

User centered analysis of customer behaviours in the fast moving consumer goods sector

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MASTER THESIS



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Abstract

As digital solutions become a more integrated part of peoples' everyday life, their purchasing patterns are changing. Today it is easier to research products and purchases can be performed anytime, anywhere. The change is apparent in most retail sectors but not as much in the fast moving consumer goods sector. By using a user-centred approach this master thesis aim to analyse the user behaviour within this sector, as well as to evaluate customers' shopping patterns and attitude towards e-commerce and other technical solutions in this environment. Interviews, a survey, a literature study and workshops with end users and experts on e-commerce were used to collect data for the analysis. Personas and scenario were drawn up to identify user patterns. These were used to design prototypes of possible tools to enhance the customers' shopping experience. Both a low fidelity and a high fidelity prototype was produced and tested with exploratory and assessment user tests. During these processes the use of personas and scenarios as a tool in a development project were evaluated as well.

The analysis concluded that there are six different user groups with different means and goals within the fast moving consumer goods sector, but the issues experienced were similar for all of them. Five of these user groups were used as a base to create personas. The final high fidelity prototype is an application helping the customer to perform their shopping quicker and easier by using their mobile device in a physical store. It was concluded that personas and scenarios are very helpful throughout a development process, it keep the designers focused on the user's needs and not too fixated with a possible solution.

Keywords: User-centered design, scenario based design, personas, fast moving consumer goods

Sammanfattning

Människors köpmönster ändras i takt med att digitala lösningar blir en allt mer integrerad del i deras vardag. Det blir allt lättare att hitta produktinformation och inköp kan utföras var som helst. Denna förändring är lätt att se inom de flesta delar av detaljhandeln, men inom livsmedelsbranschen är förändringen inte lika tydlig.

Syftet med detta examensarbete var att genomföra en analys av köpmönster och köpbeteende inom dagligvaruhandeln. Att undersöka kundernas attityd mot e-handel var även av stort intresse. Detta har genomförts med en användarcentrerad metod som har inkluderat intervjuer, en enkät, en litteraturstudie samt workshops med både experter och slutanvändare. Personas och scenarion skapades för att identifiera användarmönster och utifrån dessa designades prototyper som var till för att förbättra kundernas shopping upplevelse. Det skapades både low fidelity prototyper och en high fidelity prototyp som testades med explorativt test respektive utvärderingstest. Även huruvida personas och scenarion är lämpliga verktyg i utvecklingsprojekt utvärderades under denna process.

Analysen visade att det finns sex stycken olika användargrupper som alla har olika tillvägagångssätt och mål med sina matinköp, fem av dessa användes senare för att skapa personas. Den high fidelity prototyp som analysen mynnade ut i är en applikation som hjälper kunderna att med hjälp av sin telefon utföra inköp både snabbare och enklare i butiken. Eftersom designernas fokus riktas på användarnas behov istället för på en potentiell lösning kan slutsatsen om att personas och scenarion är mycket goda hjälpmedel vid en utvecklingsprocess dras.

Nyckelord: Användarcentrerad design, scenario baserad design, personas, dagligvaruhandeln

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1 Introduction

This section gives an introduction to the subject of the master thesis. Information about how grocery stores use digital solutions today and future predictions as well as a quick introduction to user-centred design can be found in the Background section. The aim of the thesis together with its research questions and restrictions is found in the section Purpose of project.

1.1 Background

The internet has become an integrated part of peoples' everyday life and the level of technology maturity in our society is increasing rapidly. As peoples' working and personal life are becoming more digital, it is also becoming more mobile. As a result peoples' purchasing patterns are changing, it is easier to research and buy products and it can be carried out anywhere at any time. In general, the change is apparent in the retail industry but it is still not as visible in the fast moving consumer goods (FMCG) sector. When it comes to buying food most people are still sticking to their old routine and the big grocery stores are just starting to offer online alternatives to the traditional stores. Some actors tried to kick-start the online food market in the beginning of the millennium, but their efforts fell flat. Now it is on the rise again and doing better than ever, many customers are intrigued but still, few are making the transition. Modern technology offers endless possibilities and can be used to transform the shopping experience in more ways than the e-commerce we know today.

To integrate new technology in current and new products in a satisfactory way it is central to always have the user in mind during the design process. This design approach is called user-centred design (UCD) or Human factors engineering. It is an iterative process where the design choices are based on collected data and input from the user by using tests and evaluations. The developers should always think about what goals and expectations the users have and what kind of constraints they may encounter. When working with UCD, personas and scenarios can be powerful tools. A persona is a fictive person based on user patterns within a user group and scenarios is a lightweight method that describes a user interaction. For every step in the design process, it is important to always test the design ideas on suitable users. (Abrás, Maloney-Krichmar & Preece, 2004)

This master thesis was carried out in cooperation with Dynamic dog, which is a digital communication agency founded in 1999. They create, implement and support the digital strategy for companies within e.g. the FMCG sector (Dynamic dog, 2016). Dynamic dog offer their customers expertise within web development and e-commerce and are active in all stages of the development process.

1.1.1 Online retailing today

Today it is possible to buy almost anything online and to get it delivered to your home. In 2015 online sales within the retail industry had a turnover of 50.1 billion SEK. Online sales stand for about 12% of the total retail revenue, excluding the FMCG sector. The consumers' incentive for online shopping is that they find it convenient, easy and economic. The largest sectors within e-commerce are books and media, electronics and fashion, but other sectors are increasing rapidly. The most frequent consumer group is women in ages between 18 and 29. (PostNord, 2016a)

Within e-commerce it is important to provide a perfect customer experience and always try to exceed the consumers' expectations. The retailer have to provide complete and accurate information about the product's price and properties as well as company specific information to gain the customers' trust and make them feel safe. Consumers are used to high quality customer service before, during and after a purchase in a physical store and they expect the same level of customer service when shopping online (PostNord, 2016a).

1.1.1.1. E-commerce within FMCG sector

The latest report from PostNord show that swedish e-commerce within the food industry has grown rapidly during 2015. During 2014, e-commerce accounted for 1% of all food purchases (PostNord, 2015) and in 2015 the number had grown to 1.5%. The online sales within the food sector grew with 40% in 2015, online purchases of personalised assortment grew with 55% and online purchases of dinner solutions grew with 26% compared with the year before. With these numbers it is easy to see that e-commerce within FMCG sector is one of the fastest growing retail industries right now. The average online grocery customer is a woman in the age between 30 and 49 years old (PostNord, 2016a).

Today people use computers and smartphones equally as much when purchasing food online, but reports indicate that the smartphone soon will be the main device used for online food purchases. Online grocery consumers are more impatient than consumers that visit physical stores, and the smartphone provide flexibility which is attractive for this consumer group (PostNord, 2016a). There are some obstacles that prevent the growth in online sales. The most common one is that consumers find it more convenient to shop in physical stores, due to the fact that the delivery time for a purchase is too long or unpredictable. That customer tend to stick to their

old routine, as well as the fact that the consumer cannot see and touch the product before they buy them is also contributory (HUI research, 2015).

The growth of online food sales is a global trend and can be spotted in Europe as well as in Sweden. In Great Britain 29% of the population have purchased groceries online and e-commerce stands for 5% of the total grocery market (PostNord, 2016b; HUI research, 2015). In Great Britain and USA traditional grocery retailers are being challenged by traditionally non-grocery companies like Amazon and Google on the online grocery market. Both companies have launched online grocery stores in certain areas and attract customers by e.g. offering delivery within the hour of the purchase (Rowell, 2016).

1.1.1.2. Omnichannel retailing

Omnichannel retailing is the idea that a customer can order products independent of time, location and communication channel as well as have the purchase delivered how, when and where it suits them (Rowell, 2015). A communication channel can be e.g. a physical store, a website, social media or a mobile application (PostNord, 2016a). Some of these can be difficult for a traditional retailer to handle as they constantly provide the customer with information and make consumers more inclined to switch between stores and brands. But used correctly they can be a huge asset for the retailer and a tool to provide higher customer value.

The aim with an omnichannel strategy is to make the customer do both the research and order at the same place by using different channels without realising it. The e-commerce survey performed by PostNord (2016a) states that customers that use multiple channels when shopping spend more money on products. Successful omnichannel retailing demand that the customer are presented with a cohesive customer experience no matter what type of channel they use. Frazer & Stiehler (2014) argues that the aim of omnichannel retailing is more than to integrate the channels, it is to provide a seamless experience. It is important to look at the customers' behaviour in the different stages of their shopping journey and assess how to best complement this behaviour. There are many different customer segments which act differently in different situations. To succeed with omnichannel retailing it is important to differentiate between these and customise solutions for each of them. A one fit all solution will not suffice in giving customers the service and experience they expect (Rigby, 2011).

1.1.2 Technology, innovation and the future of retail

Rigby (2011) argues that about every 50 years the retail industry go through some kind of disruption. Historically, the changes have not eliminated what came before, but they have changed customers' expectations beyond recognition. As the consumer behaviour change due to new technology the retailers need to embrace the changes and find new ways to meet the current need (Rigby, 2011). Retailers need

to re-invent themselves, instead of using the new technique as a way to optimise their current way of operation (Elliot, Twynam & Connell, 2012).

Some might argue that the new technology will be the death of physical stores, but this does not have to be the case. Oliver Guy, retail industry director at Software AG, believes that the physical store will continue to be the main stop for consumers but it will be more technology-enabled in order to provide a super-personalised customer experience. He says that omnichannel retailing together with Internet of things (IoT) and big data will make the industry more customer-centric (Berthiaume, 2015a). A survey performed by Fujitsu predicts that within four years customers will be able to use location-based services within the store to enhance their shopping experience. They also emphasize the importance of using analytics and big data to provide a seamless customer experience as omnichannel retailing become more common (Berthiaume, 2015b).

Software AG think that predictive analysis will make it possible for retailers to know what a customer is going to want and when they want it (Berthiaume, 2015a). Fujitsu says that new customer research behaviours will decrease the number of impulse buys as customers will tend to only buy what is on their shopping list. Marc Janssens, executive VP of retail at Fujitsu America inc., says "retail technology is changing significantly to respond to a more empowered, technology-savvy shopper, and retailers without a multi-connected, multichannel strategy will fall behind if they make the cut at all" (Berthiaume, 2015b).

1.2 Purpose of project

The information revolution is changing peoples' purchasing patterns and modern technology is providing endless opportunities to make the shopping experience even better. This master thesis aim to investigate if this technology can be made user-friendly and enhance the shopping experience within the FMCG sector further. By focusing on the user and identify their consumer patterns within both the physical and digital grocery store this project aim to identify different user groups and existing challenges. This information will then be used to develop a prototype that can make the transition from a physical to a digital store more natural.

By using personas and scenarios as a tool in the development process, the aim is to evaluate if they are useful in the innovation process as well as in the design process.

1.2.1 Problem definition

This master thesis aim to answer the following research questions.

RQ1. Are personas and scenarios useful when developing new software products?

RQ2. Which different personas and user patterns can be found within the FMCG sector?

RQ2. Which aspects and features within e-commerce in the FMCG sector are important for each persona?

RQ4. Can a digital solution developed for one persona enhance customers' shopping experience?

1.2.2 Project restrictions

The customers' opinions about online grocery stores and how willing they are to use them are influenced by many different factors, since this master thesis focus on interaction design, factors such as the delivery service, assortment of products and price point cannot be addressed in this master thesis. This master thesis focus on the customers' needs and expectations, therefore the retailer's point of view is not investigated.

Throughout the project it has been difficult to get hold of representatives from all demographic and socioeconomic groups. The people that has participated in the interviews, survey and user tests mostly lives in the same area. This has affect the conclusions drawn from the analysis.

2 Theory

This section states how user-centred design and scenario based design is defined in this master thesis. A description of personas and scenarios can be found in the section Scenario based design. The section A location based service in a retail setting describes how beacons work and how they can be used in a retail setting.

2.1 User-centred design

According to Rubin and Chisnell (2008), there are three main principles of how to apply UCD on the design process;

- The focus should be on the user from an early stage, which tasks they perform and how the design of the product facilitate these. There should be a continual contact between the developers and the users throughout the design cycle.
- Evaluate and test the product continually throughout the design cycle so the developers and designers can validate that the process is moving in the right direction.
- The process should be iterative. It is vital that the designers are prepared to reflect on their design choices and are willing to change direction based on the users' opinion on the design.

To get a better understanding of what the users wants and expect, the designers should conduct interviews early in the design process. After the interviews it is good practice to use surveys to collect more quantitative data and reach more users. In user-centred design it is important for the designer to discuss and evaluate design ideas and concepts with the users, it can be beneficial to use a focus group for this. This way the designers get input and can make sure that they are heading in the right direction. When the designers are satisfied with the feedback on their idea, a prototype should be designed and tested by simulations and walkthroughs to gather additional ideas and opinions. After this the collected data need to be evaluated and a new prototype can be developed and tested. UCD is a time consuming design approach, but in the end the designers have produced a product with high usability that provides a good user experience. (Abrams, Maloney-Krichmar & Preece, 2004)

2.1.1 Usability and user experience

It is difficult to define what usability is and which aspects make a product usable. There are many different definitions of the term, Rubin & Chisnell (2008) use six different key words define usability;

- Usefulness means how willing the user is to use a product and how well the product enables the user to accomplish her goals. A product can consist of all the functionality it need and be easy to learn but if it does not enable the user to reach her goals the product will probably never be used.
- Efficiency measures the time it takes for the user to accomplish her goals.
- Effectiveness concerns how well the product live up to the user's expectations on how the product is supposed to work. As well as how good the product is doing what it is supposed to do. This is often measured in how many errors a first time user do.
- Learnability refers to how easy the product is to learn and how well the user remembers their skill until later usage.
- Satisfaction refers to the absence of uncomfortable feelings and how the user feel about the product in general.
- Accessibility refers to how the product meet the needs of people with both temporary and permanent disabilities. When designers think about how to design for people with disabilities it often improves the product for other users as well, since the design of the product often get clarified and simplified.

For a long time products were developed with sole focus on the technique, but as the products became more available for the general public different requirements had to be put on the products. The term usability mainly focus on the functionality and if the product is working as the user expects it to, hence user experience or experience design got more popular in the 1900 century. User experience often, especially when applied on online stores, use the persuasion, emotions and trust (PET) principles. It covers how the user feel when she uses the product, both the positive and negative experiences. It is equally important for the user to have a positive experience of the product as the fact that the system is working as it is supposed to. Just like in a store the product needs to be placed attractively and conspicuously to persuade the user to the item in a subtle way. For the user to keep wanting to use a product it is important that she has an enjoyable and fulfilling time using it. (Rogers, Sharp & Preece, 2011)

2.1.2 Scenario based design

Scenario based design is a lightweight method that aim to describe the use of a future system. The idea is to illustrate scenarios early on in the process, which make it easier to keep all development efforts on track. It is a user-centred method and focus

on how the user interact with the system unlike traditional design methods that focus on the functions of the system. (Rosson & Carroll, 2002)

Rosson and Carrol (2002) describe a user interaction scenario as a sketch of use, the purpose being to capture the essence of the interaction in the same way an initial sketch captures the essence of a physical design. These kind of sketches enable rapid communication within the development team and is a good base for an iterative work process. This type of sketch-like approach is a useful tool to get different perspective on the project scope, it enables a possibility to zoom out and get a holistic perspective and likewise to zoom in and see all the details. Being able to sketch up many ideas to a low cost makes it possible to investigate a larger part of the problem area (Hillgren & Szücs Johansson, n.d.).

When designing a product it is important to constantly reflect on the performed work. When a designer or test person reflects on a project, new interesting angles and ideas can be brought to the surface. At the same time actions and actually producing something is vital to show progress and be able to perform evaluative testing. Carroll (2000) states that there is a fundamental tension between thinking and doing; thinking impedes doing and doing obstructs thinking. Using a scenario based approach is a way to provide room for reflection in the process of designing instead of doing it as a retrospective task, see figure 1. A scenario convey a vision of a system and make it concrete, thereby it exposes the design to critique (Carroll, 2000).

The design process need to be fluid and change rapidly as e.g. new requirements are found. This makes the design process complex since all decisions need to be provisional. A design team cannot spend hours producing a prototype that might become irrelevant in a heartbeat, there is simply not enough time for that. A scenario is a concrete proposal and can therefore be evaluated, since it is like a sketch it can easily be altered or discarded if needed, see figure 1.

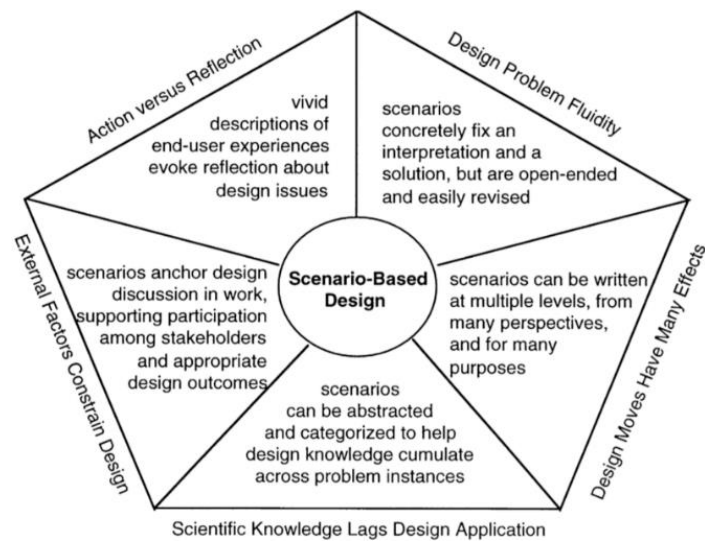


Figure 1. Five common design challenges and how scenario based design approach them (Carroll, 2000)

2.1.2.1. Scenarios

A scenario is a type of user story that describe how a user manipulate the system to achieve the desired outcome and it is important that the goal of the interaction is clear. The user story entails information about the situation state, the actor, its motivations and knowledge and the tools available to manipulate the system. It describes the sequence of actions and events that lead to the desired outcome. It is an easy way for designers to convey possibilities of the system and make them more concrete. (Rosson & Carroll, 2002)

A scenario is easy to understand and can be complimented with a sketch or a storyboard. By focusing on scenarios instead of solutions a number of obstacles can be avoided. Since they are created quickly and without much effort, scenarios can visualise work progress without causing premature commitment to a certain solution. Scenarios highlight the use-appropriateness of the design ideas, since they focus on the user experience, the designer is less likely to simplifying the problem area based on external factors e.g. reuse familiar solutions. Scenarios are by nature incomplete, which make them a source for questions and discussions. This ensures that many different aspects and ideas are addressed throughout the design process. (Rosson & Carroll, 2002)

2.1.2.2. Personas

A lot of information about the user is needed to be able to make a user-friendly product. To go out on the street and find a typical user, ask her what she wants and then develop the product based on the response is not a good idea, simply because the user does not have the tools to immediately identify the needed solution. She has

valuable information about the problem area but that is not the same as having a good solution. A better option is to gather a lot of information about the users, then use this data to create fictitious users, so called personas, and design the product for them. (Cooper, 1999)

A persona is a representation of a group of real users and is defined by the group's goals. Personas are not as much invented as they are discovered in the information gathering phase of a project. They are derived from real users' goals and behaviour patterns and in that sense personas are not fiction although their name and personal details are. It is important to give the persona a name, this is when it becomes an individual that can be referred to. In addition the persona will need a job, a family situation and hobbies, anything that help make them individuals. It is also common practise to give the persona a face by attaching a photo to the description, this makes them even more real. When creating personas it is often good to make them consistent with current ideals and stereotypes since this make them more believable and will cause less confusion. (Cooper, 1999)

A common error when working with UCD is that the designers want to solve every problem that the users express. This can lead to overcomplicated products with too many features which are difficult to learn and use. When developing this way chances are that the user groups will accept the product but none of them will be ecstatic about it. If the target is narrowed down to a single user group it is much easier to make them satisfied. A product that users love, even a small part of the end users, will be much more successful than a product that many users tolerate. (Cooper, 1999)

Another problem that can occur during the development process is that the target user becomes elastic. The nature of the user changes to justify solutions that are easy to develop, which will affect the end result negatively since the real users are not elastic. A persona is more specific than an anonymous user, it is easier for every member of the development team to ask themselves "will this be an ideal solution for our persona?" The more specific a persona is the less elastic it is, making it a very powerful communication tool for the developing team. (Cooper, 1999)

In e-mail correspondents with Norman (2016), he said the following about persona and their use in the design and development process;

"Personas are fictitious people based upon data collected about real people who are in the target group for the product under consideration. They are not of direct use in the design. Rather they are good for communicating to designers, engineers, marketing and management the requirements, tone of voice, language style and level, and features.

The standard use is to consider each proposed feature or style of interaction and ask of each persona, would this be appropriate for this person?

I also advocate developing a Persona for the product which helps make the output style and visual design be cohesive and appropriate.

When used properly, personas can maintain cohesion and consistency in the product."

When working with scenario based design personas can be a powerful tool, as they make it easier for the developers, users and designers to talk the same language. The process of creating a scenario becomes more straightforward if the team know who the scenario's agents and actors are, it helps them to narrow down the scenario and not make it too broad (Kellingley, n.d.).

2.1.3 Usability testing

To validate a prototype and to understand how the user will experience the future product is it important to perform usability testing. These test reduce the cost of maintenances and support when the product is released since most of the negative aspects have been discovered and rectified. Even though it is beneficial to perform usability testing many companies do not since they are expensive and time consuming to create and execute. Another problem with user tests is that the artificial environment and product can affect the result and not always show how the prototype would work in real life and in different environments. It is also hard to involve test participants that represent all different kinds of end users. (Rubin & Chisnell, 2008)

There are four main types of usability test; exploratory, assessment, validation and comparison tests. Validation and comparison tests are not used in this master thesis, hence they are not described further in this report. An exploratory test is performed in the beginning of the design process to test an idea or a lo-fi prototype to validate how the conceptual design works. Assessment tests are executed in the end of the design process to test hi-fi prototypes. This type of test investigates the prototype's potential shortcomings and if the work flow corresponds to the users mental model. The test moderator should have limited interaction with the participant during the assessment test since the test should provide information on how the participant handle and overcome obstacles that may occur. (Eriksson, 2014)

Before starting usability tests it is important to have a well-structured test plan and to remember not to change the design of the product when the test plan is finished. To ensure an accurate result from the test it is vital to select test participants with the right qualities. In exploratory testing it is good to use internal test participants. These participants generally have more knowledge about the subject and technique and if they cannot do the task correctly, chances are that other users will fail as well. (Rubin & Chisnell, 2008)

At the end of the test a debriefing usually takes place. In this part the test participant get an opportunity to explain why they performed tasks in a certain way and what they were thinking of when they did the test. The debriefing often takes place in the

same room as the test did. At the beginning, the questions are open but can become more closed towards the end of the session. (Rubin & Chisnell, 2008)

2.2 A location based service within a retail setting

A beacon is a device that enables positioning indoors as well as outdoors. It uses Bluetooth Low Energy (BLE) to communicate between the beacon and other devices. BLE is a technology developed to provide lower power consumption and cost than regular Bluetooth (Android, n.d.).

Beacons can be used for many different purposes, one being within retail. Since beacons can detect a very specific position for a device, it enable stores to send out e.g. push messages containing advertise or information to the customer. The payment can be simplified with the usage of beacons as it enables the customer to pay for their purchases using their smartphone (Labwerk, 2016). This technology can even be used by the store to learn more about how the customers move in the store and thereby use this information to enhance the stores structure (ibeaconsinsider, n.d.).

3 Innovation process

This section presents the thesis's work process and its different methods. The section the iterative work process describe how the work have moved between the different phases. The phases and their components are described closer in the sections Identifying opportunities and challenges, Generating Ideas and Developing and testing.

3.1 The iterative work process

This innovation process included three different phases, identifying opportunities and challenges, generating ideas and development and testing. These phases are based on the first three phases of the NESTA spiral. The four phases not used in this project are focusing on how to establish an innovation in a organisation and are therefore not applicable (NESTA, 2013). In this project, these phases have been modified to fit the project scope. The first phase included a literature study, interviews and a survey and its purpose was to gather information about the project scope. The second phase included the making of persona skeletons and personas which were validated in workshops. The aim of this phase was to come up with interesting scenarios to be investigated further in the third phase. This was done by developing and testing lo-fi and hi-fi prototypes. Throughout the process the work has moved iteratively between the phases, see figure 2. When the problem area is large and complex it is beneficial to use an iterative work process, which make it easier to investigate and react accordingly to found results (Hillgren & Szücs Johansson, n.d.). This way potential problems and threats can be identified early and avoided before causing the project any real damage. An innovation process is a creative way of working and it comes naturally to move back and forth between the phases. When generating ideas new question marks will arise in a need of an answer.

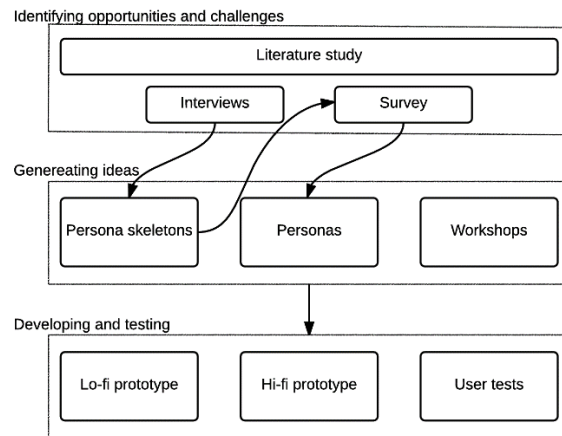


Figure 2. The iterative work process used in this master thesis.

3.2 Identifying opportunities and challenges

The innovation process started with finding out as much as possible about e-commerce, the FMCG sector, existing research and different technologies that could be applied. There was also a need to identify which directions that was of interest for the project's stakeholders and to investigate different market opportunities. As the analysis is centred around the end user this phase included finding users and get their opinions on e-commerce and how they currently perform their grocery shopping.

3.2.1 Literature study

To get acquainted with e-commerce and the FMCG sector a literature study was carried out in the first two weeks of the project, as well as parallel with other activities later on. Articles about why e-commerce within the FCMG industry has not developed as quickly as other retail industries, existing obstacles and how to overcome these where of initial interest. As the work process continued the target for the literature study changed, it became more important to understand how technique is used in the FMCG sector today and how new technology is affecting the industry.

Google scholar was the main tool for finding articles, using search words such as "e-commerce", "trust factors", "food industry", "FMGC sector" and "retail". Snowballing was also used to find relevant articles from references of good articles. The project supervisors also suggested articles and books that were helpful, mainly regarding user-centred design, personas and scenario-based design.

3.2.2 Interviews with grocery store customers

The focus on the initial research phase was to identify how the end user perform their grocery shopping today and if there are any areas within this process that needs improvement. The FMCG sector is big with many actors that offers a bundle of different services, making it important to talk to customers of many different services to cover general behaviours and problem areas. To achieve this goal people of different age, social and economic status needed to be included in the study.

A key element of the thesis was to investigate how e-commerce and technology can help customers, therefor many questions needed to be about the customers' thoughts and attitude towards these subjects.

In this master thesis a semi-structured interview technique was used. It uses both open and closed questions but the majority of them are open, the interviewer adjust the questions to the answers given by the interviewee. This approach is good to use if the interview is supposed to give a deeper understanding of a topic since probes make sure that the interviewee does not forget facts. As this approach contains a script of questions, it is also easy to replicate the interviews. (Rogers, Sharp & Preece, 2011)

The interview script started with some structured questions regarding ethnography that were easy to answer, followed by several open questions and ended with a general question to ensure the whole subject had been covered, see appendix A. The first interview was used to validate the questions, as a result the questions were re-worked to make them easier to understand and to ensure that they were not influencing the respondent's answers.

To make it easier to find people to interview it was decided that both telephone and face-to-face interviews could be used, this meant that people in other parts of Sweden could participate in the study too. It was also decided that a minimum of 20 interviews would be held with people in different stages of their life, half of them men and the rest women. The first people to be interviewed were friends and relatives to the authors. To ensure that the result of the interviews was unbiased, people outside of the authors' social circle were also asked to participate in the study. These people were found at local libraries in Lund and Malmö and corresponded to almost half of the participants.

Later on in the project, before the lo-fi prototype phase began, another interview was held with a new user. The main persona had been chosen and before the prototype phase could begin more information needed to be gathered about this persona. This was done by interviewing a person that by earlier discussions clearly belonged to the relevant user group.

3.2.3 User patterns-survey

To get more information about user behaviours and attitudes towards online grocery stores, as well as to validate the user patterns, an online survey was created and sent out to grocery store customers. Since a survey provide quantitative data and an online survey can reach users that otherwise could be hard to get in contact with, it was a good way to validate if the identified user behaviour were correct. One negative aspect of using an online survey is that it easier for the participants to quit during the survey, leading to a lot of unfinished answers. It can be hard to ensure that people do not answer the survey several times and generate false data. On the other hand there is a higher probability of trustworthy answers since people do not get pressured to answer what they think the conductor wants to hear (Creative Research Systems, 2014).

The questions in the survey were mostly closed, since every participant should get the same response options. It also ensured that the questions were clear and made it possible to compare the answers from different respondents. However, some of the questions were open, meaning that the participant could write an answer if the given response options did not apply. The questions were based on data collected through the interviews, since they had disclosed some new questions and uncertainties as well as ideas of possible user patterns. All survey questions can be found in appendix B.

In the beginning of the survey the participant were asked questions about their shopping behaviour within the FMCG sector. Later on the survey consisted of questions about what factors, concerning an online grocery store the participant found important. The questions differed depending on if the participant had tried to buy food online or if they were interested in doing so. At the end of the survey there were some demographic questions that everyone had to fill out. The survey was created in iterations and sent to the stakeholders for validation before it went live. The web based survey tool Enalyzer was used to create the survey, since it offered possibilities to customise the survey depending on the user's answers as well as offered a possibility for the respondent to rank answer options for a certain question. It was also easy to use, made professional-looking surveys and offered the possibility to create reports and diagrams of the result (Enalyzer, 2015). Most surveys were sent out through Facebook, but also via e-mail to get more direct contact with participants. The survey link was also given out in various workplaces to ensure that the participants were in different ages and different living situations.

3.3 Generating ideas

When sufficient information had been gathered from the interviews or the survey it was time to analyse the information and use it as a base to generate personas and scenarios of possible ideas for the lo-fi and hi-fi prototypes.

3.3.1 Analysing the interviews result and creating persona skeletons

When all the interviews had been completed they needed to be analysed. This was done in several different stages. Firstly the recorded interviews were transcribed, then they were analysed individually and in group. These discussions resulted in a number of persona skeletons that were validated in a meeting with the stakeholders.

3.3.1.1. Transcription of the recorded interviews

Before the interviews were analysed they needed to be transcribed to make sure that all details of the interview was taken in to consideration in later stages. Also, using a transcript of a recording makes it easier for the analyst to base decisions on facts instead of assumptions (Rogers & Kalmanovitch, n.d). The work was divided between the analysts and it was decided that a high level of accuracy was needed to conduct a sufficient analysis of the content. It was decided that hesitations and pauses could be ignored if they did not add nuance to the answer. Sentences could also be slightly changed to follow common writing conventions, making them easier to read.

3.3.1.2. Creating persona skeletons

To create the persona skeletons the interviews were analysed. Firstly, the analysts read through all the interview transcripts individually, highlighting important facts and writing a small summary for each interview. Each analyst identified user patterns based on the interviewee's statement and used this to divide the respondents into different user groups. To get different perspectives on the interviews the analysts individually had to decide what aspects were important and how the user groups should be identified.

After this the analysts combined their results, see figure 3, which created much discussion and different points of view and aspects were brought up to the surface. The analysts had focused on different aspects while doing the analysis and therefore they had different opinions about which user groups existed. One of the analysts focused on why the persons bought food, what needs and issues the person had. The other focused on why the person chose a specific store and the groceries that they did. After discussing the different approaches, one of the analyst decided to analyse the interview again. When the groups were identified the analysts read them once again to ensure that the user patterns were consistent within the groups. Each group got a backstory based on the interviews within the group, these became the

persona skeletons. There were an ongoing discussion during the whole process and some individuals were moved from one persona skeleton to another as the skeletons were changed.



Figure 3. The different piles of possible user groups.

When the persona skeleton were completed they were presented to the stakeholders at Dynamic dog. Information about how the interviews had been performed and some result found was presented together with the persona skeletons. The focus of the meeting was on having an open discussion and find interesting areas to focus the future work on. The meeting lasted approximately two hours.

3.3.2 Analyse of survey result and creating personas

After the survey had been open for two days the analysis of the result started. The report tool provided by Analyzer did not have a function that generated diagrams for answers of a specific user. Therefore, all answers had to be exported to excel and then analysed. After three weeks the survey was closed. Since the survey resulted in 219 participants, the analysis of the survey result was divided between the two analysts to make it more time efficient.

When the analysis started it focused on the answers to eight questions. The first two, where information on how often the participant bought food and how well the purchases was planned beforehand. The other questions focused on which factors that contributed when the participant chose grocery store and between products, if the participant had bought food online, the underlying reason for this and which factors the end user think are essential for a digital grocery store to possess.

From the result of these questions every participant was put into the most appropriate persona skeleton. When this was done for all 219 participants, statistics and diagrams were made for each question and persona skeleton. These diagrams were analysed to find the purchase pattern of the future personas. The tables and

diagrams were drawn up in excel to visualize the data. It was of great importance to keep the personas as lifelike as possible, therefore every answer was analysed and combined with the result of the interviews. The personas were given a name, living situation and a personality based on the found results. Throughout this process the analysts discussed different options and ideas with each other to create the most realistic personas possible.

3.3.3 Stakeholder workshop

A workshop with the stakeholders at Dynamic dog were held to validate the personas. The workshop consisted of three participants, all of which had taken part in the previous meeting when the persona skeleton were presented. Before the workshop all participants got an email with the personas and the data from the survey to ensure that everyone had the same level of knowledge prior to the workshop, ensuring that the focus could be on generating ideas. In the beginning of the workshop the facilitators presented the personas to refresh the participants' memory. The participants were asked to take notes and highlight the facts and personality traits they thought were most important for each persona.

When all of the personas had been presented, the group discussed one persona at a time, focusing on how accurate and lifelike they thought it was. The stakeholders were then asked to choose the three personas they thought were most interesting for the project. For each of the chosen persona, the group was asked to identify possible scenarios where the persona interacted with a digital solution to solve the problem. The scenario did not have to be very detailed, instead the focus were on when and how the persona needed help from a digital solution. Hence a need and problem existing in the personas everyday life could be identified. Some ideas of possible solutions connected to the scenario were also generated. Throughout the entire workshop the facilitators asked the group what problem the generated ideas solved.

When all of the personas were assigned scenarios and solution ideas, a discussion on which of these that were most relevant for the project started. All of the ideas and opinions were written down by one of the facilitator so they could be analysed further later on in the development process. After the stakeholder workshop the designers discussed the collected data and chose three personas to focus the future work on. Then they created short scenarios for the three chosen personas. These were to be discussed, validated and extended at the focus group workshop.

3.3.4 Focus group workshop

A focus group was created to get ideas and opinions from real users. To ensure that many opinions and points of view were brought up, it was important that the focus

group included members with different competences and from different demographics. The group consisted of five men and two women with in ages between 23 and 58 years old, see figure 4. All of the group members had an academic education or were students at Lund University.

Since most of the participants never had met each other before, the workshop started with everyone introducing them self. This made the participants more comfortable and they got to tell the group about their grocery shopping behaviour and their thoughts about it. When all group members had gotten acquainted with each other, they got to talk about their potential bad experience regarding grocery shopping. According to Lauesen (2002) it is a good idea to start a focus group meeting with this assignment to get an idea of different problem areas and shortcomings in existing products. After everyone had narrated their experiences, one of the facilitators had a quick presentation on the aim of the master thesis and how the methods UCD and scenario based design work. The facilitator also explained different expressions e.g. personas, to ensure that everyone had the required knowledge to perform the different tasks of the workshop. The three personas that were chosen after the stakeholder workshop were presented, followed by their scenarios. The group then had an open discussion about them, if they thought these scenarios were suitable for the persona and if any scenarios were missing.

After the scenarios were validated, the group was divided in two. The facilitators explained that their task was to choose a persona and transform the basic scenarios into more detailed ones. The focal point was on how the persona performed different tasks and solved problems when it was put in a specific situation. The groups discussed for half an hour, then the groups were merged together and got to present one idea at a time for each other. The whole group discussed the idea and how well it was suitable for the chosen persona. The entire meeting took approximately two hours.



Figure 4. The focus group session.

After the focus group workshop the designers discussed the collected data from both the focus group and stakeholder workshop and used it to decide what persona to focus on when developing the prototypes. Detailed scenarios were then created for this persona, these were heavily influenced by the focus group meeting. The scenarios were to be used when developing the lo-fi prototypes.

3.4 Developing and testing

After the idea generating phase had discovered a persona and interesting scenarios to use as a starting point, the development of a lo-fi and then a hi-fi prototype started. Later on these prototypes were tested, the lo-fi was tested with an exploratory test and the hi-fi with an assessment test.

3.4.1 Lo-fi prototyping

The designers started with discussing the persona and the corresponding scenarios to decide which were interesting to investigate more thoroughly. All of the collected data was taken into account, from the literature study and the first interviews to the ideas from the workshops. Every decision was made with the persona in mind. All of the prototypes were designed using post-it, pencils and paper, see figure 5. The prototypes were made by hand to get a sketchy appearance. If a digital program would have been used, the prototype would look more finished and the test participants would probably hesitate to give negative criticism. Since people are more afraid to hurt the designer's feelings when a prototype looks more developed (Eriksson, 2014).

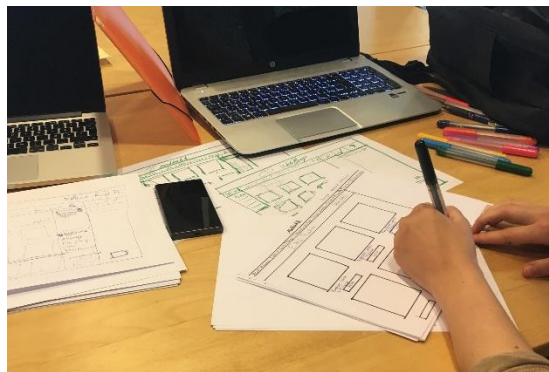


Figure 5. Sketching up one of the lo-fi prototypes

There was an ongoing discussion about which functions that were primary and which were less necessary for the persona. The focus was on functionality and as little as possible on the design, since it was the ideas that needed to be evaluated at

this stage. Also, in lo-fi prototyping it is difficult to make a design that reflected the end products design.

3.4.1.1. Usability testing of lo-fi prototype

The lo-fi prototype was tested with an exploratory test on the stakeholders. This decision was based on the fact that they have much knowledge about e-commerce and how web shops usually are built. Also, end users would have focused on the design instead of the functionality (Rubin & Chisnell, 2008). The stakeholders are used to work with and test lo-fi prototypes. The prototype was tested on five persons that all had different positions at the company to get different point of views.

The room that was used to perform the test in was a conference room. It was important to get a stress-free environment to get the participants comfortable so they would open up and speak their mind. It also made it easier for the participants to take part if the test were held at their work place. Since the prototype did not have any specific requirement on the test environment it did not need to be tested in a fixed test lab. The test was carried out with one test leader and one logger. The test leader's role was to interact with the test participant and to read the scenarios for the participant. If the participant hesitated on what to do or did not understand the scenario, it was the test leader's role to explain the scenario in a different way. The logger wrote down if the participant did something in another way than intended and if the participant hesitated on how to perform a task. Thoughts and ideas were also written down by the logger.

When a test participant entered the test room they got a short summary on the chosen persona so they would get in the right state of mind and try to think like the persona. Then the test leader read one scenario, see appendix C, to the test participant to explain what environment and situation the person was in. Then a prototype was put in front of the test participant. The task for one prototype was broken down to smaller parts to make it easier for the participant to remember what to do. The tasks were not detailed or specific since it was important to see how the participant reacted and instinctively wanted to solve the task. The logger focused on what buttons the participants pressed and how the participant wanted to solve the task. This was done to see if the functions were used as they were intended to. After the participant were done with the scenario for one prototype the test leader asked about the product, how they experienced the prototype and if the participant thought the prototype were suitable for the persona. It was also important to ask the participants if they would use the product and if they thought there is a need for this type of product. This procedure was re-done for all five prototypes and after gathering information on all prototypes the test leader asked the participant which prototype they thought was most usable and which ones they did not see a need for. The test leader also asked if the participant wanted to change something regarding the product or if some functionality should be moved to a different place. Based on the feedback from the tests one prototype was chosen for the future hi-fi prototype phase.

3.4.2 Hi-fi prototyping

After the lo-fi prototypes had been evaluated and one had been chosen for closer investigation, the process of making a hi-fi prototype began. Hi-fi prototype looks like the real product, hence a test on it generates an accurate perception on how the product will be received (Eriksson, 2014). The tools Invision and Inkscape 0.91 were used to develop the hi-fi prototype. Inkscape is a vector graphic software which allows the user to create pictures that is suitable for prototyping (Inkscape, n.d.). Invision is a platform for developing hi-fi prototypes, collaborations and workflows (InVision, n.d.). The platform enables connecting pictures and the user can choose how to navigate between the pictures to reflect how the product is supposed to work. Other tools were considered but most of them had a relatively high cost and the two chosen ones had all the functionality needed and were free of charge.

In the beginning of the design process the two designers decided which colours to use. When this was done the designers divided the pages to be created between them. However, all design choices were thoroughly discussed between the designers. The choices of where to put different functions was based on the lo-fi prototype. Icons and button choices were based on how these tend to look in similar so they would match the user's mental model on how the product are supposed to be used. After a while it was shown that the chosen colour scheme were not a good fit for the prototype so the designers decided to change it. The new colours were chosen to represent the personality of the persona.

Before doing the usability tests on the prototype two pre-test were done to evaluate that the prototype worked as it was supposed to. These test were done in a unofficial manners and the participants only task was to navigate around in the prototype. Both of the participants had opinion on how the products were shown and therefor the designers re-designed the layout for the products before the real usability tests were conducted.

3.4.2.1. Usability testing of hi-fi prototype

An assessment test was performed to test the hi-fi prototype and the test was performed on four participants. The number of participants were based on Rubin and Chisnell's (2008) statement that it takes approximatively four to five test participants to expose around 80 percent of all deficiencies in the prototype. A detailed test plan were made before the test started, see appendix D.1. The tests were executed in a fixed laboratory to ensure that every movement and reaction was recorded. The setup was a classic test laboratory setup and the laboratory provided both cameras and microphones. A screen recorder, provided by Invision, were used as a complement to the fixed equipment. This recorder recorded the participants screen touches and the participants faces.

The participants were students at Lund University in ages between 24-28 years. All the participants were used to working with technology. These participants were

chosen based on the fact that the persona is woman that works with IT and probably is experienced with working with this type of technology. One of the participants usually used a phone with Android operating system and the other three usually used phones with iOS operating system. The prototype was developed to fit on the screen of an iPhone 6 but it was important that the prototype also was intuitive for users with Android devices.

The test was executed by one test leader and one logger. The test leader was in the test room with the participant and the logger was in the control room and overlooked the entire test session. It was the test leader's role to interact with the test participant and guide them if they got stuck on the scenario. However, the test leader had as little interaction with the participant as possible to get an idea on how intuitive the prototype was. The recording of the session was managed by the logger.

An introduction of the chosen persona and the tests structure was given to the test participant. The participant was instructed to think aloud during the test to give a better understanding on how the participant experienced the different design choices and functions. Two of the participants started at scenario *User at home* and the other two started at scenario *User in the store*, see appendix D.2, to minimize the learning affect. When the participant had read the scenario, the test scenario was executed and then handed the next scenario. After both scenarios were completed a short debriefing was held. The debriefing questions were open and adjusted to the complication the participant had whilst performing the test.

The collected data were of both performance and preference type. Performance data were collected by counting how many incorrect selections the participant executed, how long it took for the participant finish the scenario and how long it took for the participant to notice pop-ups. Preference data was collected by looking at how well the prototype corresponded to the user's mental model and the usefulness of the buttons and menus. In the debriefing session preference and qualitative data was collected.

4 Result

This section presents the results of the analysis and prototypes. The section Analysis of user purchasing patterns present the personas identified in this master thesis, as well as their user patterns and attitude towards an online grocery store. The sections Development of lo-fi prototypes and Development of the hi-fi prototype present the scenarios and the prototypes created in this master thesis, as well as the results of the user tests.

4.1 Analysis of user purchasing patterns

The analysis was carried out with the goal to create personas, making the analysts focus on gathering information about user patterns and opinions instead of focus on ideas for solutions. Each persona's personal attributes, user pattern and attitude towards e-commerce in a FMCG setting is based on the collected data from the interviews and survey.

4.1.1 Anette, 53 years old, that follows a strict routine

Anette lives in Lund and works as a doctor. She lives with her husband and they have a son that moved away from home two years ago. She does not like to go grocery shopping and strive to do it as seldom as possible. She always visits the same store and before she goes to the store she makes a detailed shopping list, she then buys everything on that list and nothing else. She always buys the same product brands and is very particular when it comes to the products quality. She has not bought food online yet but is willing to try it. The detailed persona description can be found in appendix E.1.

4.1.1.1. Personal attributes

Three of the interviewed people were mapped to this user group, two of the women and one man. They were between 26 and 51 years old. Two of the households consisted of three persons, both included one child, the last household consisted of two people and no children. 20 of the survey participants were mapped to this user group, see table 1.

Table 1. Percentage of participants that chose a certain answer option per question. All of the survey questions and answer options can be found in appendix B.

<i>Question</i>	<i>Answers</i>	<i>No. of respondents</i>
29. Gender	Women: 63% Men: 37%	20
30. Age	20-30 years old: 35% 31-40 years old: 10% 41-50 years old: 15% 51-60 years old: 35% 61-70 years old: 5%	20
31. Children living at home	Yes: 30% No: 70%	20
32. Ages on children	0-5 years old: 33% 6-12 years old: 33% 13-17 years old: 33% 18 years or older: 33%	6
33. No. of persons in household	1: 30% 2: 40% 3: 20% 4: 5% 7: 5%	20
36. Free time per day	4.4h ^a	20

^aThe mean value of all of the respondents answers

4.1.1.2. User patterns

The analysis of the interviews show that this user group strive to visit the store as seldom as possible and is very well-structured in their shopping behaviour. They have scheduled days when the grocery shopping is performed and they often write a shopping list before going to the store. They have a well-established process that is followed both before and during the visit to the store. Today they use websites and applications to look up recipes and plan their purchases. This was confirmed in the survey, see table 2.

According to the interviews they priorities grocery store that they have visited before and since they know that they can find all their wanted products, they are loyal to their store. It is also very important that it is easy to navigate in the store and find products. They have clear goals with their shopping and know what they want regarding products and brands. They usually choose products based on history, in order to get products they like they do not compromise with their product standard. These patterns were confirmed in the survey, see table 2.

Table 2. Percentage of participants that chose a certain answer option per question. All of the survey questions and answer options can be found in appendix B.

<i>Question</i>	<i>Answers</i>	<i>No. of respondents</i>
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2. Visits to the grocery store per week	1.9 ^a	20
3. Extent the purchase is planned before visiting the store. (0= not at all, 5=extensively)	4.45 ^a	20
4. Most important factors to consider when choosing grocery store ^b	Proven store: 70% The store location: 61% Wide assortment of products: 47%	20
5. Most important factors when choosing between products ^b	Good quality: 75% Proven product brand: 60% Organic and ethically produced products: 55%	20
22. Ordered non-food products online	Travels: 85% Books and media: 80% Clothes and shoes: 70%	20

^a The mean value of all of the respondents answers

^b The respondent rank the answer options for this question. The percentage show the number of respondents who placed the option as number one, two or three.

4.1.1.3. Attitude toward e-commerce in a FMCG setting

According to the interviews this user group is curious and overall positive to e-commerce in general. Since they have high demands on their physical store the online version must meet or exceed the same demands to be a valid candidate. The results from the survey is displayed in table 3.

Table 3. Percentage of participants that chose a certain answer option per question. All of the survey questions and answer options can be found in appendix B.

<i>Question</i>	<i>Answers</i>	<i>No. of responders</i>
6. Bought groceries online	Yes: 40% No: 60%	20
7. Reason for buying groceries online	Save time: 39% Easier to perform purchase: 22% Can buy groceries when it suites me: 22%	8
8. Type of online purchase	Dinner solution: 68% Personalised assortment of products: 33%	8
10. Device used to make purchase	Computer: 63% Smartphone: 38%	8
11. Reason for choice of device used for purchases	Easy to use: 29% Close at hand: 21% Provide lucidity: 21%	8
13. Satisfactory experience of ^b (0= not satisfied at all, 5= very satisfied)	Delivery: 88% Quality of products: 75% Overall impression of service: 75%	8
15. Willing to buy groceries online	Yes: 58% No: 42%	12

16. Reason for interest in buying groceries online	Save time: 44% Can buy groceries when it suites me: 22% Easier to perform purchase: 13% Exciting to try something different: 13%	7
17. Type of purchase that is interesting	Dinner solution: 27% Dinner solution with extra products: 27% Personalised assortment of products: 27%	7
18. Reasons for lack of interest in buying groceries online	See and touch products before purchase: 44% Get inspiration in the store: 22% Demand more planning than visiting a physical store: 22%	5
19. Important aspects for an online grocery store to possess^a	Flexible deliveries: 65% Possibility to buy personalized assortment of products: 65% Frequently bought products are easy to find: 50%	20
23. Ways to include a mobile device in grocery shopping process	Pay for purchase: 34% Scan products in the store: 31% Receive notifications with offers in the store: 21%	20
26. Interest in type of subscription^b (0= not at all, 5= very interested)	Dinner solution: 55% Dinner solution with extra products: 35% Complete recipes: 30%	20

^a The respondent rank the answer options for this question. The percentage show the number of respondents who placed the option as number one, two or three.

^b The percentage show the number of respondents that answerer 4 or 5 on the question

4.1.2 Simon, 23 years old, wants to maintain the flexibility in his everyday life

Simon is a student that lives in Gothenburg and values his free time. He goes grocery shopping every other day and he usually have an idea of what he wants before going to the store, but most of his purchase decisions are made at the location. He buys food in the local store, the assortment of products is ok but the price is a bit higher than he would prefer but he thinks that the larger store and cheaper store is too far away. He has not tried to buy food online, but he is strongly considering it. He is especially interested in dinner solutions since that would make it even easier for him to buy food, although he is a bit hesitant to the fact that he would not get his food straight away. The detailed persona description can be found in appendix E.2.

Simon is based on interviews and surveys that originally was two different user groups, but after the survey was analysed they were merged since it was difficult to differentiate between them.

4.1.2.1. Personal attributes

Based on the interviews it was concluded that seven participants matched this user group. The ages within the group is between 23 and 67, but the majority of them are under 25 years old. Two of the participants are women and the other one is a man. Most of them live alone or with one other person, one participant live with two other persons. None of the participants have children living at home. The survey result can be found in table 4.

Table 4. Percentage of participants that chose a certain answer option per question. All of the survey questions and answer options can be found in appendix B.

<i>Question</i>	<i>Answers</i>	<i>No. of respondents</i>
29. Gender	Women: 55% Men: 45%	67
30. Age	20-30 years old: 79% 31-40 years old: 6% 41-50 years old: 3% 51-60 years old: 12%	67
31. Children living at home	Yes: 13% No: 87%	67
32. Ages on children	0-5 years old: 44% 6-12 years old: 33% 13-17 years old: 33% 18 years or older: 33%	9
33. No. Of persons in household	1: 33% 2: 46% 3: 10% 4: 4% 5: 6%	67
36. Free time per day	4.9h ^a	67

^aThe mean value of all of the respondents answers

4.1.2.2. User patterns

According to the interviews the user group think it should be easy to buy food and the task should not limit the flexibility in their everyday life. The choice of grocery store is heavily influenced by the store location and they usually visit the closest store to their location, they are not loyal to any store. The store must fulfil their basic needs regarding assortment of products but it does not have to be perfect, they will adapt their needs according to what the store offer. They are generally not interested in buying food and it is reflected in their choice of products. The decision of what to get is made in the store and influenced of what is available on the shelves. They are not loyal to product brands, if a known brand is available it would probably be chosen but it does not really matter. They are impulsive in their shopping pattern, they visits the store when the need occur and do not plan what to buy beforehand. The results from the survey can be found in table 5.

Table 5. Percentage of participants that chose a certain answer option per question. All of the survey questions and answer options can be found in appendix B.

<i>Question</i>	<i>Answers</i>	<i>No. of respondents</i>
2. Visits to the grocery store per week	3 ^a	67
3. Extent the purchase is planned before visiting the store. (0= not at all, 5=extensively)	2.8 ^a	67
4. Most important factors to consider when choosing grocery store ^b	The store location: 87% Wide assortment of products: 76% Good price point: 67%	67
5. Most important factors when choosing between products ^b	Good price point: 90% Good quality: 78% Proven product brand: 42%	67
22. Ordered non-food products online	Travels: 91% Books and media: 90% Electronic goods: 83%	67

^a The mean value of all of the respondents answers

^b The respondent rank the answer options for this question. The percentage show the number of respondents who placed the option as number one, two or three.

4.1.2.3. Attitude towards e-commerce in a FMCG setting

The interviews stated that the user group generally is hesitant to the thought of buying food online, since they do not want too much of their free time confined. Although, they could find it interesting to buy a complete dinner solution, since it would mean less planning. They are positive to using technical solutions in the grocery store, as long as the process of buying food becomes easier. The results from the survey can be found in table 6.

Table 6. Percentage of participants that chose a certain answer option per question. All of the survey questions and answer options can be found in appendix B.

<i>Question</i>	<i>Answers</i>	<i>No. of responders</i>
6. Bought groceries online	No: 84% Yes: 16%	67
7. Reason for buying groceries online	Save time: 39% Easier to perform purchase: 17% Can buy groceries when it suites me: 9% Good price point: 9% Wide assortment of products: 9%	11
8. Type of online purchase	Personalised assortment of products: 50% Dinner solution: 43%	11
10. Device used to make purchase	Computer: 73% Smartphone: 27%	11

	Tablet:	
11. Reason for choice of device used for purchases	Provide lucidity: 27% Easy to use: 23% Close at hand: 23%	11
13. Satisfactory experience of ^b (0= not satisfied at all, 5= very satisfied)	Quality of products: 81% Delivery: 62% Usability: 62% Overall impression of service: 54%	11
15. Willing to buy groceries online	Yes: 84% No: 16%	56
16. Reason for interest in buying groceries online	Save time: 28% Can buy groceries when it suites me: 18% Easier to perform purchase: 16%	47
17. Type of purchase that is interesting	Personalised assortment of products: 35% Dinner solution: 19% Dinner solution with extra products: 17% Complete recipes: 17%	47
18. Reasons for lack of interest in buying groceries online	Do not want to wait for purchase to be delivered: 22% See and touch products before purchase: 19% Get inspiration in the store: 19%	9
19. Important aspects for an online grocery store to possess ^a	Flexible deliveries: 67% Possibility to buy personalized assortment of products: 59% Price comparison service: 42%	67
23. Ways to include a mobile device in grocery shopping process	Create shopping list: 15% Search for information: 14% Find special offers on certain products: 12%	67
26. Interest in type of subscription ^b (0= not at all, 5= very interested)	Personalised assortment of products: 30% Frequently bought products: 27% Dinner solution with extra products: 22%	67

^a The respondent rank the answer options for this question. The percentage show the number of respondents who placed the option as number one, two or three.

^b The percentage show the number of respondents that answerer 4 or 5 on the question

4.1.3 Sandra, 26 years old, likes a good bargain

Sandra lives in Malmö with her boyfriend Johan and she works with HR at a big company. She has the main responsibility for buying food to the family, which she does not mind. She have a couple of stores that she visits to buy food, she chooses the one with the best available offers. She has membership cards at all these stores to get the best offers. Her shopping list is also heavily influenced by special offers. Most weeks she go grocery shopping on Mondays and Thursdays. She has not tried to buy food online but has thought about doing it many times. She thinks it would be easier to compare product prices online. The detailed persona description can be found in appendix E.3.

4.1.3.1. Personal attributes

From the interviews it was concluded that five participants belonged to this user group, three women and two men. They are in the ages between 21 and 29. Four of the participants lived with one other adult. The last participant lived with one child and one adult. The personal attributes identified in the survey can be found in table 7.

Table 7. Percentage of participants that chose a certain answer option per question. All of the survey questions and answer options can be found in appendix B.

<i>Question</i>	<i>Answers</i>	<i>No. of respondents</i>
29. Gender	Women: 70% Men: 30%	45
30. Age	Under 20 years: 2% 20-30 years old: 80% 31-40 years old: 9% 41-50 years old: 2% 51-60 years old: 7%	45
31. Children living at home	No: 76% Yes: 24%	45
32. Ages on children	0-5 years old: 81% 6-12 years old: 45% 13-17 years old: 9% 18 years or older: 20%	11
33. No. Of persons in household	1: 29% 2: 42% 3: 9% 4: 16% 5: 4%	45
36. Free time per day	4.7h ^a	45

^aThe mean value of all of the respondents answers

4.1.3.2. User patterns

The interview participants in this user group perform their grocery shopping in a structured manner, they are willing to go further to receive the shopping experience they want. They usually try to buy food for a week at a time but sometimes have to make smaller complementary purchases. Before they go shopping the purchase is planned to a certain extend but the final decision between products is taken at the store. When choosing which store to visit they looks at the assortment of products and price point, but ultimately the store with the best weekly offers will be the one they visits. Hence, they are not loyal to a specific store. The choice of products is based on either history or price and available offers, meaning they are not loyal to product brands. The results from the survey can be found in table 8.

Table 8. Percentage of participants that chose a certain answer option per question. All of the survey questions and answer options can be found in appendix B.

<i>Question</i>	<i>Answers</i>	<i>No. of respondents</i>
2. Visits to the grocery store per week	1.9 ^a	45
3. Extent the purchase is planned before visiting the store. (0= not at all, 5=extensively)	4.4 ^a	45
4. Most important factors to consider when choosing grocery store ^b	Good price point: 100% Wide assortment of products: 72% The store location: 62%	45
5. Most important factors when choosing between products ^b	Good price point: 97% Good quality: 75% Desirable amount: 39%	45
22. Ordered non-food products online	Books and media: 93% Travels: 89% Clothes and shoes: 84%	45

^aThe mean value of all of the respondents answers

^b The respondent rank the answer options for this question. The percentage show the number of respondents who placed the option as number one, two or three.

4.1.3.3. Attitude towards e-commerce in a FMCG setting

The interview participants are generally positive to buying food online, there are however some hindrance that make them hesitate. Today they use technique to find current offers and recipes. The results from the survey can be found in table 9.

Table 9. Percentage of participants that chose a certain answer option per question. All of the survey questions and answer options can be found in appendix B.

<i>Question</i>	<i>Answers</i>	<i>No. of responders</i>
6. Bought groceries online	Yes: 38% No: 62%	45
7. Reason for buying groceries online	Save time: 32% Can buy groceries when it suites me: 19% Easier to perform purchase: 14% Exciting to try something different: 14%	17
8. Type of online purchase	Personalised assortment of products: 46% Dinner solution: 29%	17
10. Device used to make purchase	Computer: 71% Smartphone: 24% Tablet: 6%	17
11. Reason for choice of device used for purchases	Easy to use: 29% Provide lucidity: 24% Close at hand: 15%	17

	Have not tried the service on another device: 15%	
13. Satisfactory experience of ^b (0= not satisfied at all, 5= very satisfied)	Delivery: 70% Quality of products: 70% Usability: 70% Overall impression of service: 70%	17
15. Willing to buy groceries online	Yes: 89% No: 11%	28
16. Reason for interest in buying groceries online	Save time: 27% Can buy groceries when it suites me: 18% Easier to perform purchase: 17%	25
17. Type of purchase that is interesting	Personalised assortment of products: 52% Subscription of frequently bought products: 17% Dinner solution: 14%	25
18. Reasons for lack of interest in buying groceries online	See and touch products before purchase: 33% Get inspiration in the store: 33% Do not want to wait for purchase to be delivered: 22%	3
19. Important aspects for an online grocery store to possess ^a	Possibility to buy personalized assortment of products: 62% Flexible deliveries: 53% Frequently bought products are easy to find: 53% Price comparison service: 53%	45
23. Ways to include a mobile device in grocery shopping process	Create shopping list: 15% Perform online purchase: 15% Find special offer for specific product: 13%	45
26. Interest in type of subscription ^b (0= not at all, 5= very interested)	Personalised assortment of products: 30% Frequently bought products: 27% Complete recipes: 24%	45

^a The respondent rank the answer options for this question. The percentage show the number of respondents who placed the option as number one, two or three.

^b The percentage show the number of respondents that answerer 4 or 5 on the question

4.1.4 Malin, 30 years old, gets inspired in the grocery store

Malin lives in Täby with her partner Andres and their cat Frans. She works with marketing which means that she in periods work a lot of overtime. She and Anders are expecting their first child. Malin buys food about three times a week and she usually visits a bigger store that is convenient to drive past on the way home from work. She tries to have a plan on what she need to buy before she enter the store but she mostly makes the decisions in the store, she usually shops with her eyes. She has not tried to buy food online, but think it would be nice to try it if it could save her some time. Although she is not quite sure it would suit her since her shopping

behaviour is so dependent on visual aspects. The detailed persona description can be found in appendix E.4.

4.1.4.1. Personal attributes

Two of the interviewed participants were mapped to this user group, one man and one woman and they are both in their fifties. One of them live with one other adult, the other live with one adult and one child. The results from the survey can be found in table 10.

Table 10. Percentage of participants that chose a certain answer option per question. All of the survey questions and answer options can be found in appendix B.

<i>Question</i>	<i>Answers</i>	<i>No. of respondents</i>
29. Gender	Women: 61% Men: 39%	31
30. Age	Under 20 years: 3% 20-30 years old: 52% 31-40 years old: 19% 41-50 years old: 10% 51-60 years old: 16%	31
31. Children living at home	Yes: 35% No: 65%	31
32. Ages on children	0-5 years old: 36% 6-12 years old: 36% 13-17 years old: 10% 18 years or older: 45%	11
33. No. Of persons in household	1: 37% 2: 27% 3: 17% 4: 10%	31
36. Free time per day	4.0h ^a	31

^aThe mean value of all of the respondents answers

4.1.4.2. User patterns

From the interviews it is clear that this user group strive to make their grocery shopping more efficient and convenient. They depend much on the visual effect when shopping and choose products based on what looks good. They also find inspiration in the store and can base their shopping list around the produce they find in the store. Their grocery store must be easy to access and its assortment of products must contain all the products they usually buy, they are not interested in visiting more than one store. When choosing a product they look for good quality and use their senses to decide if the product fulfil their standard. This user group's shopping patterns are based on convenience, they decide what product groups to buy at home but the final decision is made in the store. They visits the store when the need occur and do not have a routine for when to buy food. The user patterns discovered in the survey, is presented in table 11.

Table 11. Percentage of participants that chose a certain answer option per question. All of the survey questions and answer options can be found in appendix B.

<i>Question</i>	<i>Answers</i>	<i>No. of respondents</i>
2. Visits to the grocery store per week	3.1 ^a	31
3. Extent the purchase is planned before visiting the store. (0= not at all, 5=extensively)	3.1 ^a	31
4. Most important factors to consider when choosing grocery store ^b	Wide assortment of products: 80% The store location: 63% Good price point: 55%	31
5. Most important factors when choosing between products ^b	Good quality: 90% What the product look like: 74% Good price point: 61%	31
22. Ordered non-food products online	Books and media: 87% Travels: 84% Electronic goods: 74%	31

^a The mean value of all of the respondents answers

^b The respondent rank the answer options for this question. The percentage show the number of respondents who placed the option as number one, two or three.

4.1.4.3. Attitude towards e-commerce in a FMCG setting

The interviews state that the group generally is positive to buying food online as long as it makes the shopping process easier, does not require more planning or infringe on their free time too much. The same apply to the use of technical solutions in the physical store. They have tried to buy food online, both dinner solutions and personalized assortment of products, but they find it difficult to trust that they will receive good quality fruit and vegetables. The results found in the survey is presented in table 12.

Table 12. Percentage of participants that chose a certain answer option per question. All of the survey questions and answer options can be found in appendix B.

<i>Question</i>	<i>Answers</i>	<i>No. of responders</i>
6. Bought groceries online	Yes: 35% No: 65%	31
7. Reason for buying groceries online	Save time: 33% Easier to perform purchase: 24% Can buy groceries when it suites me: 19%	11
8. Type of online purchase	Dinner solution: 43% Personalised assortment of products: 24% Dinner solution with extra products: 19%	11

10. Device used to make purchase	Computer: 73% Smartphone: 18% Tablet: 9%	11
11. Reason for choice of device used for purchases	Easy to use: 24% Provide lucidity: 24% Close at hand: 34% Have not tried the service on another device: 14% The service work best on this device: 14%	11
13. Satisfactory experience of ^b (0= not satisfied at all, 5= very satisfied)	Quality of products: 91% Delivery: 82% Usability: 82% Overall impression of service: 72%	11
15. Willing to buy groceries online	Yes: 55% No: 45%	20
16. Reason for interest in buying groceries online	Save time: 27% Can buy groceries when it suites me: 21% Easier to perform purchase: 21%	11
17. Type of purchase that is interesting	Personalised assortment of products: 32% Dinner solution: 23% Subscription of frequently bought products: 18%	11
18. Reasons for lack of interest in buying groceries online	See and touch products before purchase: 31% Get inspiration in the store: 24% Demand more planning that visiting a physical store: 14% Do not want to wait for the purchase to be delivered: 14%	9
19. Important aspects for an online grocery store to possess ^a	Flexible deliveries: 67% Possibility to buy personalized assortment of products: 51% Frequently bought products are easy to find: 55%	31
23. Ways to include a mobile device in grocery shopping process	Create shopping list: 16% Search for information: 14% Receive notifications with offers in the store: 12%	31
26. Interest in type of subscription ^b (0= not at all, 5= very interested)	Dinner solution: 35% Dinner solution following a concept: 25% Personalised assortment of products: 22%	31

^a The respondent rank the answer options for this question. The percentage show the number of respondents who placed the option as number one, two or three.

^b The percentage show the number of respondents that answerer 4 or 5 on the question

4.1.5 Ulrika, 43 years old, that wants to buy organic and ethically produced products

Ulrika lives in Solna with her husband Anders, their seven year old daughter Alva and their dog Olga. She works as a software developer at a big company in Stockholm. For Ulrika it is very important that the products she buys are organic and ethically produced. Hence she visits the stores with a large assortment of organic products. She is quite organized when it comes to grocery shopping but sometimes she makes spontaneous decisions in the store. She has thought about buying food online but she has not tried it yet since she is sceptical to what quality of products she would receive. The detailed persona description can be found in appendix E.5.

4.1.5.1. Personal attributes

From the interviews, it was decided that two participants belonged to this user group, both women in their forties. One lives with one adult and one child and the other lives with one other adult. The attributes for the participants in the survey can be found in table 13.

Table 13. Percentage of participants that chose a certain answer option per question. All of the survey questions and answer options can be found in appendix B.

<i>Question</i>	<i>Answers</i>	<i>No. of respondents</i>
29. Gender	Women: 65% Men: 33% Other: 2%	46
30. Age	20-30 years old: 57% 31-40 years old: 22% 41-50 years old: 9% 51-60 years old: 4% 61-70 years old: 9%	46
31. Children living at home	Yes: 28% No: 72%	46
32. Ages on children	0-5 years old: 62% 6-12 years old: 38% 13-17 years old: 15% 18 years or older: 15%	13
33. No. Of persons in household	1: 16% 2: 44% 3: 20% 4: 18% 5: 2%	46
36. Free time per day	4.5h ^a	46

^aThe mean value of all of the respondents answers

4.1.5.2. User patterns

The interview participants in this user group focus on the organic and ethical aspects when choosing a grocery store and products. When choosing a specific grocery store it is important that the store offer a wide assortment of products and many organic products. The location of the store, especially if it is easy to access, also influence the choice. They are not loyal to any specific store and go to different stores based on what they want to buy. They are also relatively price-conscious but not at the expense of the organic and ethical aspects. When choosing products the person look at the quality of the product and if it is organic. They go grocery shopping two to four times per week and try to organize their purchase before going to the store, but sometimes they find this hard. The user patterns identified in the survey can be found in table 14.

Table 14. Percentage of participants that chose a certain answer option per question. All of the survey questions and answer options can be found in appendix B.

<i>Question</i>	<i>Answers</i>	<i>No. of respondents</i>
2. Visits to the grocery store per week	2.9 ^a	46
3. Extent the purchase is planned before visiting the store. (0= not at all, 5=extensively)	3.7 ^a	46
4. Most important factors to consider when choosing grocery store ^b	Have organic and ethically produced products: 95% Wide assortment of products: 65% The store location: 55% Good price point: 55%	46
5. Most important factors when choosing between products ^b	Organic and ethically produced products: 94% Good quality: 85% Good price point: 62%	46
22. Ordered non-food products online	Travels: 91% Clothes and shoes: 91% Books and media: 87%	46

^a The mean value of all of the respondents answers

^b The respondent rank the answer options for this question. The percentage show the number of respondents who placed the option as number one, two or three.

4.1.5.3. Attitude towards e-commerce in a FMCG setting

Overall, this user group is positive to buying groceries online. They have tried to purchase both dinner solutions and a personalised assortment of products. They like that it makes the shopping process quicker, easier and that they do not have to plan ahead in the same extent as when visiting a physical store. They usually do not buy vegetables and fruit this way since they do not trust the quality of the delivered products. For e-commerce to really satisfy their need, they must be able to buy all their products online. The results from the survey can be found in table 15.

Table 15. Percentage of participants that chose a certain answer option per question. All of the survey questions and answer options can be found in appendix B.

<i>Question</i>	<i>Answers</i>	<i>No. of responders</i>
6. Bought groceries online	Yes: 39% No: 61%	46
7. Reason for buying groceries online	Exciting to try something different: 19% Save time: 17% Easier to perform purchase: 17%	18
8. Type of online purchase	Personalised assortment of products: 50% Dinner solution: 23% Dinner solution with extra products: 12%	18
10. Device used to make purchase	Computer: 78% Smartphone: 17% Tablet: 6%	18
11. Reason for choice of device used for purchases	Provide lucidity: 23% Easy to use: 20% Close at hand: 20% Have not tried the service on another device: 20%	18
13. Satisfactory experience of ^b (0= not satisfied at all, 5= very satisfied)	Overall impression of service: 72% Assortment of products: 67% Quality of products: 65%	18
15. Willing to buy groceries online	Yes: 75% No: 25%	28
16. Reason for interest in buying groceries online	Save time: 28% Can buy groceries when it suites me: 20% Exciting to try something different: 16%	21
17. Type of purchase that is interesting	Personalised assortment of products: 42% Dinner solution with extra products: 22% Dinner solution: 14%	21
18. Reasons for lack of interest in buying groceries online	See and touch products before purchase: 33% Demand more planning than visiting a physical store: 17% Difficult to find a suitable delivery time: 11% Additional charges are added: 11% Other: 11%	7
19. Important aspects for an online grocery store to possess ^a	Flexible deliveries: 68% Possibility to buy personalized assortment of products: 50% Frequently bought products are easy to find: 50%	46
23. Ways to include a mobile device in grocery shopping process	Create a shopping list: 16% Search for information: 14% Help navigate in the store: 12% Scan products in the store: 11% Perform online purchases: 11%	46

26. Interest in type of subscription^b (0= not at all, 5= very interested)	Dinner solution following a concept: 30%	46
	Frequently bought products: 24%	
	Dinner solution: 24%	
	Personalised assortment of products: 24%	

^a The respondent rank the answer options for this question. The percentage show the number of respondents who placed the option as number one, two or three.

^b The percentage show the number of respondents that answerer 4 or 5 on the question

4.1.6 Other user patterns

Since only a few participants in the interviews and survey were mapped to this user group it was decided to not create a persona based on the user group and patterns described below.

4.1.6.1. User patterns

Visual and quality aspects are in focus when these interview participants choose products. It is also very important for them to support local stores and businesses to ensure a thriving local community. This together with the service provided by the staff influence their choice of grocery store. If possible they visits a couple of specialist stores in the local area to find the products they want. When choosing products they are influenced by visual aspects and look at the product to determent its level of quality. They are very flexible in their choice of products, if a certain product does not live up to their standards they choose something else. They visits the store often and buys a small amount of products each time. They also looks for inspiration in the store and interaction with the staff heavily influence their decisions. The result from the survey can be found in table 16.

Table 16. Percentage of participants that chose a certain answer option per question. All of the survey questions and answer options can be found in appendix B.

<i>Question</i>	<i>Answers</i>	<i>No. of respondents</i>
2. Visits to the grocery store per week	3.4 ^a	7
3. Extent the purchase is planned before visiting the store. (0= not at all, 5=extensively)	3.7 ^a	7
4. Most important factors to consider when choosing grocery store^b	Support a local store: 100% The store location: 55% Have organic and ethically produced products: 42% Wide assortment of products: 42%	7
5. Most important factors when choosing between products^b	Good quality: 100% Good price point: 71% Organic and ethically produced products: 42%	7

	Desirable amount: 42%	
22. Ordered non-food products online	Travels: 71% Books and media: 57% Clothes and shoes: 57% Electronic goods: 57%	7

^a The mean value of all of the respondents answers

^b The respondent rank the answer options for this question. The percentage show the number of respondents who placed the option as number one, two or three.

4.1.6.2. Attitude towards e-commerce within a FMCG setting

The interview participants in this group are not interested in buying food online if it does not benefit their local stores. Today they use technical devices to look up recipes. The results from the survey can be found in table 17.

Table 17. Percentage of participants that chose a certain answer option per question. All of the survey questions and answer options can be found in appendix B.

<i>Question</i>	<i>Answers</i>	<i>No. of responders</i>
6. Bought groceries online	Yes: 67% No: 33%	7
7. Reason for buying groceries online	Save time: 50% Exciting to try something different: 25% Can buy groceries when it suites me: 25%	4
8. Type of online purchase	Personalised assortment of products: 75% Dinner solution: 50%	4
10. Device used to make purchase	Computer: 100%	4
11. Reason for choice of device used for purchases	Provide lucidity: 50% The service work best on this device: 50% Other: 25%	4
13. Satisfactory experience of ^b (0= not satisfied at all, 5= very satisfied)	Delivery: 73% Quality of products: 50% Overall impression of service: 50%	4
15. Willing to buy groceries online	Yes: 33% No: 67%	3
16. Reason for interest in buying groceries online	Save time: 100% Easier to perform purchase: 100% Wide assortment of products: 100%	1
17. Type of purchase that is interesting	Dinner solution with extra products: 100% Complete recipes: 100% Subscription of frequently bought products: 100%	1
18. Reasons for lack of interest in buying groceries online	See and touch products before purchase: 100% Difficult to find time for delivery: 50% Demand more planning than visiting a physical store: 50%	2

	Do not want to wait for purchase to be delivered: 50%	
	Additional chargers are added: 50%	
	Do not trust that payment details are handled securely: 50%	
	Higher price point than physical stores: 50%	
	Other: 50%	
19. Important aspects for an online grocery store to possess ^a	Flexible deliveries: 71%	7
	Frequently bought products are easy to find: 67%	
	Possibility to buy personalized assortment of products: 42%	
23. Ways to include a mobile device in grocery shopping process	Create shopping list: 29%	7
	Scan products in the store: 29%	
	Receive notifications with offers in the store: 29%	
	Perform online purchase: 29%	
26. Interest in type of subscription ^b (0= not at all, 5= very interested)	Dinner solution: 14%	7
	Frequently bought products: 14%	
	Dinner solution following a concept: 14%	
	Personalised assortment of products: 30%	

^a The respondent rank the answer options for this question. The percentage show the number of respondents who placed the option as number one, two or three.

^b The percentage show the number of respondents that answer 4 or 5 on the question

4.2 Development of lo-fi prototypes

To avoid making an overcomplicated prototype, the design efforts were focused on satisfying the need of one persona. Ulrika was chosen as the main persona because of her shopping behaviour, the results from the survey and workshops. Five lo-fi prototypes were conducted in this master thesis, these prototypes are based on the four extended scenarios created for Ulrika. Two of the prototypes represented web shops and three prototypes were mobile applications.

4.2.1 Scenario *Simpler filtering options*

Ulrika is at work when she remembers that there is a parent conference at Alva's school today. She was supposed to go grocery shopping after work but now she has to solve it some other way. She opens the service and checks that the organic filter is on, now she is sure that only organic products will be displayed on the screen. She searches for sausage and put it in her basket, she also add ketchup and potatoes to the basket. She searches for minced meat and chooses the mince that lives up to her standards. In the basket, she changes the amount of potatoes and specifies that

she want to have the products delivered between 18.00 and 19.00, she confirms the purchase and closes the service.

4.2.1.1. Web shop

The prototype *Web shop* contained five papers and was produced to simulate a web shop for groceries. The prototype contains a filter that by default is set on organic and locally produced groceries. This filter can be altered by the user if the user likes to filter on another aspect, such as the price. When the filter is on, only organic products are shown on the screen. On the side border a shopping cart is located which is permanently fixed on the page. The shopping cart is a list that has two functions to show the groceries in the shopping cart and to show the user's standing subscription of groceries. This prototype was produced to give an easy shopping flow and also to make it easier for the persona to find the food she is looking for. Figure 6 shows the entire prototype in the order the paper were presented to the user.

4.2.1.1.1. Test result of Web shop

The test scenario and tasks used for the explorative test can be found in appendix C.1. Two of the five test participants had trouble finding the search button and used the menu option “Meat and Deli” to find the sausage. One of them said that search buttons usually do not work in a satisfactory way and that the participant would not use this option even if it was easier to find. In the payment part of the scenario, one of the five participants clicked the shopping cart before clicking on the button that would redirect the user to the check-out page. All of the other tasks were performed without any problem. Four of the five participants found it confusing that the unit stated on the products differed. One participant said that this probably would not work since most stores have pre-packaged groceries.

All of the participants liked the prototype and three of five said that the flow felt very logical. Two participants said that they would personally use the organic filter and one of them said that the web shop included all of the functionalities the user wanted from a web shop.

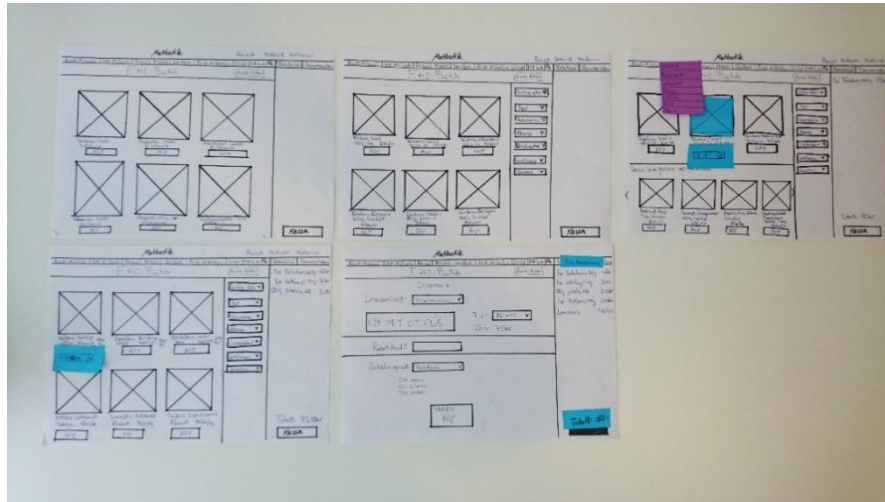


Figure 6. The Web shop prototype.

4.2.1.2. *Inspirationally web shop*

The prototype *Inspirationally web shop* was also based on the scenario *Simpler filtering options* and contains five papers that show five different pages. Just like the Web shop prototype, this prototype contains an organic filter. This prototype was developed to inspire the user and to keep the user updated on food-related news. The inspiration is shown in fictive inspiration videos, articles about locally produced groceries and recipes. If the user find a recipe or an article that she find interesting, the user can easily put the groceries in the shopping cart. The prototype also consist of a web shop only stocked with stable goods, everything organic and ethically produced. Figure 7 shows the pages in same order as the workflow.

4.2.1.2.1. Test result of *Inspirationally web shop*

The test scenario and tasks used for the explorative test can be found in appendix C.2. One of the participants felt insecure on what would happen if the participant clicked the play button on the video and how the participant was supposed to open the link to the inspiration video without playing the video on the current page. Two participants had trouble when they were asked to go to the basic goods store, one of them did not realize it was two different functions and thought she already was in the basic goods store. Two participants thought that it was unclear if they were using the shopping cart or the subscription part of the list in the basic goods store. One participant requested to be able to buy all ingredients of the recipe with one button. Three participants thought that the prototype looked a lot like existing web shops but that the concept was good.

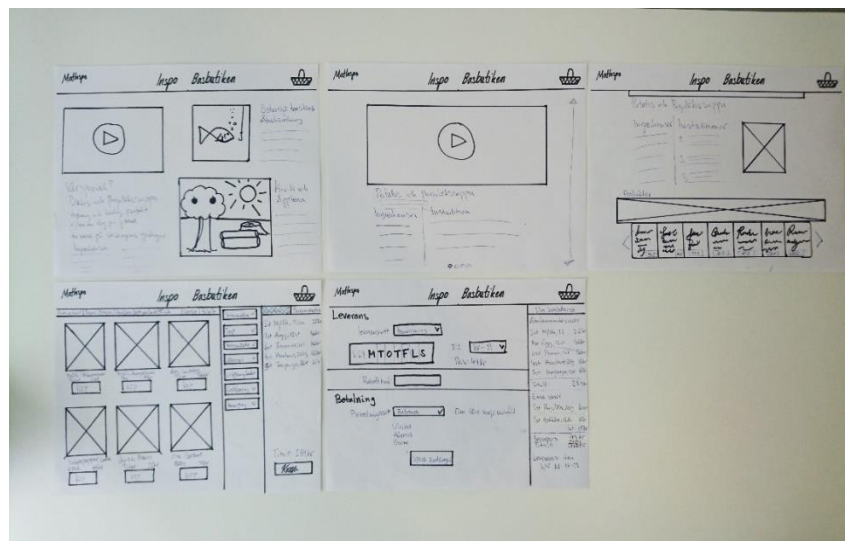


Figure 7. The prototype *Inspirationally web shop* prototype.

4.2.2 Scenario *Inspiration on the go*

Ulrika is sitting on the train on her way to work and is thinking of what to make for dinner tonight. She has received a couple of emails from her grocery stores but she does not want to read them. Instead she opens her application and generates some random recipes. She is not interested in the shown recipes and indicate that only vegetarian recipes are of interest. She looks through the new recipes and chooses one of them. She can now see the instructions, pictures, ingredients as well as its effects on the environment such as if the ingredients are in season and its co²-emission. She likes what she sees and saves the recipe in her favourites.

4.2.2.1. *Inspirationally chat app*

The prototype *Inspirationally chat app* was developed to make it easier for the user to get information, inspiration and recipes. There was also an idea that an online purchase could be made through the app, just by typing it in the application. The prototype work similar to a chat where the user can ask questions and get information in return. The prototype simulate an intelligent app that uses machine learning to understand the user and reply with relevant information. The user is supposed to get a feeling that she is talking to a real person and not a computer. If the user receive a recipe that she find interesting she can click on the link to get more information, pictures and a description on how to make the recipe. Figure 8 shows the prototype pages and are lined out in same order as the workflow.

4.2.2.1.1. Test result of *Inspirationally chat app*

The test scenario and tasks used for the explorative test can be found in appendix C.3. Two of the five participants pressed the menu button before writing in the text field. One participant thought it was unclear which messages were clickable and which were not. All of the participants had a hard time saving the recipe to their favourites, three of them requested a button on the screen so they did not have to leave the page.

One participant thought the prototype required a lot of effort from the user and two participant thought it was a good idea, but they would not use it themselves. Two participants thought it would be easier to give vocal instruction instead of written ones. Two participants thought it would be a good additional function to a web shop but should not be the main function. This was the least well received prototype by all participants.

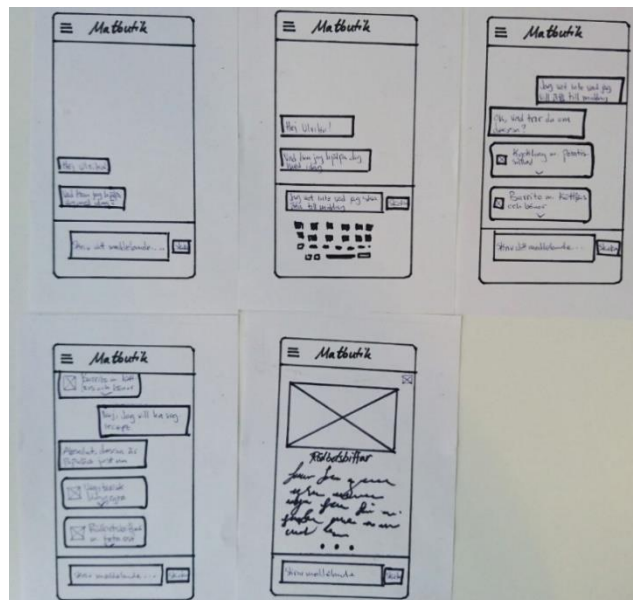


Figure 8. The *Inspirationally chat app* prototype

4.2.3 Scenario *More information*

Ulrika is in the grocery store after work and is standing by the shelf with chopped tomatoes. She picks up a can which state that it is organic and scan the label with her phone, in the application she quickly read how the product is produced and its effect on the environment. She is not satisfied with the product, closes the screen and put the can back. Then she scan a QR-code at the shelf and get a list of chopped tomatoes ranked by their effect on the environment. She choose the product with the best score after reading about it and put it in her basket.

4.2.3.1. *Information app*

The *Information app* prototype was developed to be used in the store, to give the user an opportunity to get more information about the groceries available. It contains information regarding the product's origin, how eco-friendly it is and which organic certificates the product has. To show information about a product, the user scans the product's label and a detailed description appears on the screen. The user can also choose to scan a barcode to get a comparison of all brands within a product category presented on the screen in a ranked list, based on how eco-friendly they are. After scanning a label, a picture of the product is shown in the window previously used for scanning a product. See the whole prototype in figure 9

4.2.3.1.1. Test result of *Information app*

The test scenario and tasks used for the explorative test can be found in appendix C.4. Two participants had some trouble with the first step to press the “Scan items for more information”-button, one clicked on the menu since the participant was used to navigate between screens this way. The other one pressed “Shopping list” but quickly realized the mistake and then pressed the right button. One participant pointed out that the buttons “Back” and “Scan a new item” probably directed the user to the same place. The participant thought one of the buttons could redirect the user directly to a ranking list so the user does not have to scan a specific barcode to get this information. Two participants thought it was unclear how the ranking was conducted and what it was based on and thought this should be clarified.

One participant had an idea about the app and said that it could work for many stores and be used as a way for customers to compare price levels between different stores. Overall the prototype was well received, one participant thought the scenario was a bit far-fetched but could be relevant since it was designed with focus on Ulrika and her needs.

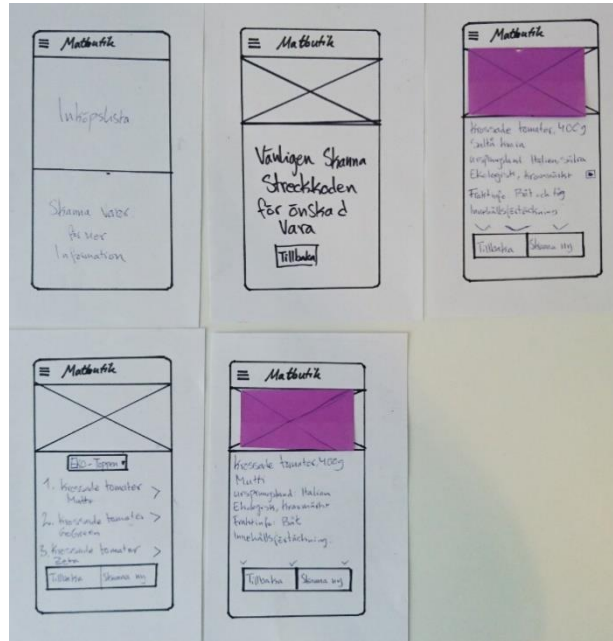


Figure 9. The Information app.

4.2.4 Scenario *Streamline purchases*

The family is going to their cabin in the archipelago this weekend. Ulrika has to purchase most of the groceries before they go away since the local store do not offer that many organic products. She enters a grocery store that she has visited a couple of times before and opens the shopping list she created earlier. She goes to the meat section and pick up two packets of tenderloin, scans them and put them in her bag. She moves towards the dairy section and her mobile phone vibrates, a notification tells her that she has passed the shelf for ham, she goes back, picks up a packet and scans it. At the vegetable section the phone vibrates again, the notification tells her that Peter has added two packets of tortellini to her shopping list, she goes to their shelf, scans two packets and put them in the bag. She moves towards the cashiers and a notification tells her that she is in the payment zone and the amount due for her products. She pays with her phone and leave the store.

4.2.4.1. *Shopping tool app*

The *Shopping tool* app is an app prototype that is developed to provide an easier shopping flow in the physical store. The prototype is supposed to be used in the store and enable the user to scan and purchase groceries. The prototype has two functions, to scan grocery items to get product information and to scan groceries from a shopping list. It is also possible to buy products that are not on the shopping list. The list items are arranged in the order they appear in the grocery store. After

the user has completed her purchases she can, with help of the prototype, pay for the purchase, see figure 10.

4.2.4.1.1. Test result of *Shopping tool app*

The test scenario and tasks used for the explorative test can be found in appendix C.5. One participant did not understand the scenario and did not know if the participant was supposed to look for a physical list or if the app contained the list. This participant also missed the fact that the scenario where taking place in a store and not at home, but when the participant realized where the scenario was taking place the participant clicked the right button. One participant expressed that the participant wanted a choice to decline an update made by another user. Another participant had a wish to be able to pay with something else than a credit card in the payment zone.

All of the participant liked the prototype, one participant said that the participant liked that the list was changing dynamically. This was the best received prototype.

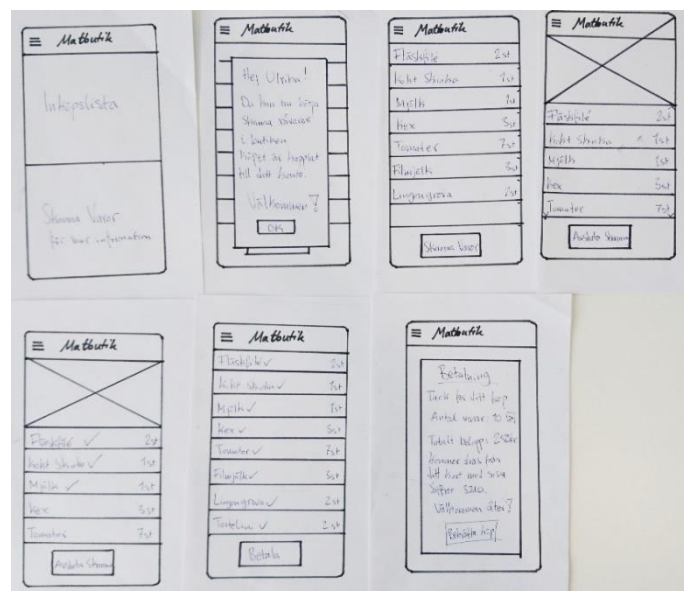


Figure 10. The *Shopping tool app*.

4.3 Development of the hi-fi prototype

The prototype functionally is the same as in lo-fi prototype *Shopping tool app*, it also has buttons that simulate functions from the lo-fi prototype *Information app*. However, the *information app*-function was not implemented or tested. The hi-fi prototype consist of two different modes depending on the user's location. The

modes have different functionality, depending on if the user is in the grocery store or at home. These functions were tested with two scenarios, *User at home* and *User in the store*. The scenario *User at home* is based on what happens before the user visit the store and is supposed to add groceries to the shopping list. The scenario *User in the store* is based on the scenario *streamline purchases* that was used to develop the lo-fi prototype *shopping tool app*. See appendix D.2.1 and D.2.2 for the detailed scenarios.

4.3.1 Hi-fi prototype for scenario *User at home*

The start screen have three buttons; *Shopping list*, *Cookbook* and *My account*, see figure 11. Two of the buttons, *Shopping list* and *My account*, is clickable. Since the cookbook is not used in the scenarios, this button is not clickable. A welcoming message is shown at the top of the screen. The colours are chosen to fit the persona and give an eco-friendly appearance. The background behind the buttons is slightly darker to make the text stand out more.

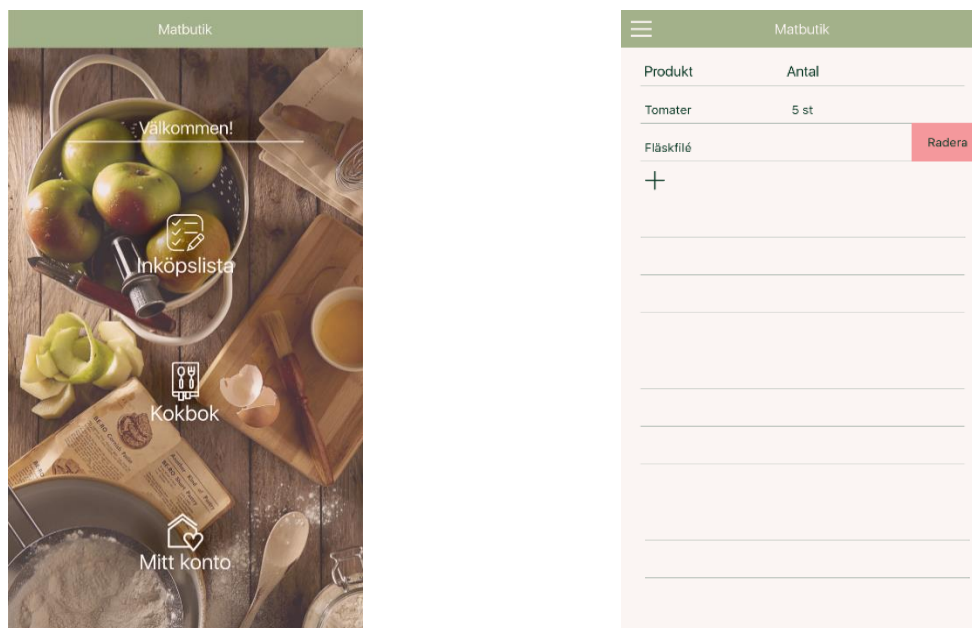


Figure 11. The picture on the left shows the start page and the picture to the right shows the shopping list when a user has swiped to remove a product.

The button *Shopping list* navigates the user to her shopping list and here the user can add or remove products from the list. This list can be shared between different users, but that function is not implemented in this prototype. To add an item the user press the plus sign on the list and the write the name of the item, to remove an item the user swipe to the left and a remove button is shown on the screen, see figure 11. The button *My account* navigate the user to a screen with buttons to see or change a

subscriptions, personal settings, recipes and so on. These function were not implemented since they were not used in the scenario.

4.3.1.1. Test result

The prototype was well received by the test participants and the scenario seemed clear to all participants. When the participants opened up the shopping list, three of them did so without any incorrect screen touches, the fourth participant had some trouble entering the list, see figure 12. This affected the average time it took for the participant to complete the task, making it a bit high even though the button is the first button on the start screen.

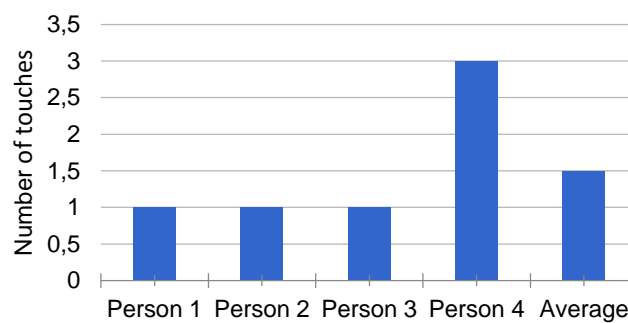


Figure 12. The diagram shows number of touches it took for each test participant to open the shopping list.

To add a new product to the list takes a minimum of four touches. All participant, except for one, were able to add a product to their shopping list without any incorrect touches, see figure 13.

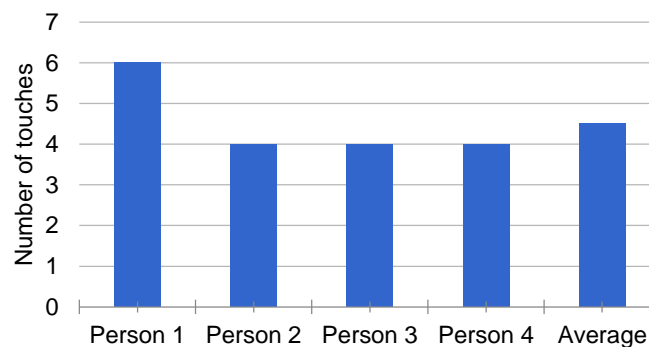


Figure 13. The diagram shows the number of touches it took for each participant to add a product to their shopping list.

To remove a product takes a minimum of two touches. Only one of the participant was able to complete the task without any errors. Participant number one did the highest amount of touches to perform the task. The biggest contributing factor to the incorrect touches was that the participants clicked the name of the product

instead of doing a swiping gesture and therefore the delete button did not appear on screen, see figure 14.

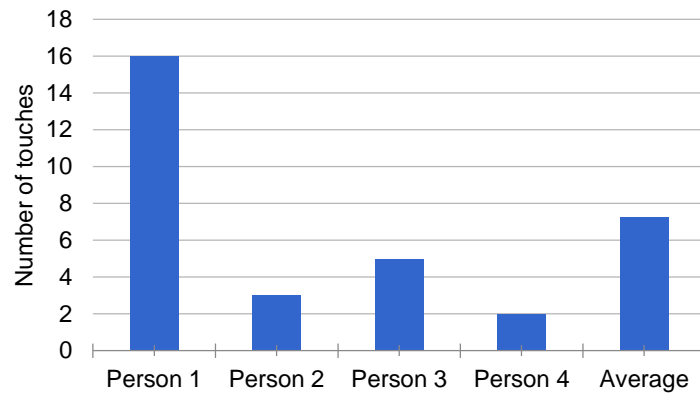


Figure 14. The diagram shows the number of screen touches it took for each participant to remove a product from the shopping list.

During the entire scenario, participant number two only made one error and participant number one performed sixteen incorrect screen touches, see figure 15. Most of these incorrect touches were performed when the participant should remove a product.

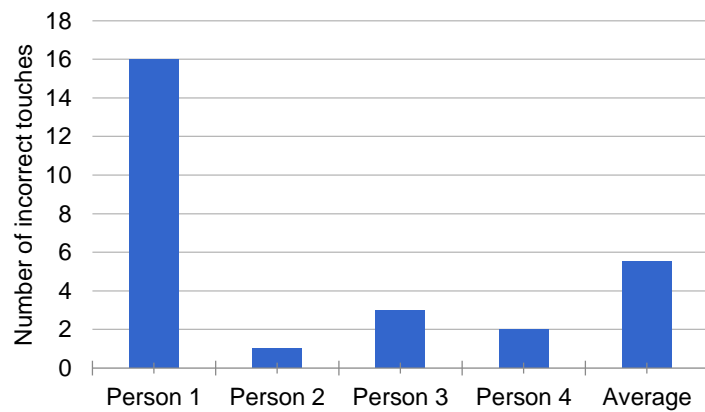


Figure 15. The diagram shows the amount of incorrect touches each user performed in the scenario.

The average time to execute the test was 79 seconds. Even though participant number one performed significantly more incorrect touches, this participant executed the test the fastest, see figure 16.

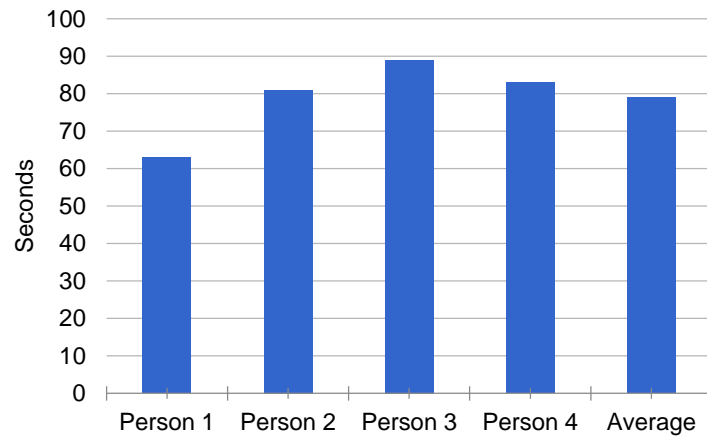


Figure 16. The diagram show the time it took for each participant to execute the test.

The participants did not show any signs of discomfort or stress whilst performing the test. It seemed like the prototypes was corresponding well to the participants' mental model and that the flow of the product was well perceived by the test participants.

4.3.2 Hi-fi prototype for scenario *User in the store*

Like the other mode of the prototype, the start screen consist of three buttons, but they have different functions; *Purchase*, *Information* and *My account*. The page *My account* is the same as in in the other mode of the prototype, the button *Information* is not implemented since the function is not used in the scenario. A message that welcomes the user to the store is shown on the top of the screen. This lets the user know that the application is aware of the user's position, see figure 17.



Figure 17. The start screen when the user is in the store

The button *Purchases* navigate the user to her shopping list. To make it easier for the user to find the products when shopping, they are arranged in the order they appear in the store. The user can start a purchase and scan the items by clicking the button *Start scanning*. A barcode scanner is shown at the top of the screen, this is illustrated with a barcode in the prototype, see figure 18. This window is supposed to show a camera view in a future product, but in the prototype this could not be implemented. To scan a product in the prototype the user has to click on the barcode, in the future product this function is intended to work automatically when the camera notices a barcode. When a product is scanned a check mark appears next to it and the product price is shown on the right side of the list to indicate that this item has been scanned. The user can scan items that are not on the list if the user wishes, the product will then appear on the list. If the user passes a product on the list without scanning it a notification in the form of a pop-up appears on the screen, reminding the user of the product. The user gets two options to choose between, go and get the product or ignore the message, see figure 18. If the message is ignored the item will not get a check mark and the user can instead scan the next item on the list. The list can be altered by other connected users, these connected users can add items on the list and if they do so, a pop-up appears on the user's screen. This pop-up consists of a choice to allow the change or ignore it.

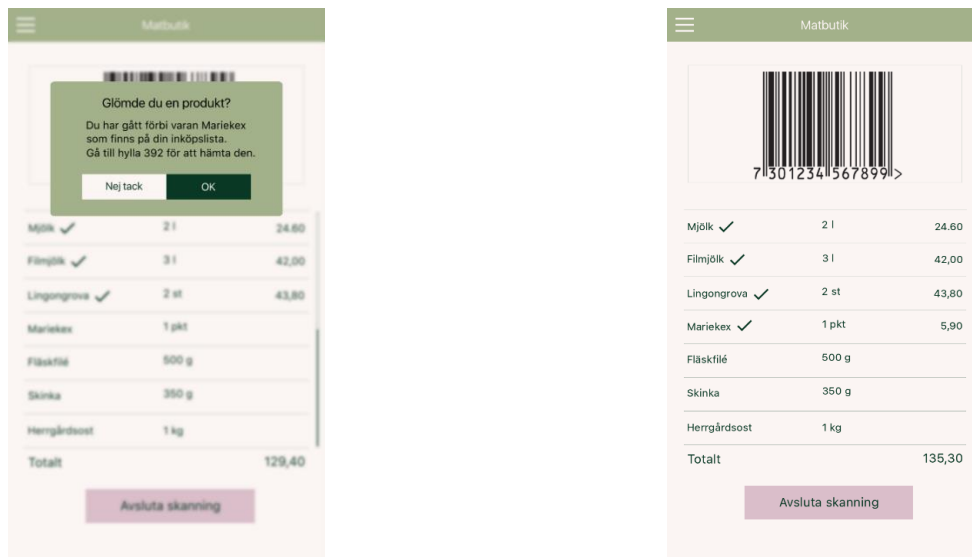


Figure 18. The picture to the left shown the pop-up for a forgotten product. The picture to the right shows the list when some item has been scanned.

If the user wishes to pay for the purchases with the mobile phone, the user can do so when she enters the payment zone. The phone senses that the user is in a payment zone with help from e.g. beacons and enables payment through the application. When the user is in a payment zone the button *End scanning* changes to *Payment*, see figure 19.



Figure 19. The figures shows the stage when a user is in the payment zone and have clicked on the *Payment* button.

4.3.2.1. Test result

It only took one screen touch for all of the participants to open *Purchases*. From that page it takes on screen touch to start scanning. Participant number one took eleven touches to start the scanner, see figure 20. This participant clicked back to the start screen and tried to use the button *Information* to start the scanner. After a couple of tries the participant asked for help, the test leader asked the participant to look more thoroughly on the screen and the participant found the *start scanning*-button and started the scanner.

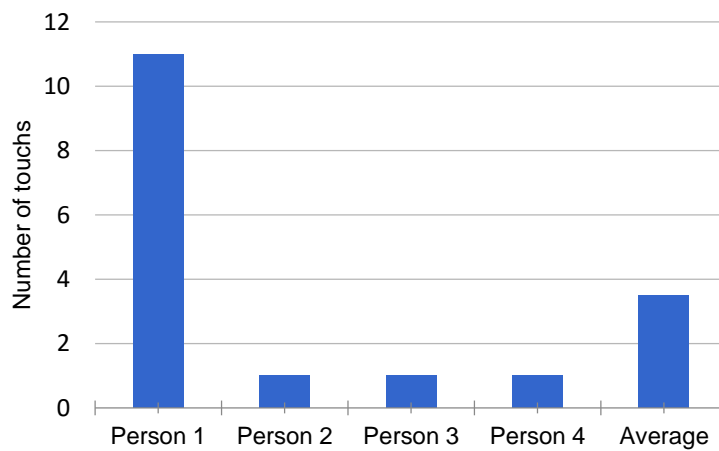


Figure 20. The diagram shows the number of touches it took for each participant to start the scanner.

The reaction time to notice the first pop-up varied between the participants. Two participants had the fastest response time and noticed the pop-up quickly after it appeared. Participant number three had the longest reaction time with more than twice the time it took for participant two and four to notice the pop-up, see figure 21.

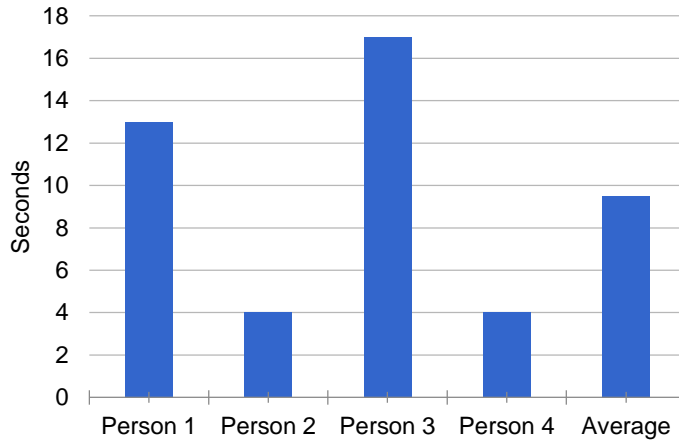


Figure 21. The diagram shows the time, in seconds, it took for each participant to notice the first pop-up.

The average reaction time on the second pop-up was significantly lower than for the first pop-up. It only took one second for participant number one to notice the pop-up, participant number three had the longest reaction time with 9 seconds, see figure 22.

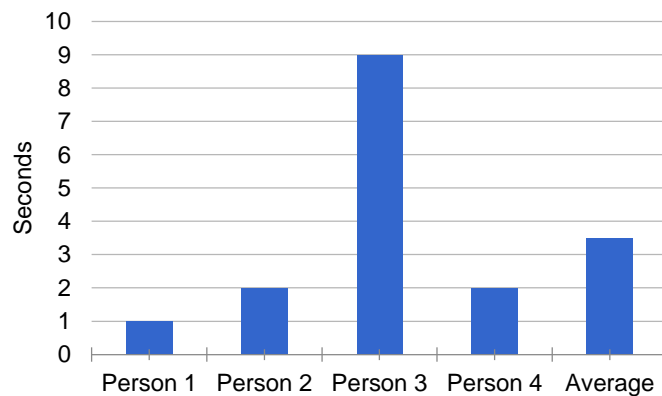


Figure 22. The diagram shows the time, in seconds, it took for each participant to notice the second pop-up

The total scanning session had an average time of 84.75. Participant number three took the longest time to scan the products on the list and participant number two took the shortest amount of time to scan the products, see figure 23. The difference in time between participant number two and participant number three is 154 seconds which is more time than it took for participant one, two and four combined to scan the products.

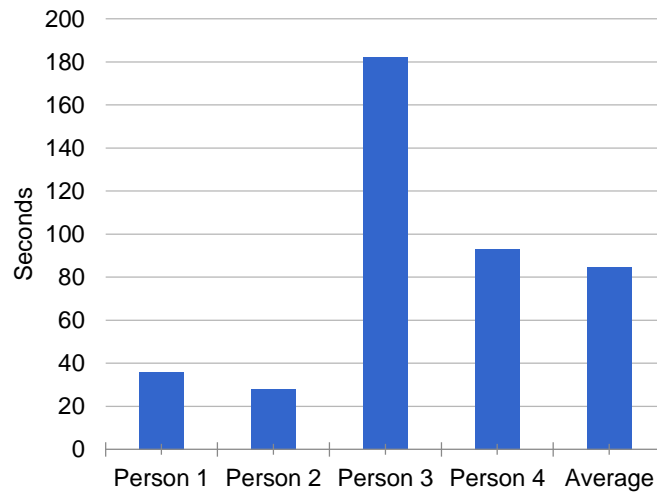


Figure 23. The diagram shows how long time it took for each participant to scan the product on the list.

Participant two, three and four all made five errors or less during the entire scenario. Test participant number one performed considerably more incorrect screen touches, see figure 24, this participant had a hard time with the payment. The participant closed the scanning process after a while and clicked on *My account* instead. When the participant clicked on Purchases again, the scanned item were gone. The test leader then helped the participant back to the position in the prototype where the participant were before clicking on *My account*.

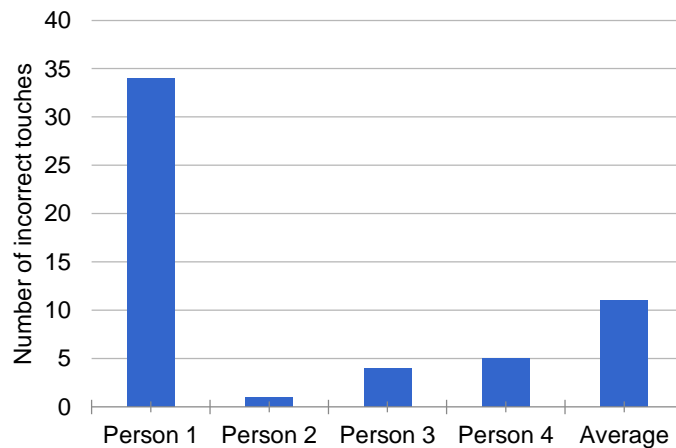


Figure 24. The diagram shows the amount of incorrect touches each participant performed during scenario *User in the store*.

Scenario *User in the store* took a bit longer for the participants to execute, the average time was 205 seconds. The fastest participant to complete the scenario was

participant number two. Participant number one and three had almost equal time duration and these two participants also used the highest amount of time to complete the scenario, see figure 25.

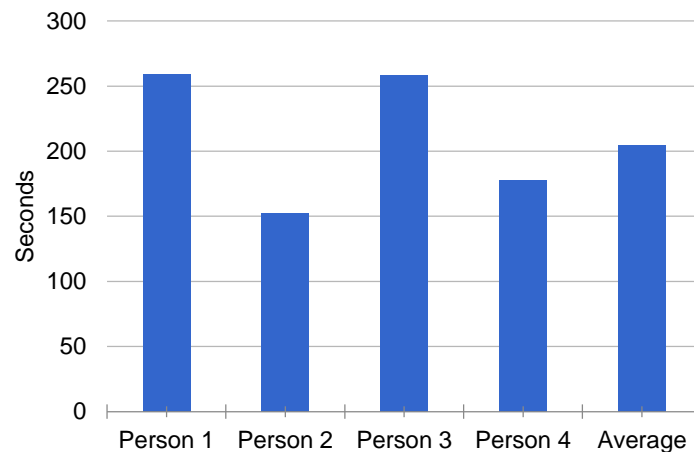


Figure 25. The diagram shows how much time each participant took to execute the entire scenario.

4.3.2.2. Result of the debriefing session

The first participant thought it was good that the prototype gathered all the functionalities into one product and also liked that more than one user could use the same account on different devices simultaneously. According to the participant the first pop-up screen need to appear quicker in order to make it more notable. Since the participant had a hard time removing a product in scenario one, the participant expressed that it was desirable to have an icon to the right of the screen explaining how the movement should be performed.

The participant was unsure of how the user add more than one item of the same product. In the prototype the quantity of a product was predefined and by scanning the product barcodes, all items of the product were scanned. The participant expressed an opinion that the users should be able to add more of the same items on the screen without having to scan the barcode several times. When a product had been scanned, the participant wanted the price of the product to appear on the screen.

Participant number two thought the prototype was good and presented the concept of the idea in a good way. The participant said that the participant often used scanning devices provided by the store whilst performing grocery shopping. Therefore, the participant was used to the process of self-scan groceries and thought this prototype had the same functionality as the ones in the store. Also, the prototype would enable the participant to have one hand free whilst purchasing groceries since the participant usually carries a mobile phone with the shopping list in one hand and use the other to scan the items. The participant could not see any downsides with

using a phone in this way and were open to the thought of paying for groceries in an unmanned payment zone. But if the cost of the purchase exceeded 300 SEK, the participant thought it would be a good idea to use some sort of electronic identifier to increase security. From the stores point of view the participant did see some security shortcomings since the store staff would not be able to make sure that every person have paid for their purchases when leaving the store. According to the participant, the feedback regarding a missed product was really good and the participant thought this function would be very useful.

Participant number three was unsure of how the prototype showed that the user was positioned in the store or at home. The participant thought that the start page should have a clear message that ensured the user of the position or an icon of a house if the participant was at home. A question regarding if the shelf number should be shown next to the product name in the shopping list was brought up. However, the participant said that a similar application show the shelf number and the participant was unsure of this function was desired or if the participant was just used to seeing it. Another request the participant had was that the prototype should show where the user could write down the volume of a product when creating a shopping list.

The participant thought the idea was good, especially that the prototype provided real time notifications. The design of the prototype was well received by the participant who thought that the colour choices was really good and that the appearance of the prototype was clean and attractive.

Participant number four thought the idea behind the prototype was really good and would use the app if it was available on the market today. The participant thought it was especially good that the list was synchronized between different devices. The prototype did not have any restriction or shortcomings according to the participant and the prototype had every functions the participant required. According to the participant, the buttons were clear and it was easy to navigate in the prototype. The participant requested tactile feedback in form of a vibration when a product had been scanned, which also would help users with vision loss.

None of the participants felt that it was unsafe to pay with an application in an unmanned payment zone. Some participants felt insecure on the feedback provided by the prototype, but overall the prototype was perceived as easy to use and had high usefulness according to all test participants.

5 Discussion

Here the results found in the master thesis as well as the method used is discussed. The section Findings discuss the data collected in the analysis. The section Development of prototypes discuss the design decisions that were made as well as the results from the user tests. The process and methods used in the thesis, as well as the use of personas and scenarios as a part of a development process, is discussed in the section Reflection on the process and methods.

5.1 Findings

The tools used to collect data resulted in a lot of usable data, but the process was time consuming. Since the gathered data was extensive and of high quality it enabled trustworthy conclusions regarding user patterns and made it possible to create lifelike personas.

To achieve diversity between the participants in the survey was hard within the given time and budget limitations. If the survey participants were more diverse demographically, the personas might have looked different. It was a clear overrepresentation of women and people in the ages 20 to 30 years old among the survey respondents. Since the survey answers were combined with the data collected from the interviews when the personas were created, the effect of this was reduced to a certain extent. When analysing the result from the interviews and survey the focus were not on ethnographies but on user behaviours, the result would be significantly different if it was done the other way around. This mean that conclusions about user behaviour cannot be drawn from just age and gender factors. It should instead be based on a combination of several factors.

Even though the survey results were divided into different user groups, it was clear that a lot of the answers were similar for all of them. These common factors are important to most people regardless of their shopping preferences. Almost every survey participant stated the shop location, price point or assortment of products as at least one of their main reasons for choosing a specific store. This may be due to the fact that most survey participant had limited spare time and would like to perform their grocery shopping more efficient. Although a lot of the aspect were similar for all persona skeletons it was easy to see user patterns within them. The aspects that separated them from each other were easy to identify and were used to

divide them in to groups. Aspects like how well they plan their grocery shopping and choose which product to purchase were apparent and made it easy to see different user patterns.

The data collected from the end users clearly state that they are interested in buying food online. For all the user groups the vast majority had tried or wanted to try to buy groceries online. It was also obvious that saving time and making the task easier and more flexible is the motivation for this. Some of the participants think that online grocery shopping as it work today demand more planning than visiting a physical store, both since they have to wait for their products to be delivered but also that they have to decide what to buy in advance. Both of these aspects can be seen as hindrances that keep people from ordering food online. Another hindrance is that people want to see and touch their products before buying them, a reason for this can be that the customers do not trust that the store will deliver high quality products. What makes a person think the quality of a product is good is very personal and make it even harder for the shop to live up to different people's standards. The online grocery stores have to work hard at changing peoples' perception of this and be very particular with the products that get delivered to the customers. These reasons stated by the participants are well conformed with what the available literature about e-commerce say as well.

Overall most user groups are most interested in buying a personalised assortment of products, but the user group that Anette is based on, would rather buy a dinner solution. This match with the fact that most user groups want to keep their flexibility when buying food. A dinner solution ensure that the customer does not have to plan what to buy or eat in the same extent. This can be desirable for Anette's user group since they are the ones that plan their purchases the most and maybe to the level that it becomes hard to handle.

The five personas identified in the interviews and survey were well received and seemed lifelike according to the participants in the workshops. The decision to not conduct a persona based on the user group that want to support local businesses was legit since none of the participants in the workshops requested a persona with these qualifications. This user group can however be of significance when looking nationwide. Perhaps it would be larger if the survey participants and interviewees were located in different parts of Sweden. There are some areas that is more sparsely populated than in the southern parts of Sweden and where they might be keener to support local businesses. Since the survey and interviews were not held nationwide, the quantity within all of the user groups may differ within different geographical areas. Efforts were made to make the survey nationwide in both Sweden and Norway, yet most of the participants were from the southern part of Sweden. These factor may have affected the personas developed in this master thesis.

5.2 Development of prototypes

The decision to use Ulrika as the main persona was based on the results found in the investigation phase of the project. When dividing the survey results into different user groups, her corresponding user group was one of the biggest ones. Her grocery shopping behaviour and goals also made her an excellent candidate. She craves much information about the products she buys at the same time as she plans her purchases well. The price is of course important for her but at the same time she is prepared to pay a little extra to get the service she wants. She is interested in buying food online, at the same time as she does not mind to visit a physical grocery store.

A problem with choosing Ulrika as the main persona was that she was created from a persona skeleton based on the survey result in contrast to the other skeletons that were based on the interview result. To ensure that this would not affect the result the interviews were analysed again to identify which of these could be mapped to the new skeleton.

5.2.1 Lo-fi prototype

It was decided to make prototypes based on four different scenarios, one of the scenarios worked as a base for two different prototypes, making the total number of prototypes five. The reason for making a couple of different ones was that the decision for which prototype that was most interesting should be based on user tests instead of the opinions of the designers.

Most of the prototypes got positive feedback from the test participants, they understood and appreciated the ideas behind the concepts. Most of them found the web page prototypes to be a bit safe and to not include many new elements. This is of course true since the purpose of these were to improve the purchase flow, hence it was built using traditional components. Based on this it was decided to not proceed with these prototypes even though the results from the test were satisfying. These products would certainly provide Ulrika with a pleasant shopping experience if she tried them, but they do not solve the problem with getting her to try to buy food online.

The mobile application prototypes got mixed reviews and it was noticeable that the test participants had not tried similar products before. The *Chat application* was the prototype that got most critique, the test participants thought it required too much work. The benefits with this type of interaction is that the same interface can be used for many functions, but it also means that the visibility as well as the learnability of these functions are affected. The idea behind the prototype was that the user might be more inclined to trust the service if she felt like she knew the "person" she was talking to, making her trust that an online purchase would be of high quality. This would demand a very sophisticated system using machine learning to understand

what the user want. This was clearly not appreciated by the test participants and it was decided to not proceed with this prototype.

The *Shopping tool* app was the most well received prototype, the test participants liked that it required few touches to perform the purchase and thought it was an innovative idea. One of the big grocery concerns in Sweden have a similar app where the customer can use a smartphone to scan products in the store, but in the *Shopping tool app* this functionality is enhanced by combining it with the customer's shopping list.

5.2.2 Hi-fi prototype

To base the colours of the prototype on the chosen personas personality seemed to be a good decision since the appearance of the prototype was well received by the test participants. Since the lo-fi prototype did not get any negative feedback regarding the functionality, a choice was made to keep the same functions in the hi-fi prototype. As all of the test participants expressed that they would use this prototype whilst performing their shopping and most of them said that the prototype contained all the desired functions, it seems like the prototype has high level effectiveness and usefulness. There are, however, some minor details that can make the prototype more user-friendly e.g. make it easier to remove a product and change the text on the *end scanning*-button.

All of the test participant performed some incorrect screen touches in the usability test, some more than others. A couple of these incorrect touches would probably not occur in a real setting. The scanning function were simulated which could have contributed to some of the confusions. The test participant that had problems paying for a purchase, was probably affected by the simulated environment. In a retail setting, the participant would not expect to be able to pay for a purchase in the middle of the store. A lab setting is not always the best choice for testing prototypes since it can give this kind of incorrect data. But in this master thesis this choice was the best alternative when all factors had been taken into consideration.

The application is an ideal steppingstone towards omnichannel retailing, since it introduces the mobile phone as a natural part of the shopping experience. Once it is integrated in the shopping behaviour it will become more natural for the customer to perform purchases with it in other situations as well. This application will give Ulrika the possibility to choose her products herself, which is something she values, at the same time as she can spend less time in the store and make it easier for her to plan her purchases.

For the prototype to work in a grocery store today and make it safe from the retailer's point of view, it would require some additional techniques. There would have to be some kind of check when the customer leaves the store to ensure that the purchase is paid for. One idea is that a barcode is shown on the display once the purchase is

paid for and that this code is scanned to open the exit gate, another alternative is that the staff perform random security checks to ensure that the customer have scanned the correct products. Both of these alternatives are used in grocery stores today when the customer uses a portable scanner or a self-service checkout. The prototype would have to use a location based service e.g. beacons to notify the customer that it has passed product or entered the payment zone. To make the shopping list easy to use, the app would have to analyse the shopping list content and match it with the scanned products to ensure that the customer do not have to do this task, this could be a deal breaker for if the application is useful or not.

5.3 Reflection on the process and methods used

The innovation process applied in this project generated a good result, although it has to be said that the process of performing a user-centred analysis before developing prototypes is very time consuming. But since the aim of the thesis was to both identify personas and user patterns as well as to investigate how these could be applied in a development process it was critical to do both of these stages. Regarding the iterations, if there were more time available it would have been beneficial to move back to gather more information after the personas had been created to use in the making of scenarios. The same could have been done after the creations of the prototypes as well. The results would probably have been even better if the process had moved back and forth between the second and third phase as well. But in this case, due to time constraints and good testing results, it was decided to not move back to the idea generating phases.

The decision to use interviews and a survey was based on literature and discussions with the project's supervisors. This ensured that both qualitative and quantitative data could be gathered and analysed. Using an online survey made it easier to get many responses to the survey but at the same time it probably mean that most of the respondents are used to interacting with computers and other technology. This could have affected the result as most of the respondents were very positive towards integrating technology and e-commerce in the shopping pattern. If the survey was distributed in other ways as well this might have changed to outcome of the survey. This was something that was discussed at length before the survey was sent out but due to the number of questions it would be hard to get people to answer it while e.g. visiting the grocery store.

When the personas had been created they needed to be validated, this was first done on experts since they have much knowledge about the problem area and are familiar with the term personas. Later the validation process hade to be done on end users, to ensure that the personas were lifelike and could be used as representatives for user groups. An alternative to workshops could have been to perform a walkthrough with the design team or another form of user tests. It was decided against theses

since the discussion between the participants was vital to understand how realistic the personas were. The analyst also wanted to incorporate scenarios in this process to understand how the participants approached the discussed problems.

From the expert workshop conclusions about which personas the future work should focus on could be drawn. One of the aims of this project was to develop a prototype based on the need of one persona, and the stakeholder workshop was the best starting point for deciding which were most interesting. It was necessary to limit the number of personas to present on the focus group meeting since it would be too difficult for the end users to comprehend information about all of them. Further, there was not enough time to discuss all of the personas since the meeting was not allowed to take more than two hours.

When developing the lo-fi prototypes and deciding to develop five prototypes instead of one it was clear that it would be a more time consuming process than to just focus on one. However, this decision contributed to even more inputs from the user and seemed like the correct choice. The lo-fi prototypes helped gather information on how the test participants wanted to use the product and clarify if the ideas had a high level of usefulness and efficiency. If the prototypes had not been developed it would have been hard to conduct a hi-fi prototype and the functionality choices would have been based on the developers' opinions. Also, changes in a hi-fi prototype is far more time consuming than in a lo-fi. The exploratory test on the lo-fi prototype was performed on experts on Dynamic dog, this choice may have affected the outcome of the test. Since, they have much knowledge on similar products on the market and may be bias. However, as they are used to work with this type of products they also know what makes a product good and what types of products that are requested.

The hi-fi prototype were developed to see if the end user found the product useful and effective. The prototype was developed directly from the lo-fi prototype and the developers found it unnecessary to develop a mid-fi in between. This choice was based on the fact that the lo-fi prototype was so well received that the developers did not find it necessary to test the functionality further. The assessment test performed on the hi-fi prototype was tested on the end user instead of experts to get a realistic view on how the product would be received. The test could include more test participant to ensure a more statistically secure outcome, but due to the time restriction the designers found that four participant was enough to conduct conclusions regarding the prototypes' usability. It was decided to not test the hi-fi prototype on users within Ulrika's user group since it was interesting to see how any type of user interacted with the product. It would have been interesting to perform tests on Ulrika's user group as well and compare the results.

5.3.1 Personas and Scenarios as a tool in a development project

Working with personas have been of great help in the innovation and design process of the project. In the early stages when the effort was on identifying opportunities and challenges they helped the analysts to stay focused on the users, instead of finding potential solutions straight away. To identify lifelike personas it was more important to find out more about user behaviours and to understand the user's need than to focus on what other stakeholders might want. Later on, when the personas were identified it gave the designers a starting point for discussions. The decision to use one main persona when designing the prototypes is based on the literature and made it possible to approach design issues from the persona's point of view. Some might argue that the prototype should be useful for all user groups, hence more personas should be involved in the design process. But by focus on one persona's need the purpose of the prototype got clearer and the efforts could be distributed easier. When making a product perfect for one persona it is more likely that the corresponding user group love the product and that other user groups will find it useful as well. As the result from the survey state that many user groups have similar demands on a digital solutions within the FMCG sector this is certainly true for the prototypes created in this master thesis.

The project team consist of two persons which were involved in all phases of the project, but there was still problems that they had perceived differently and where the persona's perspective helped to find the best possible solution. These effects would probably be even more noticeable in a larger team where many different people perform the tasks and where few people are present throughout the whole development process. Personas are an excellent communication tool since they are based on user data and describe the behaviour and goals. The process to identify personas is time consuming and for a small team it can be hard to justify the use of resources, but even a small team will benefit from making decisions based on personas e.g. help keep future updates cohesive.

Scenarios were of great help in the design of the prototypes, it evoked discussions about possibilities and problems early on in a lightweight manner. Problems were identified early and could be solved easier than they would have been later on in the design process. They also helped the designers to focus on how the user interacts with the product and in which settings a solution is needed, ensuring that the end result really is user friendly. The use of scenarios made the design of the lo-fi and hi-fi prototype easier since the designers had a clear idea of how the user should interact with the prototype.

The personas and scenarios were used to communicate the purpose of the project and prototypes in the workshops and user tests. This ensured that the participants had sufficient information about what they needed to do. It was, however, difficult to get the participants to use scenarios as a base for discussion, they easily got focused on the functions of a solution instead of the user interaction. This was

especially noticeable in the focus group workshop were some of the participants were not familiar with UCD.

5.4 Future research

In the future, this prototype could be used as way to make the transition to e-commerce smoother. By using machine learning to interpret data regarding shopping patterns and what kind of products the user buy, the future product could send target information to the user. The application would know what, when and how much of a product the user usually buy, as well as when the user is most approachable for interaction. For example, if a user buys a lot of milk, an offer to buy milk cheaper online can be sent out. This way the user would benefit from purchase online and would probably be more open to the idea.

By using machine learning to collect user information it would probably also be easier to offer a subscription to the user based on commonly purchase items. Both stakeholder and users would benefit from this. The stakeholder would get a constant customer base and these costumers would probably also buy additional sales on the same site as they have their subscription. The costumer do not have to carry home their basic goods and are assured that they always have staple goods at home. The store within the same concern would probably benefit from the future application as well since it would attract costumer to the store if the costumer got an improved shopping experience from using the application.

6 Conclusion

Based on the user-centred analysis, research questions two and three were answered. Five personas were identified, each of them represent a user group and have inherited the user patterns and attitude towards buying food online from them. One user group was not turned into a persona but it still has valid user patterns. The extent of which the purchase is planned beforehand differs between the personas, as well as how often they visit the store. They choose their grocery store and products based on different aspects, which define their goals with grocery shopping. Despite their different goals and user patterns, they have similar opinions about e-commerce in a FMCG setting.

Regarding research question one, whether personas and scenarios are useful when developing a new software product, it can be concluded that they are excellent tools to use both in an innovation and design process. They are helpful to convey ideas or possibilities as well as to ensure that all involved parties speak the same language. They clearly helped the analysts to focus on the users and not to get fixated with possible functions in the information gathering phase. They also ensured that the designers worked with a non-elastic user in mind and helped them evaluate their ideas in a lightweight manner. It is easier to justify the use of personas in a large development project but smaller teams will benefit from them as well.

All of the participant in the assessment test stated that they would use the product if it was available on the market today. The test shows that the product have high level of usefulness, effectiveness and satisfaction, thus research question four is answered. Since the test participants considered it to be a desirable application it is concluded that this digital solution enhance the costumer's shopping experience. It can therefor also be concluded that developing a product to suite one persona's need, can enhance the shopping experience for many users.

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Appendix A Interview script

The following interview script was used to gather information from grocery store customers.

- Kön, ålder och arbete?
- Vem sköter matinhandlingen i ditt hushåll?
- Hur långt är det till din närmsta mataffär?
- Hur ofta handlar du mat?
- Var sker merparten av dina matinköp?
 - Varför sker de just där?
 - Hur upplever du valet av inhandlingsplats?
 - Vad fungerar bra/ mindre bra?
- Har du provat att handla mat på något annat sätt än i vanliga mataffärer?
 - Om ja: Vilka?
 - Varför just dessa?
 - Hur kom det såg att du provade på detta första gången?
 - Hur frekvent handlar du din mat på detta sätt?
 - Vilken typ av inköp var det? (Matkasse, lösplöck av varor, varor från specialaffärer?)
 - Hade du kunnat tänka dig att prova andra typer av inköp?
 - Hur upplevde du inköpet?
 - Om positivt svar: Finns det något som du tycker borde förbättras
 - Om negativt svar: Kan du utveckla vad du tycket fungerade mindre bra?
 - Var det något som du tyckte var lite mer positivt än det du just nämnde?
 - Via vilken typ av enhet utför du din handling?
 - Hade du kunnat tänka dig att handla på det sättet igen?
 - Varför eller varför inte?
 - Hade du kunnat tänka dig att gå över helt till detta handlingsätt?
 - Om nej: Finns det några specifika varor du hade kunnat tänka dig att handla enbart på detta sätt? och i så fall vilka?
 - Om nej: Varför inte?
 - Har du funderat på det någon gång?

- Finns det några aspekter som hade fått dig att ändra dig?
- Vad anser du vara viktigt vid val av plats för matinköp?
 - Påverkar din omgivning dig i valet av plats för dina matinköp?
- Hur bestämmer du vilka varor du köper?
 - När bestämmer du dig för vilka produkter du ska köpa?
 - Finns det vara som du oftare köper än andra? varugrupper, märken.
- Brukar du söka information om matvaror?
 - Varför eller varför inte?
 - Vilken information behöver du veta för att du ska köpa en råvara?
 - Påverkar detta ditt val av råvaror?
- Har du besökt någon mataffärs hemsida?
 - Vilken?
 - I vilket syfte?
 - Bra respektive dåligt?
- Brukar du kolla upp recept innan du handlar?
 - Hur påverkar detta dina inköp?
 - Hur ofta gör du det?
 - Bra respektive dåligt?
- På vilka olika sätt tror du att det är möjligt att köpa mat idag?
 - Hur har du hört talas om dessa?
- Hur tror du att du handlar mat om 5 år?

Appendix B Survey questions

The following section contain all the questions and the answer options available in the survey that was sent out to grocery store customers.

1. Matinköpsvanor och e-handel

Vi undersöker hur personer handlar mat och deras inställning till e-handel som en del i vårt examensarbete inom interaktionsdesign. Undersökningen är helt anonym och tar cirka 10 minuter.

Tack för att du ställer upp!

2. Hur många gånger handlar du mat per vecka?

Svar: 0-7

3. I vilken utsträckning bestämmer du vilka varor du ska köpa innan du går till affären (0= inte alls, 5= mycket stor utsträckning)

Svar: 0-5

4. Vad anser du är de viktigaste egenskaperna vid val av matbutik? (tryck på "välj graderingsobjekt" och välj minst tre alternativ och placera dem i prioritetsordning)

Svar: Brett sortimentet, Har ekologiska och närproducerade varor, Bra prisnivå, Affärens placering, Främja lokal butik, Lätt att hitta i butiken, Beprövad butik

5. Vad anser du är viktigast vid val av produkt? (välj minst tre alternativ och placera dem i prioritetsordning)

Svar: Bra prisnivå, Bra kvalitet, Hur varan ser ut, Önskvärd mängd, Beprövat varumärke, Ekologisk och närproducerad, Förpackning och material

6. Har du köpt livsmedel via internet? (Ange endast ett svar)

Svar: Ja, Nej (Hoppa till nr 15)

7. Vilka anledningar fick dig att prova på att handla livsmedel via internet? (Ange gärna flera svar)

Svar: Spara tid, Enklare att utföra inköp, Bra prisnivå, Brett sortiment, Kan utföra inköp när det passar mig, Spännande att prova på något nytt, Annat (Fritextfält)

8. Vilka av följande typer av inköp har du provat? (Ange gärna flera svar)

Svar: Matkasse, Matkasse med tilläggsvoror, Lösplock av varor, Helt recept, Annat (Fritextfält)

9. Var har du utfört dina inköp? (Ange gärna flera svar)

Svar: ICA, Coop, Mathem, City Gross, mat.se, Linas Matkasse, Annat (Fritextfält)

10. Vilken typ av enhet använder du oftast i samband med köp av livsmedel via internet? (Ange endast ett svar)

Svar: Dator, Mobiltelefon, Surfplatta, Annat (Fritextfält)

11. Varför använder du denna enhet? (Ange gärna flera svar)

Svar: Enkel att använda, Nära till hands, Överskådlig, Har inte provat tjänsten på annan enhet, Erbjuder mobilitet, Tjänsten fungerar bäst på denna enhet, Annat (Fritextfält)

12. På vilken plats utför du oftast dina matinköp via internet? (välj minst ett alternativ och placera dem i prioritetsordning)

Svar: I hemmet, På jobbet, I kollektivtrafiken, I bilen, Varierande plats, Annan plats

13. Hur upplevde du följande: (0= inte alls nöjd, 5= mycket nöjd) (Ange endast ett svar per fråga)

Sortiment (0-5)

Leverans (0-5)

Prisnivå (0-5)

Kvalitet på produkter (0-5)

Tjänstens användbarhet (0-5)

Helhetsintryck av tjänsten (0-5)

14. Vilka av följande alternativ kan du tänka dig att beställa via internet? - Gå till 19 (Ange gärna flera svar)

Svar: Matkasse, Matkasse med tilläggsvoror, Lösplock av varor, Helt recept, Prenumeration av basvaror, Annat (Fritextfält)

15. Hade du kunnat tänka dig att köpa livsmedel via internet? (Ange endast ett svar)

Svar: Ja, Nej (Hoppa till nr 18)

16. Vilka anledningar gör att du är intresserad av att handla livsmedel via internet? (Ange gärna flera svar)

Svar: Spara tid, Enklare att utföra inköp, Bra prisnivå, Brett sortiment, Kan utföra inköp när det passar mig, Spännande att prova på något nytt, Annat (Fritextfält)

17. Vilken typ av inköp är du intresserad av? - Hoppa till nr 19 (Ange gärna flera svar)

Svar: Matkasse, Matkasse med tilläggsvoror, Lösplock av varor, Fullständiga receipt, Prenumeration av basvaror, Annat (Fritextfält)

18. Vilka anledningar gör att du inte är intresserad av att handla livsmedel via internet? (Ange gärna flera svar)

Svar: Vill se och känna på varor innan jag köper dem, Svårt att hitta passande tid för leverans, Vill inte vänta på produkter, Vill få inspiration i butiken, Tillkommer extra avgifter, Litar inte på att behandling av personuppgifter och betalning sker säkert, Kräver mer planering än att gå i fysisk butik, Högre prisnivå än i fysisk butik, Annat (Fritextfält)

19. Vad tycker du är viktigast att en digital mataffär erbjuder? (välj minst tre alternativ och placera dem i prioritetsordning)

Svar: Flexibel leverans, Prenumeration på vanligt köpta varor, Matkasse, Lösplock av varor, Receiptgenerator, Inköpslista, Att varor jag köper ofta är lätta att hitta, Erbjudanden och förmånklubb, Prisjämförelsetjänst

20. Hur vill du bli informerad om matbutikens erbjudanden och nyheter? (Ange gärna flera svar)

Svar: E-post, SMS, Reklamutskick, App-notifikation, Tidningsannonser, Sociala medier, TV-reklam

21. Hur ofta vill du bli kontaktad av din matbutik? (Ange endast ett svar)

Svar: En gång per månad, Två gånger per månad, En gång per vecka, Två gånger per vecka, Annat (Fritextfält)

22. Har du handlat något av följande online: (gå vidare utan att fylla i om inget alternativ stämmer in på dig)(Ange gärna flera svar)

Svar: Restaurang/ Take away, Kläder och skor, Hemelektronik, Böcker och media, Resor, Skönhet och hälsa, Annat (Fritextfält)

23. Jag är intresserad av att använda en mobil enhet i samband med matinköp i följande syfte: (Ange gärna flera svar)

Svar: Söka information, Skriva inköpslista, Hitta i butik, Utföra matinköp via internet, Hitta kampanjer för specifik produkt, Få kampanjnotifikationer på plats i butik, Självskanna produkter på plats i butik, Betala inköp via app på plats i butik, Skanna produkter hemma för att generera receptalternativ, Annat (Fritextfält)

24. Hur ofta söker du på recept på internet? (0= aldrig, 5= mycket ofta)(Ange endast ett svar)

Svar: 0 (Hoppa till nr 26) - 5

25. Vilka av följande faktorer är viktigast för dig när du väljer recept på internet? (välj minst tre faktor och placera dem i prioritetsordning)

Svar: Tilltalande bilder, Ingredienser kan läggas till i digital inköpslista, Receptet är enkelt att följa, Omdömen från användare, Pris per portion, Näringsinnehåll per portion, Anpassa antalet portioner

26. Hur villig är du att prenumerera på följande: (0= inte alls, 5= mycket villig)(Ange endast ett svar per fråga)

Matkasse (0-5)

Basvaror (0-5)

Koncept (t ex. en diet, ett kök, en kock) (0-5)

Matkasse med tilläggsvaror (0-5)

Lösplock av varor (0-5)

Fullständiga recept (0-5)

Annat(Fritextfält)

27. Hur ofta hade det varit önskvärt för dig att få hem din prenumeration? (Ange endast ett svar)

Svar: En gång i månaden, Två gånger i månaden, En gång i veckan, Två gånger i veckan, Annat (Fritextfält)

28. Om du ska beställa en matkasse, vilka faktorer tycker du är viktigast? (välj minst ett alternativ och placera dem i prioritetsordning)

Svar: Prisnivå, Svårighetsgrad på recept, Följer ett koncept, Varierande råvaror, Fullständig innehållsförteckning för måltider, Möjlighet att anpassa recept (t. ex efter allergi, matpreferens), Möjlighet att beställa tilläggsprodukter, Möjlighet att lägga till och ta bort recept

29. Kön (Ange endast ett svar)

Svar: Man, Kvinna, Annat

30. Ålder (Ange endast ett svar)

Svar: Under 20 år, 20-30 år, 31-40 år, 41-50 år, 51-60 år, 61-70 år, 71-80 år, 81-90 år, Över 90 år

31. Har du/ni några barn som bor hemma? (Ange endast ett svar)

Svar: Ja, Nej (Hoppa till nr 33)

32. Hur många barn? (Ange endast ett svar per fråga)

0- 5 år: (0, 1, 2, 3, 4, >4)

6- 12 år: (0, 1, 2, 3, 4, >4)

13- 17år: (0, 1, 2, 3, 4, >4)

18 eller äldre: (0, 1, 2, 3, 4, >4)

33. Hur många personer ingår i ditt hushåll? (Ange endast ett svar)

Svar: 1(Hoppa till nr 35), 2, 3, 4, 5, 6, 7, 8, 9, 10, >10

34. Är du huvudansvarig för hushållets matinhandling? (Ange endast ett svar)

Svar: Ja, Nej, Delat ansvar

35. Vad är din huvudsakliga sysselsättning just nu?

Svar: Fritextfält

36. Hur mycket fritid har du överlag per dag? (antal timmar)(Ange endast ett svar)

Svar: 0-24

37. Tack för din medverkan!

Vi uppskattar att du tagit dig tid att svara på våra frågor och värdesätter dina svar. Resultatet kommer användas i vårt examensarbete som grund för att ta fram användarmönster i samband med matinköp. Arbetet kommer att publiceras i början av sommaren, kontakta Sarah eller Caroline för mer information.

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Appendix C Lo-fi prototype exploratory test

This appendix contain all scenarios and corresponding tasks that were used to evaluate the lo-fi prototypes.

C.1 Prototype Web shop

Scenario: Du sitter på jobbet och kommer på att du har ett möte ikväll och kommer därför inte hinna handla. Du går in på websidan, kontrollerar att ekofiltret är på och börjar att handla.

1. Du vill köpa falukorv och vill därför söka efter det via sökfunktionen. Lägg till 1st Scans falukorv, 800g i varukorgen, Felix ketchup 1kg och 500g King Edwards potatis i varukorgen
2. Du vill köpa köttfärs och använder menyn för att hitta det. Lägg till 500g Nötfärs från Älmhult i varukorgen
3. Gå till kassan. Du vill få varorna hemkörda på söndag mellan 18 och 19 och betalar via faktura och slutför köpet.

C.2 Prototype Inspirationally web shop

Scenario: Du sitter hemma vid din dator, du vet inte vad du vill äta de närmsta dagarna och vill därför ha lite extra inspiration. Du går in på MatInspo och ser om något fångar ditt öga.

1. Kolla runt på sidan och välj en inspirationsvideo. Ta reda på vilka råvaror som videon har. Välj två av råvarorna och lägg dom i din varukorg
2. Gå in på din till basbutiken och kolla din stående prenumeration. Välj att du vill få hem två mjölkpaket och ett 12pack ägg
3. Gå till kassan och bekräfta ändringarna.

C.3 Prototype Inspirationally chat app

Scenario: Du sitter på pendeln på vägen till jobbet och vet inte vad du ska laga för något ikväll och vill få inspiration.

1. Du vet inte vad du ska laga till middag idag och vill ha förslag på receptet
2. Du vill inte laga de recepten som visas och frågar därför efter vegetariska recept istället
3. Rödbetsbiffar låter gott så du vill veta mer om detta recept. Lägg till receptet i dina favoriter

C.4 Prototype Information app

Scenario: Du är och handlar efter jobbet, du står vid hyllan för krossade tomater och vill veta mer information om tomaterna.

1. Du vill få veta mer information om Saltå kvarns krossade tomater.
2. Du är inte nöjd med innehållsförteckningen och väljer att skanna en QR-kod på hyllan för att få information om alla krossade tomater. Du vill veta mer om den burk med krossade tomater som är mest ekologisk. Du är nöjd med denna vara och lägger den i din varukorg och handlar vidare.

C.5 Prototype Shopping tool app

Scenario: Du ska ut till sitt landställe i skärgården i helgen och måste gå och handla till detta eftersom den lokala butiken har ett riktigt dåligt ekologiskt utbud. Du tar upp din telefon och öppnar din app

1. Du vill kolla på din inköpslista och börja skanna dina varor
2. Du glömde skinkan som du ska ha till pastan i helgen
3. Du ser information om att inköpslistan har ändrats
4. Betala för dina varor. Kontrollera informationen och slutför ditt köp

Appendix D Hi-fi prototype assessment test

The following appendix contains the test plan and the test scenarios that were used during the hi-fi test.

D.1 Test plan

D.1.1 Purpose of the usability test

The purpose of the usability test is to get an understanding of how usable and user-friendly the prototype are. The test will also evaluate the design and the idea behind the prototype to see if the prototype have high usefulness.

D.1.2 Research questions

1. How useful is the prototype?
2. How well does the flow match the test participant's mental model?
3. Can the test participant perform the task within the benchmarks?
4. Do the user understand how to navigate in the prototype?
5. How easy does the user find the function and buttons that they wish to use?

D.1.3 Participant characteristics

The prototype will be tested on four test participants, two women and two men. Since the chosen persona is a female is it important to test the product on women but the product should work for both sex and that is the reason two men are chosen. The participants are in the ages between 25-35 years old. They all have the main responsibility of their household's purchase of groceries.

D.1.4 Test design

This usability test will mostly focus on collecting assessment data to detect flaws in the prototypes' design. The test participants will be divided up into two groups, one group will start the test at the first scenario which is to add grocery items in a shopping list. The test participants in group number two will start at the second scenario which contains tasks about scanning groceries in a fictive store.

The session will be around 30-40 minutes long depending on how quickly the test participant understand the scenarios. 10 minutes of each test will be used for pre-test tasks. Before the tests start the test participant gets to sign a disclosure agreement and the persona will be presented. The test moderator will also ensure that the test participant are aware of the observer in the control room and tell the participant to think aloud so the test generates more data. The test itself will take approximatively 20 minutes. After the test is conducted a 10 minutes debriefing session will be held. This debriefing session will consist broad and open question to collect preference data.

D.1.5 Task list

1. The test moderator welcomes the test participant.
2. The test participant gets to sign a disclosure document that includes information regarding the recording of the test.
3. The test moderator present the persona and the app prototype.
4. The test moderator open up the first app.
5. The test participant reads the first scenario and execute the tasks.
6. The test moderator open up the second app.
7. The test participant read the second scenario and execute the tasks.
8. The debriefing session starts and the participant gets to answer preference questions.

D.1.6 Test environment and equipment

The usability test will be performed in a classical test laboratory setup environment at Ingvar Kamprad Designcentrum at Lund University. The room will be equipped with cameras and microphones to record the whole test session. The equipment needed is one iPhone to test the prototype on and record finger touches whilst using the prototype, fictive barcodes to scan, one payment zone sign, papers and a pen to write down observations and the scenarios and script for the participants.

D.1.7 Test moderator's and test logger's role

The test moderator will be in the same room as the test participant during the test. First the moderator will describe the chosen persona and give a short introduction to the session. After this the test moderator will open up the prototype app and hand out the first scenario and the corresponding task to the test participant. Since the test is an assessment test, the test moderator will have very limited interaction with the test participant during the performance of the tasks.

The logger will be sitting in the control room and observe the test and control that the recording equipment is working as it is supposed to.

D.1.8 Data that will be collected

To answer the following questions:

1. How useful is the prototype?
2. How well does the flow match the test participant's mental model?
3. Can the test participant perform the task within the benchmarks?
4. Do the user understand how to navigate in the prototype?
5. How easy does the user find the function and tools that they wish to use?

Both performance and preference data will be collected. Performance data will be collected by counting incorrect selections, how many tasks the test participant can complete without help from the test moderator and by measuring how long time the tasks is taking. Preference data will be collected by looking at how straightforward the prototype is and the usefulness of the buttons and menus.

After the test in the debriefing session preference and qualitative data will be collected, the debriefing session will focus on how the user experienced the prototype and what feelings the test participant have regarding the product.

D.2 Test scenarios

D.2.1 User at home

Du befinner dig i ditt hem och ska planera vad du ska handla i mataffären. Du har din app uppe och vill lägga till fem stycken tomater och fläskfilé i din inköpslista. När du väl lagt till produkterna inser du att du redan har en fläskfilé i kylskåpet och bestämmer dig därför för att ta bort denna ur din inköpslista.

Korrekt utförd när: Testdeltagaren har klickat på *Inköpslista* lagt till rätt produkter i sin lista och sedan tagit bort fläskfilén.

Tidsåtgång: 3 minuter

Maximal tidsåtgång: 5 minuter, efter det så avbryts scenariot

D.2.2 User in the store

Du och Peter har gemensamt matkonto och delar på all mat ni köper hem. Det är din tur att gå och handla och du har precis kommit in matbutiken och ska handla hem mat. Du har din app uppe och vill köpa de matvaror som står på din och Peters inköpslista. Du vill använda din mobiltelefon för att självscanna och betala för de varor som du köper.

För att skanna varor klickar du på den streckkod som visas i telefonen.

Korrekt utförd när: Testdeltagaren har gått in på *Inköp*, påbörjat skanningen, skannat alla varor på listan inklusive de som Peter lagt till och betalat för sina varor.

Tidsåtgång: 10 minuter

Maximal tidsåtgång: 15 minuter, efter det så avbryts scenariot.

Appendix E Personas

The following section presents the five personas identified in this master thesis.

E.1 Anette

Anette är 53 år och arbetar som öron- näs- och halsläkare vid Lunds universitetssjukhus och har gjort det i 21 år. Hon har varit tillsammans med sin man sedan hon gick tredje året på gymnasiet och bor i ett radhus på Norra fälåden. Det tar henne ungefär en kvart att komma till sjukhuset med cykel. Hon och hennes man har ett barn tillsammans, Jacob, som flyttade hemifrån för två år sedan. Hennes arbetsdagar är långa och krävande och hon är oftast inte hemma fören runt 19.00. När hon väl kommer hem från jobbet är hon ofta ganska trött och vill därav laga mat som hon känner sig bekväm med och vet tar kort tid att förbereda. Ibland behöver hon dock lite extra inspiration och söker då recept via internet som ska vara lätta att följa, men oftast väljer hon recept som hon har lagat förut och vet smakar bra. Eftersom hon och hennes man inte alltid äter tillsammans är det viktigt för henne att kunna anpassa antal portioner som receptet avser och att hon kan läsa vad andra tycker om receptet innan hon lagar det.



Att handla mat är inget som Anette uppskattar utan hon gör det gärna så sällan som möjligt helst endast en gång i veckan. Hon handlar alltid i samma butik eftersom att hon vet att denna butik har ett väldigt brett sortiment och därav har alla de produkter som hon vill ha. Dessutom tar det inte mer än 10 minuter att ta sig till butiken. Vid det här laget känner hon igen några i personalen och vet vem hon kan fråga om middagstips och vem som har bäst koll på de olika avdelningarna. Hon planerar noggrant och skriver upp på en detaljerad inköpslista vad hon ska köpa för produkter innan hon beger sig iväg till affären. Väl inne i affären följer hon sin lista och det är väldigt sällan något som inte står på listan följer med ner i hennes kundvagn, men hon är noggrann med att produkterna möter alla de krav hon ställer på produkterna.

Hon köper varumärken som hon har provat förut eftersom hon vet att de produkterna håller god kvalitet. Anette är även väldigt mån om att hennes råvaror är framtagna på ett sätt som gynnar hela produktionskedjan, från bonden som producerar råvaran till de som slutligen säljer den färdiga produkten.

Anette handlar ofta på Internet, hennes senaste köp var både en resa till Rom och en roman att läsa på planet dit. Sedan hon blev tipsad om en digital resebyrå av sin arbetskollega beställer hon alltid sina resor via det bolaget. Hon kan även tänka sig att handla mat online fast i dagsläget har hon inte gjort det. Hon kan ju inte granska varorna på samma sätt som hon gör själv i affären och måste dessutom anpassa sina lediga timmar efter leveranstiderna. Men hon är ganska intresserad av att handla lösplock av varor på detta sätt eftersom hon då skulle kunna spara tid och utföra handlingen när det passar hennes schema, dessutom tycker hon att det känns spännande att prova på det. Men för att ta steget till att handla online är det viktigt för henne att lätt kunna välja när hon ska få varorna levererade och att hon lättar hittar och kan handla alla de produkter som hon brukar att köpa i sin vanliga butik. Hon kan även tänka sig att ha en stående prenumeration på sina produkter och få hem sina varor varje vecka. Eftersom Anette skriver inköpslistor innan hon går och handlar hade hon uppskattat om hon kunde använda sin mobil till att göra detta så hon lättare kunde få med listan till butiken, om hon senare kunde betala sina varor i butik med appen hade hon upplevt den ännu bättre. Hon kan även tänka sig att bli kontaktad av butiken via notifikationer från appen men ser helst att hon får information via e-post så att hon kan kolla på det passar hennes tidsschema.

E.2 Simon

Simon är 23 år gammal och bor i en studentlägenhet i Göteborg. Lägenheten är ganska liten men är ändå relativt välplanerad så han trivs bra med sin bostad. Simon läser sin fjärde termin på socionomprogrammet och trivs väldigt bra med både programmet och att vara student. Han har många vänner som också studerar och är aktiv i ett flertal studentföreningar. På sin fritid brukar han ofta umgås med sina vänner eller spela datorspel, ibland studerar han med men han gillar att ha mycket fritid och prioriterar det högre. När han är klar med sina studier planerar han att söka jobb på socialtjänsten och hjälpa familjer som inte klarar av sin ekonomi.



Ungefär varannan dag handlar Simon mat och då brukar han gå till den affären som är närmst honom, vilket brukar vara närbutiken på hörnan som ligger cirka 200 meter från hans bostad. Butiken har ett okej utbud och han kan hitta det mesta han

behöver där, om än inte allt. Närbutiken är lite dyrare än han önskat men han tycker att det är för långt till den större butiken. Han har en tanke på att börja storhandla eftersom han inte skulle behöva handla lika ofta då, men han glömmer oftast bort hälften av de varor han skulle ha och får alltid gå tillbaka och handla fler gånger. Han tänker ofta ut en bas till vad han ska äta innan han går till affären men merparten av det som inhandlas väljs spontant. Ibland kommer han inte på vad han ska handla och brukar då googla på recept på måltider som han lätt kan återskapa och som har fått bra omdömen från andra användare. När han står i butiken och ska välja produkter brukar han kolla på prisskillnaden mellan produkterna och på om varan är av bra kvalitet, men ofta tar han det varumärket som han står närmst. Det är även väldigt viktigt för honom att han får rätt mängd av produkten för den måltid han tänker använda den till. Eftersom Simon bor själv är det viktigt för honom att han inte får för stora volymer av varor eftersom han inte hinner äta upp allt innan det blir gammalt.

Simon har inget intresse för att gå i butiker och shoppa och handlar därav merparten av sina inköp på internet för att undvika detta. Mat har han dock inte handlat på internet ännu men han funderar starkt på det. Detta för att kunna beställa mat när han har tid för det och på så sätt spara tid som han kan använda till andra aktiviteter som han tycker är roligare. Han har funderat på att matkasse med tilläggsvoror så han aldrig behöver gå ut och handla mat. Då är det dock viktigt för honom att matkassen inte är för dyr eftersom han endast har studiemedel, han vill även kunna anpassa innehållet i kassen då han är allergisk mot nötter och inte vill ha några recept som innehåller detta. För att han ska beställa en matkasse är det viktigt att butiken erbjuder flexibel leverans så att han inte måste stanna hemma från någon rolig aktivitet för att han tidsmässigt har bundit upp sig efter sin matkasses leverans. Det är även viktigt för honom att han kan handla alla sina produkter på ett och samma ställe och inte behöver gå till flera olika butiker så därför måste den digitala butiken även erbjuda lösplock av varor och inte endast matkassar. Simon använder sin mobiltelefon i många olika syften och kan tänka sig att han i framtiden använder den för att skriva inköpslistor och för att söka information om butiken och varorna som finns där. Han kan även tänka sig att köpa sina varor via mobiltelefonen men gör det helst via sin dator. Det är även via app-notifikation och e-post som han helst blir kontaktad av butiken om dom har någon information som dom ska nå ut med.

E.3 Sandra

Sandra är 26 år och bor i Malmö med sin pojkvän Johan. Hon arbetar som rekryterare på Sweco, hon började jobba där direkt efter sin kandidatexamen inom personal och arbetslivsfrågor och har varit där i 1 år. Hon arbetar vanliga kontorstider och brukar vara hemma runt 17.30 på vardagarna. Två vardagar i veckan går hon till gymmet och ibland följer Johan med henne. Sandra och Johan bor i en tvåa på Möllan, det är en hyresrätt men de sparar just nu för att kunna köpa något eget.



Hon har ingenting emot att gå och handla mat men det är klart att det ibland är jobbigt att behöva gå och handla efter en lång dag på jobbet. Det är oftast hon sköter inhandlingen och bestämmer vilka varor som ska köpas. Det är inget som är planerat utan det bara faller sig naturligt att hon tar på sig ansvaret för att kylskåpet är välfyllt. Hon har ett antal butiker i närheten av lägenheten som hon brukar handla i, vilken hon väljer beror dels på vad hon ska handla men framför allt på vilka erbjudanden och kampanjer som är aktuella för tillfället. Hon handlar oftast på Netto för att det är billigt och det mesta hon behöver finns där. Men när det finns bra erbjudanden på ICA eller Willys så går hon dit istället, det är lite längre till Willys men om det finns bra erbjudanden där så är det värt att ta bilen dit. Både ICA och Willys har ett större sortiment vilket hon uppskattar. Hon har ett medlemskort hos alla de butiker hon brukar handla i, på så sätt får hon fler erbjudanden och nyhetsbrev från butikerna där alla erbjudanden står, praktiskt! Om hon fick bestämma själv skulle hon få nyhetsbrev en gång i veckan via e-post och gärna ett SMS eller en app-notifikation om nya pangerbjudanden.

Hon handlar ungefär två gånger i veckan, oftast på måndagar och torsdagar, och gillar att ha en plan på vad hon ska köpa innan hon går till butiken. Ganska ofta skriver hon en inköpslista över vilka typer av varor hon vill ha men det händer att hon bara gör en mental lista om hon inte ska handla så mycket. Inköpslistan fungerar som en grov plan, vilka varor och varumärken hon faktiskt köper bestämmer hon i butiken. När hon väljer mellan olika produkter brukar hon oftast ta den som är billigast men självklart vill hon köpa produkter av bra kvalitet och att hon får den mängd som hon behöver. Om det är en vara som hon ofta använder köper hon gärna lite mer om hon får ett bättre pris då. Innan hon går till affären tänker hon ut vad hon vill laga för mat i veckan och ibland söker hon efter nya recept på internet för att få inspiration. Hon tycker ofta att recept kan vara krångliga och väljer därför enklare recept som är lätta att följa, omdömen från andra användare och bilder på maträtten hjälper henne ofta för att se om ett recept är värt att laga.

Sandra har inte provat att handla mat via internet men hon är intresserad av att göra det, hon har funderat på det många gånger, men bara inte kommit till skott. Hon gillar tanken på att kunna utföra inköpen när det passar henne och att hon skulle

slippa ta sig fram och tillbaka till affären, vilket skulle spara henne en del tid. Hon tror även att det är lättare att jämföra priserna mellan olika butiker på internet och på så sätt kan hon spara pengar. Hon är mest intresserad av att köpa lösplock av varor, på så sätt kan hon vara mer flexibel i sina inköp och anpassa dem efter veckans kampanjvaror. En prenumeration på basvaror kan även vara intressant, det är ju produkter som alltid går åt och måste köpas oavsett pris. Hon vill att butiken ska erbjuda flexibel leverans och det är viktigt att hon lätt kan hitta de varor som hon köper ofta. Hon tycker även att det vore praktiskt om butiken erbjöd en prisjämförelsetjänst som gör det ännu lättare för henne att hitta de billigaste produkterna.

E.4 Malin

Malin är 30 år gammal och är gravid med sitt första barn. Hon bor tillsammans med sin partner Andreas och deras katt Frans i ett radhus i Täby. Hon arbetar heltid inom marknadsföring, beroende på vilket projekt som är igång blir det i omgångar en del övertid. Andreas jobbar också rätt mycket, han har ett eget företag. De lägger mycket av sin lediga tid på att renovera huset, de vill gärna ha det mesta klart tills när barnet kommer. Annars sjunger hon i kör och försöker att regelbundet springa en runda i spåret.



Malin åker ofta till en lite större butik när hon ska handla, den ligger ganska nära hennes hus och är lätt att åka förbi på vägen hem från jobbet. Hon gillar även att det finns en stor parkering utanför butiken så att det går snabbt att stanna till och handla. Eftersom butiken är stor så vet hon att alla produkter hon är intresserad av finns där och att priset är lite bättre än i en mindre butik. Hon handlar ungefär tre gånger i veckan men det kan variera från vecka till vecka. Det finns en liten lokal butik fem minuter bort från hennes hus, den besöker hon ibland om till exempel mjölken tar slut eller om hon glömt att köpa en vara på vägen hem. Hon och Andreas försöker att dela på ansvaret för att köpa mat, den som har bilen brukar åka förbi butiken på vägen hem från jobbet. De försöker skriva upp produkter på en inköpslista när de tar slut, ibland funkar det och ibland inte, Malin brukar alltid glömma att ta med sig listan när hon åker till jobbet på morgonen. Hon försöker planera vad hon ska köpa innan hon går in i butiken både utifrån listan hemma och vad hon är sugen på men det slutgiltiga beslutet tas på plats i butiken, hon påverkas ganska mycket av vad hon ser när hon väl är där. Det händer rätt ofta att hon ändrar hela sin inköpsplan om hon ser en vara som ser fin ut när hon väl är i butiken. Hon brukar även söka recept på internet för att hitta inspiration till matlagningen innan hon går och handlar, hon kollar efter recept som är enkla att följa, har fina och beskrivande bilder och som fått bra feedback från andra användare. Hon vill att hennes butik kontaktar

henne en gång i veckan angående nyheter och erbjudanden och då gärna via E-post, SMS eller Sociala medier.

När hon väljer mellan olika produkter kollar hon på hur varan ser ut och att den ser ut att uppfylla hennes krav gällande kvalitet. Hon är noggrann när hon väljer sina färskvaror och gillar att klämma och känna på varan för att se till att den är bra. Även när hon väljer mellan olika varumärken av torrvaror påverkas hon av utseende på förpackningen, det fångar hennes uppmärksamhet om förpackningen är snyggt gjord och det påverkar definitivt hennes beslut. Självklart spelar även skillnader i pris roll för beslutet. Hon är inte särskilt lojal mot varumärken utan det är mer ett spontant beslut om vilken vara som får följa med hem.

Malin har funderat på att handla mat via nätet men än så länge har hon inte provat. De som är lockande är att hon kan spara en del tid genom att handla online eftersom det är ett enklare och mer flexibelt sätt att handla mat. Samtidigt tvekar hon på om det passar henne eftersom hon har ganska specifika krav på vad som är en bra produkt, hon kan inte bedöma det på samma sätt när hon inte ser produkten. Dessutom får hon ju inspiration till vad hon ska laga för mat när hon går runt i butiken vilket också blir svårare om hon skulle handla online. Hon kan absolut tänka sig att beställa en matkasse men hade gärna sett att det finns möjlighet att ändra antalet recept och råvaror så att det passar hennes lilla familj. En prenumeration på antingen basvaror eller ett koncept skulle också kunna vara intressant då det skulle ge henne lite mer tid och flexibilitet i vardagen.

Malin är van vid att använda teknik och hennes mobil, surfplatta och dator används flitigt. Hon kan tänka sig att använda mobilen i samband med matinköp och gärna när hon är i en fysisk butik, då kan hon få den inspiration hon söker samtidigt som själva köp-processen går fortare. Hon handlar på internet i andra sammanhang, oftast när hon ska köpa böcker eller resor.

E.5 Ulrika

Ulrika är 43 år gammal och bor i en villa Solna med sin sambo Peter, en sju årig dotter, Alva, och en terrier som heter Olga. Efter att hon har sagt godnatt till Alva brukar hon gå ut på promenad med Olga i Hagaparken. Ulrika har ett stort intresse för datorer som började redan när hon var liten och spelade spel på familjens Commodore 64. Idag arbetar hon heltid som utvecklare och projektledare på ett stort IT företag. Varje dag tar hon pendeln in till centralen vid åttatiden och därifrån är det en tio minuters promenad till hennes arbetsplats. Hon trivs väldigt bra med sina kollegor och med sina arbetsuppgifter och gillar främst att det är varierande arbetsuppgifter nya utmaningar varje dag. Vid femtiden brukar hon gå från kontoret, innan hon hoppar



på pendeln hem brukar hon ofta gå förbi en mataffär på vägen om det är hennes vecka att handla mat. Ibland söker hon på recept innan hon går hem för att få en tydligare bild av vad hon ska handla och få extra inspiration innan hon går från jobbet. Eftersom att hon är hemma först strax innan sex, och då är Alva oftast hungrig, är det viktigt att recepten är utförligt beskrivna så hon lätt kan följa dom.

Det finns några butiker på sträckan mellan arbetsplatsen och centralstationen som har ett stort ekologiskt utbud så det brukar oftast bli en av de butikerna som hon besöker. Hon är väldigt mån om att produkterna hon köper ska vara närproducerade och ekologisk odlade eftersom hon inte vill ge sin dotter besprutade produkter som är farliga för både henne och miljön. När hon säkerställt att produktionen på varan motsvarar hennes önskemål granskar hon kvaliteten och även att varan inte är alldeles för dyr. Hon har en mental bild av vad hon ska handla för något innan hon går till butiken, hon följer oftast denna men ibland händer det att hon köper andra produkter om hon blir mer sugen på något annat i butiken.

Många gånger har hon funderat på att handla mat online men det har inte blivit av än eftersom hon är skeptisk till att hon får hem produkter av samma kvalitet som hon annars själv hade valt ut i butiken. Eftersom att det tillkommer extra avgifter på de flesta sidor om man inte handlar varor för ett högre belopp gör detta att hon känner att hon måste planera upp sina köp noggrannare om hon ska handla på internet vilket hon inte är särskilt intresserad av. Däremot så gillar hon tanken av att kunna beställa maten när det passar henne och på sätt spara tid som hon kan lägga på att umgås med hennes dotter. Eftersom att de flesta digitala livsmedelsbutikerna har ett stort och väl sorterat sortiment tror hon även att hon lättare kan komma över fler produkter som är ekologiskt odlade. Hon ser även stora fördelar med att leveransen från butikerna går ut till många olika konsumenter då detta sparar in på användandet av fossila bränslen då den totala körsträckan blir kortare. Men om hon ska beställa mat online är det viktigt för henne att hon kan välja själv vilka varor som hon ska köpa och att hon kan få hem maten när det passar henne så hon slipper att vänta på maten. Hon har dock beställt andra saker via nätet, oftast kläder och skor, och då har inte leveransen varit ett problem.

Ulrika får mycket mejl och sms från kollegor och pågående projekt och hon får lägga ner flera timmar dagligen på att svara dessa mejl. På grund av detta vill hon helst inte bli kontaktad av butikerna mer än varannan vecka om dom har någon information eller kampanjer som dom ska gå ut med och helst då via mejl eller app-notifikation.