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SUSTAINABLE DELIVERY SOLUTION - QUICKDELIV

Bachelor's thesis

Smart and Sustainable Design

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Smart and Sustainable Design — Abstract
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The aim of this thesis is to research and explain a possibility of new sustainable delivery solution with working name QuickDeliv. This company does not exist yet but it is an idea for a possible future entrepreneurial purpose.

Topic was researched as deeply as possible because of its pioneering properties which made it more difficult to find reliable and relatable sources. Researched subjects were mainly from environmental field but as well from an area of interest in commuting, fast fashion and online shopping which created a solid base for building the topic of this thesis. Additionally, questionnaire was made to support the research and gain information and feedback from asked people to see things from different angles.

In the beginning this thesis introduces the problem and relates to it later on with topics of emissions, interesting sustainable ways of deliveries, commuting and lastly with explanation of workability of QuickDeliv. It is presenting target group and model company through user personas and explaining their steps. The service is explained from three perspectives and later on by scenario case where all perspectives are working together.

The result of the work is interpreted by explaining the service and ideas for its future development. Thesis does not produce any tangible output.

Keywords Sustainable delivery, emissions, networking, commuting
Pages 44 pages and appendices 1 page

Content

Figures, tables and equations

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1 Introduction

We live in a very quick and modern era where online shopping is nothing unusual and with this comes many questions about sustainability and pollution in terms of delivery. Current market shows many options of delivery but how many of them are really “green”?

Name of company QuickDeliv which can be seen it the name of this thesis is just a working name of potential future company which means it does not exist yet.

Delivery solution researched in this thesis would help to solve this problem by connecting packages/orders heading to their final destination with people commuting along the same route by various means of transportation (not limited by e.g. need of car). This would reduce emissions and possibly shorten the time of delivery a lot as “customers” could pick and tailor time of the delivery what suits them the best.

Inspiration for this kind of service came from co-drive company called Blablacar which is well known and used in the world (not in Finland yet). This company connects people with free seats in car with other people in need of travel within the same route. Although this idea is not too similar as this thesis, by researching and possibly interviewing companies with similar values and goals understanding and implementing of this work would get easier and more reachable. Data collection will be done through questionnaires, interviews, observation and benchmarking.

1.1 Problem

Online shopping is much discussed topic these days what leads us to multiple problems connected to it. Such as polluting and not effective delivery options, long and not suitable times of delivery, not much express and sustainable options of delivery on the market and of course big emissions created by massive orders from online shoppers. The goal is not to stop people from online shopping (because it is not possible) but to give them option to cut their carbon footprint as much as they can.

Many people might find themselves in situations where they would need their delivery really fast, in some specific time window or delivered straight to their door due to some handicap, age or other reasons. On the other hand there is group of people who commute to work or other places and have much space in their car or even backpack and would be glad to earn

few Euros for the route that they need to make anyways. Service QuickDeliv would solve this problem by creating a network for people in search of sustainable and quick delivery.

There are many studies which surprisingly show how online shopping can reduce CO2 emissions but of course it goes deeper than just that. From existing online market we can find many categories of goods e.g. food, clothes, books, electronics, etc. Every of these categories have different impact on emissions taking in account things like distance of the shopping trip, size of the shopping cart, supply chain of the company and many more.

> Carbon emissions from shopping can be curtailed by 29 % when the shopping trip length is 20 km and by 50 % when the shopping trip length extends to 40 km. This outcome underscores that online shopping is more conducive to carbon emission reduction in remote areas like suburbs. Conversely, in densely populated urban areas with numerous shopping centres, online shopping may have a negative effect by increasing carbon emissions. (Zhongzhen, Xuanrong, Yu, Yu, & Dongxu, 2024)

QuickDeliv would take advantage of trips what would be done anyways and this way it “joins” existing emissions and therefore not creating more of them.

In very simplified way we could consider this as friendly favour type of delivery which can be shown on a smaller scale example: 2 friends are living in the same building/area. One of them forgot to buy some sort of goods and the other friend happens to be in store and can pick up the goods for them and bring it to their door. This equals one trip for 2 or multiple different reasons whereas typically 2 (or more) trips would be used.

With this in mind, key concentration will be on smaller and middle-sized companies from Finland as primary target group. Secondary target group will be people travelling from/to/within bigger cities, for example Tampere or Helsinki, by all means of transportation. Tertiary target group will be the actual online shoppers who create the demand for the service.

1.2 Core questions

Main question:

How to create delivery system what saves emissions and works fast?

Sub-questions:

How to create a network what works in practice for this type of delivery?

Why is this type of delivery needed in world of fashion?

What kind of fashion company could benefit from QuickDeliv and how?

1.3 Key concepts

Sustainable delivery- The thesis is engaging in questions of more sustainable delivery and studies its potential.

“Hidden” polluters- Pointing out polluters what usually do not come to one´s mind as a first option when talking about environmental problems.

Networking- Topic of this thesis is based on people communicating, commuting, travelling and connecting. This combination is a strong base for a good network which is essential for this project to work.

1.4 Frame of reference

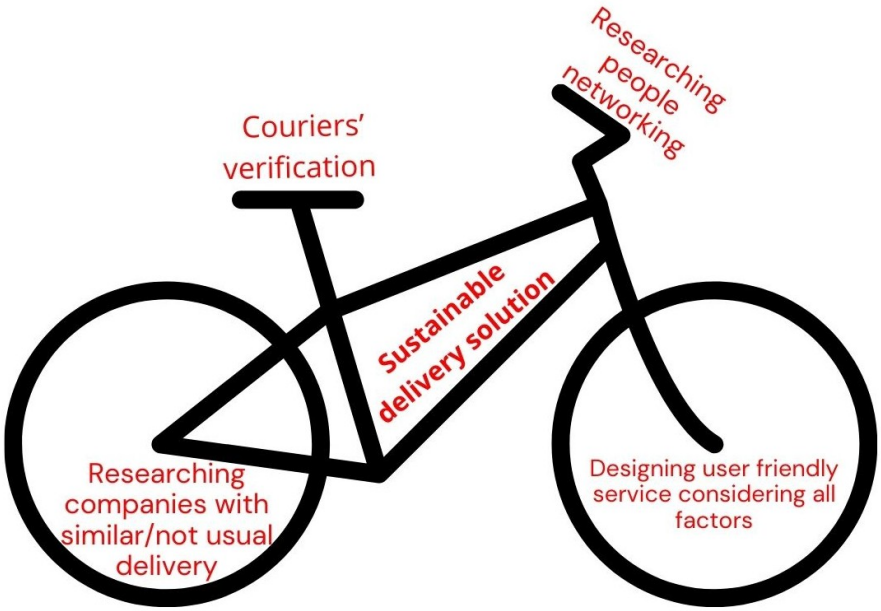
Creating this new system of delivery calls for very strong research of peoples’ habits and how people network, what are their habits when it comes to ordering goods online and how to combine this knowledge to a working service.

Since this type of delivery is new there are not enough sources on this topic and that is why research needs to be conducted by combing some of the existing knowledge from books and studies made on specific parts of this work (e.g. emissions) with questionnaires and observing.

A crucial part of this service is couriers´ verification because it is important to distinguish reliable people although work load of this thesis is not big enough to figure this problem out completely. That is why this part needs to be saved for future developing but it is significant enough to be already mentioned in here.

And finally, the aim is to design a service (user friendly, sustainable delivery option) for possible future company taking into account everything learnt. Visual representation of frame of reference is shown in Figure 1.

Figure 1. Frame of reference (Author, 2024)



2 Emissions made by online shopping

In today's world, online shopping is nothing new. Neither is the fact that delivery companies and transportation in general creates very many emissions and air pollution what is harmful to us, people and to our environment.

> Emissions are substances released into the air and are measured by their concentrations, or parts per million, in the atmosphere. The main greenhouse gases are water vapor (H20), carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF6). These long-lived gases trap solar energy (heat) and create a "greenhouse effect" in Earth's climate. Human activities have largely led to the high concentrations of greenhouse gases and global warming we see now. Energy use and production, followed by agriculture, are the largest sources of emissions worldwide. Carbon dioxide from burning fossil fuels accounts for about three-fourths of current total greenhouse gas emissions. (UC Davis)

These gases are a concomitant phenomenon of most of the industries but like this thesis the research and finding knowledge about emissions will be focused on transportation and from some part on a clothing industry, with which this thesis topic collaborates the most.

In their article, Bukhari et al. (2022) say that the major source of global warming is greenhouse gas produced by, for instance, agricultural, chemical, manufacturing, transportation and power industries. From all global emissions, 16,2% belong to transport industry which is between the top three biggest contributors.

It does not affect just global warming but a way and quality of living. It represents diseases and many health issues such as breathing problems, which can lead to fatal outcomes or even death in some cases. In some countries the air pollution is so intense that it creates dense smog. This complicates sight and breathing as well, so it is very usual to see people with face masks in the streets of air polluted countries such as Bangladesh, Pakistan or India which are ranked as Top 3 countries with highest PM (Airborne particulate matter) concentration.

According to Vourvoulias (2024) and research done by company GreenMatch the most (air) polluted country in Europe is Turkey with 41 µg/m3 (µg stand for microgram) and the least polluted is Sweden with 6 µg/m3. Finland obtained 7 µg/m3. This research mentions as well

that WHO (The World Health Organization) guideline limits the annual mean of PM2.5 concentrations at 10 µg/m3. For comparison, Bangladesh (ranked as the most polluted country) has alarming value 54.17 µg/m3.

> Air pollution caused due to the introduction of dust particles, gases, and smoke into the atmosphere exceeds the air quality levels. Air pollutants are the precursor of photochemical smog and acid rain that causes the asthmatic problems leading into serious illness of lung cancer, depletes the stratospheric ozone, and contributes in global warming. In the present industrial economy era, air pollution is an unavoidable product that cannot be completely removed but stern actions can reduce it. Pollution can be reduced through collective as well as individual contributions. There are multiple sources of air pollution, which are industries, fossil fuels, agro waste, and vehicular emissions. (Viskup, 2021)

Reducing pollution from deliveries by sharing already existing trips is main topic of this thesis and therefore it can be considered both, collective and individual contribution. QuickDeliv would be this way avoiding making new emissions with use of people willing to help and eager to earn some extra money in return for a small favour. Current situation in the world of online orders, returns and deliveries what are drastically polluting our air calls for a better, more sustainable and affordable solution than what is currently available on market.

According to Citizens Advice (2023), delivery company with the biggest carbon footprint for year 2023 in United Kingdom was DPD. Each delivery made by this company equalled 600 grams of CO_2 equivalent in the environment. On the other hand, the most climate-conscious was Royal Mail with 218 grams of carbon dioxide equivalent.

2.1 Emissions made by returns

With online orders and deliveries is connected another big problem about which is not talked so much in general as it is talked about people ordering massive amounts of products, although it is very connected. This problem is returns.

As stated by Davison (2024), “comparing the sustainability of online shopping versus shopping in stores is complex. One study found that traditional shopping contributes to twice as many emissions as online shopping. However, there’s also a higher volume of returns derived from online purchases.”

Davison (2024) mentions as well that the amount of returns from online shopping differs by industry but can be even 40% high. In same time, all in-store purchases have just 5-10% return rate because the process isn't as easy, anonymous and customers needs to travel back to retailer.

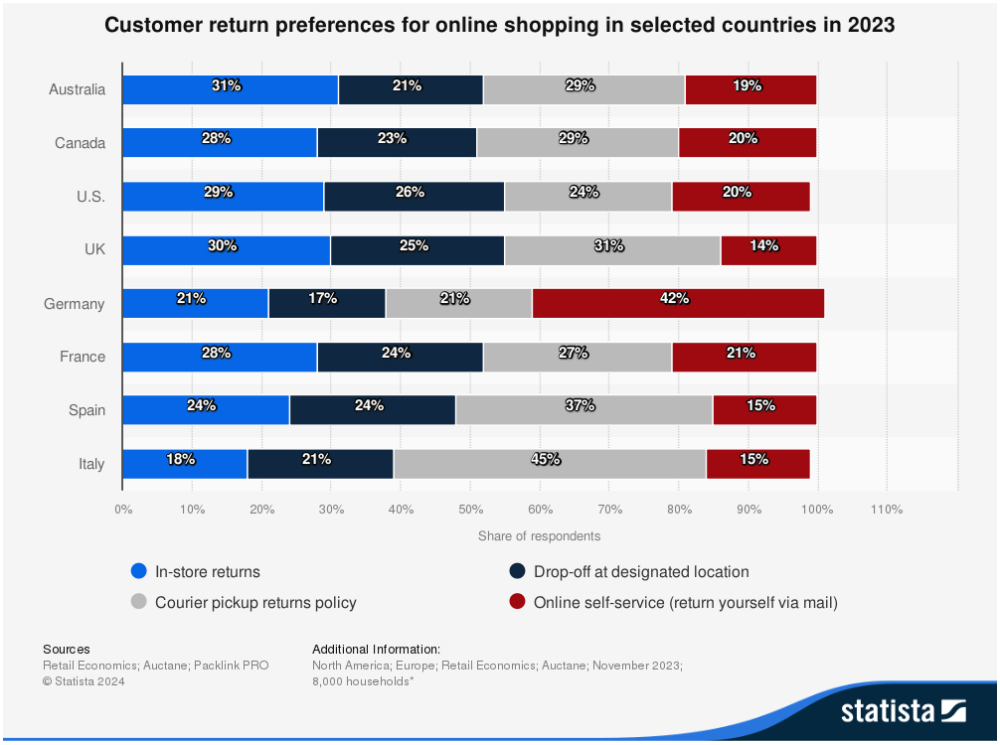
Emissions from returns reach to a much more large and important part of the ecommerce industry, with 25% of total emissions. Meanwhile, just 7% of emissions are linked to returns for brick and mortar stores. (Davison, 2024)

Figure 2. represents preferences of customers when it comes to online shopping returns in 2023 in selected countries.

Emissions correlated to returns usually reach up to 30% of original´s delivery emissions. By returning online ordered items, climate change speeds up because it enhances the harmful emissions that have bad effect on the surrounding and people´s health. (Davison, 2024)

Citing British Fashion Council (Institute of positive fashion) (2023), "fashion items are one of the most returned product categories in e-commerce. In the United Kingdom (UK), the amount of online returns of fashion items produced 750,000 metric tons of carbon dioxide just in 2022. The figure did not include the emissions due to reverse transport, amounting to 350,000 metric tons of CO2 over the considered year."

Figure 2. Customer return preferences for online shopping in selected countries in 2023. (Packlink PRO, 2024)



According to study from March 2023, the most sent back products in the USA were apparel (clothing (26%), bags (19%), shoes (18%) and accessories (13%)), followed by, electronics, food and beverages. (Davison, 2024)

Since fashion industry has the most returned percent of purchases, it is obvious that it has much to do with fast fashion (online) stores and shopping habits of people. It is well known fact too that these companies are manufacturing their products in countries where child labour, poor working conditions and very bad salary compensation seem not to be a problem to authorities. These countries are for example India, China or Vietnam that means it is quite of a journey for a garments made in these countries when their final destination is somewhere in Europe or America, etc. so it even doubles it´s journey when this piece of clothing gets returned.

Davison (2024) adds that return packages need to travel many times overseas to come to their final destination since many retail warehouses are located exactly there. Nevertheless, shipping containers burden our environment greatly, for example, in 2022 international shipping reached 3% of the world´s total carbon emissions.

People return their orders because of many reasons such as wrong size, not suitable material, etc. Many shoppers though just throw pieces of clothing to their online shopping cart without even thinking if the thing what they ordered will be used or not. Many online stores are having policy of free returns (and money returns) and that is from a big part why people do not think what they buy. It is maybe harsh to say but most of the people will never start valuing something free until they need to pay for it. With free returns they do not take any responsibilities for their unnecessary purchases because they can just send it back and received their money back too. And that is how our planet receives a shot of unnecessary emissions. The worst is that there are many of these people and they will not change their shopping habits because it is easy, convenient and cheap. Therefore it is important to offer people something convenient and on budget yet still with strong sustainable principles.

3 Interesting sustainable and innovative ways of delivery

Although concept researched in this thesis is quite new and pioneering, there are few companies/types of delivery based on similar values known under a name green delivery.

> Green delivery is the most efficient way of transporting items. Whether that means clustering deliveries together, waiting until the delivery van is at capacity before sending it out, or using carbon-efficient transport such as bikes or electric vehicles. Sustainable shipping can take longer than other delivery options. But when time is more flexible retailers and carriers can be more efficient. (Savitsky, 2018)

When talking about sustainable ways of transportation and delivery, carpooling should not be left out. In a nutshell, carpooling offers shared transportation to same destination, or destination on a way to one´s final point. Majority of people definitely used some sort of carpooling over their life, although it might not have been called like that. If you ever shared a drive with someone or offered a drive to someone, in opinion of the author of this thesis, you experienced carpooling. It is really easy, saves money and nature and in addition it makes us feel good after we helped someone by just being kind and offer someone a lift.

In words of Shaheen et al. (2024), “studies have found that carpooling can save fuel and reduce greenhouse gas emissions for carpooling users and non-users, the latter by reducing congestion of general purpose traffic.”

There are more companies offering these services but probably the most known all over the world is BlaBlaCar which operates in 21 countries. This company is using same principles as are aimed to be done in this thesis – cutting emissions by avoiding creating new ones (using already existing trips). This way there is no new emissions made and if yes they are minimalistic.

BlaBlaCar and its reliable network connected 2,4 million meeting points across the world and enabled 104 million human interactions in 2023. Carpool community saved 513 million Euros, and all BlaBlaCar’s services contributed to avoiding 2 million tonnes of CO2 emissions. (BlaBlaCar)

Except carpooling and other alternatives of delivery there is nowadays more and more popular, service called click&pick or click and collect, etc. Growing popularity of this service in stores is dating few years back when COVID-19 was troubling lives of millions of people. It

is available in many different types of retails such as groceries or clothing stores. It works very easy and it can be very convenient because it allows to customers to pick the goods up next day or even in few days, depending on the deal. Customer can this way think when and how they will collect their order, by for example combining their trip with grocery shopping, going for lunch or coffee, etc.

A little bit different direction than usual delivery offers a Finnish company named Biila operating in Sweden as well. Mentioned company provides its users with cars which need to be transferred to other city or location due to them being sold. This service is compensated with money reward and the prices differ according to distance. This provides the dealerships (from place A) with an option to sell cars from place B to a person in a city C. Deals are very quick and the whole order (starting from ordering a car and ending by receiving it) is 48 hours or less. This service has a great feedbacks from customers which are 4,7/5 stars thanks to high-quality and trained drivers which are carefully picked. Cars in transfers are monitored by the whole journey and are photographed and documented before and after the drive too to ensure the state of car was not damaged during the time it was in the hands of drivers.

Biila is a national car transfer service that brings together transferers and drivers who carry out the transfer. Departure transfers occur every day of the year - everywhere in Finland. (Biila)

3.1 Choosing sustainability while ordering

Seeing all the effort to make this planet a better place by creating sustainable opportunities of delivery is really inspiring and shows that there are still people willing to go down this path although in today’s quick living it can be quite challenging. Lately more and more people are interested in more sustainable delivery and willing to e.g. pay more for a service like that. In Figure 3. you can see share of shoppers who would consider options for more sustainable deliveries in selected countries worldwide in 2023.

Sustainability in online shopping is becoming very important factor for making the right decision worldwide. Almost eight out of ten global consumers in 2023 would consider a greener option for delivery of their orders. From the survey it is clear that French shoppers (87%) were choosing parcel deliveries which were the most eco-friendly. Followed by Italian shoppers from which around 83% took sustainability into account. (MetaPack, 2023)

Figure 3. Online shoppers in favour of sustainable deliveries worldwide 2023, by country (MetaPack, 2023)

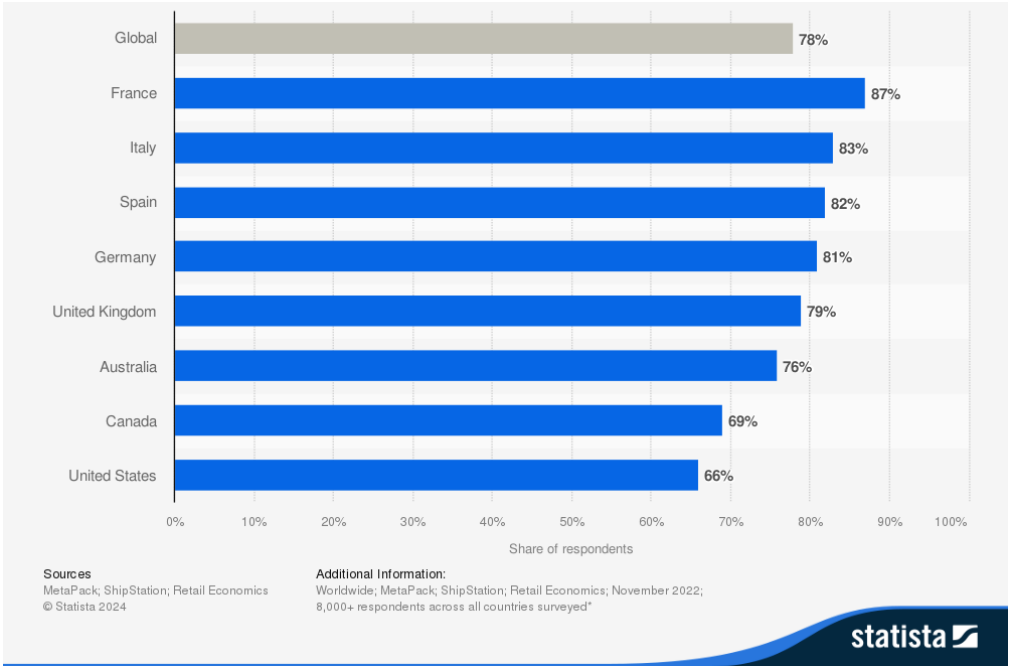
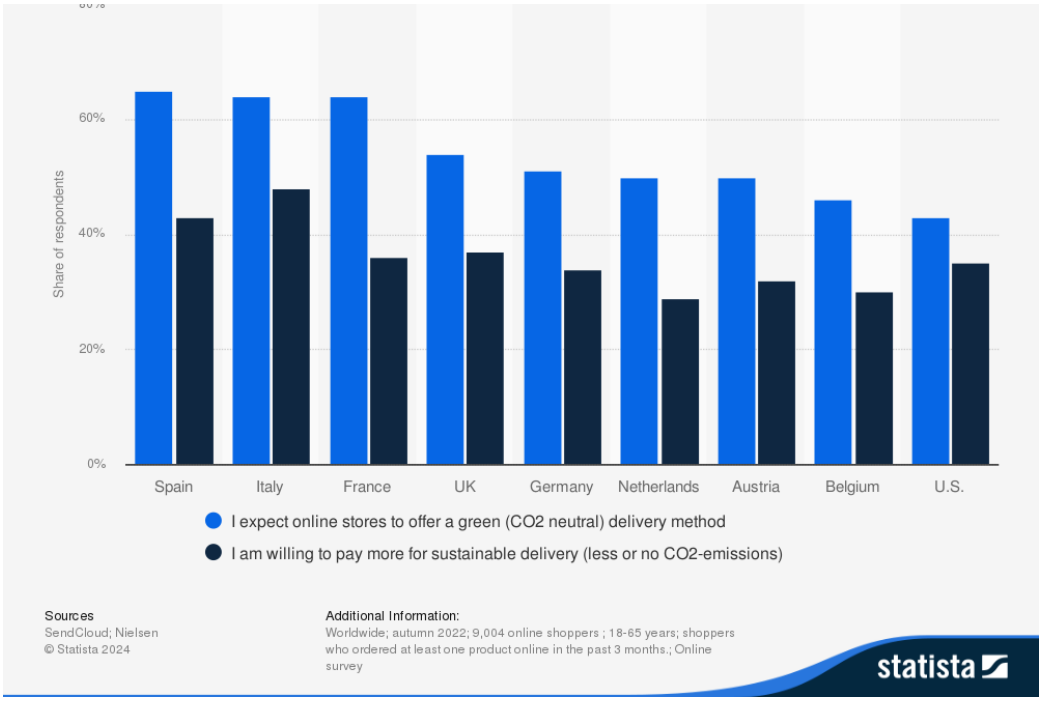


Figure 4. represents opinions of customers from different countries on sustainable delivery in 2022. It shows that people are, once again, willing to pay more and even they expect companies to offer more sustainable options of delivery what is a very good sign that people are aware of their surrounding and global warming problem is something they are concerned about.

Figure 4. Opinions of customers on sustainable online delivery in 2022, by country (SendCloud, 2023)



A survey from 2022 indicated that European consumers were more concerned about the environmental footprint of e-commerce than U.S. shoppers. A carbon neutral delivery was expected by over six of ten respondents in Spain, France, and Italy, while 35 percent of U.S. respondents were willing to pay more for sustainable delivery, leaving Belgium and Netherlands at 30 and 29 percent, respectively. However, 48 percent of Italians seemed to not mind extra costs of low emissions delivery, followed by Spanish shoppers at 43 percent. (SendCloud, 2023)

4 People commuting and connecting with others

This topic is built on people and their habits in commuting and meeting people along way. For example, commuting by public transportation offers as well human interactions which are important as a form of socialisation.

As mentioned by Tiwari (2017), “studies show that face-to-face contact or the proximity factor, while important to creativity, innovation, and livability in cities, has always been invaluable in attracting people, firms, and private investments.”

Understanding the habits of people will help to create a service that will be accurate and adaptable for busy lives of today´s society but will remain sustainable.

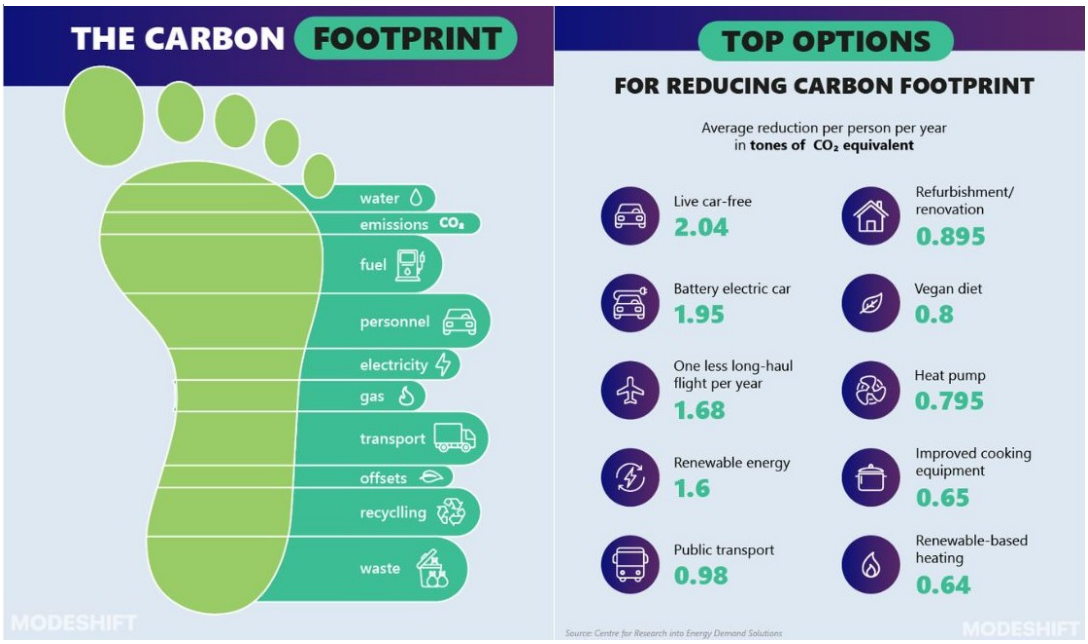
4.1 Commuting

This thesis mentions delivery and commuters very often but who even are the commuters and what does it mean? Dictionary (Cambridge University Press) recognise commuter as someone who regularly travels between work and home or a method of travel used by someone who regularly travel.

Millions of people are travelling daily because of many reasons e.g. work, school, seeing their loved ones or for a leisure time activities. There are many means of travelling such as train, bus, car, plane, biking or even walking. Some of them are better than others from environmental point of view. While some method of transportation can seem very convenient to us, to nature it can be very harmful. Talking about commuting, by using the harmful methods we are enlarging our carbon footprint piece by piece. Carbon footprint does not include just pollution made by travel but it is a complex of more things which are shown in detail in Figure 5. with options for to reducing it.

Effects of global climate change can be measured by carbon footprint which is one of the primary methods. It is environmental marker which stands for the number of greenhouse gasses (GHGs), in the form of CO2 equivalents that are being emitted, depending on the activity, directly or indirectly as its result. Carbon footprint emissions can be linked to companies, people, products or even events. (MODESHIFT, 2023)

Figure 5. Carbon footprint and how to reduce it (MODESHIFT, 2023)



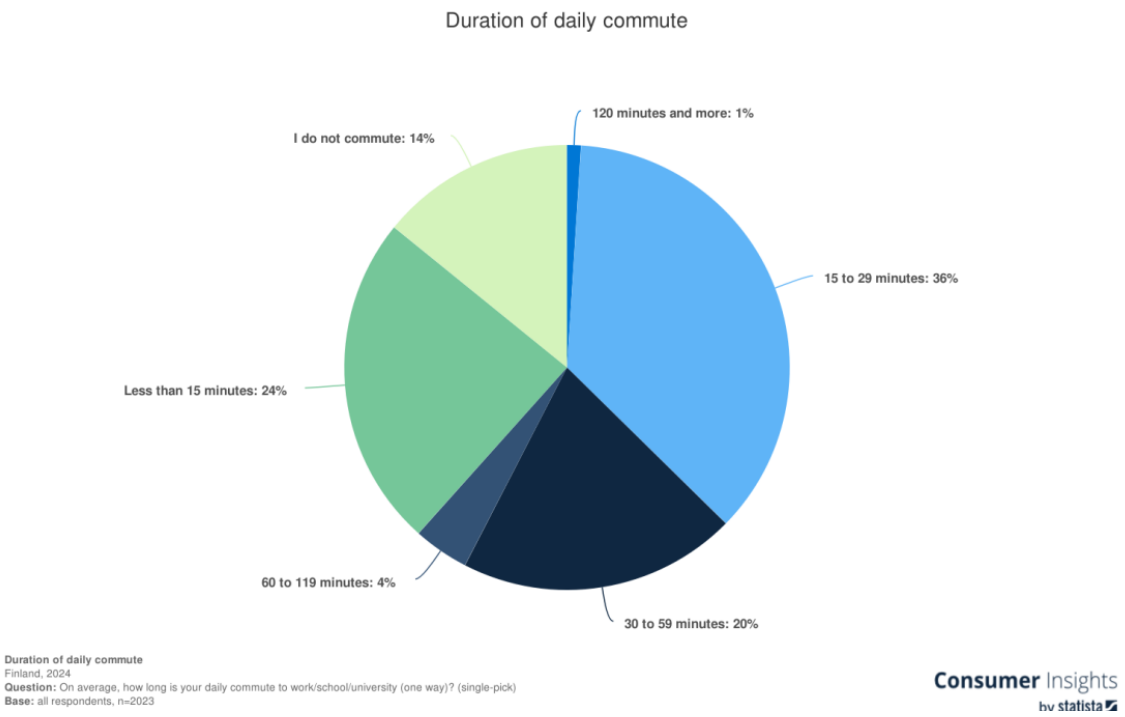
How to commute without making our carbon footprint huge then? There are options how to reduce our carbon footprint in terms of transportation by small changes in our routines for example like walking, cycling, sharing rides or using public transportation while travelling to work/other place. Except of just helping our planet these changes can help our health, physical and mental wellbeing and our budget, among other things.

> Cycling has other equally significant benefits. In terms of public health, it facilitates the reintroduction of physical activity into increasingly sedentary lifestyles and reduces the problems that result therefrom. The studies agree on the health benefits of cycling: reduced risk of and mortality from stroke and infarction, reduced incidence of and mortality from certain cancers, prevention of diabetes and obesity, etc. In economic terms, using a bicycle is less expensive than other modes of travel— with the exception of walking— not only for the users but also in terms of investments in infrastructure. In addition, because of their speed and flexibility, bicycles are effective on short journeys and, in particular, in urban areas where the volume of traffic and access or parking restrictions make car use less competitive. (Rérat, 2020)

In their article Henriques-Neto, et al. (2020) describe a study which was conducted on adults in Denmark, Finland and Switzerland to find out how active commuting affects lives of respondents. They state that already four weeks of active commuting, in this case cycling, can lead into improving cardio respiratory fitness. Except this fact, cycling to work can also reduce body fat and increase physical performance in an untrained people.

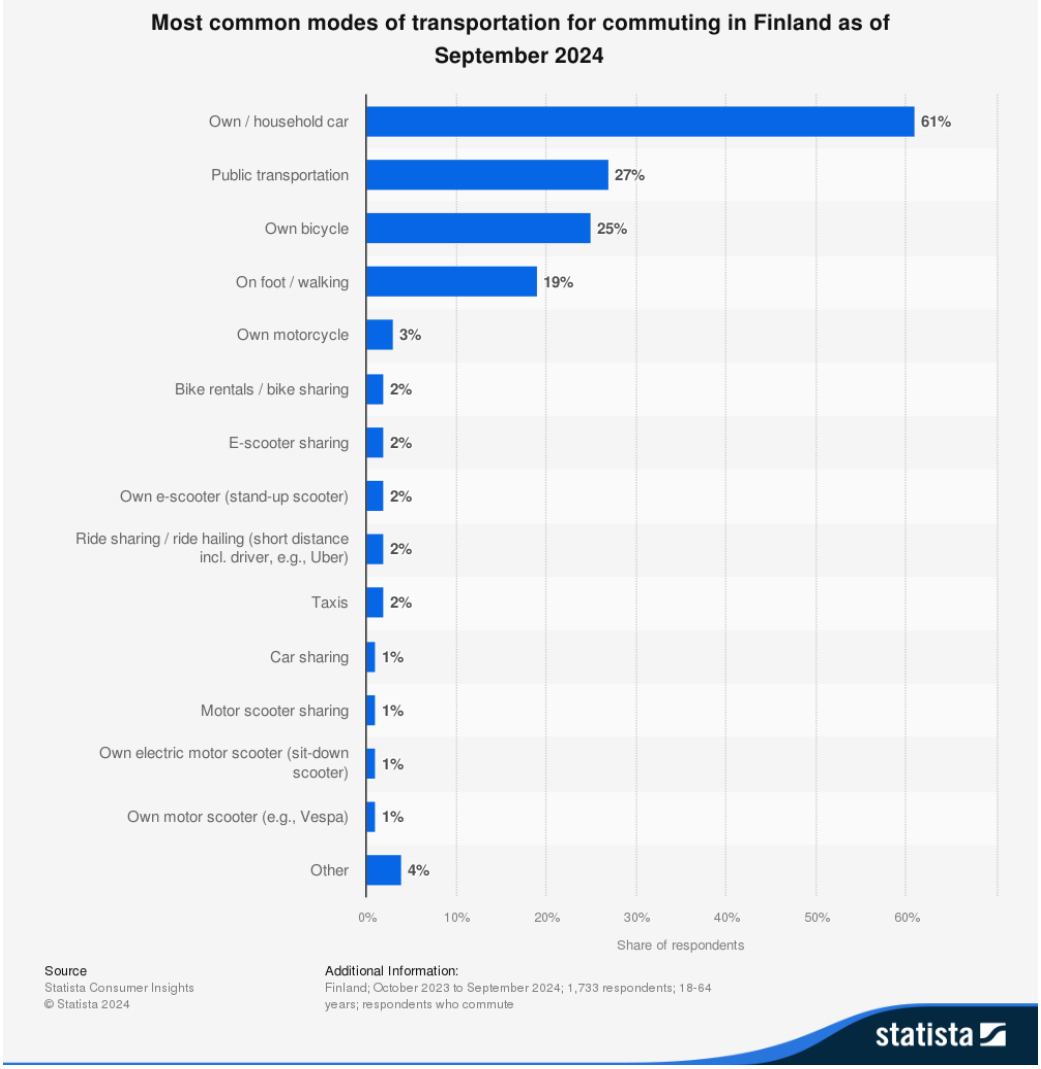
According to study made by Statista (2024) 36% of people in Finland are commuting to work 15-29 minutes. The study was conducted on 2023 respondents in ages 18-64 years while the estimated population is 3.1 million inhabitants. The question was “On average, how long is your daily commute to work/school/university (one way)?” Figure 6. presents the results. Unfortunately this study did not ask about the means of transportation what would help with estimating which type of transportation QuickDeliv should focus the most.

Figure 6. Duration of daily commute in Finland (Statista, 2024)



However, another study by Statista (2024) was asking 1733 respondents about most common modes of transportation for commuting (with possibility to choose more answers). Results are showing that 61% of asked is using own/household car, 27% is commuting by public transportation, 25% by bike and 19% are choosing active commuting by walking. The whole survey is presented in Figure 7. These answers combined with the answers of duration of commute are great help with understanding people´s choices when it comes to travel and how it can be implemented to this thesis topic.

Figure 7. Most common modes of transportation in Finland (Statista, 2024)



It is known that many people in Finland live in different city than they work in. Usually people tend to travel for work to bigger cities because it is not financially efficient to live there so people rather live a little further for better price. That means that some kind of commuting is necessary for them. We can assume that most of the people travelling by public transportation and car will most probably have the longest route to their work. On the other hand are people travelling by bike or walk what means they most probably work in same city/area where they reside.

QuickDeliv would “take advantage” of these (willing) commuters by offering options of courier´s route tailored for their transport means and working time. By doing this many emissions would be avoided (because the route would be done anyways) and couriers would be rewarded with money compensation while having done a good deed for the day.

4.2 Conducting a survey

Since all researches are focusing mainly on one aspect of travelling at a time (e.g. transportation means or duration of commuting), more detailed survey was needed to be conducted for purposes of this topic and idea. The questionnaire was made for helping to design the best possible solution for this thesis. Questions were aimed for showing what are people´s habits while commuting, what kind of transportation they use and most importantly what are their opinions about this type of delivery and if they would be interesting in service like that in general.

Questionnaire was composed from 11 questions and 1 field for free comments about the survey. Questions were tailored to find out what group of people is more likely to use this service and therefore indentify the target group. To achieve that, knowing preferences and habits of respondents is a key. The survey was then distributed mainly through social media to bigger audience. The questions were asked in this order:

1. Age
2. Do you live in Finland? (If not please write your country to the "other" option)
3. When shopping online I mostly choose:
4. How many times a week are you usually commuting (travelling) to work/school...?
5. What type of transportation are you using?
6. How long is your journey on average? (one way- kilometres and minutes approximately)
7. Imagine your usual trip to and from work/school. Do you make any stops (for example: stopping in shop, going for visit, filling up a car...)?
8. Only CAR commuters: How full is your car while commuting?
9. Only CAR commuters: Would you be willing to "transport" package/s from place A to place B (on your usual route) for some money compensation? If your answer is "no" please write a short reason to the "other" choice.
10. OTHER commuters: Are you travelling with a bag?
11. OTHER commuters: Would you be willing to "transport" package/s from place A to place B (on your usual route) for some money compensation? If your answer is "no" please write a short reason to the "other" choice.
12. Feel free to leave a comment! Thank you for your time!

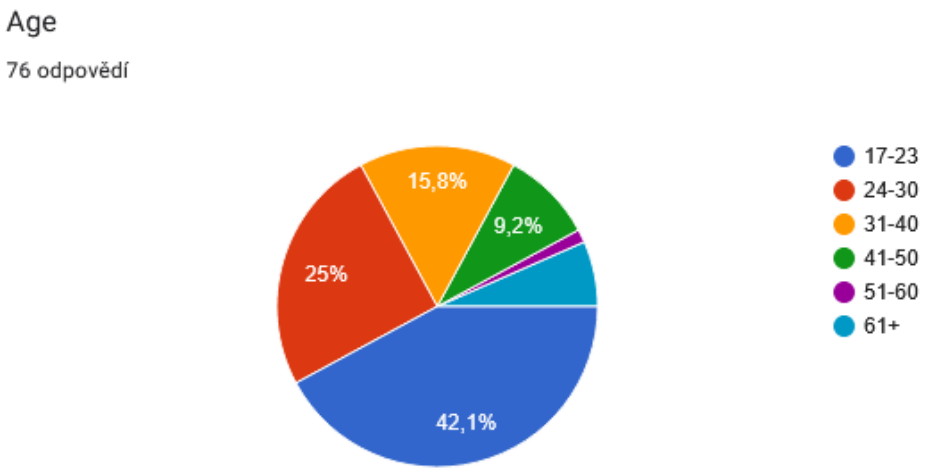
4.3 Analysis of the survey results

For obtaining enough data, goal of the survey was to have over 60 respondents. This criterion was met, since the survey collected 76 answers and therefore created a good data base for analysing and shaping the idea of this topic according to results. All attached results and graphs in this section are author´s own.

Age

As mentioned above, survey started by asking the age of the answerers offering 6 age groups to chose from: 17-23; 24-30; 31-40; 41-50; 51-60; 61+. Majority of people were 17-23 years old (42, 1%) and second biggest group (25%) in age of 24-30. Logically, the majority of audience was under 30 years of age because closest people to the author are mostly peers (author is 23 years old). Despise this fact big effort was seen to find people from different age groups as well for better understanding and seeing differences between the age groups since the service which is being designed is targeting for all people in adult age.

Figure 8. Age of respondents (Author, 2025)

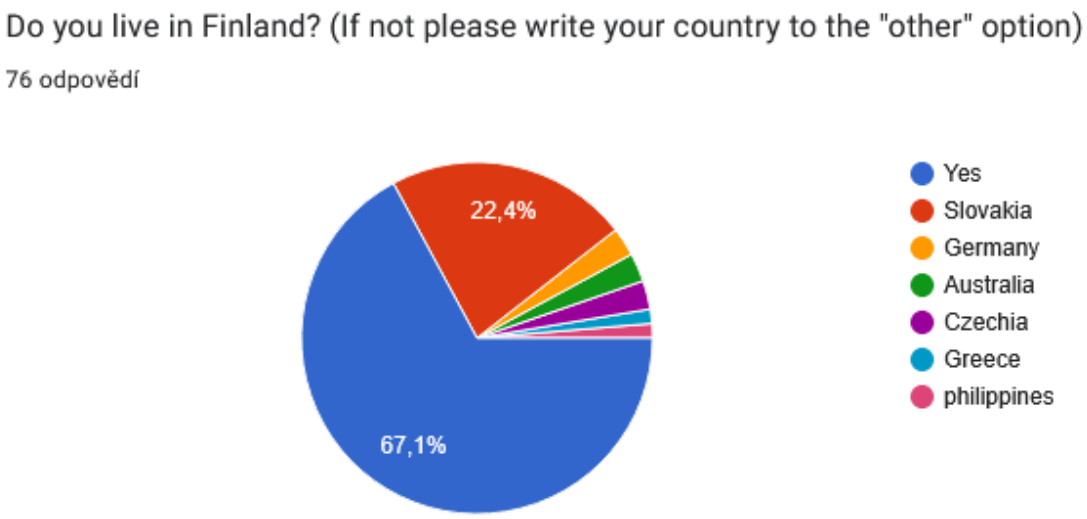


Residence

Place of residence was very important part of the survey as the focus is primary set on Finland and people living here, however it is important to see opinions of people from different corners of world and subsequently compare them to answers from Finland to see the difference in mentality and habits of people living in different places. Supermajority -

67,1% of asked claims that they live in Finland which is very good sample of people. Finland is followed by Slovakia with 22,4% but there are recorded answers as well from Germany, Australia, Czech Republic, Greece and Philippines although with very few respondents.

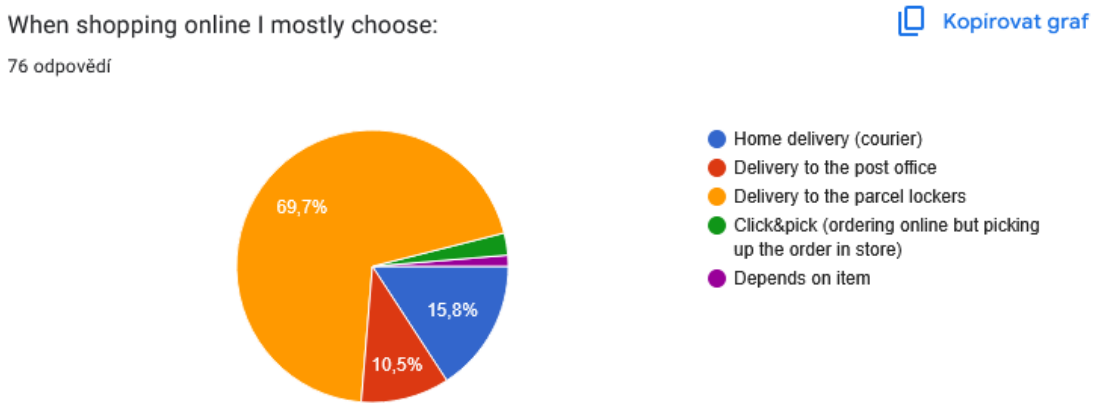
Figure 9. Residency



Preferences of delivery

While getting deeper into the topic of sustainable delivery option, the question of current preferences of delivery for online shopping arises. Answers to this crucial question helps to shape the final form of this whole idea – service QuickDeliv. Showing that almost 70% of asked chooses option delivery to parcel lockers, while home deliveries obtained not even a whole 16%. This point is showing to author what to take into account while designing QuickDeliv. That means shifting the focus rather on delivery to parcel lockers than home deliveries.

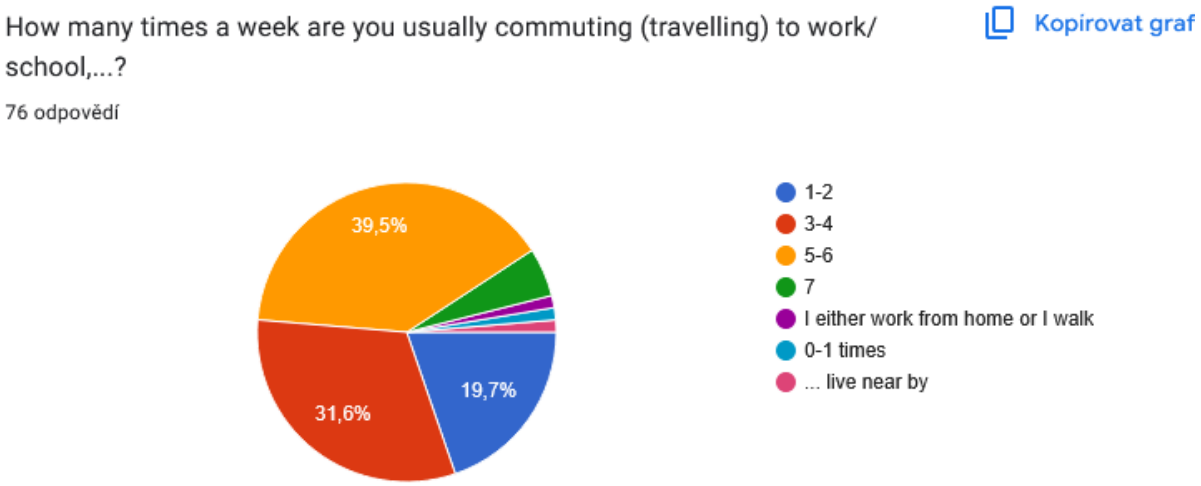
Figure 10. Preferences of delivery



Frequency of commute

“How many times a week are you usually commuting (travelling) to work/school,...?” This question was investigated for the purpose of estimating how often people commute during a week and therefore could possibly deliver some packages. Most people stated that they commute 5-6 times a week (39,5%) followed by 31,6% of respondents who commute 3-4 times a week. Rest of the answers can be seen in graph below. These numbers are showing great potential for package delivery because this way very much emission could be avoided.

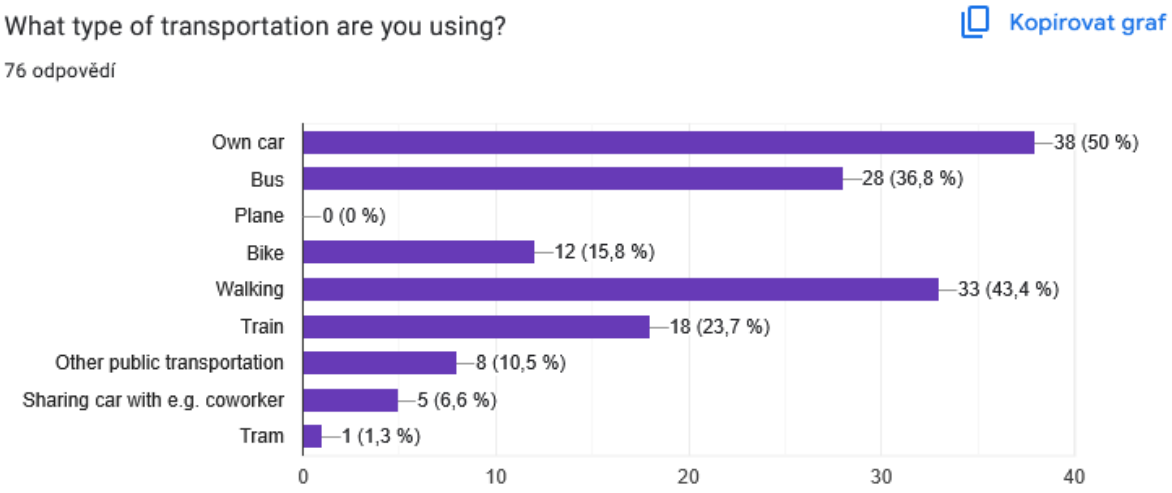
Figure 11. Frequency of commute



Means of transportation

In this multi-pick section was found out that exactly 50% of asked are travelling by own car. What was quite surprising was the fact that 33 people use the most natural way of commuting, walking. 12 commuters are fond of another active commuting – biking. Public transportation was divided for this question in 2 types: bus and train. Together public transport is used by 55 respondents in total from which 28 stands for bus, 18 for train, 8 marked option “other public transportation” and 1 travels with tram (this person chose option “other” which was offered in this question). No one from this sample is commuting by plane which is very good because regular commuting by a plane would cost our environment very much.

Figure 12. Means of transportation



Length of commute

Big role in this project plays as well the length of the commute. By asking how long one´s journey is on average many aspects can be predicted for example: cost of their travel and approximate distance from bigger city. For future development this could be used to determine costs for “couriers”.

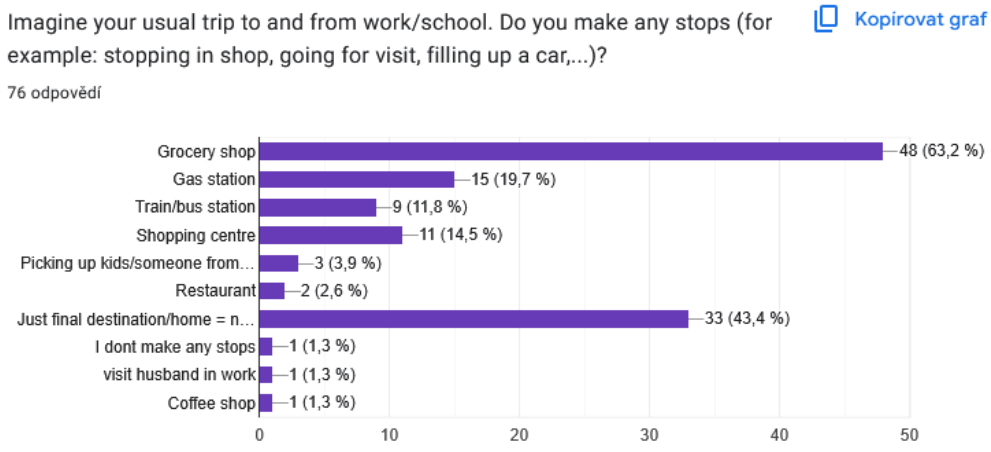
Honestly speaking, answers were a little bit confusing. Plenty were missing some part maybe because of the form of the question as well: “How long is your journey on average? (one way- kilometres and minutes approximately)” Many people did not understand it well so in future this is something author will keep in mind while creating some sort of surveys.

Since this analysis needed to be done by writing results down, it was first divided into kilometres and minutes since many answers contained just answer for one of these components. Later on smaller amounts of kilometres and minutes were categorised into 2 groups: less than 5 km (32 answers) and less than 15 minutes (36 answers). These groups were the biggest what shows that most of people travel inside of some city or from very close. Another group is people who travel 30 minutes what most probably means travelling between 2 smaller cities/towns or travelling inside of a bigger city. Many results showed that the times are something between 5-30 minutes. 5 respondents take 1 hour for their commute and 6 answered that their journey is over 1 hour long (between 1 and 4 hours). In conclusion, most respondents have shorter commute routes what could relieve traffic in cities if packages would be delivered by commuters.

Stops during commute

Since the idea of parcel lockers was here already before the questionnaire, it was necessary to ask about what kind of stops people make on their way and that from very simple reason: to know where the parcel lockers could be possibly placed. As expected, most answerers stop in grocery stores at some point of their journey. Other common stops are: gas station, bus/train station and shopping centre. Although many people just go straight to their final destination.

Figure 13. Stops during commute

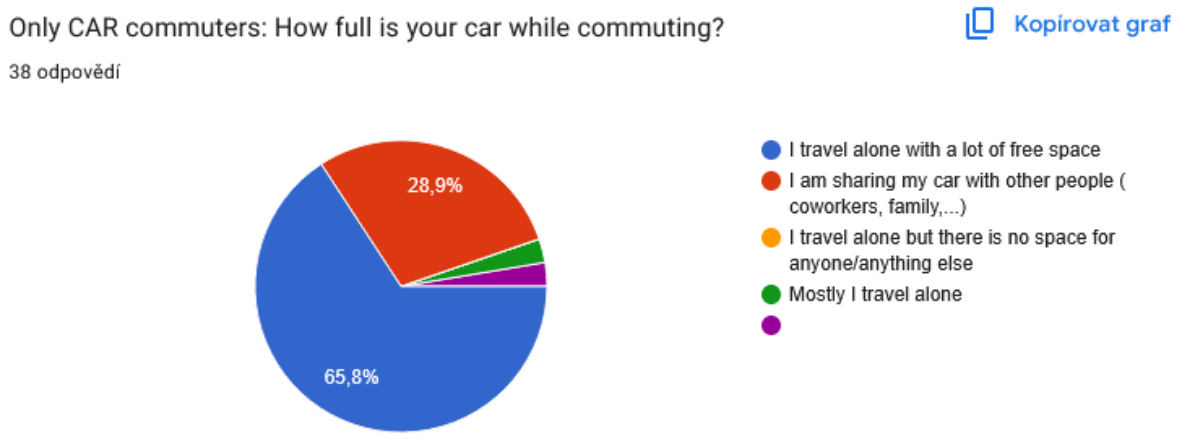


Capacity of car and willingness to deliver packages (car commuters)

The most important part was to find out if people involved in this questionnaire have space and will to distribute packages for some money compensation (not specified) while they travel. There were 4 questions about this in total, 2 for car commuters and 2 for other commuters therefore the questions were not mandatory because they do not apply for everyone. Wording of these questions are mentioned in chapter 4.2 under numbers 8.-11.

As seen in question about means of transportation, 50% of all asked travels by car, that equals 38 people. From this sample, in first question of this section 24 people answered they travel alone with a lot of free space, 11 shares car with other people (co-workers, family,...), 1 travels alone (not further specified) and one answer was empty.

Figure 14. Capacity of car

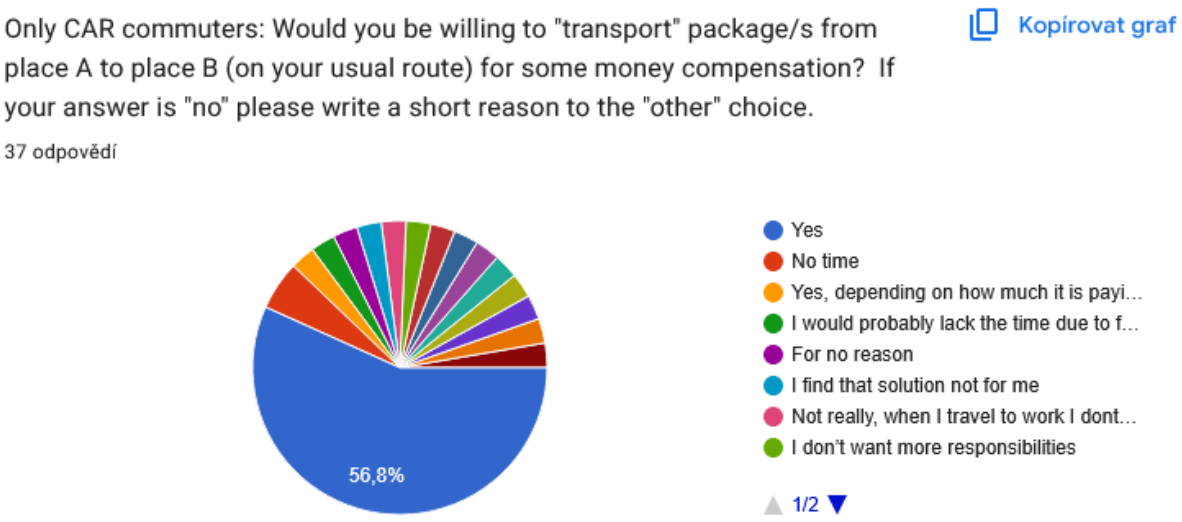


Keeping this in mind, results from second question of this section follow. Over half (21) of respondents would be willing to transport packages on their usual route without any notes. Rest of people (16) chose answer “no” with explanations such as:

“Not sure about safety of it (I am a woman) and time constraints”, “I don’t want more responsibilities” or “Not really, when I travel to work I don´t want to stop and come to work late, it is also responsibility, what if person I deliver package is not in place and I have to wait. This could be fine if i deliver it only to parcel shop. Maybe on way back from work. But I get good salary so I don´t need on top job what can be one of things why I would not have

motivation to transport it and lose time. “ and similar. One car commuter skipped this question.

Figure 15. Willingness to deliver packages (car commuters)



Luggage and willingness to deliver packages (other commuters)

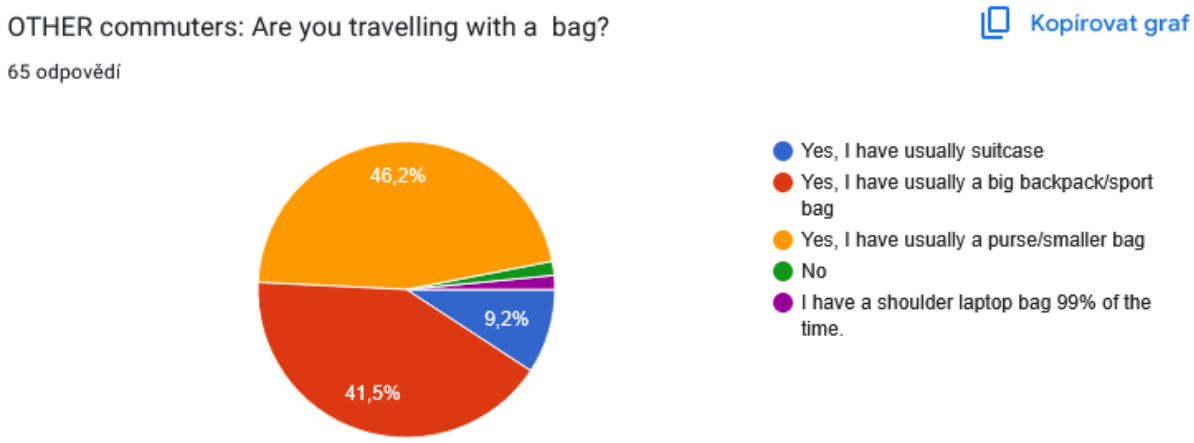
For the other group of commuters the question differed a bit in the first half. People were asked what kind of luggage they use while they commute. Results shows that 46,2% usually travels with purse or smaller bag, 41,5% have usually big backpack or sport bag, just 9,2% commute with suitcase. One person wrote that they have laptop bag and 1 does not use any bag while travelling.

In the last part of the survey (willingness to transport packages) there were 57 answers from which 41 claims they are interested into delivering packages and the rest of the answers would have either some “requirements” or it would not fit into their schedule.

It is cheering to see that many people would be interesting in this service but still respecting the opinions of those who chose the option “no”. Although of course it is a little bit disappointing to see that some people are not too interested into service like this but that is normal because everyone has different opinions and reasons for it. However, on the other hand these reasons offer opportunity for development. Without any feedback it is not

possible to build a good service and exactly these “requirements” or reasons are very helpful while designing the service because they are bringing up different points of view.

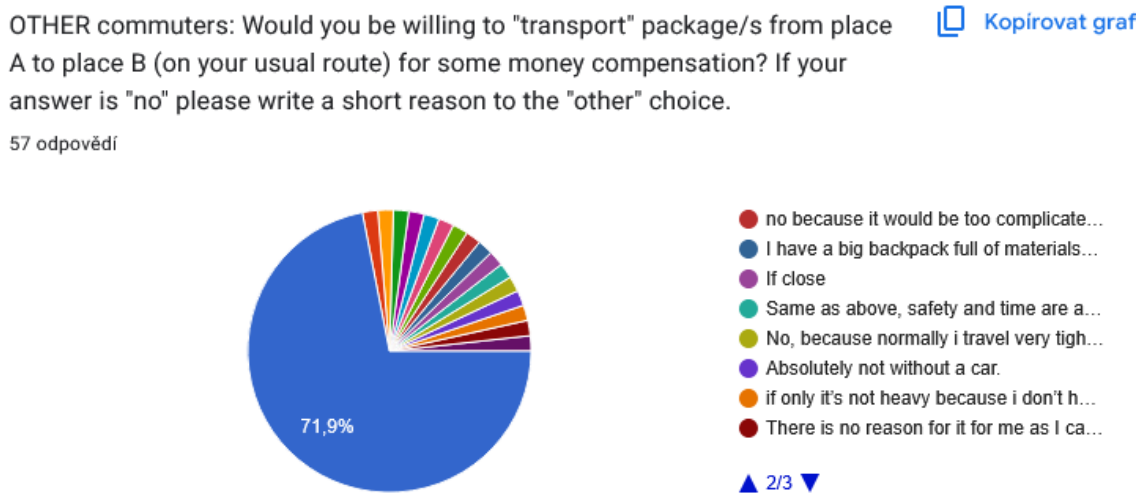
Figure 16. Luggage of commuters



When comparing car drivers and other commuters it is interesting to see the difference in willingness to deliver packages. While over 70% of other commuters would be interesting in transporting packages, from car commuters just not full 57% would do the same.

Reasons for not wanting to deliver packages vary as well. Car commuters mostly said that they do not want more responsibilities; they do not have time for something like that; it is too much effort or would demand money compensation what would cover gas and the person´s time. On the other hand, other commuters were mostly worried about the size of the packages because they lack space for them. Of course there were found few similar reasons as in car commuters’ answers.

Figure 17. Willingness to deliver packages (other commuters)



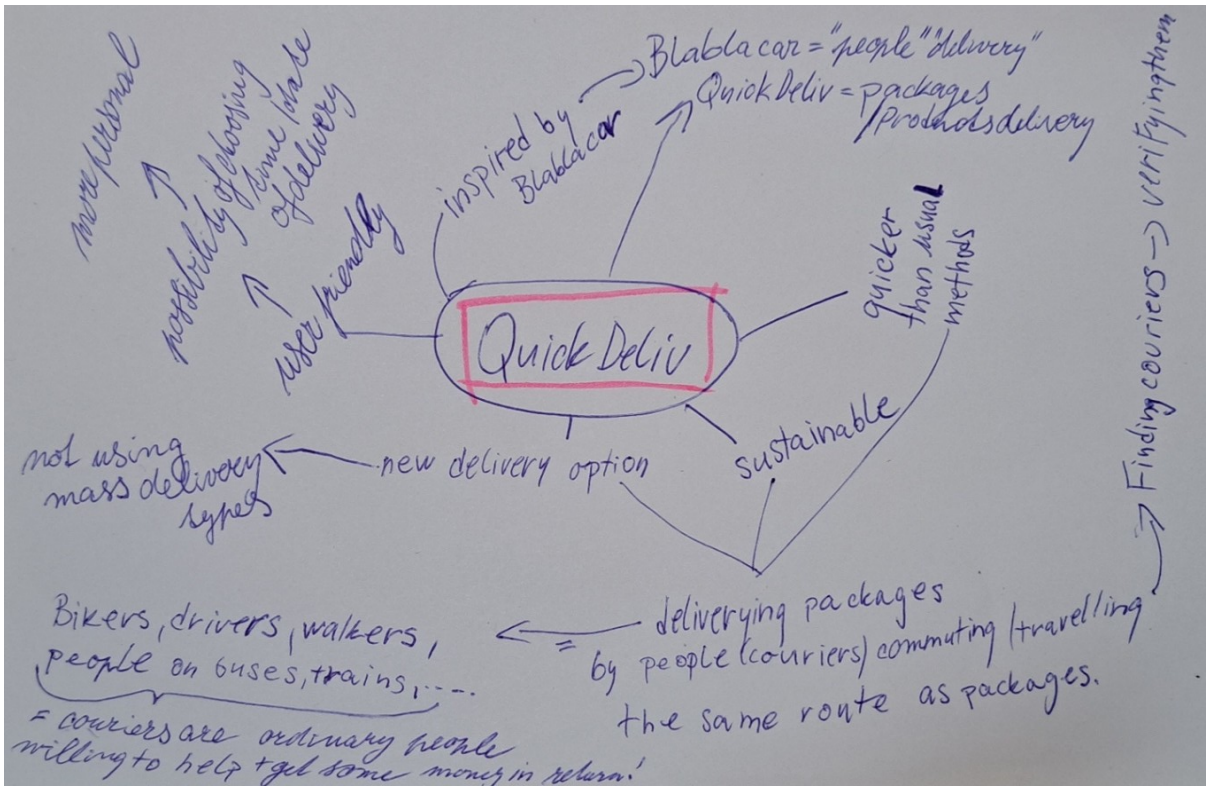
The whole questionnaire´s results were quite motivating and very helpful with shaping the idea of delivery service. Comments from respondents were useful too since it offers fresh ideas from different perspectives.

5 QuickDeliv service

The questionnaire results provided valuable information and feedback. Imagining how service like this could work can be challenging and that is why sketching routes and visualising target groups help and were the next steps. It might not have given the result right away but it is incredible tool and it offers possibility to see flaws and things what need to be though through more. Before getting more into how the service works and who forms it, it is important to see the progress of the idea from beginning and then be able to compare it to the final result.

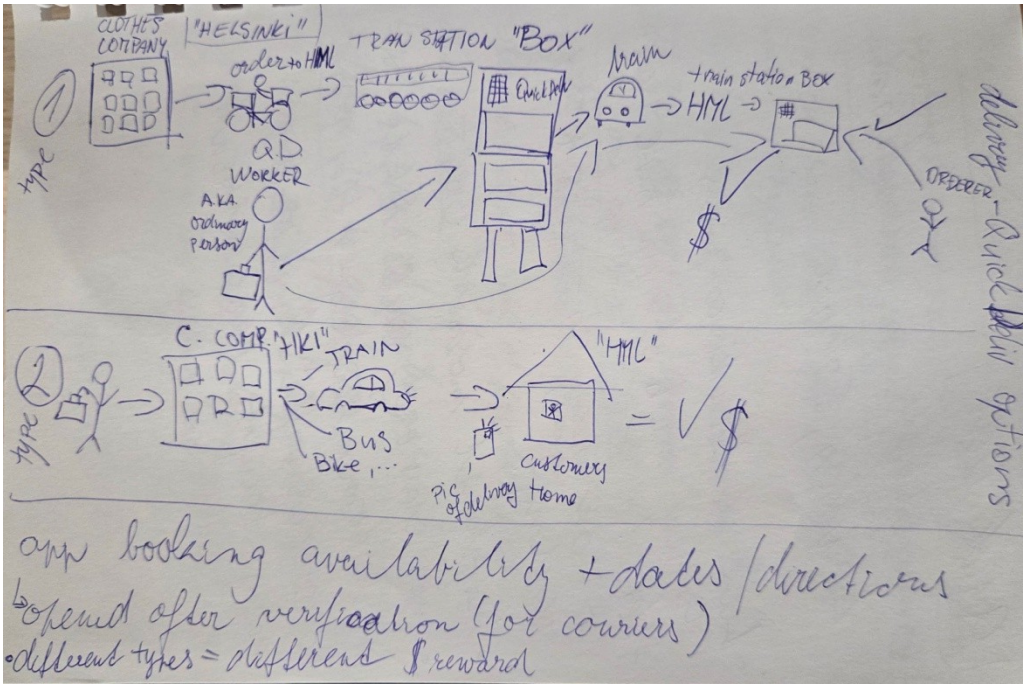
In beginning it was just an idea which, of course, needed to be brainstormed by making a mind map to sort the thoughts a little bit. This mind map can be seen in Figure 18. and it is describing the initial idea which does not differ much from the final one. The initial idea was thinking more of a home delivery service than delivery to parcel lockers although that proved not to be the best thinking after asking opinions of other people and mainly after making the survey where was clearly shown that people mostly order their items to come to parcel lockers. But this served as a great start of developing idea of this thesis.

Figure 18. Mind map (Author, 2024)



While doing the research and starting to think how this whole could come together and make sense, options how this could go started to appear. As seen in Figure19. the further the idea was developed the more possible it started to look. Although still strong emphasis was on the home delivery option, which is still not totally discarded but definitely is not the primary concept anymore.

Figure 19. First ideas of routes (Author, 2024)



After getting answers from mentioned questionnaire these sketches and ideas got new component to take into account when designing and that is people.

5.1 User personas and target groups

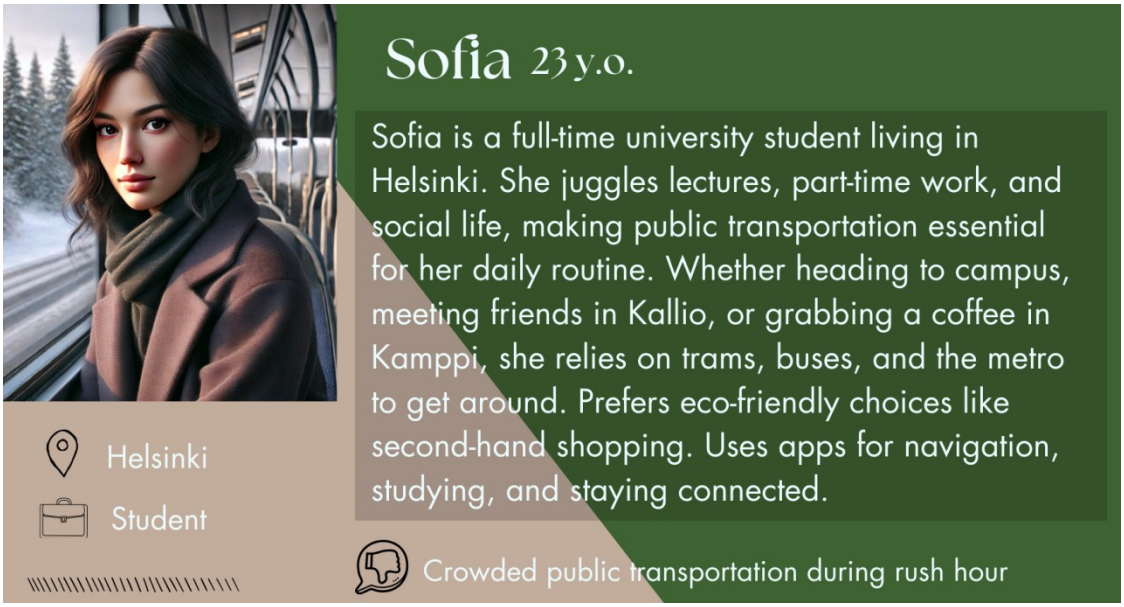
To explain how QuickDeliv would work, it is needed to look on this service from more perspectives, in this case from three. The basic division to tree groups relates to already mentioned target groups – partner companies, commuters (couriers) and online shoppers (clients). User personas of these target groups are presented in Figures 20.-23. User personas were created according to answers from questionnaire and from general predictions. Text and pictures in personas were generated by OpenAI (2025). For generating those following prompts were used:

- “Make a persona of Alex 31 y.o. living in Turku who works as a wellness coach.”

- “Make persona of Jari 45 y.o. ,living in Pirkkala and working as an engineer. His pain point is waiting for people.”
- “Make a persona of 23 y.o. Sofia who lives in Helsinki. She is a student and uses public transportation. Her pain point is crowded public transportation.”
- “Create description of fictional sustainable fashion company from Helsinki.”

After generating the texts and pictures of personas they were put into a graphic visualisation by author of this thesis not AI anymore.

Figure 20. User persona - Sofia, courier



These user personas are supposed to show what range of couriers and customers QuickDeliv could potentially have. This service is not designed to discriminate people because of their gender, older age, race or nationality. It is designed to be widely used with common goal – make world a bit better place. It does not matter if someone who is a courier is in same time a university student or a full time office worker in a successful company. Everyone who is interested in helping planet or even just to get small extra money is a great help. Hopefully while understanding how this idea could save emissions even ordinary people, maybe more money-motivated than eco-motivated, could start to be more interesting in environmental crisis and how to try to reverse them.

Figure 21. User persona - Alex, customer

Figure 22. User persona - Jari, courier

Figure 23. Model of sustainable fashion company - partner company

Partner company presented in Figure 23. is a fiction fashion company what serves as a model of an ideal partner company as QuickDeliv focuses on companies from fashion and design field. It shares same values and goals as service designed in this thesis. Since they produce small batches of their products and sell them in their brick and mortar store in Helsinki, they would benefit from sustainable delivery as it would help spreading their products across the country responsibly.

5.2 Delivery steps

As mentioned above, there are three perspectives that need to be considered and explained while talking about this delivery service. All perspectives and steps what they should do while ordering can be seen in Figure 24.

5.2.1 Partnering company

Firstly, to make this even possible there needs to be partnering company which should meet some criteria. Ideally, the company should have sustainable thinking and goals and should be small to middle sized apparel (including fashion, footwear or accessory products) company based in Finland. Company with matching qualities could register in QuickDeliv´s future website or app as a partnering company where would be some terms and conditions what will need to be agreed before proceeding to next step, which is verifying the mentioned

company. After successful verification partners can add delivery option QuickDeliv to their online stores.

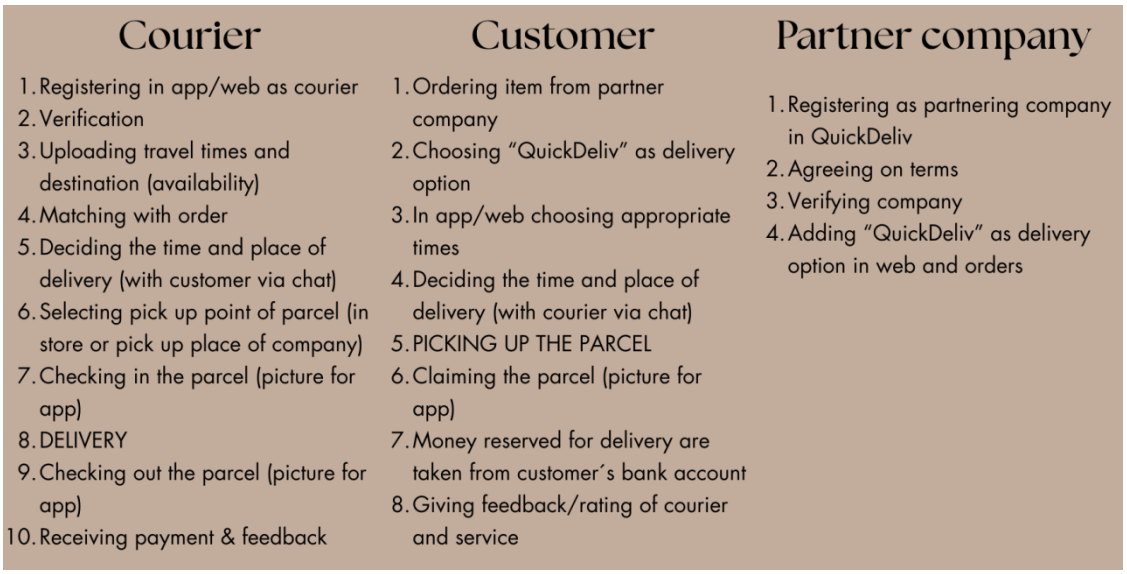
5.2.2 Customer

To avoid confusion, while speaking about customer in this case it is meant as a customer of this service although the customer is basically “shared” with partner company. Customer orders an item from chosen partner and in options for delivery marks “QuickDeliv” which, after payment for the goods will redirect the user to service´s website or app. In the service this person can check availability of couriers and match with appropriate time and location. If needed, next step is to decide on time and place of delivery or some special requirements with courier via chat (this step would be mostly needed if there would be case of home delivery). Payment for the delivery itself would be reserved in customer´s bank account.

Customer needs to then pick up the parcel from agreed or set place and claim it in the app or website by taking a picture of it while being on the location. For people without possibility of using internet or GPS could be done some option with SMS messages and special codes but that is a problem for future development.

After claiming the parcel, reserved money are taken from customer´s bank account and final step is just to give a feedback or rating in the app or website which will serve as an opportunity to improve the services.

Figure 24. Steps of each party ordering via QuickDeliv (Author, 2025)



5.2.3 Courier

Last but crucial parts of the chain are couriers. Since delivering packages is very responsible role, after registering as a courier in QuickDeliv´s services all applicants need to be successfully verified to make sure that the person is reliable.

Freshly new couriers then can upload their travel times and usual destination and match with orders heading the same way. Couriers are, of course, not limited to take just one package but it is up to them to be reasonable and book just as many packages as they will manage to deliver. As was already mentioned, if there is some special requirements for the order, courier and customer can decide those in chat in app or website.

Parcel needs to be then picked up from either company´s store or some other picking point where package will be checked in by taking picture for app or website to ensure that courier has received the package and it is currently in transfer and to have a proof that package did not get damaged while being delivered. After the actual delivery to parcel locker or decided place it is again time to check out the package using the same method like in checking it in. When the package gets checked out, customer gets notification that their order is ready to be picked up. Here the route of courier ends. Last things to be done are just to receive a payment and feedback for the delivery.

5.3 Scenario

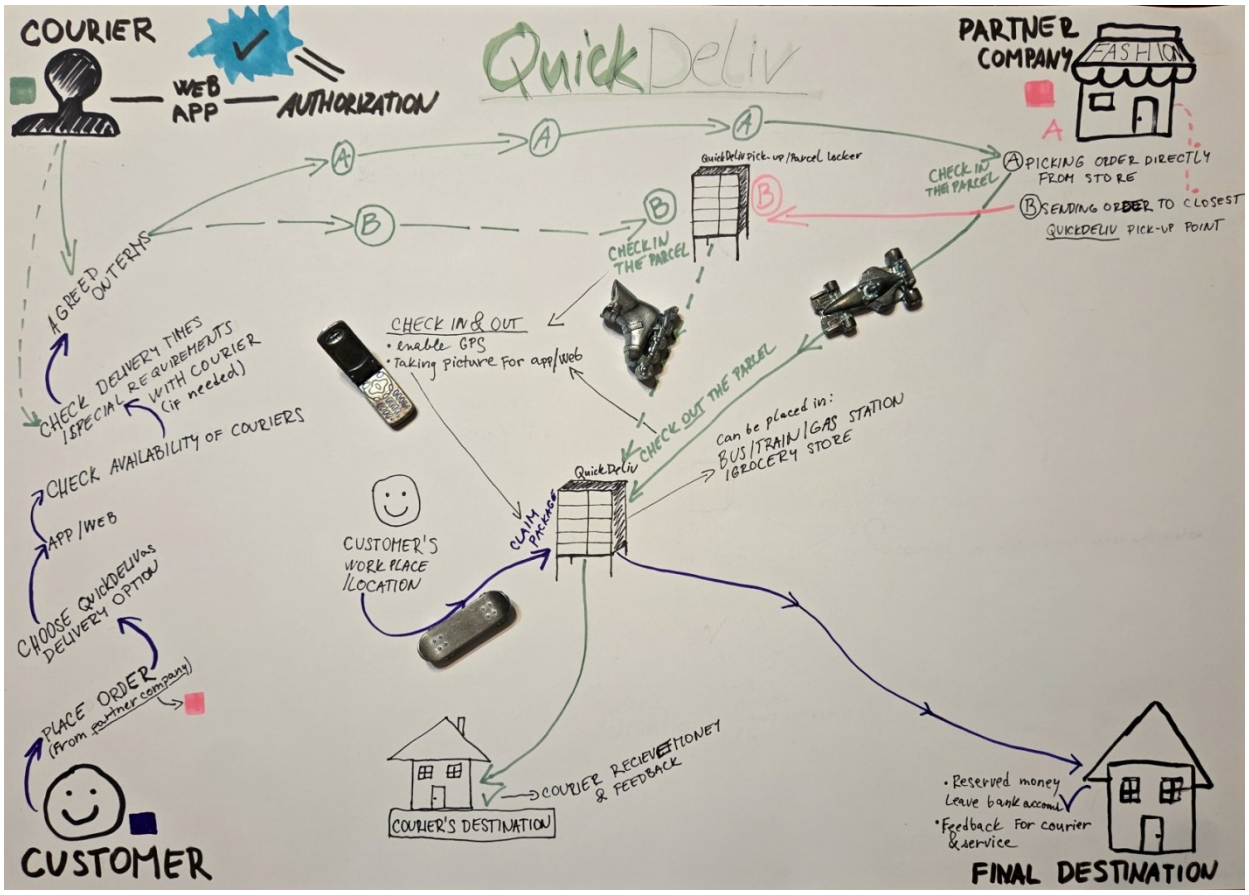
To showcase how this situation would work altogether small scenario will be used for better understanding and imagining the service. Visual support for scenario can be seen in Figure 25. All mentioned parties are used from previously shown user personas and are therefore fictional.

Sustainable fashion company called Nordet based in Helsinki is looking for a sustainable way to deliver its packages and therefore support Finnish market as well by offering local brand to people instead of not named fast fashion companies from Asian countries. QuickDeliv has similar values and fits great for this purpose. After dealing with all official matters they are now ready to use new, sustainable delivery system.

Alex is interested into buying a good sweater which will last him a long time and since he is trying to implement more sustainability into his life he chooses mentioned company Nordet where he finds exactly what he is looking for. As a big plus for him he noticed that this

company now offers new delivery options what would be “green” and without hesitation he clicks option “QuickDeliv” in check-out. He is redirected to an app where he chooses which time range for picking up the parcel would be the most suitable for him and is given a courier who matches these preferences. Alex likes to bike so he wants his package delivered to a pick up place which he can visit and pick up his order for example on his way from work that means that he has no special requirements to ask from person delivering his order but if needed he can open chat option and ask.

Figure 25. QuickDeliv visualization (Author, 2025)



Sofia from Helsinki is a verified QuickDeliv courier and is planning to visit her family in Turku, to where Alex ordered package from Nordet. She finds it appealing that she can help someone, help planet and even earn a little something for herself all while being on a planned trip what would happen anyways. Sofia goes the next day to pick up the parcel for Alex from Nordet’s brick and mortar store in Helsinki. While still at the store she checks in the parcel in the app right after she obtained it and she is ready to make her journey to Turku. After the travel she goes to the given parcel locker location in where she drops off the order.

Before she leaves the place and goes to see her family she checks out the parcel in app, which is very important step, and therefore notifies Alex that his sweater is ready to be picked up. She receives payment for the delivery what was reserved in Alex´s bank account.

Alex is still in work when he gets notification on his phone that he can go pick up the order. What a timing! After his shift is done he sits on his bike and ride right to the pickup point to get his order. He opens the locker by using special code given to him via app and claims the package by taking picture of it to the app. Alex is nicely surprised by the speed and quality of the delivery and gives a very nice feedback and rating to QuickDeliv and Sofia. This feedback is beneficial to both, Alex and Sofia because it shows their reliability. They are going to sleep with a good feeling today.

6 Conclusion

This thesis was investigating and explaining how a new sustainable delivery service could work in practice. The topic was thoroughly researched through literature and online sources although there is no similar service existing just yet which created quite big challenge while finding suitable sources. Author gained much knowledge from this research which in combination with own questionnaire provided clear path for designing the service. Some results of the survey were very interesting and offered to see this idea from different perspective. The most surprising was to see and compare interest into being a courier between car drivers and other commuters. Few respondents provided a written feedback with well-intentioned advices and things which should be considered.

During design process there were few complications such as changing the routes idea from home delivery to delivery to parcel lockers, which however offered design improvements and altogether made more sense in the end. Overall, the idea came out successfully and it answers the core questions and expectations of the author.

Creating whole service in bachelor thesis is not really possible because of the work load and therefore many things would need to be figured out outside of this project´s timeline. For future development would be important to make verification of couriers to ensure the security of the service, design and test app and website, start to pilot and test the service in real life with real companies what would be open to support and try project like this.

The result of this thesis is an explanation of delivery service with work name QuickDeliv, showing this idea from perspectives of courier, client and partnering company. It describes steps and possible duties of each mentioned party and explains how they work together.

It would be great to see this project working in real life one day helping our planet and motivate people to live a bit more sustainable life. Many people think that they cannot make change alone but if everyone starts from themselves although by doing small changes, the results and difference would be huge.

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Appendix 1. Thesis Data Management Plan Natália Kušniráková

Description of thesis research data

This thesis includes data from different sources, such as: existing data in form of books, statistics, data from online interviews with specialist in the field of the topic, articles which are available online and own survey. All written sources are cited or paraphrased according to HAMK´s referencing guidelines. Data are analysed as text and/or image files. Statistics are presented with graphs if available.

In process author also visualise possibilities of the outcome by sketching scenarios. It serves as help to understand and showcase the thinking and designing progress.

Management and storage of the research data

The data will be stored and processed on the thesis author's own computer. Backups of the data will be saved in a separate folder. Results of own anonymous survey are saved in password-protected forms account and backed-up in a separate folder. Just thesis author is able to handle the data but is able to show them to thesis supervisor and opponent.

Processing of personal data and sensitive data

Author´s own data collection (anonymous survey) includes indirect identifiers such as: age and country of residence. These data are collected for purpose of understanding which age group of people the thesis should be targeting on and understanding habits of each age group in combination with the country they reside in and therefore designing an accurate service thanks to the results.

Further use of research data after the completion of the thesis

After the thesis is completed, the anonymized data will be transferred to the ownership of Natália Kušniráková (author of the thesis) for possible further research and development.