in.
- Name of the Area. Specific area where the benchmarked mobility service is operating in.
- Name of the case. Name of the company which operates the mobility service.
- Picture. Picture of the company or the service product itself.
- Description of the Transport Service/Package. What is the purpose of the service, the user volume, the length of season and the service's funding model (how many percentage has the service required of which type of funding).
- Opportunities and Challenges for Espoo city. How could Espoo city benefit of this kind of service.
- Customer. What kind of customer is the service utilized by? The main categories of customers include if the customer is a tourist or local.
- Marketplace. The services offered to who by what kind of operator (government, private consumer, private company).
- Mobility System. Include what technologies are required for collecting, storing and organizing data for the service to generate information knowledge for functioning successfully. Examples would be journey planning, booking and payment functions.

- **Transport Modes or Mobility Services.** Transport modes are supporting movement of people by various vehicles like busses, trains, private cars or boats to mention a few. Whilst mobility services support the integration of these transport modes. This could be done by combining several transport modes in one service or by adding value to customers by integrating extra services in the value chain.
- **Needed Infrastructure.** Infrastructure is the physical system crucial for enabling movement of people. Examples of infrastructure are roads, railways, stations and terminals.
- **Stakeholders.** Stakeholders are parties involved with the service operations and development. The involved stakeholders are divided between public and private stakeholders. Private stakeholders are seen as companies whereas public stakeholders are governments, municipalities and non-governmental organizations.
- **Supplementary Markets.** Operations that are crucial for operating the provided service, but are not included as key elements.

## 2 Transport market

### 2.1 Urban mobility

Urban areas are kind of area structure that are in general distinguished in terms of using land, in socio-economic aspects, physical appearance or by historical or cultural characteristics (Yang & Hillier, 2007). Urban mobility includes accessibility of urban areas and the transportation and mobility within city areas (European Commission, 2013). Mobility in cities are complicated systems because of many different routes and end-points for the transportation, also since the transportation methods are various.

The world's urbanization progresses with an increasing pace. The amount of people living in urban areas grew higher than the amount of people living in rural areas for the first time in 2007. In 1950's 30 percentage of the world's population lived in cities. In 2014 the respective percentage was 54. The United Nations has prognosticated that 66% of the world's population will live in cities by year 2050 (United Nations, 2014). Still in the middle of 1990's only 60% of inhabitants of Finland were living in urban areas (Kangasharju, 2004), when in year 2015 69% of the population lived in cities (Tapaninen, 2018). Over half of the citizens in the world lives in cities, which brings need of focusing in planning and executing urban mobility globally. European Commission recognizes



urban mobility as a key challenge, since urban transport by road accounts for 40% of EU's CO<sub>2</sub> emissions and for 70% of pollutions by other transport modes in cities. Mobility needs to be improved at the times when cities are facing problems with congestion, accidents and pollution (EUR-Lex, 2007).

The structure of urban area has developed since before industrial time. As cities have grown larger, have distances of travels increased too. Even if the growth of urban areas has increased the commuting kilometers, the travelling time has stayed relatively the same during the last century. The transportation has become more efficient through times.

Space in urban areas can be considered competing between several different functions like living spaces, shops, office spaces, schools, parks and leisure activities. The activities operated places like shops or work these places lead to specific types of mobility needs. These mobility needs can be categorized in two different categories: regular and irregular transport needs. Traditionally city mobility has been focusing on passenger transport. The passenger transport has been counted to include travels like commuting, leisure and cultural activities and include commercial actions (Rodrigue, 2017).

Competition of space between several functions lead to intense competition of the price of the space. Areas meant for mobility decreases. Thereby the planning of space and mobility should always be synchronized rather than done separately. Mobility in urban areas include public transport, private cars, bicycling and walking. Public transport and bicycling are valuable transport methods for cities whereas private driving can be considered damaging if city's target is smooth urban mobility, since private cars increases congestion and pollutions among others. In order for public transport to operate dynamically, it needs high volume of users. As cities grow bigger, collective transport methods tend to improve. When public transport is effective, it decreases the amount of emissions and needed energy consumption per passenger. Bicycling shares the same advantage as collective transporting methods, plus increasing health for its passengers. However, in order to function, bicycling needs to be a prioritized transport method. It needs investments in city infrastructure to function (Tapaninen, 2018).

Various urban mobility services require infrastructure in the cities. Cities invest in the various infrastructural needs which are:



- Pedestrian areas, which are referred often to as pavement. These are restricted roads for walking only.
- Road and parking areas, which are spaces devoted for motorized vehicles that need roads for moving from place a to be. When these vehicles are not utilized, they need to be parked.
- Cycling areas. Cyclists have in some cities their own lanes, however, cyclists tend need to share infrastructure with some other form of transportation like roads together with cars.
- Transit systems. As cyclists, transit systems like public transport often need to share infrastructure with other vehicles. However, cities have noticed that public transport has many valuable qualities and urban areas have built infrastructure for collective transport only. Investments like these are for example “buss lanes”.
- Transport terminals, which have been built for needs of mobility in long distances like travelling abroad. Terminals can be airports or ferry terminals (Rodrigue, 2017).

The transportation in urban areas can be roughly divided into three different kind of transport which are the public transport, individual transport and freight transport. Public transportation lies on certain amount of users which are collectively transported to certain parts of the urban area. Collective transport gets its name from the fact that it is for anyone to use, as long as the person pays the fare of the transport. Examples of collective transport methods are busses, trains, trams, ferries and tube. The individual transportation means travelling by oneself. Individual transportation can be walking, bicycling or driving a car. The third kind of transport is freight transportation. The freight transportation in urban areas are usually discussed as part of the city logistics. Since urban areas are areas which produce and consume goods and services, does that sum with large amount of needed freight. Also online shopping has increased the individual shipping needs (Rodrigue, 2017).

Urban mobility approaches should be compared with different qualities in order to bring efficiency to the transport system. Qualities which should be considered are:

- Use of space. How efficiently would the transport method use space? Public transport, walking and bicycling are the most efficient transport methods from the perspective of utilizing area.
- Use of energy. The calculation of used energy by motorized vehicle is done by counting the utilized amount of capacity of the vehicle. In order for public transport



being efficient, it needs to maximize its utilization of capacity. Walking and bicycling are the most efficient transport methods from the perspective of use of energy.

- Security and speed. Cities are hubs of different transport methods that crosses each other. This is a risk for especially walking traffic, since they are in weakest position to be hurt or dead in accidents. Tapaninen mentions two ways of improving security in city traffic: to lower speed limits and to differ motor vehicle traffic from other transport methods.
- Costs. Costs can be viewed from several aspects. They can either be seen as investments, operational expenditures or as environmental costs.
- Flexibility and easiness. Even if public transport is beneficial in many ways, it unfortunately can only seldom transport the passenger for the last mile. It is both costly and time consuming to change transport methods. That is why public transport should be developed in order to keep it as a tempting transport method for urban inhabitants (Tapaninen, 2018).

## 2.2 Actors in mobility

In order to understand mobility as a market, one needs to understand the different actors in it. Transport industry is a major industry in EU. It represents 5,1% of EU's GDP and employs 11 million people (Tapaninen, 2018).

Actors in mobility go beyond being stakeholders providing only directly transport services. Different mobility actors are providers of mobility infrastructure, actors maintaining infrastructure, operators of passenger transport, operators of freight transport, actors organizing and planning transport, actors researching and developing transport and other actors related to transport, for example maintaining. All of these actors can be either publicly or privately owned actors (Tapaninen, 2018). French motorways are operated by private companies whereas Finnish highways are owned and operated by public Finnish Transport Agency.

Gathering data has become a trump card in many fields, as it has also become in transport. The actors in private sector gathers sufficiently data, whereas the public sector lacks behind. Also public sector would benefit tremendously of having access to decent amount of data from the markets. According to a study done by the Ministry of Transport and Communications in Finland in 2017, around one third of the companies gathering



data shared at least some amount of their data. Sharing data was seen as neutral course of act for major part of the companies (Salonen, Teittinen, Niittylä, Varjola, 2017).

The study identified three reasons for companies preventing to share data. These reasons were challenges in data protection, the burdensome of sharing the data and the importance of the gathered data for company's own operations. When a company gathers data, it can receive very detailed information of users. This sort of information can be detailed information of transporting routes or key information from one's routines in everyday life. Because of the data protection requirements, data needs many times to be anonymized, it cannot be gathered more than in restrictive manners or the data should be kept only for the gatherer. Data protection legislation also challenges many companies' knowledge in whether or not data can be shared. Sharing data also comes often with responsibilities and these responsibilities requires resources. Often enterprises do not see enough benefit in allocating resources for data sharing. If data sharing is not seen as profitable for company's operations, there is hardly any motivation for doing such act. Sometimes the gathered data can even be crucial for the company which restricts furthermore the willingness of sharing information (Salonen et al., 2017).

The study also discovered five key type of actors for whom companies could imagine sharing data. These were sharing openly data for any actor, a partner of co-operation, for those actors from whom the data concerns, for customers and for public authorities (Salonen et al., 2017).

The government can be a strong actor in mobility and may by authorities effect in many ways the transport system. Tapaninen (2018) mentions the key approaches:

- The ownership, maintaining and planning.
- Subventions from the government or municipalities.
- Regulations.
- Research and development.
- Labor legislation.
- Providing instructions for security improvement

The government can own and thereby be a possible maintainer of parts of the infrastructure used by transport. Government can also own parts or whole actors operating in transport sector. Subventions means that government or municipalities finances parts or whole construction or operation of certain services or infrastructures. An example could be public transport which is often supported by public sector.



Regulations regulate possible services or constructions within transport. Regulations can be very strict and challenges the possibility of new kind of services entering the market. For example, Uber has met many difficulties by authorities when operating in certain countries. Researching and developing within transport system aims to research for development of technology, transport methods and transport system itself. Undertakings can be executed in very strict frameworks of certain services, or it can be done in larger scale, researching a whole system. An example of doing research and development could be gathering and sharing data. Transport employs people and the legislation concerning these employed people is the labor legislation. It seeks to safeguard the employee, to keep him or her safe at work. Security improvement is under constant development by the respective government. (Tapaninen, 2018).

The most important governmental stakeholder in Finland in transport sector is the Ministry of Transport and Communications, which works accordingly to the information received from the Parliament of Finland and the Finnish Government (in Finnish Valtioneuvosto). The Ministry of Transport and Communications is governing two bureaus which are key stakeholders in Finland's transport system. These are the Finnish Safety Transport Agency (Trafi) and Finnish Transport Agency (Liikennevirasto). The Finnish Safety Transport Agency develops the safety of transporting, the sustainability of transporting and administrates several authoritative tasks of transporting. The area of responsibility of the Finnish Transport Agency include governing Finland's roads, railways, waterways, and the development of Finland's overall transport system. Also regional authorities in co-operation with the Finnish Transport Agency and the Ministry of Transport and Communications governs the roads, tracks and waterways. The municipalities govern their roads and owns most of their harbors. The biggest harbor in Finland, Sköldvik, is privately owned (Tapaninen, 2018).

The railways are owned by the Finnish Transport Agency, and the railway passenger transport is still fully relying on a public operator. The government's owned company, VR Transport operates the railway passenger transport. However, the markets will be opened for railway passenger transport in the near future (Ministry of Transport and Communications, 2015). Governmentally owned company, Finavia governs Finland's 21 airports (Finavia, n.d.).

Public and private actors in transport markets live in symbiosis. Public investments in infrastructure is crucial for the transport sector. However, in order to bring innovations to



the transport markets, the public actors many times need the private sector. An example of this could be counted the data gathering and sharing (Salonen et al., 2017).

### 3 Trends in mobility

#### 3.1 Global megatrends in transport and logistics

To discuss megatrends, one must first understand the definition of a megatrend. Zeev Efrat from the company Frost and Sullivan explains megatrends as forces of development on global, macro economic level that have sustained to impact businesses, economy, society, cultures and personal lives and therefore defining our future and its increasing pace of change in our society. Efrat also adds that the context for megatrends differs from industry to industry and that understanding these megatrends should be a key component in the company's future strategies (Efrat, n.d.).

Our current modern society is driven by large changes in transport industry. The transport infrastructure, authorities and transport service providers are affected significantly. These enormous changes are called megatrends. The three biggest megatrends affecting transport are aging, urbanization and climate change. A population's median age grows older everywhere in the world and increases the need for transport solutions for elderly. Urbanization leads to inequality between quality of services offered in cities and sparsely populated areas. Climate change will and has influenced transport both in direct and indirect manners. When globe warms up, it increases the amount of extreme weather conditions, warmer winters and therefore has an affect on for example building. Also political and legal actions tries to control the global warming with influence in legislation or political contracts (Tapaninen, 2018).

Nine other mega trends influence transport which are:

- The change of working habits
- The change of consumerism, underlining of individualism and free trade
- The change of making business which leads to online shopping
- The decreasing availability of raw materials which leads to sharing economy
- The change of transport streams due to global warming
- The change of highlighted services in transport and transport as service packages (outsourced)



- The change of focus towards collectivism, where people are sharing and modifying transportation rather than only being users of it
- The development of technology, which develops mobility as a part of our information society
- The change of power use in mobility and increasing diversity of fuel options (Tapaninen, 2018)

The future represents a shady line between work- and personal life. When work can be done anywhere at any time, it changes our needs of transport. Consuming will become more individualistic, since people are more aware of the choices they are making than before and buying certain products becomes a personal statement. Also online shopping has opened possibilities for increased individualistic shopping. Paradoxically at the times when online shopping has opened global possibilities for consumers, consuming local produced products has increased (Hakanen, 2018).

The trading has changed. As trade has gone global, also the competition has gone global. Goods are delivered to customers instead of customers coming to goods.

The ever decreasing amount of raw materials has consequences of how our economy functions in the future. The global sources of raw materials and processing them changes their geographical spots. Even if shipping becomes cheaper, acquiring raw materials becomes more expensive by each moment. An example of this could be seen oil drilling which happens deeper and deeper and brings new levels of risks in drilling for both employees and nature. All of this has an effect of sharing economy becoming mainstream. Sharing economy means circulating parts of a product (Tapaninen, 2018). This could mean reusing plastic from ocean and making new swimsuits from them as Finnish Halla Halla has done (Halla Halla, n.d.).

Change of transport routes is due to many reasons. It is due to globalization, new raw materials and decreasing amount of people working in production, among others. This all changes both the raw materials' and processed materials' logistics and warehousing. Climate change enables also new transportation routes, like the Northern sea route. The change to highlighting services in transport becomes more and more common. It brings easiness for customers and gives up the need of personally investing or maintaining in a transport vehicle (Tapaninen, 2018).

The collectivism means that people as users of transport methods becomes also creators of information, modifiers of information and sharers of information in the system. It results



that the administrator of the transport system is given an increasingly amount of responsibility of assuring the rightfulness of the received or collected information. When security of transport increases, the focus on security shifts towards defense of external attacks like hacking or minimizing risks for them (Tapaninen, 2018).

The development of technology has brought elements like robotizing, automation and digitalization into transport industry. Technology has resulted transport becoming a part of information society. Providing services in both public- and private sector are going online. People can search even for real-time information of transport conditions or processed information of consequences of his or her actions. When a customer of the Helsinki Regional Traffic searches for an optimal route with public transport, he or she receives real-time information if the route includes disruptions and how much CO<sub>2</sub> emissions the trip emits versus driving a private car. The change of power use in mobility results less emissions in the world. Electric cars are making their entrance to car markets. Electric motors are making their entrance also in light traffic vehicles like bicycles, scooters and drones especially in cities (Tapaninen, 2018).

### 3.2 European Union's transport policy

It is important for one to understand European Union's (EU) traffic policies, as Finland is a member state of the European Union. By being a member state, Finland binds itself in European Union's policy-making also regarding mobility and transport. EU's policy-making and regulations effect transport in Finland significantly. Depending on transport method, around 70-90% of the transport in Finland is under EU regulations instead of national regulations (Tapaninen, 2018). European Union is a treaty-based organization which was established in 1957 to become a single common market in Europe (Polychroniou, 2013:1). It was founded as an important project towards peace and economic integration between six Western European countries: Germany, France, Italy, Luxembourg, the Netherlands and Belgium (Staab, 2013). The Treaty of Rome is considered as the Treaty establishing foundations of European Union, since the Treaty of Rome founded the European Economic Community (Polychroniou, 2013: 1-2). European Union founding values includes free mobility of goods, people, capital and services.



The EU's main aim in transport policies is to establish a system which supports Europe's economic development, improves its competitiveness and offers high standard service with using resources more effective than before. EU's newest guidelines of transport policy include the White paper from year 2011. t – Towards a competitive and resource efficient transport system, includes 40 detailed initiatives from the EU Commission (European Commission, 2011). The White Paper is no regulation, but functions as a guideline for future regulations. It stresses out following challenges in the transport industry:

- The rising demand of transport and continuation of urbanization
- EU's transport industry is nearly fully dependent on oil
- EU's commitment of decreasing emissions by minimum 80% until 2050 and that the transport industry represents 25% of EU's emissions
- Traffic jams costs EU each year around 1% of its GDP and results in high emissions
- Efficiency in transport should be improved and to optimize the use of capacity
- The strategic inputs in research and innovation retains EU's competitiveness in the world's markets and helps EU remain as a front row player in the transport industry
- EU's aim infrastructure wise is to build a EU-size transport network where combining sea-, road-, railway-, air- and inner waterway transport into seamless transport chains
- EU has still much to work on to gradually open railway and securing fair competition (European Commission, 2011).

## 4 Espoo

### 4.1 Espoo Rantaraitti

The "Last Mile" in this thesis is considered to be the trip from subway station or bus stop to Espoo Rantaraitti and Espoo city archipelago. Rantaraitti project started in the 90's from the vision to bring the city archipelago for everyone, both for visitors and locals. Rantaraitti is a 40-kilometre-long route for cyclists and hikers in Espoo's coastal line. It serves as a "port" to Espoo's archipelago, shown in figure 3. The route offers different activities and sights, which are found through the app Citynomad. Citynomad includes over 100 sights for Rantaraitti in different categories (Espoo city, n.d.).





If a customer wants to use the bike for more than 30 minutes, he or she pays one euro extra of each hour. The maximum time for renting city bikes is five hours (Kaupunkipyörät, n.d.).

An option for a person who already finds herself on the coastal line of Espoo, is to take the ferry line which operates along Rantaraitti and in Espoo city archipelago. The ferry is operated by Norsöline Ltd. Espoo city pays a significant amount of the costs of the archipelago ferry line (Pettersson, Rantaraitin isäntä, 2018). Since there is no permanent settlement in the archipelago of Espoo, there is no governmental funding for ferry transport. Price per one-way ticket in 2017 was 5 euros for an adult (Espoo city, n.d.).

### **What are the journey chains?**

Länsimetro operates from Vuosaari or Mellunmäki in Helsinki and to Matinkylä in Espoo. The metro stations, which are near to Rantaraitti in Espoo, are Keilaniemi, Tapiola and Matinkylä. Länsimetro's stops takes the passenger approximately one kilometer from the Espoo city's coastal area. This can be considered as ineffective since the passenger would need to take a bus or walk from the metro station to be able to get to Rantaraitti. Even if a passenger would take the bus from the metro, she or he could not take the bus the whole way to the destination (see figures 4, 5 and 6).

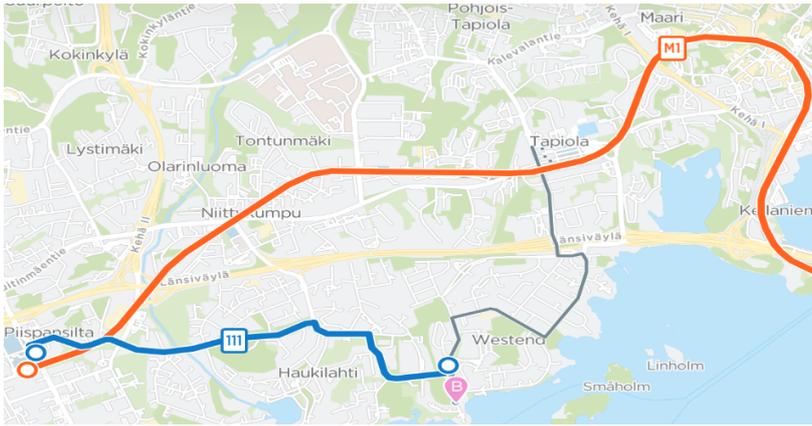


Figure 4 The suggestion for trip which Reittiopas gives when travelling from Lauttasaari to Hietaniementie (Rantaraitti) (Helsinki Regional Transport Authority, n.d.)

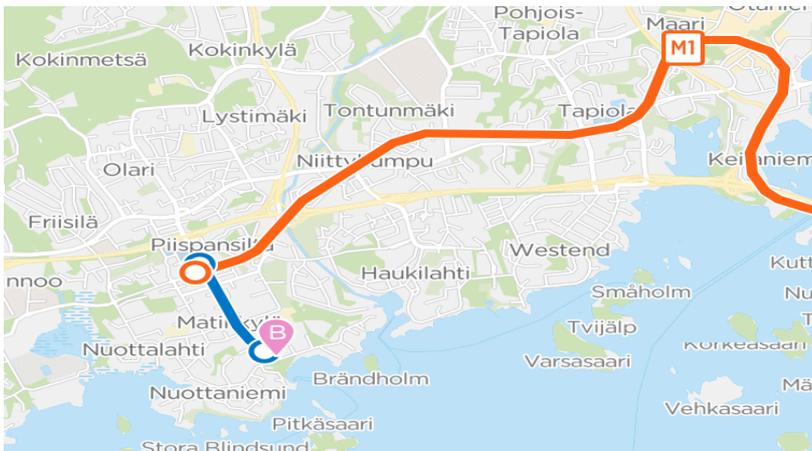


Figure 5 The suggestion for trip which Reittiopas gives when travelling from Lauttasaari to the address Rantaraitti 5 (Helsinki Regional Transport Authority, n.d.).

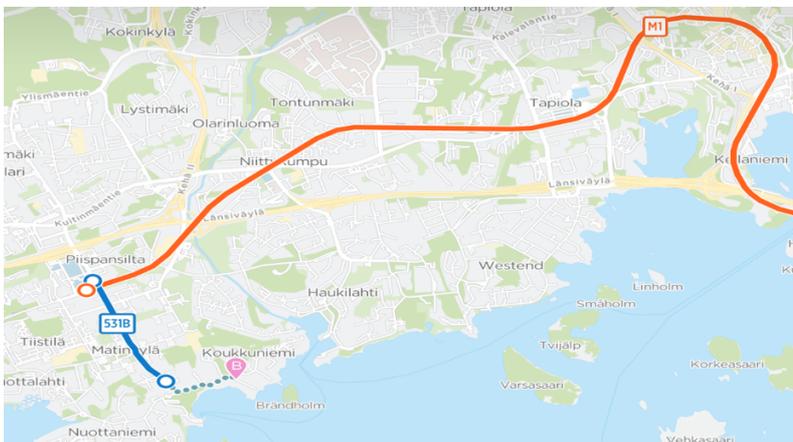


Figure 6 The suggestion for trip which Reittiopas gives when travelling from Lauttasaari to Koukkuniemi, near to the Rantaraitti (Helsinki Regional Transport Authority, n.d.).

Figure 7 below shows the numerous city bike stops in Espoo city. All metro stations will have a city bike station and thus, increase efficiency for coming to Rantaraitti with the

metro line. The travelling with bike can be expected to go smoothly since also Rantaraitti will get its bike stations (Espoo, 2017).

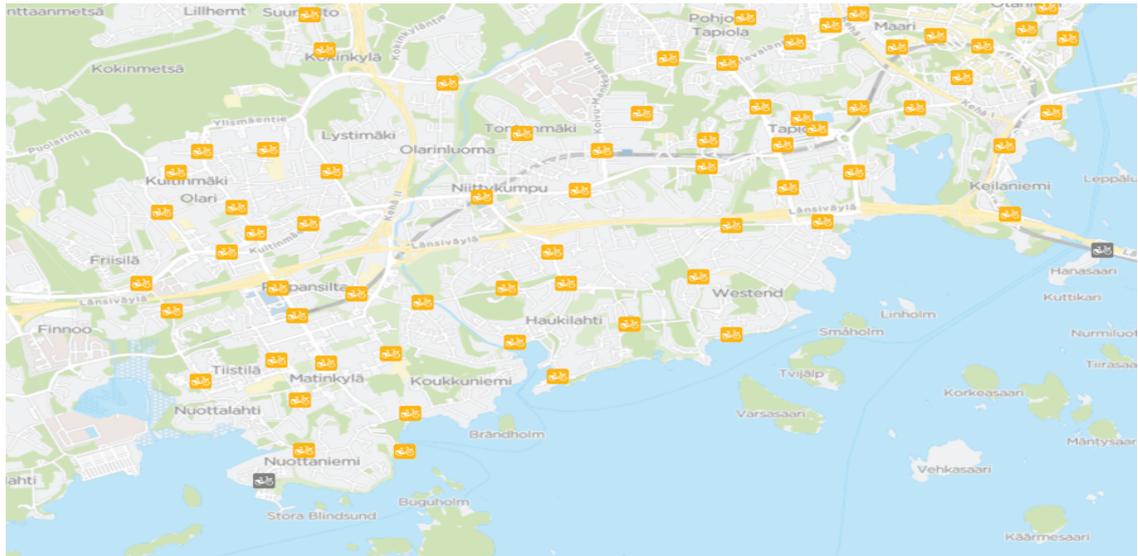


Figure 7 All the future city bikes' stations in Espoo (Helsinki Regional Transport Authority, n.d.).

The ferry line has eight stops along Rantaraitti and they are operated from 10<sup>th</sup> June to 30<sup>th</sup> September in 2017. The stops are marked in figure 8.

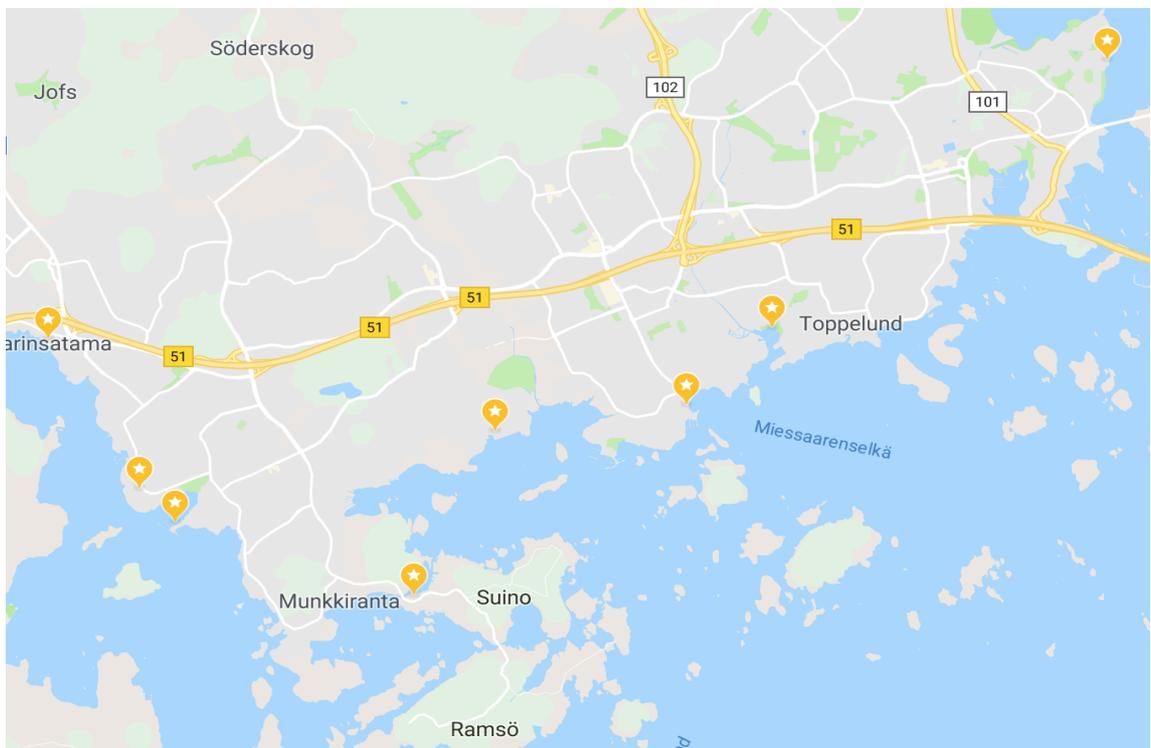


Figure 8 One can also move by the coastal line by ferry during summer. The stars represent the ferry stops on Rantaraitti in year 2017 (Espoo city, n.d.).

### **By whom are these services offered and how successful are they?**

The public transport in Helsinki area is provided by HRT. The Länsimetro was still in October 2017 mainly owned by Espoo city and was co-owned by Helsinki city and Länsimetro Ltd (Leppänen, 2017). Before starting operating the Länsimetro, Länsimetro Ltd handed over the stops and railway to Helsinki City Transport (HKL) (Länsimetro Oy, 2018). HKL operates the metro in Helsinki region and HRT orders the transport services for its customers (HKL, 2017). Information of the ownerships' size are hard to come by while writing this thesis. It has been widely criticized, that the minutes of Länsimetro's operations have decided to keep in secret (Aalto, 2016).

The amount of users of Länsimetro has remarkably been bigger than expected in advance (Malmberg, 2018). On the other hand, it has been counted that there are only 0,5 - 1% less cars than before in certain areas where the subway operates in Espoo (Nurmi, 2017). The Rantaraitti report from 2016 expected the subway line to increase the amount of visitors in Rantaraitti (Kajamaa, 2016).

On a summer day in 2017, Rantaraitti, the coastal line, had from 50 visitors to closer to one thousand visitors per day, depending on the part of the Rantaraitti. The most popular area of Rantaraitti from the end of July to beginning of August was Otaniemi. The statistics shows that Rantaraitti is most used by bicyclists during the statistical period of end of July to beginning of August (Pettersson, 2018).

Total amount of passengers in Espoo's archipelago ferry line in 2016 was 31 816 passengers. The amount was spread per line as following:

- Otaniemi's ferry line 9 137 passengers
- Iso Vasikka's ferry line 16 109 passengers
- Kivenlahti's ferry line 6 570 passengers (Pettersson, 2018)

The city bikes are coming to Espoo for the first time. The providers behind the city bikes are HKL and Espoo city's technical and environment services (Helsinki Regional Transport Authority). In general, 42% of inhabitants in Espoo bicycle every week during summer. In 2012 the distribution of the trips were following: 32% of the trips are done from home to work, 22% from home to school, 40% from home to other place and 6% other (not home) (WSP Finland Oy). According to Kauppalehti, the city bikes have been very popular and regular city bike users between years 2016-2017 had more than doubled (Kauppalehti, 2017). By 017 the city bikes had drove 1,5 million trips and 34 000



habitants had bicycled throughout the whole season in Helsinki city (HSL kaupunkipyörät).

**What are the operating models behind these services?**

Norsöline –ferry line and city bikes are summarized in figure 9 and 10.

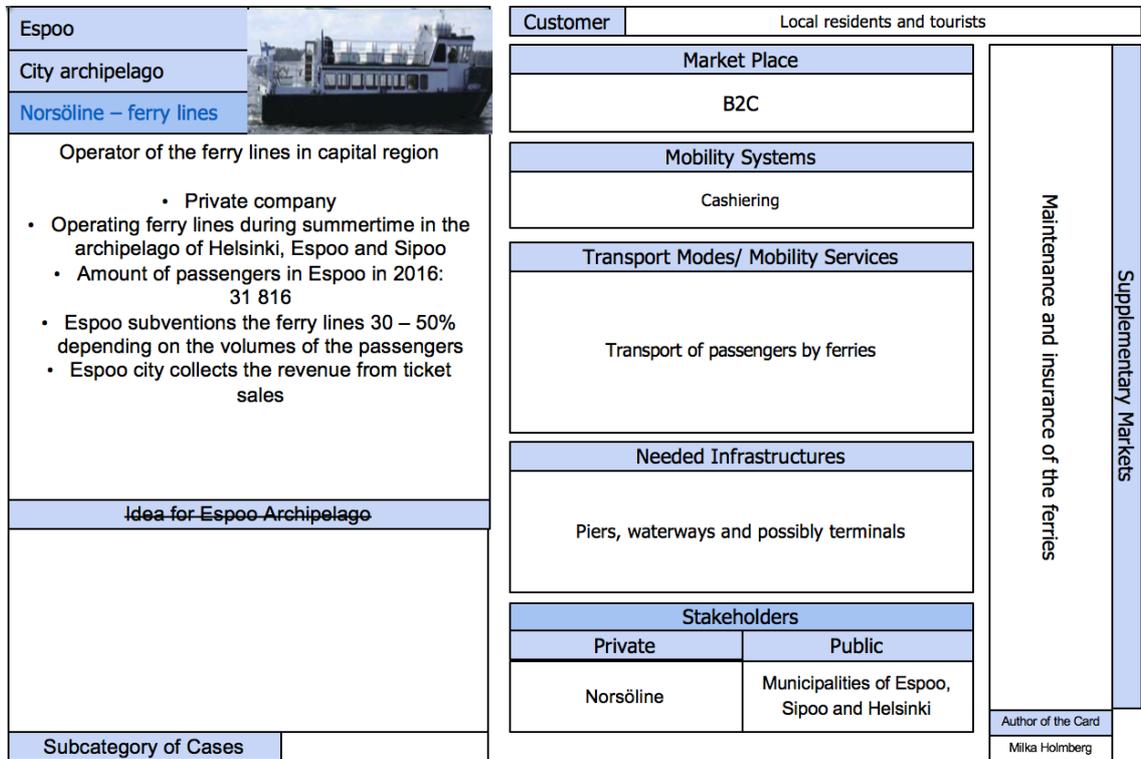


Figure 9 The operating model canvas of the ferry line



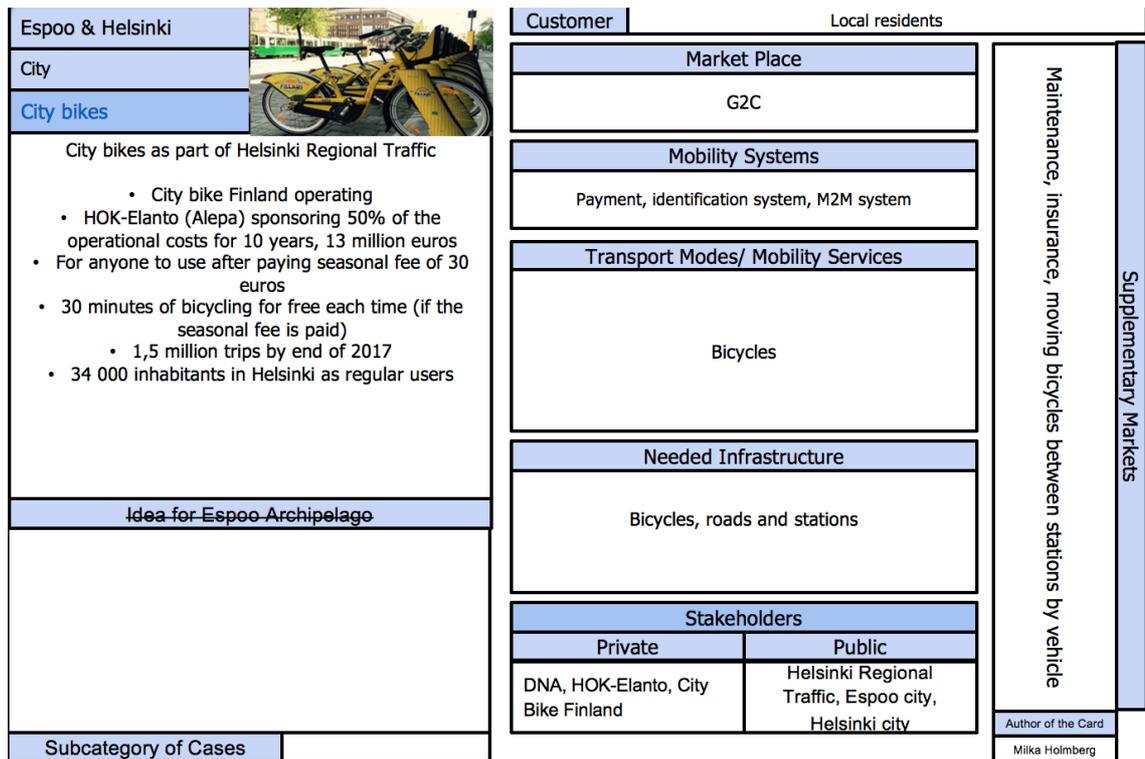


Figure 10 The operational model canvas of the city bikes in Espoo

## 5 Stockholm

Move About and UbiGo were the two mobility services discussed in Stockholm.

### 5.1 “Move About”

**What kind of mobility services are offered to customers and what is included in the service?**

Move About is a carpool consisting of electric cars and provides its services to communities, associations, companies and private consumers in Sweden and Norway. Unlike DriveNow, Move About’s cars have their fixed stations where they are charged after each use. Move About has been a pioneer in carpooling as the company was founded already in 2007. Since its foundation, the company has provided only electric cars. The car brands the company uses is Nissan, Tesla and Renault. All of the cars are fully insured by Move About. Pricing model works in the same manner whether the



customer is a private consumer or a company. The model is based on a monthly fee of the service additionally to hourly or daily rent (Move About, n.d.).

### **What are the journey chains?**

Services' prices include parking in some cities like Helsingborg (Bilpool, n.d.). Driving routes are free for the customer to choose and there are no limitations in driving distance from the charging station (except with three models) as long as the car is driven back to the same station as it was taken from (Move About, n.d.).

In 2016 Stockholm's city added a charging station to the central station together with Move About and Vattenfall with the idea to expand offered mobility services in city center (Jernhusen, 2016).

### **By whom are these services offered and how successful are they?**

Move About AB is owned by the Norwegian company Move About AS (Allabolag.se, 2018) and 22 other companies (Kilter, 2016). Move About has been partly under French ownership since 2012 when Ecomobilité Ventures invested 2 million euros in the company. Ecomobilité Ventures is a private equity fund specialized in sustainable mobility and founded by Total, SNCF and Orange (Move About, 2012).

Stockholm city is a member of the European Union's GrowSmarter –project. Stockholm joined the project to find smart solutions to energy, infrastructure and transport (Stockholms stad, 2018). Move About is an actor in the GrowSmart -project.

The Swedish media wrote in 2016 of the growth of carpooling and discussed of the difficulty of building carpool companies profitable. According to the article, Move About was already in year 2015 slightly profitable with profit of 0,07 million Swedish crowns. In 2015 the company's revenues reached 5,6 million Swedish crowns. At that time Move About had 100 cars, a growth rate of 32% in a year and operated in 10 different cities or municipalities in Sweden. The biggest carpool operator in Stockholm in 2015 was Sunfleet with 1031 cars, 108 million Swedish crowns in revenue and loss of 0,4m Swedish crowns (Leijonhufvud, 2016). The revenue development of Move About is visible in figure 11.



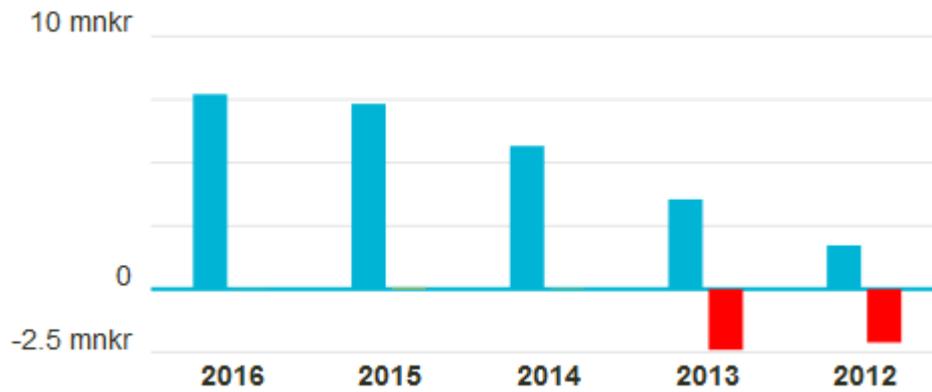


Figure 11 The development of Move About's revenues (and loss between years 2012-2013) since 2012 (Leijonhufvud, 2016)

Calculated in trips, Move About has been more popular in Sweden than in the country it was founded in, Norway. In Sweden the service has 8 000 registered users and made 30 000 trips. The respective numbers in Norway are 9 000 and 22 000 (Move About, 2018).

**What are the operating models behind these services?**

Move About's operating model is summarized in figure 12.

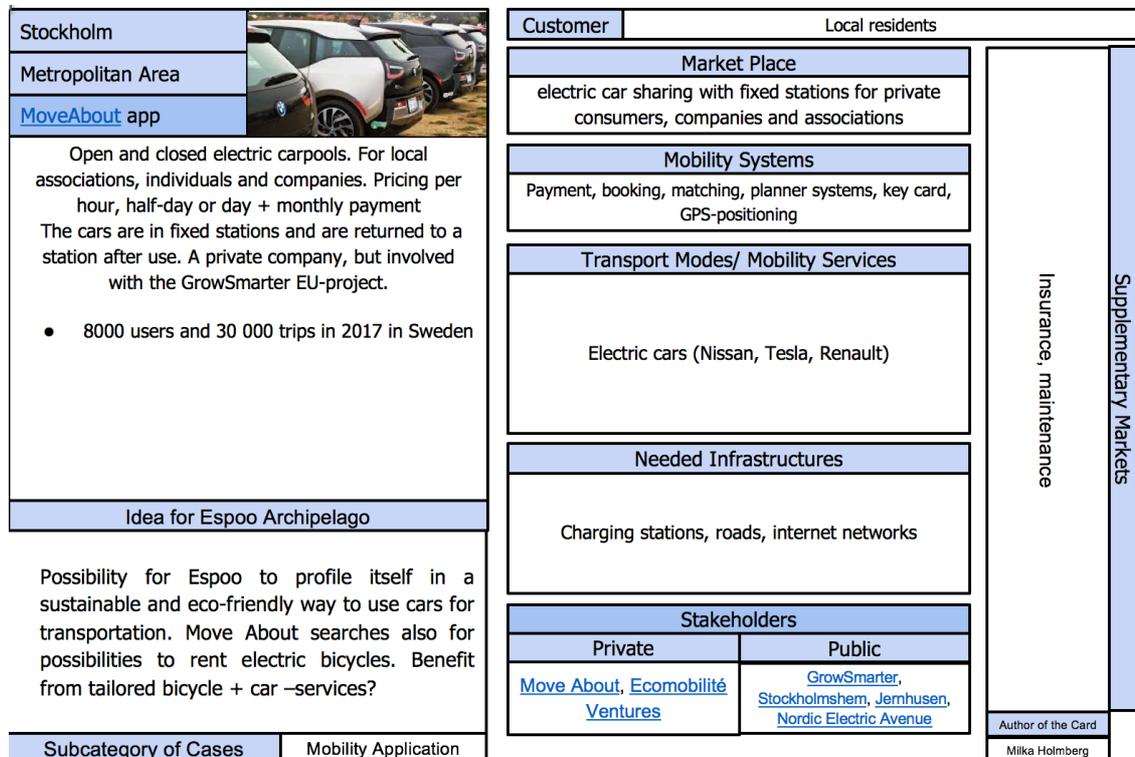


Figure 12 The operating model canvas for Move About



## 5.2 UbiGo - app

### **What kind of mobility services are offered to customers and what is included in the service?**

UbiGo believes and proves that owning a car is expensive and that even without a car a person can travel seamlessly and according to one's own needs. UbiGo is a service where a household imports all the estimated household's travels during one month and travels accordingly using UbiGo. UbiGo provides all the different transport methods. Different transport methods to choose from are rental car, public transport, taxi rides, car sharing or bicycle (UbiGo, n.d.).

At the end of the month, the household receives an invoice formed from the diverse transport methods. If the household has not successfully estimated its needs, the household can buy more trips even in the middle of the invoice period.

### **What are the journey chains?**

The journey chains are built accordingly to customer's needs. He or she can use public transport and connect private vehicles in that journey if the person so wishes.

### **By whom are these services offered and how successful are they?**

UbiGo was originally established as a pilot between years 2012-2014 in Gothenburg. The pilot included 70 households using UbiGo's services for 6 months. The pilot turned out to be successful, as majority was satisfied or very satisfied with the service and felt that they benefitted from UbiGo. Now UbiGo is re-piloting in Stockholm starting from March 2018 with the same operational idea: to offer all of the household's transportation from the same service (UbiGo, n.d.).

UbiGo is a private company, a subsidiary to Arby Kommunikation Ltd. UbiGo's revenue in 2016 was 156 000 Swedish crowns (Ratsit, n.d.). UbiGo has received public funding to test its business idea during years 2012-2017. The financier has been Vinnova, which is a governmental financier for research and development. The amount of financing throughout the years have been:



- August 2012 to August 2014, 9 934 000 Swedish crowns for developing, testing and to demonstrate concept for sustainable transporting methods (Vinnova, n.d.).
- March to December 2015, 500 000 Swedish crowns for studying a pre-plan of building a MaaS (Mobility-as-a-Service) concept and platform (Vinnova, n.d.).
- September to November 2016, 4 000 Swedish crowns for participate in SWII conference of Smart Products for Automated Transport in Zurich (Vinnova, n.d.).
- April to June 2016, 4 000 Swedish crowns for contributing in Eurostars contest in Helsinki (Vinnova, n.d.).

**What are the operating models behind these services?**

The operating model of UbiGo –app is summarized in the figure 13.

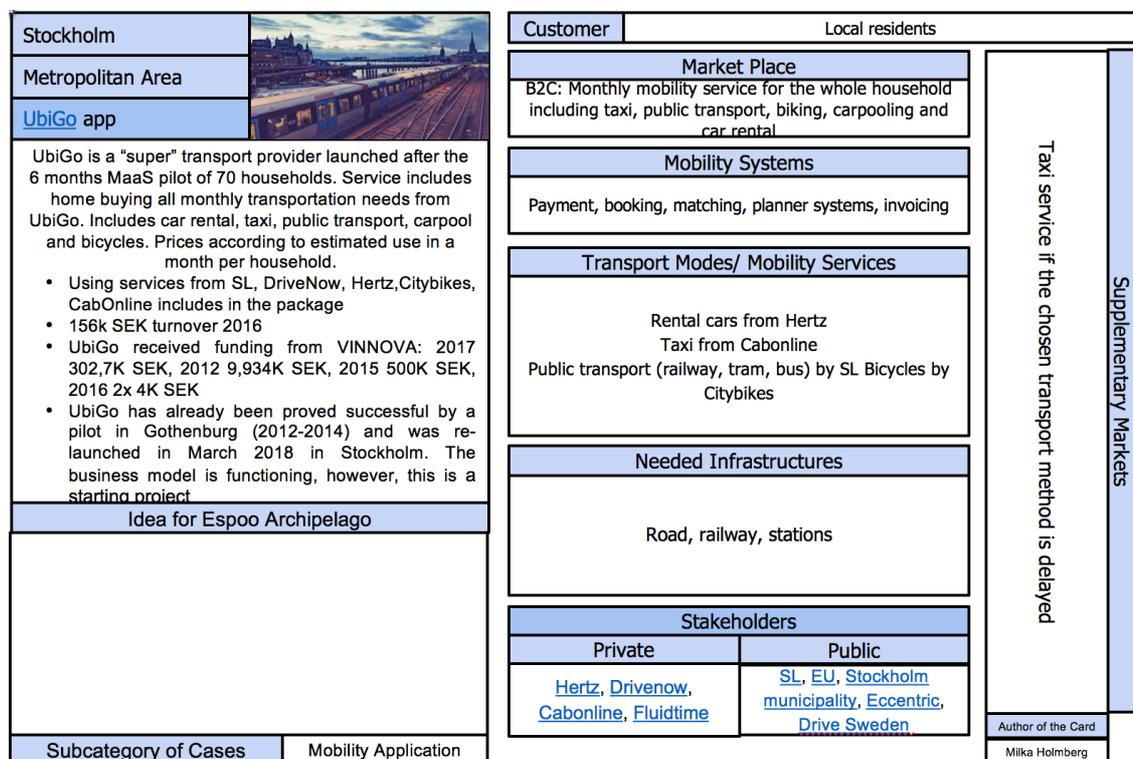


Figure 13 The operating model canvas for UbiGo.

**6 Copenhagen**

Copenhagen had four interesting mobility services which were examined closer.

**6.1 DriveNow**



**What kind of mobility services are offered to customers and what is included in the service?**

DriveNow is an international carpool service founded by BMW, Sixt ASE and Mini. The carpool service DriveNow was expanded with 400 electric cars together with Arriva in Copenhagen in autumn 2015 as an additional service to public transport (Arriva, n.d.) (DriveNow, 2015). Arriva will be further integrating DriveNow to the public transport system. DriveNow will be added to rejseplanen.dk in the near future (Arriva, 2017). In January 2018 DriveNow launched expansion of co-operation with the chain Scandic hotels. The idea behind the launch was that also hotel guests could utilize DriveNow's services during their trip (Angselius, 2018).

DriveNow's service includes reserving and driving a vehicle which customer can pay for by minute or by hour. Prices include tax, parking and insurance. If a customer charges the car, he or she can be rewarded by extra driving minutes (DriveNow).

The company claims that at any time the customer would not be more than 300 meters from the nearest car within the marked driving area. It equals for the distance for an inhabitant to the nearest bus stop by average in the center of Copenhagen (Arriva company, n.d.).

**What are the journey chains?**

Cars have a marked area where the cars can be used and parked accordingly to DriveNow's rules. The area in Copenhagen is shown in figure 15.

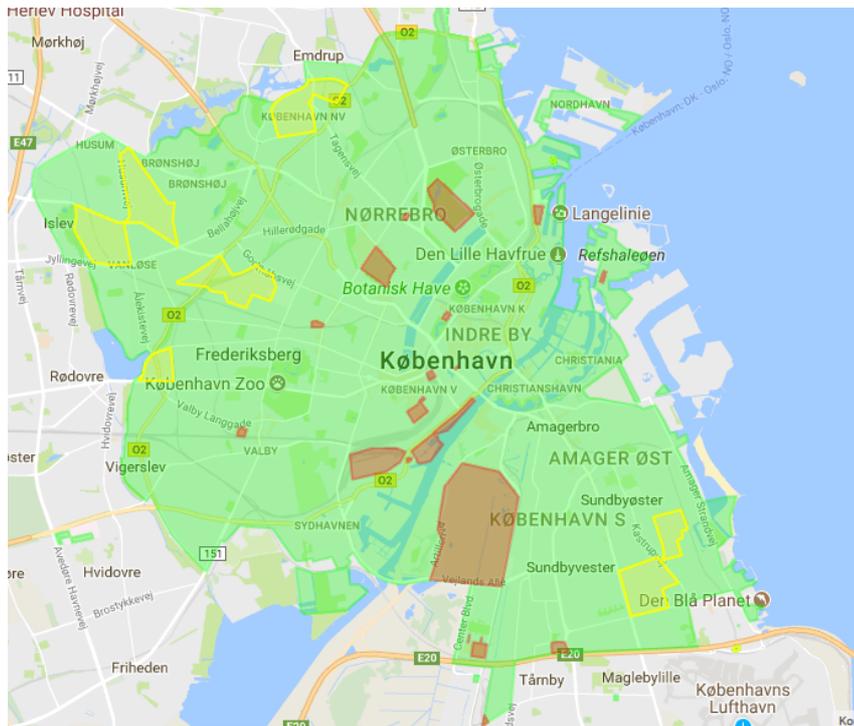


Figure 15 DriveNow operational area in Copenhagen (DriveNow, n.d.).

### **By whom are these services offered and how successful are they?**

Almost 10 million Danish crowns public money has been invested in the carpool through Energistyrelsen and the Capital Region of Denmark (Krabbe & Berner, 2015). Arriva is the operator of the DriveNow in Copenhagen and the operational model is franchising. By co-operation with Arriva, the customers of Arriva can use the public transport's key cards with DriveNow's services. Arriva is a leading provider of collective transport in Denmark, being the biggest bus operator and second biggest train operator in the country (Arriva, n.d.). Arriva is owned by Deutsche Bahn (Arriva company, n.d.).

The launch of DriveNow in Denmark can be considered as very successful. The service has 50 000 registered users in Denmark and around 1200 trips per day (Arriva company, n.d.). Arriva informed in September 2017 that DriveNow's user base is growing by approximately 1600 new customers each month (Arriva, 2017).

### **What are the operating models behind these services?**

Figure 14 describes DriveNow's operational model.

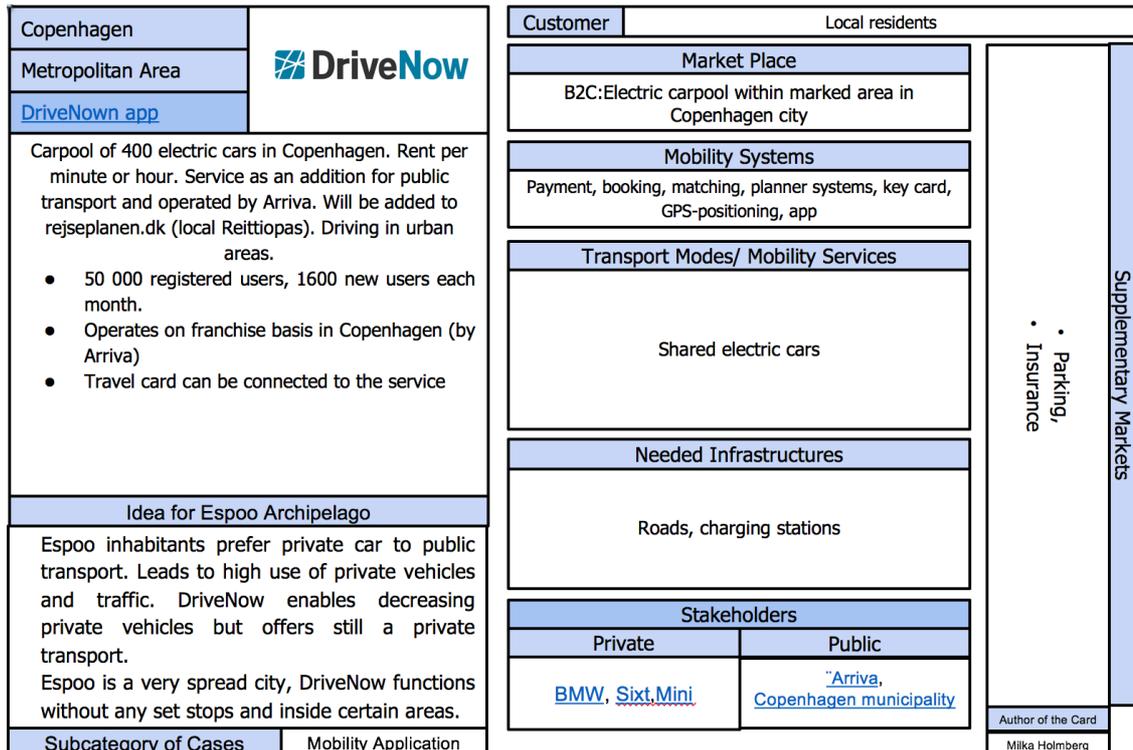


Figure 14 The operational model canvas for DriveNow

## 6.2 GoBoat – rentals boats

### What kind of mobility services are offered to customers and what is included in the service?

GoBoat is a service that provides sailing for everyone – whether one has sailed before or not. Services are meant to be used by locals and tourists. GoBoat hires boats from its platform to private consumers or companies. The trip can be booked in advance online or from the GoBoat –app. The company also provides the possibility of buying food and beverage for picnic purpose on the spot, before departure. Anyone who's age is at least 18 is allowed to be a captain of the "RAND picnic boat", which is the boat model utilized by GoBoat. Rent for the boat is paid hourly, one hour of use costs 399 Danish kroner. A boat fits eight persons. The season starts March and ends in October (Sommermagasinet, 2018). Kids are welcomed by the company. GoBoat has a program called "Rubbish pirates". Whenever kids collect trash from the water, they get an ice cream for free from GoBoat (Sommermagasinet, 2018).

RAND picnic boat's max speed is 6,5 kilometers per hour. RAND boats are manufactured sustainably, including recycled materials. Co-founder of GoBoat, Carl Kai Rand owns the



RAND –manufacturing company. Boats are driven with batteries that are charged with solar electricity. GoBoat produces its own energy by solar panels on the roof its terminal (GoBoat, n.d.).

### **What are the journey chains?**

The peer is situated in Copenhagen city center's canal area. Boats are free to drive without any fixed route. However, GoBoat provides a map with tips for great routes in the area. The company website also shares information about sights by the canals and rivers. GoBoat markets its kind customer service which is always ready to share tips of routes (GoBoat, n.d.).

### **By whom are these services offered and how successful are they?**

GoBoat was founded in 2014. It has been expanded to Malmö, Canberra, Perth and London. There are plans further expansion plans. The popularity of the service can be also measured by amount of users. By March 2018 GoBoat's services has been utilizing near to 123 000 people only in Copenhagen. The service is marketed to be one of the best ways to experience Copenhagen for tourists. Boats in London often sell out according to the service provider (GoBoat, n.d.).

The app is developed by Shape and includes features to pay, book and cancel trips (Shape, n.d.). A centric part of GoBoat's business model is to be sustainable. For that the company has developed an independently running energy system for its boats, using solar panels. The solar panels on the roof of the terminal charge the batteries. Batteries are provided by Torqeedo and they run the RAND Picnic boats. RAND's owner, Carl Kai Rand has a role as co-founder in GoBoat. Since the boats are designed and manufactured by RAND, GoBoat can be assured that the manufacturing is sustainable and that the product is based on recycled materials.

In 2016 Innobooster (a public fond for SMEs) invested 1,244 million Danish crones for GoBoat's new platform. The focus was especially in the GPS services, to be able to locate the boats in all times. This investment however did not require losing ownership for the co-founders and remains as the main reason for the founders of GoBoat to choose Innobooster as their partner (Vest, 2017).



## What are the operating models behind these services?

Figure 15 describes in more detail the GoBoat’s operational model.

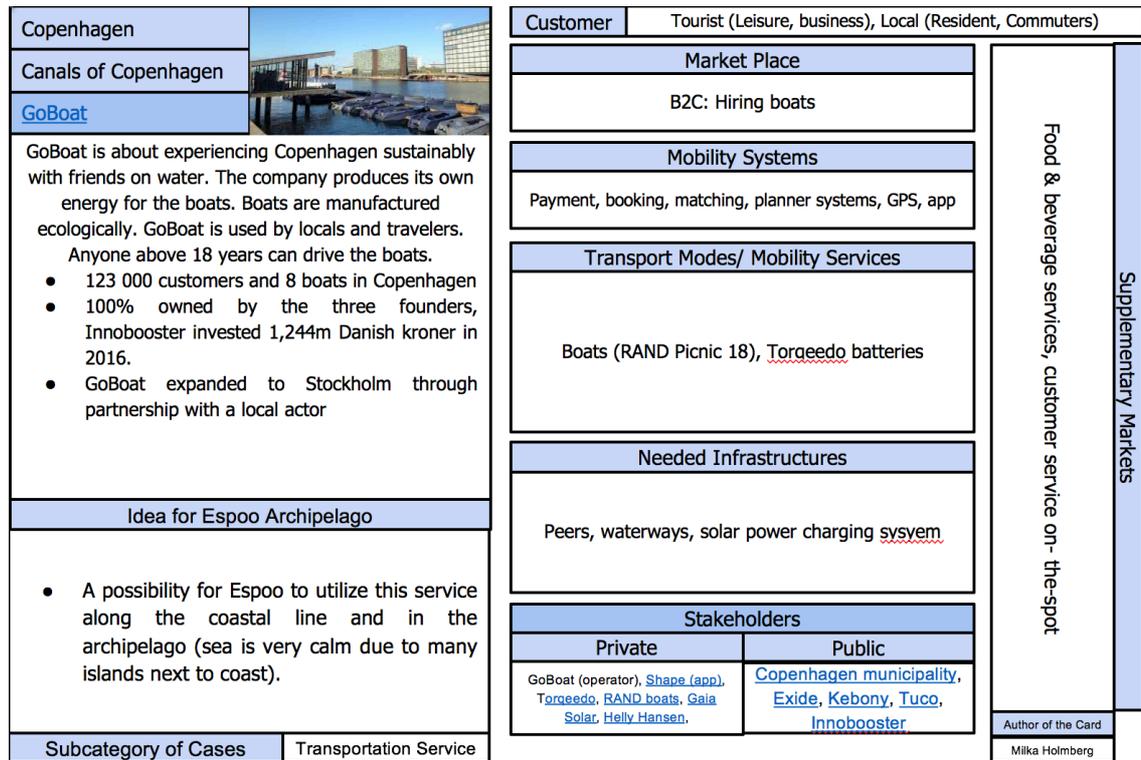


Figure 15 The operational model canvas for GoBoat.

### 6.3 BoatFlex

#### What kind of mobility services are offered to customers and what is included in the service?

Founded in 2014, BoatFlex operates as the Airbnb for boats (The Hub DK, n.d.). The transaction for renting a boat are done on a peer-to-peer platform. It means, that the buying and renting out process are done between private consumers. In order to sail safely, BoatFlex buys insurance from Lloyd’s. BoatFlex is also working together with yacht clubs in order for clubs to efficiently use their boats. Age of the sailors are rapidly growing since sailing is too expensive hobby for many young. BoatFlex seeks to find a solution for how to let young experience sailing too.

The owner of the boat sets the hourly, daily or a weekly price for which by the boat is rented. The idea is that private persons can rent out their boat in order to decrease the costs of maintaining a boat. A customer who has the license to drive is allowed to drive



the boat. However, if the customer does not have a license to drive on the sea, he or she can order a captain for the trip (BoatFlex, n.d.).

### **What are the journey chains?**

BoatFlex builds upon the idea that the customer either drives and determines on his or her own where the boat is driven, or that the captain takes care of the journey planning.

### **By whom are these services offered and how successful are they?**

BoatFlex maintains the operational platform where private consumers rent out and hire boats (Axelsen, 2017). In 2016 the platform had 200 000 unique visitors and 4000 registered users (Ohr, 2017). The platform had 1400 registered boats in 2017. BoatFlex has since its foundation in 2014 spread across Southern Europe in countries like Croatia, Turkey, Spain and Greece (Bloomberg, 2018).

To raise capital in order to grow, BoatFlex has had three rounds of raising venture capital. In June 2015 (\$330k), 2016 (\$194,47k) and March 2017 (\$729,03k). BoatFlex raised in total \$1,3 million in venture capital. The major investor has been Seed capital (Datafox, n.d.).

BoatFlex's revenue model builds on taking margins of both the buyer and the seller. BoatFlex takes 12% margin of the value of the rent from the boat owner and 4% margin from the customer that rents (Dane, 2017).

### **What are the operating models behind these services?**

BoatFlex's operational model is presented in figure 16.



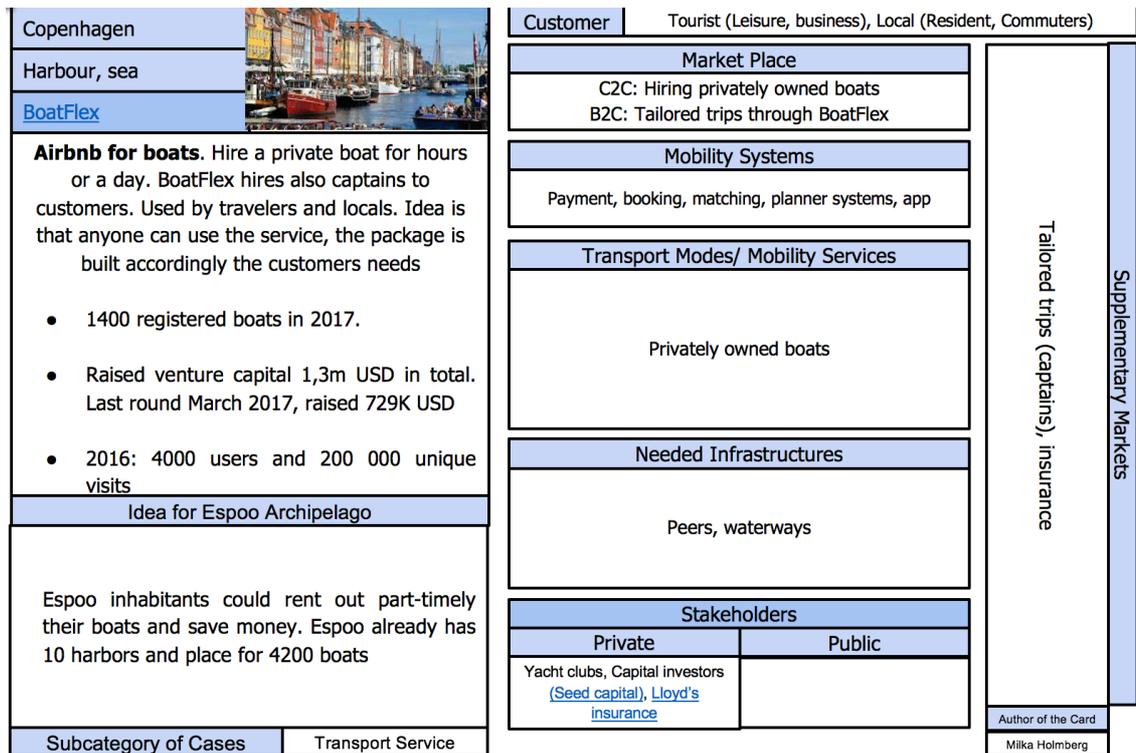


Figure 16 The operational model canvas for BoatFlex

#### 6.4 Bycyklen

**What kind of mobility services are offered to customers and what is included in the service?**

Bycyklen has been established for commuters to “connect the last mile” and has been added as “the fourth leg” in Copenhagen’s and Frederiksberg’s public transport system (Bycyklen, n.d.). The service works year around (Goldmann, 2016). Over 100 charging stations exists where a customer can pick up and leave the “Bycyklen”. The bicycles are all equipped with electric motor, which at fully charged can take the passenger 250 kilometers. Bicycles are also equipped with a smart system. They have a tablet with touch screen. The touch screens enable the customer to unlock the bicycle, shows the nearest bus stops as well as charging stations and gives the departure time of public transport nearby. All of the bicycles have GPS built in them in order to track where are nearest bicycles.

Bycyklen was founded to offer a smart and healthy method of transporting local inhabitants. It has not established as a priority for tourists (Bycyklen, n.d.). In 2016, 75% of the users of Bycyklen had registered with a Danish telephone number (Koefoed,



2017). In June 2016, the Bycyklen had 1860 operating bicycles. The figure 18 describes the different pricing packages for Bycyklen.



Figure 17 The different pricing models for Bycyklen (Bycyklen, n.d.).

### What are the journey chains?

The journey chain starts from the Bycyklen charging stations by starting the customer's reservation. The location service is shown in figure 17. It helps the customer to choose one from the 105 stations around Copenhagen area. Real-time information of available bicycles is available on [bycyklen.dk](http://bycyklen.dk).

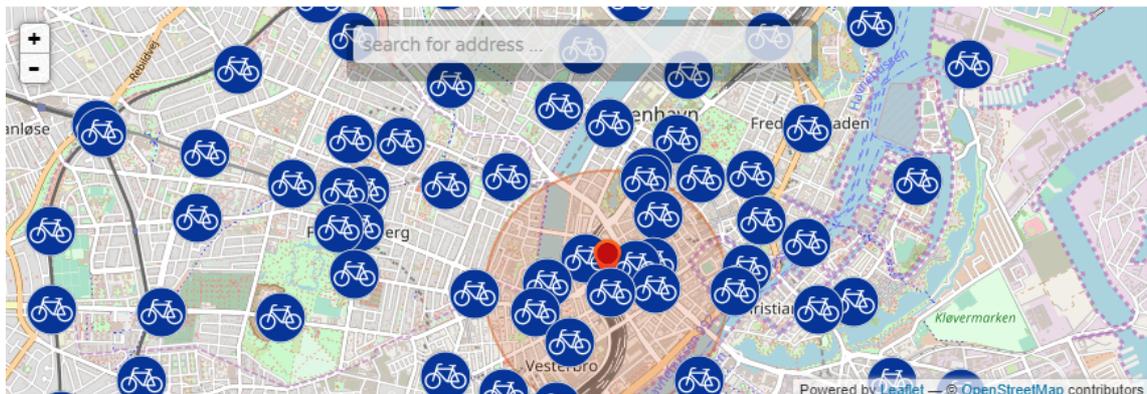


Figure 18 Bicycle stations in the center of Copenhagen city (Bycyklen, n.d.).

### By whom are these services offered and how successful are they?

By- og Pendlercykel Fonden is a fond which owns the operations of Bycyklen. The fond is founded by DSB, Copenhagen city and Frederiksberg city (Bycyklen, n.d.). The operating budget for 8 years is 86 million Danish crones (Koefoed, 2017).

Around 169 000 trips were made in year 2015. In 2016 the respective number rose to 933 000. The amount of trips has increased 2 500% in two years. The estimated number

of trips for 2017 was 1,5 million. The average journey has shorten from 8,8 kilometers in 2014 to 4 kilometers in 2016 (Koefoed, 2017). Rotterdam has studied Copenhagen’s system and copied Bycyklen with 2200 city bikes for Rotterdam city.

**What are the operating models behind these services?**

Bycyklen’s operational model is summarized in figure 19.

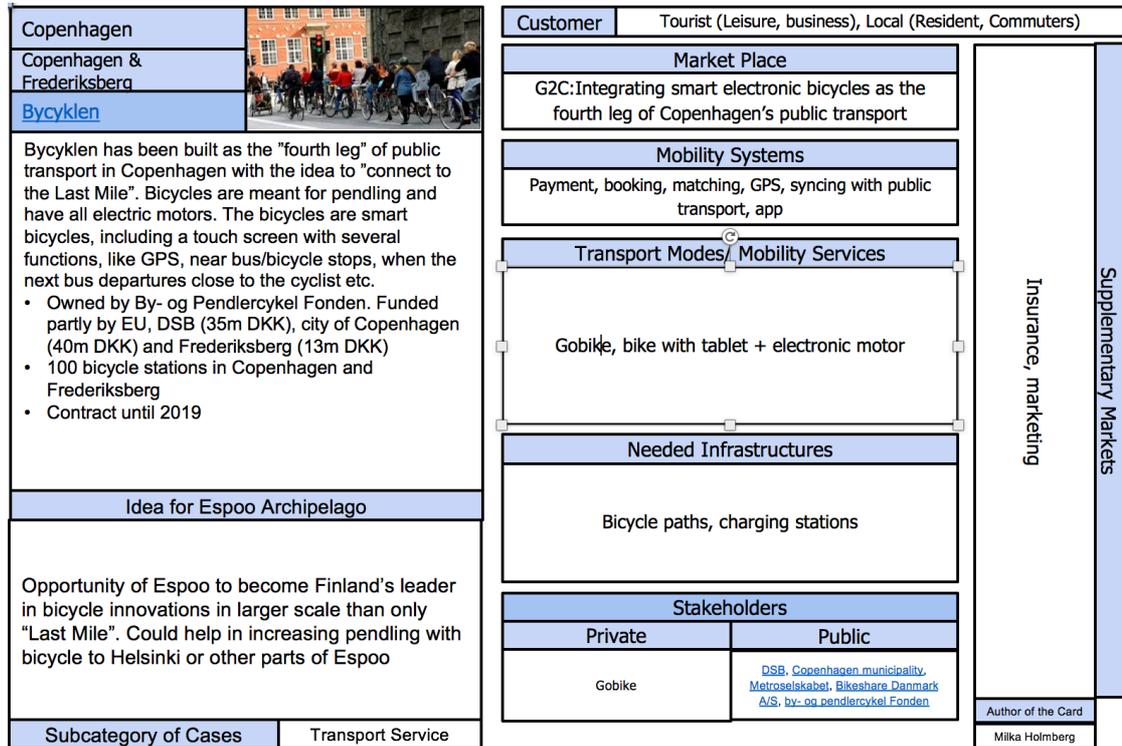


Figure 19 The operational model canvas for Bycyklen

**7 Analysis**

Each case was analyzed with help of a SWOT -analysis. SWOT stands for Strengths, Weaknesses, Opportunities and Threats. The strengths and weaknesses analyses the mobility service whereas opportunities and threats focuses on the perspective of operating the services in Espoo’s coastal line and city archipelago. Analysis looks at the services’ position in Espoo’s market and in terms of global megatrends. The results of the SWOT –analysis are written in tables 1-6.

Table 1. SWOT Analysis of Move About.

Move About	
Strengths:	Weaknesses:



<ul style="list-style-type: none"> <li>• Sustainable transport mode which can be used individually or by groups</li> <li>• In accordance with EU policies to reduce CO<sub>2</sub> emissions of transports</li> <li>• Inexpensive with short distances and if one has a seldom need of a car</li> <li>• A service to drive accordingly to one's own needs without needing to own a car</li> <li>• Move About has been growing tremendously during years it has operated in Stockholm</li> </ul>	<ul style="list-style-type: none"> <li>• Needs infrastructure (recharging stations) and space to start the service, especially if the carpools are large</li> <li>• Only people above age of 18 can drive cars in Finland</li> <li>• Driving license needed</li> <li>• The cars may all be in use when one needs the car</li> </ul>
<p>Opportunities:</p> <ul style="list-style-type: none"> <li>• The service could be connected with public transport in Espoo, in order to make travelling smoother</li> <li>• Sharing economy and sustainability in transportation are increasingly important factors in mobility also in Finland and especially in capital region where space is tight</li> <li>• The service is suitable for short distance solutions</li> <li>• A transport option which is suitable the whole year around</li> <li>• Could this product enable Espoo inhabitants to rely less on their private cars?</li> </ul>	<p>Threats:</p> <ul style="list-style-type: none"> <li>• Competitors in capital region like DriveNow</li> <li>• If Move About was established for only between subway stations to Rantaraitti, there would be a threat of too small volume of users, especially during bad weather</li> <li>• If no interested operator was found</li> </ul>

Table 2 SWOT Analysis of UbiGo.

UbiGo	
<p>Strengths:</p> <ul style="list-style-type: none"> <li>• The service provides efficiently all transportation needs for a household</li> <li>• All transportation services under one service</li> <li>• Builds journey chains according to one's needs</li> <li>• High customer satisfaction during piloting period of 6 months in Gothenburg</li> <li>• In accordance with EU policies to reduce CO<sub>2</sub> emissions</li> </ul>	<p>Weaknesses:</p> <ul style="list-style-type: none"> <li>• Only a pilot project, so far not a real market player</li> <li>• Has been able to generate only a small revenue stream of 156 000 SEK annually</li> </ul>

<ul style="list-style-type: none"> <li>• Sustainable transport mode which can be used individually or by groups</li> </ul>	
<p>Opportunities:</p> <ul style="list-style-type: none"> <li>• Very little competition in the field of super transport apps which provides all needed mobility services for a household</li> <li>• Since outsourcing transportation needs is a global megatrend, the UbiGo service is very up-to-date and has future potential</li> <li>• Could this product enable Espoo inhabitants to rely less on their private cars?</li> </ul>	<p>Threats</p> <ul style="list-style-type: none"> <li>• Would markets in Espoo be ready for UbiGo's services?</li> <li>• Taxi is still under very much regulations in Finland</li> <li>• Very complex service for only using as the "Last Mile" solution</li> </ul>

Table 3 SWOT Analysis of DriveNow.

DriveNow	
<p>Strengths:</p> <ul style="list-style-type: none"> <li>• Large company with successful business model and strong partners</li> <li>• Flexible price modeling</li> <li>• In accordance with EU policies to reduce CO<sub>2</sub> emissions</li> <li>• Inexpensive with short distances and if one has a seldom need of a car</li> </ul>	<p>Weaknesses:</p> <ul style="list-style-type: none"> <li>• Only people above 18 can have a driving license</li> <li>• Driving license needed</li> <li>• Cars can be parked anywhere and it could mean that no cars are available in near distance</li> </ul>
<p>Opportunities:</p> <ul style="list-style-type: none"> <li>• Business model in line with megatrends like sustainability and sharing economy</li> <li>• Espoo already has the required infrastructure</li> <li>• Could this product enable Espoo inhabitants to rely less on their private cars?</li> <li>• The service could be connected with public transport in Espoo, in order to make travelling smoother</li> <li>• Sharing economy and sustainability in transportation are increasingly important factors in mobility also in Finland and especially in capital region where space is limited</li> <li>• The service is suitable for short distance solutions</li> </ul>	<p>Threats:</p> <ul style="list-style-type: none"> <li>• Competition in car sharing in Helsinki region</li> <li>• If DriveNow was established for Rantaraitti, there would be the risk of having too small number of customers especially during mal weather conditions</li> </ul>

<ul style="list-style-type: none"> <li>• A transport option which is suitable the whole year around</li> </ul>	
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Table 4 SWOT Analysis of GoBoat

GoBoat	
<p><b>Strengths:</b></p> <ul style="list-style-type: none"> <li>• Became very successful in Copenhagen and has expanded rapidly worldwide</li> <li>• Suitable for the whole family, kid friendly activities included</li> <li>• Sustainable transport solution, owns its electricity system and manufactures boats sustainably</li> <li>• Possibility to book the boat online in advance and cancel the reservation</li> <li>• In accordance with EU policies to reduce CO<sub>2</sub> emissions</li> </ul>	<p><b>Weaknesses:</b></p> <ul style="list-style-type: none"> <li>• Requires infrastructure and space like terminal, piers</li> <li>• Only people above age of 18 can drive boats</li> <li>• Can become costly for whole day use</li> <li>• Speed of the boats is rather slow</li> </ul>
<p><b>Opportunities:</b></p> <ul style="list-style-type: none"> <li>• No similar services yet offered in Espoo</li> <li>• No need to own an expensive boat</li> <li>• Possibility to expand services perhaps to island hopping on Espoo's islands?</li> <li>• Sharing economy and sustainability in transportation are increasingly important factors in mobility also in Finland and especially in capital region where space is tight</li> </ul>	<p><b>Threats:</b></p> <ul style="list-style-type: none"> <li>• Weather conditions can highly effect the demand for services</li> <li>• Only for seasonal use</li> </ul>

Table 5 SWOT Analysis of BoatFlex

BoatFlex	
<p><b>Strengths:</b></p> <ul style="list-style-type: none"> <li>• Offering two sort of options: packages (trips including a captain) and renting a boat</li> <li>• Expansions in Europe, especially successful operations in vacation destinations like Greece or Italy</li> <li>• Thematic business model in sharing economy</li> </ul>	<p><b>Weaknesses:</b></p> <ul style="list-style-type: none"> <li>• Can become expensive for the customer if one does not know how to drive a boat</li> <li>• Availability of boats depends on the owners' actions. On a sunny day the owners might want to use their boat too, especially if there are only few sunny days that summer</li> </ul>



<ul style="list-style-type: none"> <li>• Business model in accordance with EU policies to reduce CO<sub>2</sub> emissions</li> <li>• Suitable for the whole family, boats offered for flexible needs</li> </ul>	
<p>Opportunities:</p> <ul style="list-style-type: none"> <li>• Espoo has 10 private harbors, quantity of boats for the service to work already exists</li> <li>• No extra effort in infrastructure required</li> <li>• Business model already exists in Espoo. Co-operation could be taken further to improve customer mobility in Espoo city archipelago</li> <li>• Boat owner most likely willing to decrease costs of owning their boats</li> </ul>	<p>Threats:</p> <ul style="list-style-type: none"> <li>• Skipperi, peer to peer boat renting company operates in Espoo</li> <li>• Weather conditions can highly effect the demand of services</li> <li>• Similarity to Skipperi's service, how diversify oneself from the competitor?</li> <li>• Heavy service package for short distance, not suitable only as short "Last Mile" trips</li> <li>• Only for seasonal use</li> </ul>

Table 6 SWOT Analysis of Bycyklen.

Bycyklen	
<p>Strengths:</p> <ul style="list-style-type: none"> <li>• A well functioning, shared smart bicycling system</li> <li>• Stops spread widely within the area</li> <li>• Sustainable and business model based on sharing economy (megatrend)</li> <li>• Optimizes the customer's journey as the smart screen shows the departures of collective transport vehicles near (megatrend, utilizing technology)</li> <li>• Offers a smart way of travelling short distances</li> <li>• Business model in accordance with EU policies to reduce CO<sub>2</sub> emissions</li> <li>• Improves health of service's users</li> </ul>	<p>Weaknesses:</p> <ul style="list-style-type: none"> <li>• Bicycles were originally meant for commuters (long distance bicycling), but the distance bicycled has shorten from 8,8 kilometers to 4 kilometers within few years. Is the company reaching its target users?</li> <li>• Can take only one person at a time</li> <li>• No handicapped can travel with the bikes</li> <li>• No guarantee that bicycles are available when needed. However, possibility of checking each station's situation online</li> </ul>
<p>Opportunities:</p> <ul style="list-style-type: none"> <li>• Bicycles could be synced with HRT public transport in order for the customers of Rantaraitti and archipelago to optimize their bicycling journey to decrease time spent travelling. Availability of the areas would improve</li> </ul>	<p>Threats:</p> <ul style="list-style-type: none"> <li>• Competitor, Helsinki Regional Traffic launched bicycles which are synced with customer cards to public transport which means that a large quantity of customers available for HRT's bicycles.</li> <li>• HRT's bicycles are less valuable and requires smaller investments</li> </ul>



<ul style="list-style-type: none"> <li>• Opportunity for not only using as a “Last Mile” but also along whole Rantaraitti</li> <li>• Opportunity to research if the Citynomad app could be synced with the bicycle in order to improve the customer’s experience in Rantaraitti?</li> </ul>	<ul style="list-style-type: none"> <li>• Weather conditions can highly effect the demand for services</li> <li>• Prestigious project and needs a very committed partner</li> <li>• Limits in seasonal use</li> </ul>
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All of the transport solutions seeks to use transport solutions more efficiently by sharing transport vehicles, thus, decrease CO<sub>2</sub> emissions and increase sustainability in mobility. Sustainability is a remarkable driver for many companies analyzed. GoBoat produces its own energy and manufactures its boat from recyclable materials. When Move About’s and DriveNow’s services are commonly used, they decrease remarkably the need of private cars. BoatFlex believes that there is more to win from sharing one’s private boat with others. UbiGo’s business idea builds on the fact that there should not be any need of owning a private vehicle anymore and that owning a vehicle is more expensive than using other (collective and individual) mobility services. Bicycling does not let any emissions plus improves driver’s health.

Five services, Move About, DriveNow, BoatFlex, UbiGo and Bycyklen are strongly influenced by sharing economy. All the services discuss that consumers will not have a need of anymore individually own transport vehicles in the modern world. Companies with the most flexible pricing model for short-term using are more potential for solutions as providers of transporting for the “Last Mile”. Some of the services like GoBoat or UbiGo would be unique in their qualities in Finnish markets. Offering unique mobility services could increase interest in such services and therefore bring recognition for that geographical area.

All of the chosen services have been successful in their respective markets. The rate of success was stated by the amount of users, profitability or growth. External interest for the service can also seen as some sort of success even if it does not result in direct revenue. It can be stated that a respective business model is successful when it has reached success in its market.

Each of the services have their weaknesses. Since many of the services rely on sharing, availability of services cannot be guaranteed. Rantaraitti and city archipelago visiting are



strongly correlated by weather conditions. This could result in over demand of services at times when the weather is good, and under demand when the weather is bad.

Services included some restrictions in use of the services. DriveNow, GoBoat and Move About require the age of 18 and driving license in order to use their services. Bycyklen can be drive by only one per time. This limits the target group which could be damaging depending on who belongs to Espoo Rantaraitti and archipelago's target group.

Some of the services analyzed are already in Espoo by similar qualities, but not in use for as the "Last Mile". BoatFlex, DriveNow's, Move About's and Bycyklen's concepts already have competitors in the capital region in Finland. Other threats for services included possibility of utilizing the services only during a short season (summer), the size of the service (the degree of which it requires capital and commitment) and regulations by the government (markets are not yet ready for such services).

UbiGo provides a wide range of services under one app. As the "Last Mile" is only for a kilometer, the service could be seen as inefficiently complex to such short distance of travel. The taxi service which is part of the UbiGo's service is still highly regulated in Finland and therefor limits UbiGo's potential operations.

BoatFlex provides services more as daily or weekly rather than minutely or hourly. As the renting period would not suit for short distances, BoatFlex would have more potential in day cruises rather than as a pure transport method.

## **8 Conclusion**

This study was conducted by collecting and analyzing secondary data for the purpose of finding suitable "Last Mile" solutions for Espoo city's coastal line and city archipelago. Limitations of this study includes availability of the relevant data for analyzing the cases. Many of the companies this thesis studied were still rather small businesses, hence, these companies offered narrowly information. The researcher was finding plenty of information about the services, but very insufficiently numerical data or financial information of most of the companies. Another challenge of the project was time limitations. As the thesis is written as part of the Last Mile –project, certain frameworks' establishment within the project was crucial in order to proceed with the thesis.



The three main global megatrends in transport (the aging of the population, urbanization and climate change) will strongly shape future politics and execution of transport solution in the future. The development of transport will also respond to the other nine megatrends: change of working habits, change of consumerism, change of making business, decreasing availability of raw materials, change of transport streams, change of highlighted services in transport and transport as a service package, change towards collectivism, development of technology and the change of power use in mobility.

In order to build durable transport solutions in Espoo, Espoo must take in consideration these megatrends. Espoo is a city and receives its share from the urbanization, which is especially current in Finland's capital region. How sustainable is transport which relies heavily on driving a private car in one of the Finland's biggest cities?

The consequence of these trends can already be seen in transport solutions of today. Most of the innovative transport solutions studied in Scandinavia were built for sustainability, sharing economy (decreasing availability of raw materials), change of power use in transporting (from fuel to electricity), change of highlighted services or transport as a service package (mobility super apps) and utilized the development of technology (services rely on technology and develops accordingly).

The studied cases were all chosen based on the explicit criteria's with the aim of finding applicable transport solutions for Espoo's "Last Mile". As the Rantaraitti and archipelago area are collective areas, also transport methods should aim in collectivism in order to efficiently transport travelers. The "Last Mile" for Rantaraitti is a kilometer-long trip. Since customers of different ages and in different size of groups move in the area, should there be several transport methods available for the "Last Mile".

The researcher could not find any transport solution in Scandinavian archipelago which would have served only as a "Last Mile" solution, but other transport services which could be applicable in such use. The services were analyzed by SWOT analysis. SWOT analysis resulted that only two transport solutions would be problematic for Espoo's "Last Mile". These services were UbiGo and BoatFlex.

UbiGo's services were seen as very advanced, but too complex for only short-term use, as UbiGo seeks for long-term customers who are in need of diverse mobility methods. The researcher discovered that BoatFlex had inefficient pricing- and business model for transporting. BoatFlex's customer profile was more in accordance for a day or week long



use rather than for only travelling from point A to B. BoatFlex seemed also to offer experience rather than transport.

Applicable transport services for Espoo Rantaraitti and city archipelago's last mile will be studied furthermore in the "Last Mile" project. This thesis offers some ideas for Espoo city to continue researching the most suitable transport method for its coastal area and city archipelago. The researcher would recommend that Espoo city would set qualities of which are seen as most important for the "Last Mile" transport service in order to proceed. When prioritized qualities are set, the services can be analyzed from the sufficient perspective to reach the next step of Espoo's target to develop accessibility of Rantaraitti area.

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