

Institutionen för datavetenskap
Department of Computer and Information Science

Final thesis

**Developing a responsive mobile-first design
guide for e-commerce with the users in focus**

by

Mathias Aktan & Ulf Wirén-Hallqvist

LIU-IDA/ LITH-EX-A--14/046--SE

2014-06-18



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Abstract

Mobile e-commerce is an increasing trend. Still, many sales sites are not adapted to mobile interfaces. Important factors in the design of successful e-commerce applications are trust, high quality graphics, and easy navigation. However, a typical design approach is to strip down functionality and this can have a negative impact on the user experience.

The goal of this thesis was to create a style guide that can be used to develop responsive e-commerce sites through a mobile first implementation strategy. A style guide was created by applying modern design theory and by investigating existing e-commerce solutions. Moreover, a prototype of an e-commerce solution was developed using the style guide. This prototype was evaluated by an expert group of usability professionals. The study indicates that the style guide is a useful and effective tool in the design and development of e-commerce systems. We conclude that a mobile first strategy needs to be combined with subsequent traditional desktop design.

Acknowledgments

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Linköping, June 2014

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1 INTRODUCTION

In just a few years the web browsing experience has changed drastically. About a fifth of the population in Sweden state that they have bought a product at a webpage or application with their smartphone, this does not include services such as movie tickets or application purchases. (Posten, 2013 Q2)

The main focus of companies planning to change their webpages is that they want to improve design and usability, closely followed by improvements on mobile purchasing and getting the site mobile ready. (Posten, 2013 Q2)

Studies also show that about 68% of the Swedish population has used their smartphone to search for product information. While only 6% state that they have bought a physical product with their phone, many users state that they use their phone in some part of online purchases. (Posten, 2013 Q2) Shopping with mobile interfaces increase rapidly by around 15% each quarter and businesses need to adapt in order to capture the growing market. (Posten, 2013 Q3) Bad design, lacking usability, unsupportive interfaces and the lack of trust to companies and smartphone usage demands a change in how e-commerce sites are built today.

Sites look different depending on screen resolutions, by implementing a responsive design a more uniformly interface can be created. Responsive design allows content to be rearranged in order to address issues with pages looking bad on different devices.

Traditionally mobile sites are stripped down versions of full sites offering less content and functionality. (Florins & Vanderdonckt, 2004) Removing the wrong content from a site often gives a bad user experience, which affect customers and business partners' views on the company affecting sales and relationships negatively. With a mobile-first strategy, the full mobile site is designed first and extra functionality is added to bigger screen sizes. By doing this core functionality and content will still be available to the users creating a greater user experience.

1.1 THE PROBLEM

The major problem developers are faced with is developing a user-friendly e-commerce solution that has great intuitive design and works on multiple platforms. It is difficult to capture what the users' requirements are mainly because what they need and what they want aren't always the same. E-commerce sites often struggle with meeting user expectations and good usability is hard to achieve on multiple devices. A good overview of what products are available is a common problem on many e-commerce sites. And getting users to fulfill a started order and leaving them wanting to comeback and use the site again. What users' value as important can be different from user to user, a problem for one user can be a nonexistent one for another.

1.2 THE TASK

A design guide is going to be created for a responsive e-commerce system that is designed through mobile first. A front-end environment of an e-commerce is going to be created as a business-to-business design solution on behalf of Infor, a leading company offering business solutions. The environment is created so that we can test the design guide.

TINE is the largest distributor of dairy products in Norway and is one of Infors customers that have asked us to gather user feedback on their existing e-commerce to find out what users want to see in a redeveloped system.

Our findings are going to be used to create a site developed with a mobile first perspective in order to better prioritize content. By designing with mobile first, we hope to focus on getting a great design on the mobile and scale it up to the bigger screened devices in a responsive environment.

We use a development method that captures what the users feel is important in an e-commerce, by doing this a more user centered system should be created.

To capture the user expectations together with good usability in an e-commerce, focus is going to be put on core user behavioral aspects on an e-commerce e.g. “*finding*”, “*choosing*”, “*acquiring more detailed information*” and “*the product checkout*”. Good usability is going to be created with the help of suitable tested design alternatives chosen by users and usability experts. Design alternatives are going to be customized and chosen to fit an e-commerce site that will be tailored to fit the users’ needs.

1.3 THESIS PURPOSE

The purpose of this thesis was to develop a responsive mobile-first design guide for an e-commerce with the user in focus. Create a prototype with the help of the design guide in order to validate that the design guide works.

1.4 SCOPE & LIMITATIONS

We focus on front-end development leaving the backend open for another thesis. A separation of website and mobile application is done where we won’t focus on mobile apps. Our focus is put on web development through HTML5, jQuery and CSS3/Sass. We will support IE9 or newer, latest Chrome, Firefox and Safari. Our chosen framework Foundation will give us predefined breakpoints that let us change the layout for different screen sizes. An interface will be created for mobile phones, tablets and desktops while we won’t cover large TV screens and smart watches in our study.

1.5 DEFINITIONS

- **Accordion** – Display collapsible content by pushing/inserting information under the clicked header.
- **B2B** – Business to Business.
- **B2C** – Business to Consumer.
- **Block** – A part of the design that can be moved, resized, reoriented, regrouped, substituted or split into several blocks.
- **CSS** – Cascading Style Sheet, used to format the layout for webpages.
- **E-commerce** – Electronic Commerce, buying, selling and exchanging goods and services through an electronic system.
- **Grid-system** – Uses rows and columns for building up the layout of webpage.
- **HTML** – HyperText Markup Language
- **Handlebars** – JavaScript library for building templates based on the mustache template language.

- **JavaScript** – Scripting language for Internet pages, mainly used to create dynamic and interactive webpages.
- **jQuery** – A JavaScript library with additional enhancements and a lot of third party plugins.
- **M-commerce** – Mobile Commerce, buying, selling and exchanging goods and services through wireless handheld devices.
- **Media queries** – CSS3 component that allows the layout of webpages to be adapted to certain conditions like the screen resolution.
- **Mobile first** – A design strategy where the first step is to make the design for smaller screens and later enhance it for larger ones.
- **Responsive design** – Is when a webpage is tailored and adapt itself for different screen sizes.
- **Sass** – A CSS precompiler who lets the developer extend the functionality of traditional CSS and later compile it into traditional CSS code.
- **TINE** – The largest supplier of dairy products in Norway.
- **Trust** – The users confidence with the site, e.g. if the users are able to reach everything they want on the site, if the site works as intended, and if the users are able trust the information on the site.
- **User interface (UI)** – The visual part of a program or system.
- **User value** – Is what the user regards as important on the site e.g. what the user has a need for.
- **Usability** – Refers to how easy something is to use. (Nielsen, 2012)
- **Utility** – Refers to a designs functionality, if it can accomplish what the user wants it to do, i.e. if it can be utilized the way the user intendeds it to. (Nielsen, 2012)
- **Useful** – Is both usability and utility together, i.e. if it is well designed and does what it is intended to.
- **User Experience (UX)** – A term used to cover all aspects of user interactions with a company, product, system or environment. (Nielsen, 2012)
- **Whitespace** – Empty space around objects, used to better separate content, making it easier to overview information.

1.6 DISPOSITION

Infor the company we did our thesis for and their customer TINE will be described in this chapter. The next chapter contains a background on the e-commerce market and an introduction to mobile first. A method chapter describes how our study is conducted, along with what tools and methods used. The thesis is divided by three phases containing a respective result chapter.

Phase one contains the theory chapter with our theoretical framework with information on e.g. usability, user experience, adaptive and responsive design, and recommendations on how to design an e-commerce. An empirical data collection chapter that covers user feedback from interviews, observations and surveys follows in phase two. In phase three the prototype chapter will show how we combine the theoretical and empirical study, realizing the chosen design alternatives in the prototype environment which is followed by the evaluation chapter that validates the prototype.

The discussion and results chapters are where we incorporate our own conclusions and present the findings to our research question. We end the report with reference guide and appendix containing interview data.

1.7 INFOR

Infor is one of the leading developers of enterprise software. User experience and usability are key factors used to differentiate themselves from the competition. Located at 38 countries with around 12000 employees and with over 70000 customers making them a large player in the development of business solutions. (Infor, 2014)

Different customers at Infor want and need different things when it comes to usability. That's why the needs to explore what their preferences are and get their opinions on what they really want and need. Infor has sent us to one of their customers to study their existing e-commerce usage and apply a mobile first approach to research a good design alternative to the existing system.

1.8 TINE

The largest dairy product company in Norway, TINE has been asked by Infor to be our test company for our study. TINEs large product base will be used to populate the user interface created from a mobile first standpoint. They in turn have been promised our research findings, which will include what their customers want, how they really work and in what context TINEs e-commerce is being used. We also explore in what way there is a need of a mobile interface for TINEs customers.

2 BACKGROUND

In this chapter we explain how traditional development of mobile sites is done and how a mobile first approach can be an alternative way of developing. This is explained together with a brief background on the e-commerce market.

E-commerce users in the Nordic countries were asked in 2012 if they could see themselves using a mobile phone to buy products where 11% said that they would and that 5% had already used the phone to order online. These numbers however include services such as in app purchases. The typical user is between 18 and 49 years old. In this group of people 14% stated they could see themselves using the smartphone to order sometime in the remainder of the year. (Posten, 2012)

Earlier studies of the postal e-barometer, a quarterly report on e-commerce depicted what businesses thought were the major obstacles leading to low m-commerce. In the study from 2008 it showed that 55% stated that the display was too small, 50% didn't know it was possible, 44% stated bad reception and 22% said that the reason was bad security. However when users where asked the same question it showed that 35% thought the screen was too small, 29% of the questioned stated that the internet connection was too bad, 23% that they didn't feel it was secure and 11% didn't know what it was possible. (Posten, 2008 Q2)

A big problem is the lack of a good strategy on mobile usage when companies market products. The most usual products bought with a smartphone (not including services) are books, entertainment media, clothes and home appliances. (Posten, 2013 Q2)

2.1 MOBILE MARKET CHANGE

Lately there has been a trend that the average person is using mobile phones more frequently than desktops. One important reason for this is that our mobile phones usually are closer at hand to us, opening the web browser and enter the address is easy, fast and convenient on the mobile. Researchers believe that the number of people visiting a website through their mobile phone will surpass the ones using their desktop. (Danger & Grigsby, 2012) Mobile commerce stands for about 16% (2013) of all e-commerce sales and has an increase of 68% from the previous year according to eMarketer. (Jones, 2013)

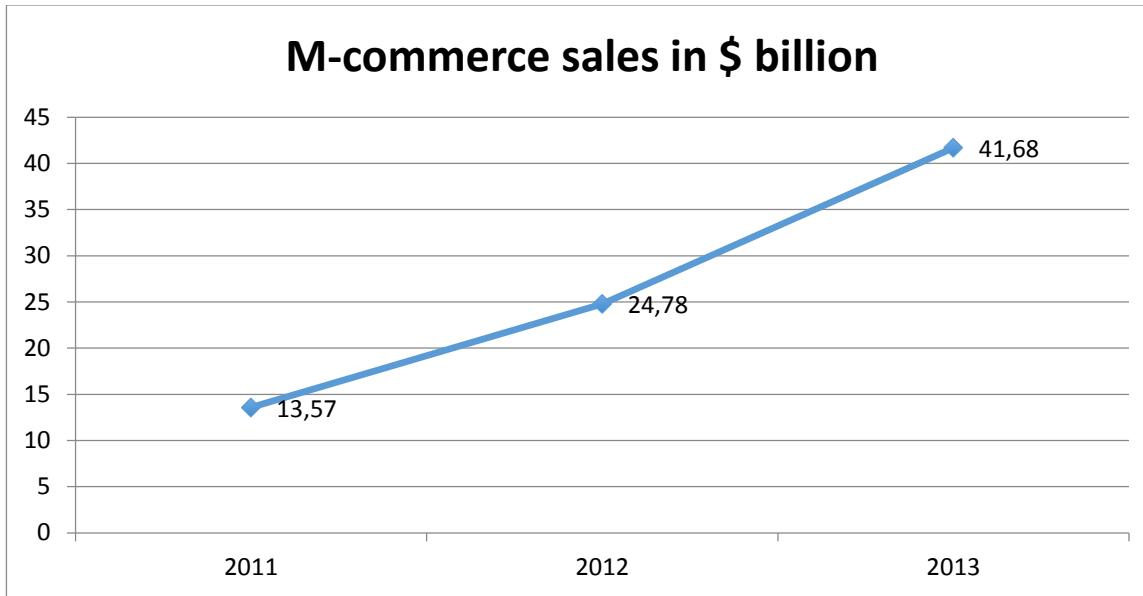


Figure 1: Increased M-commerce sales. (Jones, 2013)

The e-commerce market is growing and an increasing base of customers utilizes tablets and smartphones to order or look for information on products. However, today only 3 out of 10 companies have optimized their sites for mobile usage. (Yu, 2013)

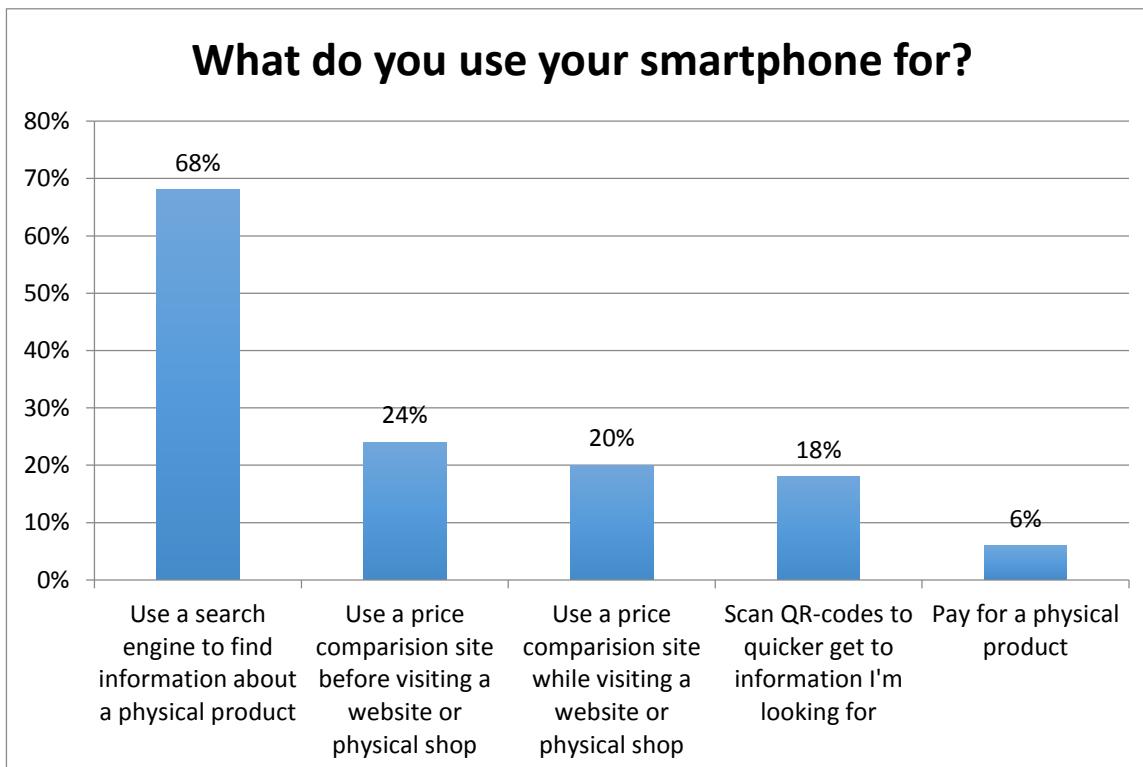


Figure 2: What the smartphone is used for in a M-commerce. (Posten, 2013)

2.2 A CHANGED STRATEGY FOR WEB DEVELOPMENT IS NEEDED

Traditional sites are developed for large screens by guessing a width that works for the majority of users. However, with the introduction of smaller screened devices such as smartphones, tablets or even tiny smart-watches sites may look ugly, as they were not originally developed for them. (Gremillion, 2013) Many developers are forced to remove content in order to compensate for the smaller screen areas creating a less than ideal user experience.

2.2.1 *Mobile First*

Mobile first is a development strategy where a website or application is developed first for the smaller screened device and scaled to larger screen devices. The idea is to create a site with the absolute necessities that a mobile device needs and add to design when developing for larger devices. This makes the developers focus on core functionality and content.

2.2.2 *Responsive design*

A new trend since 2010 is to design HTML pages responsively by adapting content to the actual window size or screen resolution. Moving information around to create a more intuitive flow of information for the users.

A responsive web design is when the same HTML code is used for all devices and styling code such as e.g. "CSS/less" or "Sass" is used to alter the page with the help of media queries. (Google developers, 2014)

Responsive design makes it easier to maintain HTML pages as it don't require separate pages for the same content. By recognizing the different screen widths of visiting devices, or if a device is in portrait/landscape mode content is adapted and moved to what has been predetermined by the developers. (Google developers, 2014)



Figure 3: Responsive and mobile first design (Stewart, 2013)

3 METHOD

Here we describe the methods used to research how a mobile-first strategy can be used to capture the essence of what's important for the user. How we aim to create a design pattern and test it in a B2B environment.

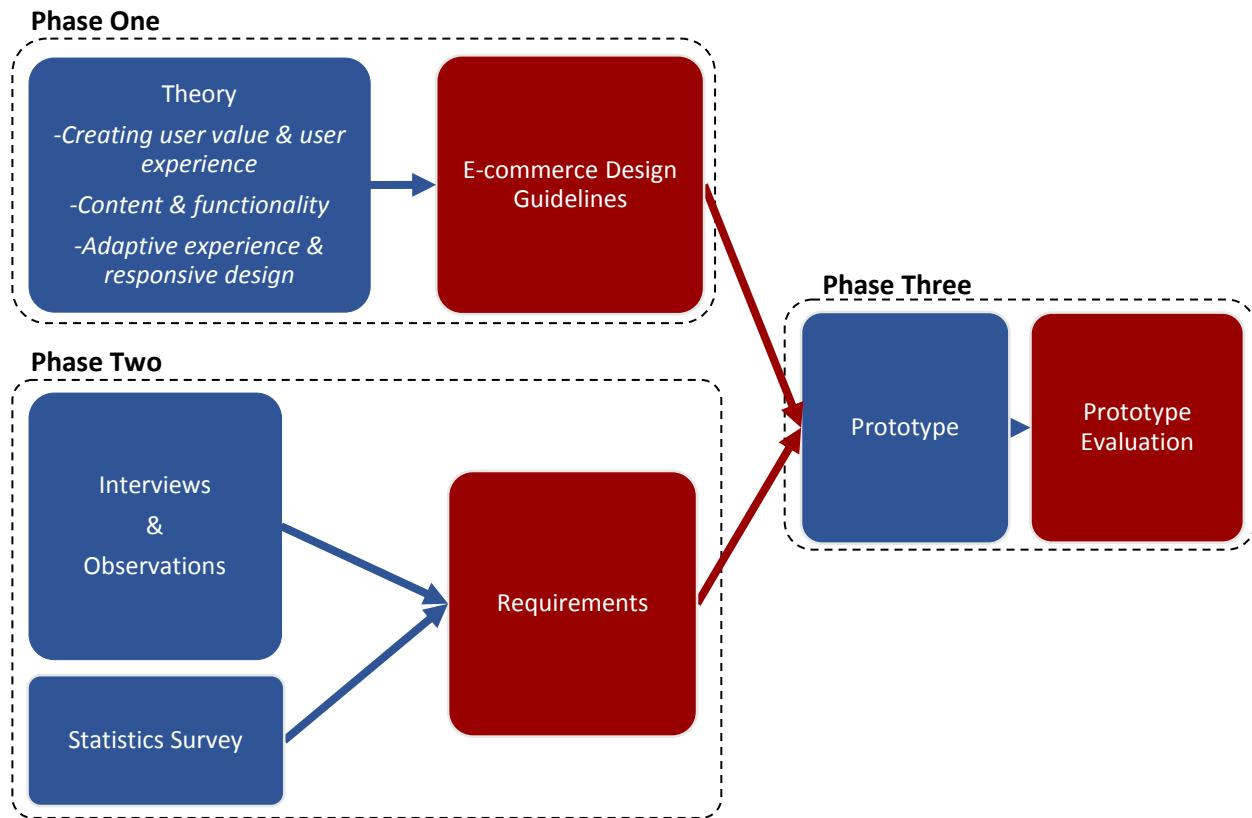


Figure 4: Our approach to create & test a mobile-first design for TINEs e-commerce.

PHASE ONE

3.1 THEORY

The theories on e-commerce help us understand what usability experts' state as important for successful e-commerce and development methodology such as mobile-first helps us prioritize content according to user requirements.

General design patterns on how solutions to common problems in e-commerce can be handled guide us to capture good ways of designing systems that meet user requirements. We have divided the theory chapter by looking at the most important design patterns for a successful e-commerce. The chapters are “Creating user value & user experience”, “Content & functionality” and “Adaptive experience & responsive design”.

The literature included in the present study is mostly consistent of online sources that are no more than 5 years old. The literature used consists of conference papers, journals, articles & books, where the most updated and creditable sources were used.

3.2 E-COMMERCE DESIGN GUIDELINES

A general design guideline is put together that shows the most important factors B2B e-commerce need to have in order to be successful. The design guidelines are divided into three categories “Creating user value & user experience”, “Content & functionalities” and “Adaptive & responsive design” which are important in order to handle requirements and problems users have.

Design patterns from the theory are summarized and structured to help form a guide with the most important factors. This allowed us to have a good overview on most important aspects of the design choices.

PHASE TWO

3.3 INTERVIEWS & OBSERVATIONS

Qualitative research methods are used to gather empirical data. A snowball sampling method was used to collect participants in our qualitative research, which were referred to us by TINE. This allowed us include users who we otherwise wouldn't have access to. We analyzed the users handed to us by TINE that represent a large portion of their customer group. (Mack, et al., 2005)

The location of the interviews and observations took place at the users' work environment located throughout Oslo, often very simple offices with moderate technology.

In-depth interviews & participant observation was the chosen qualitative methods that helped us to collect natural occurring behaviors, personal experiences and perspectives. (Boyce & Neale, 2006)

With the help of a PACT-analysis we broke down the typical e-commerce user and summarize the interviews and observations. (Trulock, n.d.)

3.3.1 Interviews

Five e-commerce users were selected and then asked a series of qualitative questions to find out in what context the system is used and what they regard important or obsolete in their e-commerce.

Semi-structured interviews with pre-prepared questions were used in in-depth interviews with a sub selection of TINES e-commerce users. Where the in-depth interviews were conducted to capture individual experiences and feelings towards the system. (Boyce & Neale, 2006)

The questions asked at the start of the interviews were relatively easy and then progressed to more challenging levels as the interview continued. The questions used are exploratory and open-ended so that we can capture what they truly wanted to say. Each interview lasted for approximately one hour and the data was recorded on paper throughout the interviews. According to the recommendations of (Benyon, et al., 2005).

(Full interview questions and answers can be found the appendix.)

3.3.2 Observations

An observation study was also conducted straight after the interviews were they performed predefined tasks defined by us. By observing the users when they performed tasks we were able to identify common problems that the users encountered and what necessities they had. (Benyon, et al., 2005)

We asked them e.g. to find a specific product on the site, add the item to the checkout cart and change the quantity. We used predefined scenarios during our interview sessions to capture how the users do certain tasks, which allowed us to observe how they interacted with the system. With the help of the observations we could then identify the problems most of the users' encounter and their user interaction patterns. (Benyon, et al., 2005)

During the observation study both of us recorded their actions on paper. (Benyon, et al., 2005) The observation study was conducted in parallel with the interview and took approximately one hour.

(Observation data can be found in the appendix)

3.4 STATISTICS SURVEY

We complemented our empirical research with data gathered from online statistics on typical e-commerce user behaviors. What the users and companies regard as the most important factors for a successful e-commerce. The statistics also show the largest contributing factors for aborted purchases.

The statistics used are mostly gathered from the Swedish postal institute and are from the years 2008 to 2013. With the help of the statistics we can better create the requirements that e-commerce users have in order to create an e-commerce that fits the users' needs.

3.5 REQUIREMENTS

The user context is very beneficial as it explains what the user does, why he does it and how he does it gives a general understanding of how the system should be designed. By understanding the context one can better draw conclusions of what is important and benefits the user. This in turn gives the developer a better understanding of how things need to be done to catch what the user requirements are. (Wäljas, et al., 2010)

The gathered information is analyzed and formed to fit a narrower e-commerce tailored for TINEs customers.

From our interviews, observations and online statistics we created a requirements list that shows what part of the e-commerce is the most important for the users. The requirements list created from our studies are also ranked according to severity for the e-commerce with the help of a user value analysis. (Tullis & Albert, 2008)

PHASE THREE

3.6 PROTOTYPE

A prototype was created with the help of our requirements list and the design guide address how the user problems can be solved while meeting their requirements. (Nielsen, 2012)

We iterate over a series of low fidelity prototypes that will transition into a high fidelity prototype. The initial low fidelity prototypes are created using wireframes to give quick and easy to evaluate design options. Our high fidelity models are created using HTML5 code together with jQuery, SASS & MySQL. Foundation is used to create responsive dynamics for the prototype. The reason we choose foundation is because it's highly adaptive, easy to use and is well documented any other framework that meets these criteria would also be sufficient.

3.6.1 *Iterative design process*

In order to create a user centered design we had to incorporate information of the users in an early stage. It is important to understand the user, how he works and what activities can occur so that the design can orient around the user.

Products need to be designed with user-centered methods to ensure that the user's feedback gets taken into account when designing systems. Implementing changes late in development are costly and often hard to measure. The earlier the user is included in the design phase the better the users tend to accept a new system. Design solutions shouldn't be forced on a user. User-feedback needs to be implemented through a human-centered design to capture how the users want to use the system, its capabilities and in what context. (Bevan, 2005) This is mainly why we choose to gather user feedback at an early stage.

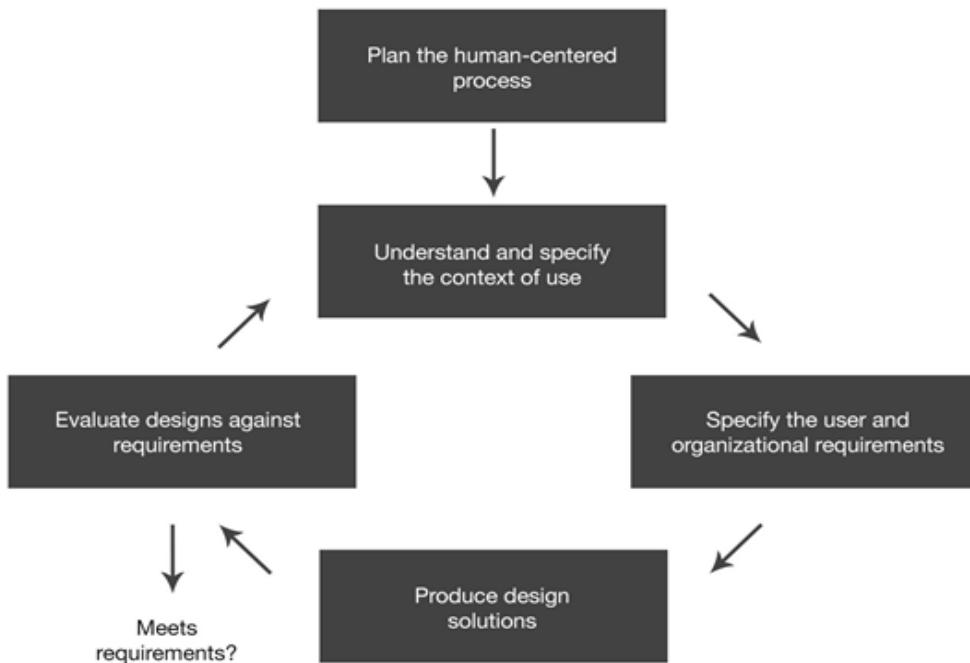


Figure 5: The Human-Centered Design cycle. (Bevan, 2005)

3.6.2 Design process

A variant of Nielsen's design process is used to create our design proposal with the help of a prototype: (Nielsen, 2012)

1. The existing e-commerce is tested to identify what parts we should focus on.
2. Study of existing e-commerce designs to get ideas on alternative solutions. Looking for what kind of features they are using and what's similar to the ones that TINE is using.
3. Perform a field study to show us how the users behave in their environment.
4. Use paper prototypes to test design ideas.
5. Iterate moving from low-fidelity prototypes to high-fidelity interface on the devices and evaluate each cycle.
6. Inspect design so that it follows usability guidelines and base the design on the theoretical framework together with the empirical study.
7. Test and evaluate the final design.

3.7 PROTOTYPE EVALUATION

By testing the prototype, the validation and legitimacy of the design guide for TINEs e-commerce was made possible. Feedback from users and other designers help us identify possible future improvements that researchers can use to further create a better style guide. Our evaluation on the system is focused on a B2B environment where the user group is TINEs customers.

The evaluation of the new design was tested by Infors usability experts by evaluating the prototype it shows whether the design pattern and requirements list used to create it are suitable or not. (Wäljas & Väänänen-Vainio-Mattila, 2009)

The evaluation study took place at Infors Linköping office where five usability experts tested the same user scenarios that the original TINE customers tested. They were also given the opportunity to explore the system freely and give feedback and pointers. During the test they were asked to think aloud. (Nielsen, 2012) The method was used because it is very good for usability testing, easy to use and gives us information on why the user performs a task wrong. What he is thinking of during the test and gives us convincing feedback on potential design flaws.

A drawback of the evaluation method is that the prototype won't be tested in the actual environment by TINEs users. We recorded the evaluation sessions by pen and paper where we both took turns. Each test took about half an hour and the results are discussed in the final chapter.

4 PHASE ONE - THEORY

4.1 CREATING USER VALUE & USER EXPERIENCE

An e-commerce is an internet-based ordering system where customers can purchase goods online. A critical part of an e-commerce is the loyal customer, without him it will be hard to succeed. (Goldman, 2010)

A successful e-commerce needs to include factors such as safety, user value, usability, and user experience to create a design that is centered on what the users need to have. If a site does not have trust or is designed to meet the users' goals the user experience will be weaker giving an impression that the e-commerce isn't good.

4.1.1 *Safety*

When technology moves forward the users can be overwhelmed by technological innovations. It is the e-commerce sites mission to mediate trust and professionalism to the users. By mediating that the user will feel more secure in buying products with the help of new technology, the reason is that customers are in general more likely to order if they feel secure.

Studies show that 64% of the Swedish people get worried when ordering online from a site that does not show any security assurance. In turn 74% state that their assurance would increase if a site showed any assurance that can identify a secure site. (Hansson, et al., 2010) A Swedish assurance logo is "Trygg e-handel", which can be placed on sites as a symbol of verification that the site is trustworthy. A symbol like the one from "Trygg e-handel" has proven to increase sales with 20-30%. Recommendations from friends are treated as the most important factor when a site's trustworthiness is determined. (Posten, 2012 Q2)

There are still not that many consumers that order online with their mobile device even though 70% of all consumers have a smartphone. (Posten, 2012 Q2) However, many use it as an information gathering tool, playing an important part in the way customers purchase products both online and in physical stores.

Many users abort purchases because of poor usability on substandard developed web sites. Insufficient trust towards the sites caused by the design is still one of the major reasons for this. (Hu H-J., 2008)

4.1.2 *User value*

If the customer does not wish to use a website at all it becomes irrelevant, understand what the user wants. Understand how they benefit from having an e-commerce. (Sun, 2010) The information on the site needs to have value for the user, since the use of irrelevant information causes the users to lose interest. (Stenfelt & Lundberg, 2012) A way of prioritizing what value is higher for the site is to use a "value users' chart". With the help of charts it becomes clear on what changes to the UI that are the most severe to the project. (Tullis & Albert, 2008)

	Affects few users	Affects many users
Small impact on user experience	Low severity	Medium severity
Large impact on the user experience	Medium severity	High severity

Table 1: Severity rating scale. (Tullis & Albert, 2008)

4.1.3 Usability & user experience

Usability is how intuitive and understandable instructions of a web interface are while *user experience* focus on the users' feelings about a product. User experience is strongly connected to what's expected from a platform as well as what previous expectations are. (Wäljas, et al., 2010)

User experience, (UX) is a term used to cover all aspects of user interaction with a product, system and application. Factors that can be used to measure UX are for example; (Tullis & Albert, 2008)

- How long it takes to perform a task on website such as ordering an item?
- The amount of errors users make while e.g. changing quantity?
- How many users can perform a specific task without failing?
- How many users can't find the shortest way of navigating to a destination using for example a shortcut?
- How many users get frustrated registering a product because text such as serial numbers is too small?
- How many users are happy with how easy it was to order a product online?

These questions can be used to study behaviors and attitudes. Measuring these can be done with the help of counting clicks, task success rate, task time, asking if they were frustrated or delighted and eye fixation. These are examples of good usability metrics. (Tullis & Albert, 2008)

Furthermore, the user needs to be able to understand the site and be able to use it to be a loyal customer. (Sun, 2010)

Usability is divided in five components; (Nielsen, 2012)

- *Learnability*, how easy it's to carry out a task for the first time?
- *Efficiency*, how quick is the user able to perform a task in a well-known environment?
- *Memorability*, how fast can users relearn skills after not using them for a period of time?
- *Errors*, how many errors do the user make, the seriousness of these and the easiness to recover from an error?
- *Satisfaction*, how satisfying is the design to use?

Another quality attribute is *utility* and refers to what the user needs in form of functionality. Both *usability* and *utility* are important attributes to determine the usefulness of a function. It doesn't matter if the function is easy to perform if it isn't something that the user wants. The same problem reoccurs if the system has the functionality but the design is bad. (Nielsen, 2012)

- *Utility* is whether it provides the **features you need**.
- *Usability* is how **easy & pleasant** these features are to use.
- *Useful* is usability and utility together.

Figure 6 Useful, usability, utility (Nielsen, 2012)

Usability is important because the user will leave the website if he isn't able to easily perform his task or find the information he was looking for. "The first law of e-commerce is that if users cannot *find* the product, they cannot *buy* it either." (Nielsen, 2012)

User generated content increases personal value to the actual user experience. If the user is able to comment on products, upload pictures to a shared gallery or a personalized profile he will feel a stronger connection to the site. Resulting in a better user experience and higher frequency of use. (Pasman, 2011)

It is important to define a clear identity for a web page so that the visitor feels familiar and comfortable with the brand. The system should be viewed as a good friend providing information, a tool that is at your disposal guiding you to fulfill tasks. Capture the users' opinions in an early stage of the design process. Tools that can be used to accomplish early user integration in the design process are typically *storyboards, scenarios, interviews and observations*. (Pasman, 2011)

4.1.4 Human-Computer Interaction

Effectiveness, efficiency and satisfaction can be studied to see how users can use a product in a specified context. Effectiveness shows how accurate and complete a task can be performed by a user. Efficiency tells what effort is needed to achieve the effectiveness and satisfaction is how the users accept and evaluate an application. (Konradt, et al., 2012)

To capture usability in a user-interface design one should look at for example credibility, content and response time. (Konradt, et al., 2012)

4.1.5 Why usability is important in B2B

What separates business to consumer (B2C) from business to business (B2B) e-commerce is the brand of the company, a consumer is more driven by what it feels towards the brand while businesses are looking at what value the business vendor gives and what long term relationship they have. In B2C good usability and emotions play a large part as it determines whether the customer returns to buy products in the future. For B2B the usability becomes more important in the long run as contracts and dependencies drive the partnership. (Konradt, et al., 2012)

Bad usability however creates irritations and affects the way the users feel about the company. Since the amount of information that B2B commerce products have is more and needs to be available to a larger extent. Usability becomes more important to help the business users to find information by structuring up how information is found and presented. (Konradt, et al., 2012)

4.1.6 Delays loading times

The ideal response time for information to be sent to the server and back should be less than 0.1 seconds for the user not to notice any interruptions. While the highest acceptable delay is 1 second and

unacceptable time is 10 seconds. Website success is strongly connected to download times, which is easy to measure and strongly connected to usability and what the users want. (Konradt, et al., 2012)

40% of users who visit a website abandon it if the load time of the page is more than three seconds. A one second delay yields about 7 % loss. For an e-commerce this can result in a very high loss of revenue. (Gardner, 2011)

With the help off CSS3, visual elements can be implemented through code instead of with images. CSS3 allows a site to be designed so it has the same look, lowering server requests by using code for rounding corners, gradients and drop down shadows for supported browsers. (Gardner, 2011)

A mobile first approach allows a site to be optimized for speed on the mobile devices and with the help of media queries high resolution content and design can be added to other larger screened devices. (Gardner, 2011)

Another possible solution regarding load times is to trick the user in believing that server requests have been done, simulating faster response times. Queuing the request to the server and displaying that the action is successful before it actually has been uploaded can do this. Instagram makes the user perceive that a “like” is done straight away by popping up a heart on the screen. However in reality the request to the server is still being handled in the background of the client. (Wroblewski, 2013)

4.1.7 Trust

Trust plays a major part of successful e-commerce. A user needs to feel comfortable with the site and factors that influence the user are design, branding, etc.

Trustworthiness can be communicated with four approaches: (Nielsen, 1999)

- Use a high design quality, clear navigation and no typos.
- Show all the important information like delivery charges regarding the order from the beginning.
- Use good shots with high quality of all products and the show correct image for all products.
- Do not isolate the site, link and let the users read reviews about the site on third-party sites, which is a sign of confidence.

A websites' openness regarding their security and how they handle private data have a large impact on their trustworthiness. For example password fields that hide the password should be used, though the functionality can be expanded and let the users change the visibility of the field to show the typed password. It's also important that a privacy statement is provided where it explains everything regarding the users' private information on the site. Trust as a subject is wider than security and includes additional aspects. An example is if the users are able to reach everything they want on the site, if the site works as intended, and if the users are able trust the information on the site (good quality images, spelling, grammar, expressions etc.). (Nielsen, 1999) (Hasan, et al., 2012)

4.2 CONTENT & FUNCTIONALITIES

In order to make a system well designed the developers need to have clear labels and balance the page content so that the flow of information leads the user to the next step of the page. Relevant navigation needs to be used to find content and the design must align with the behavior of the user while focusing on what's important to the user. The context of the user, what the customers need and how they behave has to be aligned with how the site is designed in order to create a good user experience. (Wroblewski, 2011)

4.2.1 *User attention*

Make the interface on the mobile intuitive. Let the flow of the user interaction be smooth and help them focus on their primary tasks. Don't build the site as traditional desktop ones where we try to show as much information as possible. Instead help the user traverse through the site by analyzing where the users attention is placed. (Wroblewski, 2013)

In an e-commerce it's important to understand what triggers the user with the design, have good content and good usability. A site with poor usability or design but with a great content will make it difficult to sell products. The reason for this is that it might be difficult to find the great content or that the design doesn't look professional and trustworthy. Important aspects to think about when designing the site include: (Fuller, 2013)

- *Top Content* – Users are lazy and will judge the site before scrolling or pressing a link. Therefore the most important content should be placed at the top.
- *Avoid Clutter* – Make the design easy to scan for the users, a great tips is using whitespaces to separate content.
- *Familiar Navigation* – Users expect to find the navigation at certain places, if the navigation isn't there they'll get frustrated and leave the site.
- *Typography* – Good typography is essential when it comes to readability, use large headers, mark important sections, use an appropriate line-height and a font that is retina ready.
- *Colors* – Customers make their purchase decisions based on emotions. Colors create emotions and brand recognition in the color scheme creates safety. Think about what emotions the site is supposed to mediate and base the color scheme on that.
- *Visual Hierarchy* – Visual hierarchy is all about telling the users what they are supposed to be looking at, use larger images for the most important elements, smaller for the other, the same rule applies to headers.
- *Images* – Use images to draw attention, images of things that people like tend to increase the number of sales. The use of interesting or unexpected images are normally better than using the traditional stock images that everyone else are using.
- *Movements* – Users wants feedback from the system as a confirmation, movements are a great way to direct attention to something that has changed.
- *Buttons and links* – Going to the next step usually means pressing a button or link, this is why it's important to consider the color and placement of these.
- *Make it simple* – Make it easy for the users to fill in forms and take action, don't ask for unnecessary information or steps.
- *Social Proofs* – Inform the potential customers that users before them have bought the same product. This can be done with for example ratings and reviews.

- *Recommendations* – Make it easy for the users to find similar products, additional products or information they might be interested in.
- *Sales* – Make it clear if an item is on sale.

4.2.2 Good content

A quote by Jonas Downey states, “*Say everything that needs to be said, but no more*”. (Downey, 2013) Web users tend to be lazy and it has shown that users only read about 16% of all words displayed on a webpage. While 79% only gaze through text. A study by the Nielsen Norman Group showed that the following factors increased the usability and readability with 124%: (Nielsen, 1997)

- Write concise texts.
- Make the text easy to scan through without reading the whole paragraph.
- Use an objective language or neutral language.

When choosing what information to display it's important to build the sentences so that they guide the user to what information will be displayed. Examples are the use of highlighted keywords such as hyperlinks, typeface variations and colors. Other things the eye easily gazes for are bullet lists and sub-headers. Capture the audience with the most interesting facts first and only mention one idea per paragraph. (Downey, 2013)

Fonts, icons and colors are usually well thought during the development phase, while labels get a random word or sentence. This often gives users headaches, since they don't have a clue of the meaning and what to enter in a textbox. Well thought out sentences play a huge part when it comes to usability. (Downey, 2013)

Below are two tables that compare two dialog windows. The first text is the usual standard one often presented on todays on websites while the second has been given a lot more thought. (Downey, 2013)

You're moving a repeating event. Which events too do you want to update?

- Only this event
- All events in the series
- Never mind

Figure 7: Dialog box (Downey, 2013)

You're moving a repeating event. Do you want to move all future versions of this event too?

- Yes, move all future versions.
- No, just move this one and keep the others where they were.
- Never mind, don't move anything.

Figure 8: Dialog box (Downey, 2013)

4.2.3 Quality images

Images take up around 61% of a websites space today. (Grigsby, 2013) The use of high-resolution screens requires even larger images to look good which requires an increased image size. As a web designer it's important to provide the best possible experience for a specific user. The ones without a

high-resolution display should only have to wait for the smaller images, something that can be created with the help of media queries. An alternative to reduce the size of images is to use font or vector icons. (Grigsby, 2013)

How pictures are presented becomes more important on mobile devices. Keeping the aspect ratio on pictures becomes harder with different screen ratios. What type of advertisement is suitable change since wide leaderboard ads won't look good on smaller screens? A way of handling this is with swapping out images depending on resolution. (Byrne, 2013)

4.2.4 Mobile-Optimized sites vs. Full Site

Basic ideas when mobile optimizing include, cutting out features, removing content and enlarging interface elements for easier touch, this is usually done by creating separate sites. (Nielsen, 2012)

According to Nielsen information about and what a user can do with a product should be less on a mobile site than on a desktop. But it's still important not to limit the amount of products on the mobile, if a user search for a product and don't find it on the smartphone they will assume that it won't exist on the desktop either. (Nielsen, 2012)

He also states that providing full content is sometimes the only way of satisfying all visitors to a mobile site, there is always a few who expect to have the same functionality on the phone and the desktop. But with good design or a link to the full site content can be managed to be user friendly even on smaller screen devices. (Nielsen, 2012)

Design so that for the major and more frequent tasks more users have a good user experience and that for small minor less used tasks allow the system to have extra interaction with extra clicks to reach the content. This strategy is good for pleasing the majority of the users by neglecting an often much smaller group.

For the most part complex tasks are better suited on desktop environments. An entire site can't be optimized for mobiles from the start according to Nielsen. Desktops will get penalized if forced a mobile design since it's not optimal for larger screens and don't have the same input devices as a phone, never forget who's the larger of the user groups. (Nielsen, 2012)

In and B2B environment planned complex tasks will be carried out on desktops and not on a mobile device. But when the user is on the move the best choice is to use what is available, for example a smartphone or tablet. (Nielsen, 2011)

4.2.5 Shopping procedure

Users' purpose for visiting a site can normally be divided into three categories "*urgent*", "*repetitive*", "*bored*" or a combination of these. The environment a user is in during a visit can also differ.

With the awareness that a user can visit the site for a different purpose at different places the design of the site can better be aligned with what the users want to do at each interaction of the site. The shopping procedure of an e-commerce has been divided into the following interaction types to help understand what the user wants to do: (Wroblewski, 2011)

- ***Find*** – The user wants to find information about a specific topic, order, location or product quickly by browsing or searching (*urgent*).

- **Explore** – The user got some extra time and wants to explore and browse through information or products to see if something interesting shows up (*bored*)
- **Inform** – The user repeatedly checks for the latest updates regarding a topic, product, delivery or in-stock statuses (*repeat*)
- **Create and Modify** – The user has to perform a specific task like ordering products, change or continue with an existing order (*urgent*). The same task can also be carried out on a regular basis (*repetitive & urgent*)

Understanding what the user wants to do when visiting a site and in what context the visits are in helps create an appropriate structure for the site. (Wroblewski, 2011)

4.2.5.1 Find & browse

There are two different ways to find a product, a user can either browse or search for a product. It's important to offer both alternatives in an e-commerce. Users who prefer to search usually know the products they are looking for since it's the fastest way to find a product. It's however important to handle misspelled words in a good way (fuzzy search) otherwise users will feel frustrated when they don't find what they are looking for. (Nielsen, 2011)

4.2.5.2 Keeping an eye on user activity

Revisits is an important part of every website, studies have shown that for most sites (58-81%) of all desktop traffic are revisits and that half of these occur within 3 minutes. Usually users want to check out a recently view product again when they revisit a website within 3 minutes, where they want to access the same product or information again. (Sohn, et al., 2011)

Many e-commerce sites keep track on previous user history, for example it can show recent objects viewed. If the system keeps track of user activities they can then be used at later points to help increase user experience. A user might be logged in and viewed a few products then change platform. A filtering of information presented could also help the user, if for instance it recommends certain products based on previous activities. Keeping track on how popular a product is might also be relevant through a user perspective. Showing items from a category that's usually ordered from can help users locate what they are looking for. (Sohn, et al., 2011)

4.2.5.3 Registration placement

Most web shops offer or force the users to be registered members at different stages at the shopping process. Depending on the purpose of the site a different approach can be taken but the main goal is to reduce interference for the user. The different approaches are: (Nielsen, 2009)

- Register before checkout
- Register after checkout
- Register to be able to browse products
- Register a little bit at the time

One of the most common approaches is to let the user "register before checkout". This is unfortunately not a good idea since it interferes with the customer at the most impotent part which is when he going to make the order. This interference can cause the customer to abort a purchase and go to another site. (Nielsen, 2009)

A similar approach is to let the user “register after checkout”. This approach offers a lot of benefits compared to the previous one since it won’t interfere during the shopping procedure. The membership will also be treated as a “value proposition” since the website offers the user to make his or hers next purchase easier. It is also easy to become a member since the user already has entered all the necessary information and only have to pick a password at this point. (Nielsen, 2009)

A totally different approach is to force the users “register to be able to browse products”. This method makes sense in some cases when the companies don’t want to share some information to outsiders. The privileged members can take part of the e.g. product information and price. The e-commerce can also be tailored to suit a specific customer. (Nielsen, 2009)

The last approach is “register a little bit at the time”. Users are usually more willing to enter information if it doesn’t seem to be much, this tactic fools the users by divide the registration process into smaller pieces. This approach can make the users irritated but most are still willing to proceed since they already have enter some information in the system and it’s better than one huge register form before checkout. (Nielsen, 2009)

There are a couple of general rules for registering users independent of chosen approach: (Nielsen, 2009)

- Do not force the user to register if it isn’t necessary.
- Only ask for a bare minimum of information.
- If the goal is to make the users members then offer them a “value proposition”.
- If something is missing or wrong, spare the users frustration from reentering all the information again.

Help the user to fill in his information by automatically filling in information when possible, e.g. ask for the zip code and automatically fill in the city for him or her.

4.2.6 Design characteristics of multi-platform interaction

When trying to design a good cross platform, one need to look at the *composition*, how devices and functionality are organized. *Continuity to other platforms*, how transitions between different platforms work and the *consistency of system components* that they are designed the same way throughout the system, that they use the same names, design and symbols. (Wäljas, et al., 2010)

It’s important to decide what the *core features* are, provide them in a consistent manner to create a familiarity and show that it’s the same features that are offered on different platforms. (Nielsen, 2011)

4.2.6.1 Composition

How devices and functionality are organized: (Wäljas, et al., 2010)

- *Component role allocation* defines the users purpose of each device which in turn determines the expectations of the functionality. It’s important to understand how the different platforms are used and in what situations to prioritize functionality and tailor the best user experience for each device.
- *Distribution of functionality* relates to what functionality is transferred to different devices and what is made distinguished based on the strengths and weaknesses of each device or the assumed situation to be used in.

- *Functional modularity* is how well each platform adapts to different situation. The usage of the service might be limited if not all functionality is being distributed to other platforms and not the correct device is within reach.

4.2.6.2 Continuity

How transitions between platforms are handled: (Wäljas, et al., 2010)

- *Task migration* e.g. continuing or moving work to another platform.
- *Cross-platform transitions* it should be easy to change platform without technical difficulties.
- *Synchronization* of actions and content needs to be easy between different platforms.

4.2.6.3 Consistency

Services needs to have the same look and feel over multiple platforms. Always offer the same design throughout all the platforms on a component level. (Wäljas, et al., 2010)

- *Perceptual consistency* is when viewing how the user perceives the system meaning having the same look and feel to it.
- *Semantic consistency* is when the same symbols and terminology is used.
- *Syntactic consistency* is about interaction logic, error messages are placed at the same place or menu items are sorted in the same order.

If the user knows how to use a service on one unit it should be easy to transfer that knowledge to another unit. The same icons, terminology and expressions need to be used in a consistent manner so that mitigation becomes easy. (Wäljas, et al., 2010)

However it isn't enough to only use the same logo or color scheme. This is why it's important to divide the design into blocks so that all elements have a similar look, users must be able to easily locate stuff on different platforms and understand how to interact with them. (Nielsen, 2011) Images and text need to have the same look and feel on all platforms even if they are in different sizes. It's important that the users are able feel that it's the same content they are looking at on all devices. When a system is designed with composition, continuity and consistency in mind one can expect a better total user experience over multiple platforms. (Wäljas, et al., 2010)

A fluent content and task migration gives an experience of smoothness while good consistency makes the users perceive that the systems work perfectly together. (Wäljas, et al., 2010) The transition to new environments needs to go smooth or else the user won't accept the new platform. With bad UX in the transition the main system will also suffer leaving the user lost in the transition. (Pasman, 2011)

4.3 ADAPTIVE EXPERIENCE & RESPONSIVE DESIGN

Guide the user with adaptive components that's tailored for the user environment and provide a responsive interface for different screen sizes with a mobile first strategy.

4.3.1 *Guide the user with the design*

A flexible design that adapts according to what the user is doing can increase the user experience. The system should keep track of what the user wants to see on a site and the developers need to know how the user interacts with the site, where he usually has his attention. (Sohn, et al., 2011)

4.3.1.1 *Compatibility of user environment*

From a usability point of view it is important to inform the user that he or she is using an unsupported device or needs to activate a plugin such as JavaScript in the browser. (Danger & Grigsby, 2012) Which will help the user help find a solution to the problem and not blaming the site for problems that can occur.

Browsers have different compatibility with CSS, HTML, JavaScript, and Flash among other tools that can be used when creating websites. Many users still use old versions of browsers not making them compatible with newer development tools. Some of the browsers force updates while others are not that demanding. For mobile devices much newer versions of browsers are installed making them support new standards better. While some older standards such as Adobe Flash are no longer supported. (Deveria, 2013)

Media queries in CSS3 are commonly used to trigger a different look for different screen sizes, orientation, aspect ratio etc. (Danger & Grigsby, 2012) The browsers without support for media queries use a fallback to a previous development state and what is shown depends on the chosen design method, e.g. mobile first or desktop first. (Grigsby, 2013)

- Desktop first gives a desktop fallback, only showing the desktop version even if visited from a mobile phone. Because it's developed from a desktop first perspective.
- Mobile first gives a mobile fallback, only showing the mobile version even if visited from a desktop PC. Because it's developed from a mobile first design.

The physical devices have different properties. Some have hardware buttons while others have touch, navigate with gestures, and have different screen size and aspect ratio. Depending on operating system how the user interacts with the computer is slightly different, e.g. on Apple OSX the close, minimize, expand buttons are located to the left in a window, while in Microsoft Windows it's oriented on the right side of a window. The save screen that different programs use in windows have the button order "yes", "no" and "cancel" while OSX have "don't save" "cancel" and "save". Depending on where in the world the users live they can read a book from the left to right or right to the left. These environmental or cultural differences give us a hint of how users want their websites oriented. A good rule of thumb has always been to balance the page trying to guide the user to move forward to a location. (Benyon, et al., 2005)

4.3.1.2 *Make the design adaptive*

In a world filled with a wide range of different devices it's impossible to know what device the next visitor will be using. A solution to this is to provide a responsive and adapted experience for that type of device. Most modern smartphones and tablets provide different styles on the keyboard to give the user

an adapted experience. Two common situations are showing a number pad when the user is entering numbers and a @-symbol when the user is entering an e-mail address. (Moore, 2013)

HTML5 make it easy to change input screen for a mobile device: (Moore, 2013)

- <input type="number" />
- <input type="email" />

Media queries are sensor tools that are under constant development and the new (Media Queries Level 4) will for example support “script”, “pointer” and “hover”. All of these will make it easier to increase the usability on the site. (Cox, 2013)

- *Script* notice whether the device supports JavaScript or not.
- *Pointer* makes it possible to check the devices input accuracy.
 - *Coarse* refers to a touch device.
 - *Fine* refers to a device with a mouse or styles.
 - *None* refers to devices without a pointer, e.g. only a keyboard connected.
- *Hover* checks if a device supports hovering.

These media queries also take into consideration that users can have multiple pointer devices connected to the same device, for example a touch screen and a mouse. The benefit of using media queries and adept the design to touch or mouse is that developers are able to make buttons, links, menus etc. more touch friendly. Another benefit is that they are able to offer hovering functionality when it's possible and replace it when it isn't possible. These are simple extensions to the functionality that will add more control over how the design is adapted throughout different devices. (Cox, 2013)

A common solution to save space on a website is to include the label inside a textbox and hide the label when the user starts typing or replace the label with an icon. Both of these methods have their own downsides. Hiding the label can make the user forget what information he was supposed to enter. Replacing the label with an icon can be confusing for less known icons. An alternative method is to use the “float label pattern” which makes the label float inside the textbox whenever the user has typed something in it. (Smith, 2013)

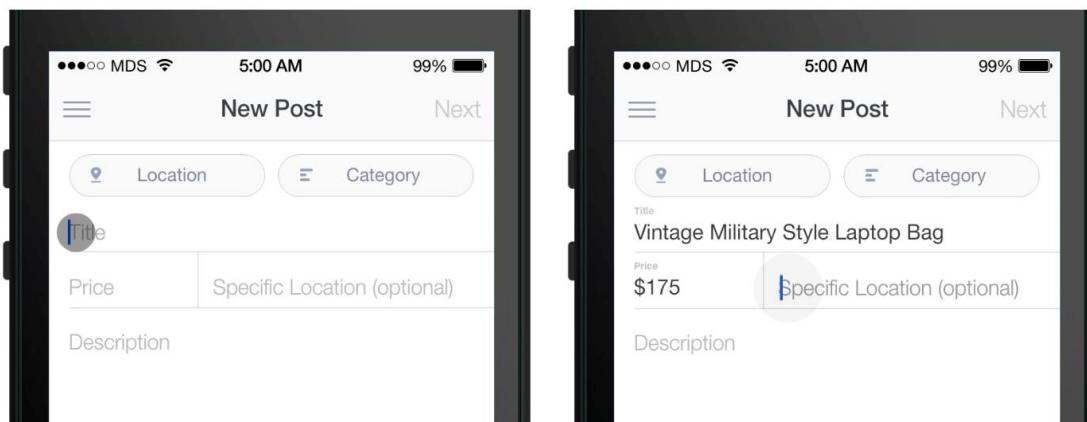


Figure 9: Float label pattern before typing and after typing. (Smith, 2013)

Besides making the labels understandable it's important to clearly inform the users about the mandatory fields to enter information in. The system shall clearly inform the user if information has been entered in the wrong format and how it's supposed to be entered. (Hasan, et al., 2012)

A good reminder is that the system always is supposed to inform the users about their interactions. If the users add, change quantity or remove an item from the shopping cart, a clear response from the system is required. (Hasan, et al., 2012)

4.3.2 Designing through Mobile first

Traditionally, web pages have always been created for larger desktop environments first and then scaled down to mobile devices. When software is designed for a mobile smartphone device before traditional desktop or laptop computers it is called a mobile first strategy. (Johnson, 2013)

The mobile-first approach changes the mentalities that exist in traditional desktop-first environments. It requires the developers to look at what the most important elements are for a user. Instead of degrading a site so that it can fit on a smaller screen by removing content the strategy enhance the site when moving to larger screens. (Johnson, 2013)

An appropriate strategy in the design helps the developers understand what to do, when to do it as well as why they need to do it.

4.3.2.1 Graceful degradation

Traditionally sites get scaled down by removing some of its functionality and gracefully degrade the site. By using the traditional downsizing approach the mobile devices don't improve. The programmer is pushed into a mentality that wants to reduce functionality in order to save space, which can impact user experience. (Johnson, 2013)

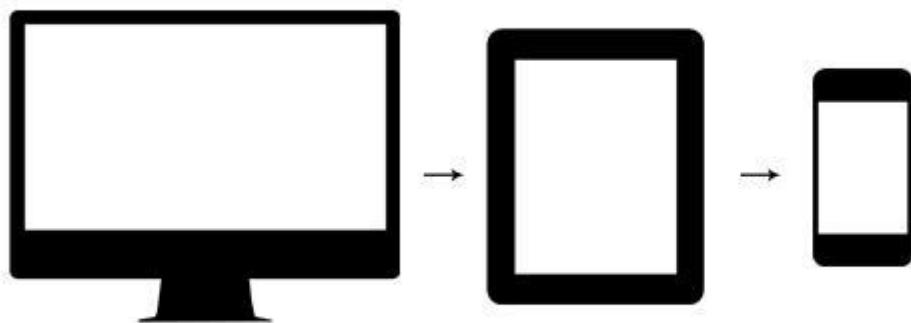


Figure 10: Traditional web development, gracefully degrading a system (Johnson, 2013)

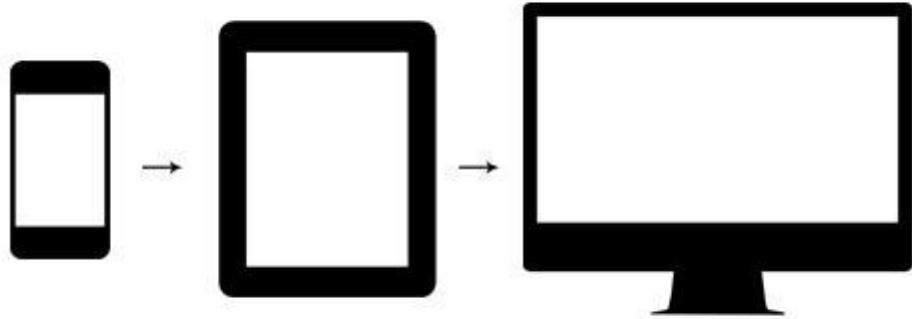


Figure 11: Progressive enhancement used in a mobile first strategy. (Johnson, 2013)

4.3.2.2 *Progressive enhancement*

A benefit of beginning with a smaller device is that the users receive a product that feels finished rather than an afterthought scaled down version of the desktop version. The developers will also already have gone through the process to decide and trim the elements to the most important. After this stage each platform becomes more robust. Progressive enhancement is a strategy in mobile first that prioritizes the most essential features and content of a system and enhances functionality step by step for larger screened devices. (Johnson, 2013)

4.3.3 *Design choices – responsive components*

A page can be static or dynamic, for example if in an e-commerce an item's stock amount won't change throughout a session if using a static approach while it will update as the quantity changes with a dynamic. (Paternò & Santoro, 2012)

4.3.3.1 *Handling different screen sizes*

Adapting a *user interface* (UI) to a new device means changing either the entire UI, a group of it or a single element. Leaving the interface unchanged often results in a bad experience for the user. Changing the UI can be done in three different ways: (Paternò & Santoro, 2012)

- *Scaling* is when the UI is resized linearly keeping the structure intact.
- *Transducing*, is when the initial structure is preserved but the content is resized or morphed to fit another screen size.
- *Transforming* is when both structure and content of the page are changed to fit the new device.

There are four different types of layout characteristics to choose from: (Davison, 2013)

- *Static* – A static layout uses a design independent of the screen size and lets the user scroll horizontally if the webpage is too wide.

- *Liquid* – A liquid or fluid layout uses static design and adapts the width of each object according to different screen sizes. This design method is usually a bad idea to use on its own since the static layout only change the width of each element on the screen.
- *Adaptive* – An adaptive layout can be seen as a series of hidden static layouts where each layout gets switched out at certain predefined breakpoints. The objects within each static layout are static so this design method can therefore create whitespaces, areas that are left unused on the site next to the objects.
- *Responsive* – The difference between an adaptive and a responsive layout is that each object within a breakpoint is liquid and will therefore be resized so this design method won't create any unwanted whitespaces.

Responsive design can be created with framework such as Twitters *Bootstrap* or Zurbs *Foundation*, which lets front-end code be written so that it can easily handle different resolutions. (Bootstrap, 2014) A responsive interface is agile which works on many different multiple platforms. (Florins & Vanderdonckt, 2004) The reason why many people are using responsive web design is because it's quicker and cheaper than developing a native app. (Danger & Grigsby, 2012)

4.3.3.2 Designing the blocks on the page

When developing from a mobile first approach its important think about what makes the content flexible rather than what makes it mobile friendly. The benefit of thinking flexible rather than mobile-friendly is that it will scale better to other devices. If a site divides components into smaller widgets or blocks, then blocks can be identified so that they can be reused, rearranged and resized in different parts of a system. By building the design with blocks it will allow a familiarity throughout different pages and devices. (Gremillion, 2013)

Blocks can be split or regrouped into different objects where they also can be scaled to utilize larger screen devices. There are three typical modifications available for blocks: (Florins & Vanderdonckt, 2004)

- Resizing, scales blocks to different sizes.
- Reorientation, changing a block without moving or changing the position.
- Moving rules, moving a block without creating unwanted overlaps

When *transforming* blocks to new visual content or changing the interaction with the block the transformation can be a: (Florins & Vanderdonckt, 2004)

- *Modification*, changing the appearance of a block, e.g. text in a top menu may be changed to an icon.



Figure 12: Modified menu to support different screen size. (Foundation, 2014)

- *Substitution, replacing a block with an alternative block. Mainly used for two reasons:*
 - *Unavailability, a block don't work correctly on a specific platform, it can be substituted with a working one.*
 - *Screen size inadequacy, screen size might not be suitable for the block on one of the devices then the block should be replaced with one that better fits the space.*

A substitution can be performed with three methods:

- *Simple substitution (one to one), one block becomes another block for another device.*
- *Regrouping (many to one), many blocks on a device become one new block on another device.*
- *Splitting (one to many), one block in one device is divided into many blocks.*

4.3.3.3 Designing responsive menu

Different ways of handling menus in responsive design: (Frost, 2012)

4.3.3.3.1 Do nothing

The easiest way of implementing responsive design is to keep the menu on the top and do nothing about it. It doesn't have any JavaScript dependencies, require easy CSS and it isn't dependent on source code orders. (Frost, 2012)

It has issues with heights e.g. the logo of the site might take too much space from the screen, pushing the menu down disrupting the time it takes for the user to reach relevant content. It's not scalable, when adding new content or when translating the menu to different languages it may force a new line, which might disrupt the layout. Users with large fingers might also tap on the wrong menu item if placed close to each other. (Frost, 2012)

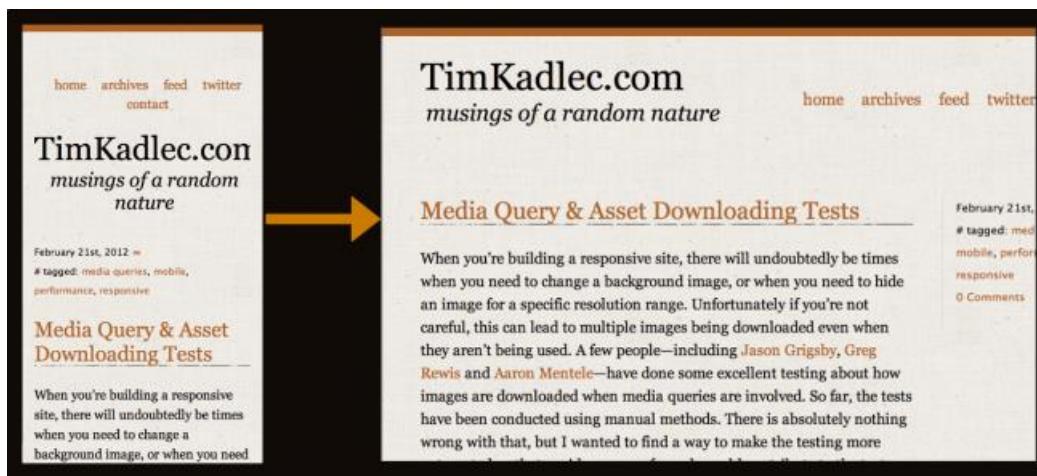


Figure 13: Do nothing, the menu is divided into multiple rows. (Frost, 2012)

4.3.3.3.2 Footer anchor

A Footer anchor design is when the menu is at the footer of the page and uses an anchor link in the top header to jump to the menu in the bottom. This gives room for important content since the menu isn't at the top and provides fast navigation. (Frost, 2012)

It's relatively easy to implement with no JavaScript dependency and don't require much work to scale the menu with CSS-code for larger screens. It is compact only taking up one button space in the top bar. Jumping to the bottom of the page might be confusing and perceived as an ugly solution by some users. (Frost, 2012)

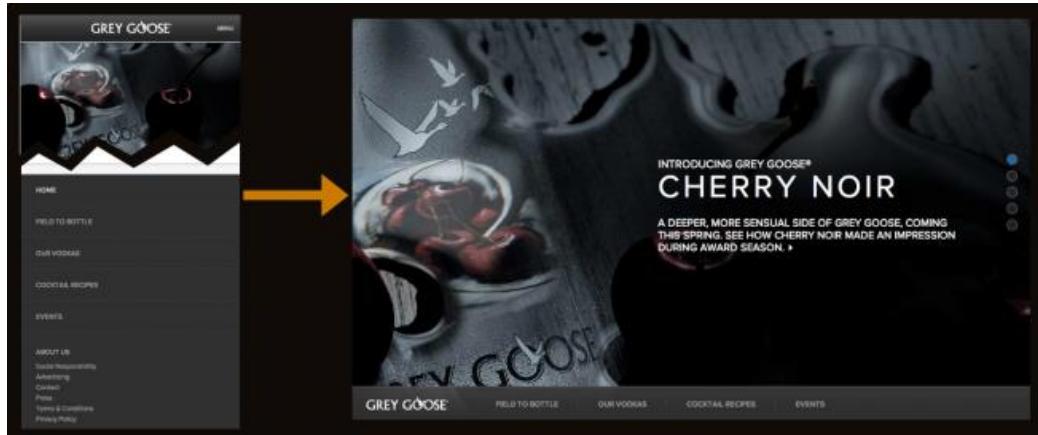


Figure 14: Footer anchor, the menu is placed at the bottom of the page and accessed with anchors. (Frost, 2012)

4.3.3.3.3 Footer only

The navigation menu is placed in the bottom footer of the page without an anchor from the top header, forcing the users to scroll all the way to the bottom of the page to use the menu. It frees up header space and allows important content to be shown first. It might be confusing to find the menu in the footer and hard to scroll down to on mobile devices. (Frost, 2012)

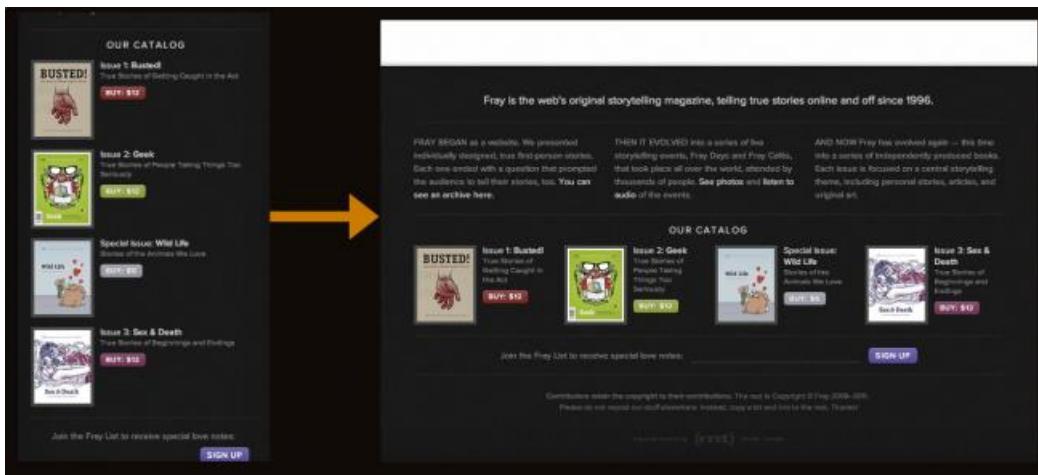


Figure 15: Footer only, the navigation menu is always at the bottom without anchors from the top header. (Frost, 2012)

4.3.3.3.4 Select menu

A dropdown menu is used that saves space and addresses the problem of the top navigation menu with multiple links and content. It uses the existing prebuilt select menu for each device altering the layout depending on device. It frees up space and the interactions stays in the top header while still being easy to figure out for most users, because of the native menus of each device. (Frost, 2012)

It's hard to style the menu across different browsers, submenus might look bad and confusing, however it only require a little JavaScript for the menu to work. (Frost, 2012)



Figure 16: Select menu, uses the prebuilt select menu on a device and is often replaced for larger screens. (Frost, 2012)

4.3.3.5 Toggle

Open a popup menu that can be toggled on or off in for example the top header that looks good and is easy to implement. It doesn't jump to another place on the site as the footer menu does. It is JavaScript dependent and works on most browsers, some older devices might though struggle with compatibility. (Frost, 2012)



Figure 17: Toggle, opens a popup menu that is easy to scale up with the right tools. (Frost, 2012)

4.3.3.6 Slide out navigation

Slides a menu from the side pushing the main page to the side. The slide out menu is particularly good in handling lots of menu items. Doesn't take up much space, looks good and is a familiar interface to many. However, it has a higher probability of failure and is not that compatible with older devices. The menu also scales bad and is potentially confusing to some. (Frost, 2012)



Figure 18: Slide out navigation, sliding away the main page and pushing in a menu. (Frost, 2012)

4.3.3.3.7 Hide

Remove content for the smaller screens, usually a bad choice that should be solved with a better design. It frees up space by removing content, navigation & functionality, which will frustrate the mobile users. Hiding the functionality with code e.g. “display: none” makes the page still load all the information in the background but don’t show it in the browser. (Frost, 2012)

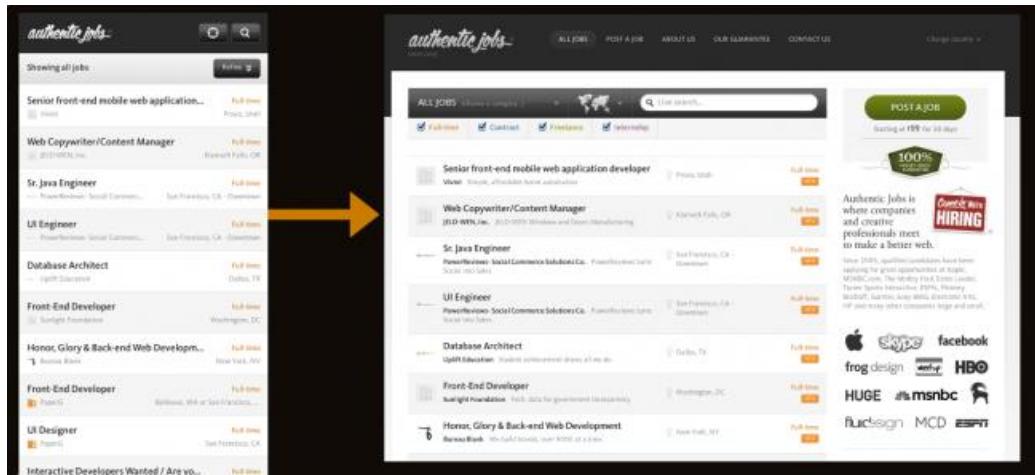


Figure 19: Hide, makes content invisible for the smaller screened device. (Frost, 2012)

4.3.3.3.8 Skip the sub navigation

Allows the user to tap into new pages by loading new pages for the mobile device, showing the sub navigation content that is viewed as e.g. a traditional dropdown menu for the larger screens. This navigation method is easy to implement. Where the largest drawback is that a new page needs to be loaded each time a sub menu is accessed. (Frost, 2012)



Figure 20: Skip the sub navigation, doesn't show submenu items on smaller screens. (Frost, 2012)

4.3.3.3.9 Priority+

Hides less important menu elements on smaller screens to only show what's believed to be the things the user is looking for. The hidden elements placed behind a more link. This navigation is relatively easy to implement and makes it easier to find relevant content than since it requires prioritization of the content. The biggest drawback is that it is possible to accidentally hide what the users are looking for. (Frost, 2012)

Startpage | Articles | Blog | +More

Figure 21: Priority+, a "more" menu item hides less prioritised features.

Startpage | Politics | Articles | Blog | Forum | Newsletter | Contact

Figure 22: Priority+ on a large screen showing all menu items.

4.3.3.4 Different ways of designing responsive tables

According to (Grigsby, 2013) most designers include all information available on tables since they believe that offering something less is not acceptable. However by designing progressively through mobile first great tables can be created that show what really matters.

The most important factor that decides what table to use is the content of the page. If the table can show what is important then the table is well designed: (Grigsby, 2013)

- Can people comprehend the meaning of the table in all contexts?
- Is all of the information available in some way?
- Is every URL is accessible regardless of device?

Here we will describe three different ways to handle tables in a responsive way.

4.3.3.4.1 Unseen Column

The unseen column is a design option that allows columns to be hidden on smaller screens. The most important information is shown on the smaller mobile screens and progressively enhanced into tables that contain more information. Is suitable for when comparing rows and columns. (Griggsby, 2013)

Code	Price	Change	Change %	Open	High	Low	Volume
AAC	\$1.38	-0.01	-0.36%	\$1.39	\$1.39	\$1.38	9,395
AAD	\$1.15	+0.02	1.32%	\$1.14	\$1.15	\$1.13	56,431
AAX	\$4.00	-0.04	-0.99%	\$4.01	\$4.05	\$4.00	90,641
ABC	\$3.00	+0.06	2.04%	\$2.98	\$3.00	\$2.96	862,518
ABP	\$1.91	0.00	0.00%	\$1.92	\$1.93	\$1.90	595,701
ABY	\$0.77	+0.02	2.00%	\$0.76	\$0.77	\$0.76	54,567
ACR	\$3.71	+0.01	0.14%	\$3.70	\$3.72	\$3.68	191,373

Figure 23: Unseen Column on small screen. (Elvery, 2013)

Code	Company	Price	Change	Change %	Open	High	Low	Volume
AAC	AUSTRALIAN AGRICULTURAL COMPANY LIMITED.	\$1.38	-0.01	-0.36%	\$1.39	\$1.39	\$1.38	9,395
AAD	ARDENT LEISURE GROUP	\$1.15	+0.02	1.32%	\$1.14	\$1.15	\$1.13	56,431
AAX	AUSENCO LIMITED	\$4.00	-0.04	-0.99%	\$4.01	\$4.05	\$4.00	90,641
ABC	ADELAIDE BRIGHTON LIMITED	\$3.00	+0.06	2.04%	\$2.98	\$3.00	\$2.96	862,518
ABP	ABACUS PROPERTY GROUP	\$1.91	0.00	0.00%	\$1.92	\$1.93	\$1.90	595,701
ABY	ADITYA BIRLA MINERALS LIMITED	\$0.77	+0.02	2.00%	\$0.76	\$0.77	\$0.76	54,567
ACR	ACRUX LIMITED	\$3.71	+0.01	0.14%	\$3.70	\$3.72	\$3.68	191,373
ADU	ADAMUS RESOURCES LIMITED	\$0.72	0.00	0.00%	\$0.73	\$0.74	\$0.72	8,602,291
AGG	ANGLOGOLD ASHANTI LIMITED	\$7.81	-0.22	-2.74%	\$7.82	\$7.82	\$7.81	148
AGK	AGL ENERGY LIMITED	\$13.82	+0.02	0.14%	\$13.83	\$13.83	\$13.67	846,403
AGO	ATLAS IRON LIMITED	\$3.17	-0.02	-0.47%	\$3.11	\$3.22	\$3.10	5,416,303

Figure 24: Unseen column is visible on large screen. (Elvery, 2013)

4.3.3.4.2 Let it scroll

When the table doesn't fit the screen it allows scrolling to view more of the table, which is very easy to implement with CSS, and maintains the same look and feel to the design. A drawback is that it isn't always that intuitive to scroll to the side on a mobile device.

#	Table heading	Table heading	Table heading	Table heading
1	Table cell	Table cell	Table cell	Table cell
2	Table cell	Table cell	Table cell	Table cell
3	Table cell	Table cell	Table cell	Table cell

Figure 25: Horizontal scroll on small screen. (Bootstrap, 2014)

4.3.3.4.3 Flip Scroll

In a flip scroll the headers are swapped from the side on the small screen to the top on larger screens and adds a horizontal scroll to view more columns. This solution is suitable when comparing of rows and columns. (Grigsby, 2013)

Code	AAC	AAD	AAX
Company	AUSTRALIAN AGRICULTURAL COMPANY LIMITED.	ARDENT LEISURE GROUP	AUSENCO
Price	\$1.38	\$1.15	\$4.00
Change	-0.01	+0.02	-0.04
Change %	-0.36%	1.32%	-0.99%
Open	\$1.39	\$1.14	\$4.01
High	\$1.39	\$1.15	\$4.05
Low	\$1.38	\$1.13	\$4.00
Volume	9,395	56,431	90,641

Figure 26: Flip Scroll on small screen. (Elvery, 2013)

Code	Company	Price	Change	Change %	Open	High	Low	Volume
AAC	AUSTRALIAN AGRICULTURAL COMPANY LIMITED.	\$1.38	-0.01	-0.36%	\$1.39	\$1.39	\$1.38	9,395
AAD	ARDENT LEISURE GROUP	\$1.15	+0.02	1.32%	\$1.14	\$1.15	\$1.13	56,431
AAX	AUSENCO LIMITED	\$4.00	-0.04	-0.99%	\$4.01	\$4.05	\$4.00	90,641
ABC	ADELAIDE BRIGHTON LIMITED	\$3.00	+0.06	2.04%	\$2.98	\$3.00	\$2.96	862,518
ABP	ABACUS PROPERTY GROUP	\$1.91	0.00	0.00%	\$1.92	\$1.93	\$1.90	595,701
ABY	ADITYA BIRLA MINERALS LIMITED	\$0.77	+0.02	2.00%	\$0.76	\$0.77	\$0.76	54,567
ACR	ACRUX LIMITED	\$3.71	+0.01	0.14%	\$3.70	\$3.72	\$3.68	191,373
ADU	ADAMUS RESOURCES LIMITED	\$0.72	0.00	0.00%	\$0.73	\$0.74	\$0.72	8,602,291
AGG	ANGLOGOLD ASHANTI LIMITED	\$7.81	-0.22	-2.74%	\$7.82	\$7.82	\$7.81	148
AGK	AGL ENERGY LIMITED	\$13.82	+0.02	0.14%	\$13.83	\$13.83	\$13.67	846,403
AGO	ATLAS IRON LIMITED	\$3.17	-0.02	-0.47%	\$3.11	\$3.22	\$3.10	5,416,303

Figure 27: Flip scroll is a regular table on a large screen with no scroll. (Elvery, 2013)

4.3.3.4.4 No more Tables

When it is not important to compare rows with columns the “No more Tables” solution is a good choice since the data can be converted to a vertical scroll list instead. A drawback with this solution is that it takes up a lot of space. (Grigsby, 2013)

Top Movies	
Citizen Kane	
YEAR	1941
RATING	100%
REVIEWS	74
DIRECTOR	Orson Welles
Casablanca	
YEAR	1942
RATING	97%
REVIEWS	64
DIRECTOR	Michael Curtiz

Figure 28: “No more Tables” on small screen, data is instead shown in a vertical list. (Grigsby, 2013)

Top Movies					
RANK	MOVIE TITLE	YEAR	RATING	REVIEWS	DIRECTOR
1	Citizen Kane	1941	100%	74	Orson Welles
2	Casablanca	1942	97%	64	Michael Curtiz
3	The Godfather	1972	97%	87	Francis Ford Coppola
4	Gone with the Wind	1939	96%	87	Victor Fleming
5	Lawrence of Arabia	1962	94%	87	Sir David Lean
6	Dr. Strangelove Or How I Learned to Stop Worrying and Love the Bomb	1964	92%	74	Stanley Kubrick
7	The Graduate	1967	91%	122	Mike Nichols
8	The Wizard of Oz	1939	90%	72	Victor Fleming
9	Singin' in the Rain	1952	89%	85	Stanley Donen, Gene Kelly
10	Inception	2010	84%	78	Christopher Nolan

Figure 29: The “No more Tables” option is a regular table on a large screen. (Grigsby, 2013)

5 PHASE ONE – E-COMMERCE DESIGN GUIDELINES

A summarized design guide based on our finding from the chapters “Creating user value & user experience”, “Content & functionalities” and “Responsive & adaptive design” is shown below.

5.1 CREATING USER VALUE & USER EXPERIENCE

Increased user value & experience helps create loyal customers that are required for an e-commerce to be successful. This is achieved by focusing on:

- Safety – Make the users feel comfortable with the help of certifications etc.
- User value – Prioritize content according to what the users value the most, if the user doesn't want certain functionality it's just a waste of time.
- Useful features – The functionality must both have good usability (easy & pleasant) and utility (feature). Where they need to be intuitive and perform the intended task well.
- The interaction with the system must be effective, efficient and satisfactory for the user. I.e. the system must do what it is intended to do, provide the functionality without meaningless interactions and in a pleasing manner without errors.
- Delays – Offer low load times, preferably less than one second but never longer than 3 seconds while users are using a good network connection.
- Trust – Make the site look trustworthy with the help of high quality design, good content and show important information early in the checkout procedure.

5.2 CONTENT & FUNCTIONALITY

When the content & functionality of the site are well designed the users' value & experience also increase. This is achieved by focusing on:

- User Attention – Draw the attention to important content/parts of the page:
 - Place important information at the top
 - Use whitespaces/empty areas on the page to give a better overview.
 - Familiar navigation.
 - Good typography.
 - Colors – e.g. use complementary colors on buttons or important texts.
 - Visual hierarchy.
 - Use images that serve a purpose.
 - Draw attention with moving graphics.
 - Buttons/link – The color, form and placement is important.
 - Spare the users from unnecessary information – They might lose interest.
 - Use credible reviews and ratings to increase the perception of the site/content.
 - Make it easy to find similar products.
 - Make it clear if products are on sale.

- Good content – “Say everything that needs to be said but no more” (Downey, 2013)
 - Write compact but still informative texts.
 - Make texts easy to scan so that users don’t have to read whole paragraphs.
 - Use an objective and neutral language.
- Quality images – Use high quality images on all devices.
- Provide full content – Make all content available by using links to less used functionality.
- Understand the purpose of visits to the e-commerce – Design the e-commerce to help the user fulfill the purpose of the visit. Help the user to:
 - Quickly find e.g. products, orders or information.
 - Casually explore what is on the page.
 - Update/Inform e.g. look for availability or delivery status.
 - Create or modify an order.
- Composition – Functionality should be organized/prioritized according to the purpose of the visit & platform and compose the functionality according to what gives best user experience for each device. Prioritize the functionality included on each device according to intended use.
- Find/browse – Offer alternative ways of finding products e.g. use both search and browse.
- Track activity – Help the user to find more relevant information by keeping tabs on the user, e.g. when revisiting a page, give the user a shortcut to recently viewed/ordered products or help the user find similar products.
- Continuity – The content on the page should easily be able to move/access on any platform.
- Registration – Try to reduce the interference with the user by offering it at an appropriate time.
 - Placement of the registration – *“Register before checkout”*, *“Register after checkout”*, *“Register to be able to browse products”* or *“Register a little bit at the time”*.
 - Don’t force the registration if it isn’t necessary.
 - Ask for minimum information.
 - Offer value propositions for new members i.e. let them gain something by registering.
 - Spare the user from having to reenter information.
- Consistency – The system should have the same look and feel on all platforms, symbols and terminology, while providing the same syntactical logic.
 - *Perceptual consistency* – The users should perceive that the same look and feel is used on all devices.
 - *Semantic consistency* – The same symbols and terminology needs to be used on all devices.
 - *Syntactic consistency* – Interaction logic such as error messages need to be consistent and placed at the same locations. Menu items should also be sorted in the same order.
- Inform the user - Let the system interact with the users, e.g. show a clear response from the system if information is entered incorrect, quantity is changed or an item is added to the checkout cart.

5.3 ADAPTIVE EXPERIENCE & RESPONSIVE DESIGN

Enhance the “*user value & user experience*” and “*content & functionalities*” by providing an adaptive and responsive design experience. Where the designer should:

- Inform the user of unsupported features/environment – E.g. that JavaScript is required to support all functionalities and help the user solve the problem.
- Adapt the interface – Adjust the interface so that it becomes more convenient for the user e.g. change input screen to a number pad when entering numbers or show the @-symbol when entering an e-mail address.
- Sense the surroundings - Use Media Queries to make the system user-friendlier. E.g. make buttons more touch friendly for touch devices or offer hover functionality on mouse pointer devices.
- Use Mobile First – Prioritize the most essential features and progressively enhance them.
- Handle different screen sizes – Offer e.g. a responsive layout that adapts to the system depending on screen size.
- Use responsive components
 - Scale the objects e.g. images, headings or input field, swap them out or change them to create a better user experience. By doing this it is possible to offer a more adapted design that is suitable for different screen sizes.
 - Blocks are one or more objects – Use blocks to offer a more agile development where widgets can be moved, swapped or changed easy. By using blocks the look and feel of the site is maintained.
 - Responsive menus – Different menu options are suitable for different reasons. The amount of data, how large the screen is on the smaller devices and the prioritizing of data decide which menus are suitable. But also the compatibility of older devices and the level of programming skills is a factor as some are harder to implement than others. For the mobile it can be done by using the strategy:
 - “Do nothing” – Keep the menu on the top and do nothing about it, good for very few menu items.
 - “Footer anchor” – Gives room for important content since the menu isn’t at the top and provides fast navigation.
 - “Footer only” – Gives room for important content since the menu isn’t at the top but might be a bit confusing especially when the page is very long.
 - “Select menu” – Uses prebuilt select menu of different devices altering the layout depending on device, frees up space while still being easy to figure out.
 - “Toggle” – Open a popup menu that can be toggled, freeing up a lot of space for important content.
 - “Slide out navigation” – slides in a navigation menu which is good at handling lots of menu items.
 - “Hide” – Frees up space by removing content, navigation & functionality and showing them on the bigger screens. Not the ideal use for mobile first development.
 - “Skip the sub navigation” – Allows the user to tap into new pages by loading new pages for the mobile device, showing the sub navigation content that is

- viewed as e.g. a traditional dropdown menu for the larger screens. Good for showing a lot of sub navigation content.
- “Priority+” – Places less important content within a more section, as more space becomes available the more menu content is moved to the main menu. Good for freeing up space by placing less used functionality in a sub menu.

(The menus are transformed into a side, footer or top menu for larger screens.)

- Responsive tables – depending on if it’s important to compare rows and columns, the availability of space and how much data a table contains the appropriate table design needs to be chosen. A well-designed table must let the users comprehend the meaning of the table, allow access to all information and work on all devices.
 - Unseen column – Progressively enhances into tables that contain more information, e.g. add extra columns to larger devices.
 - Let it scroll – When the table doesn’t fit the screen it allows scrolling to view more of the table. Good when the information flow is important and if it’s important to compare rows within the same columns.
 - Flip scroll – Rows and columns switch places and are put on opposite axels, suitable when comparing of rows and columns. Can be used to make the table longer or shorter depending on which axel has the most data.
 - “No more table” – Show the content as a list of objects instead of a table, it is suitable when the relationship between different rows and columns isn’t that important.

(The tables are transformed into e.g. ordinary table for larger screens.)

5.4 DON'T FORCE A MOBILE DESIGN

In order to make a more complete design guide we included a reevaluation phase based on our finding gathered from when we validated the design guide in and draw conclusions from it, which will be shown at the respective chapters of the study.

Start by prioritizing the content with the help of mobile first and progressively enhance the content and design of the system as it is developed for larger screened devices. When the largest screened device is developed new knowledge can be gained by reevaluating the design. This knowledge should be combined with the original mobile first design in order to capture all aspects of the system.



Figure 30 Revision to the design guide based on the conclusion & validation of the design guide in the report.

6 PHASE TWO – DATA COLLECTION

In our data collection we performed interviews and observations of TINEs e-commerce users and gathered online statistics from surveys on what typical businesses and users believe are key factors for e-commerce.

6.1 INTERVIEWS & OBSERVATIONS

An e-commerce should be created and designed so that it fits with the users' routines and needs. We focused on the purpose of the visit to the e-commerce when we created the questions for the interviews. “*Find*”, “*explore*”, “*inform*” or “*create & modify*”, which are four typical reasons why people visit an e-commerce. Whether the visit is urgent, out of boredom, a repetitive behavior or a mix of them.

Five users were interviewed and observed in Oslo that covers wide range of TINEs online customers. The purpose of the interviews was mainly to gather information on the environments, how the e-commerce is being used and what types of people are using it. The typical users we encountered all wanted to use a type of a favorites list to order products. Many also use order history and standing orders. How the users look for products vary, some like to browse while others prefer to search and filter out products.

During our interviews we also made many observations of usability problems and habits that the users have.

The five interview and observation objects are analyzed and summarized below with the help of a PACT-analysis according to background, skills, used functionality and technology.

6.1.1 Interview person 1

- **Background:** Woman of 60+ years old that is a municipal office worker for 26 kindergartens. Has worked six years at the current position and previously worked as a kindergarten teacher.
- **Computer skills:** Low computer skills with an open mind towards learning. Though afraid of how other people in her position would handle a change in TINEs site.
- **Navigation skills:** Her attention is focused on what she can see on the screen. She never scrolls the page, clicking around a lot until she finds what she is looking for (**browsing**). Often missing that she needs to create an order before items can be added to it.
- **Used functionalities:** Wants to use a favorites list, but didn't know that there was one built in to the system. She only uses **standing order** and **order history** and has never used any of the other extra ordering functionalities.
- **Technology:** Uses an old classic phone, and would at most see the page on a tablet with the same functionality as on the desktop.

6.1.2 Interview person 2

- **Background:** Man of 50+ years old that is a head kitchen chef at a hospital. Has worked at his current position for over 17 years and has worked with similar tasks since the early 80's.
- **Computer skills:** High computer skills and is burning to use the latest technology that might help him optimize daily activities.
- **Navigation skills:** Uses **search** a lot, looking for both categories and products. Likes it when pages are **dynamic**. He had some trouble changing quantities due to the fact that he needed to

click on an update button. Tried to add items to an order before it was created. Uses the keyboard a lot, tabbing to different input fields.

- **Used functionalities:** Uses the ***favorites list***, which they want to be able to reorganize after their own product shelves. Likes to see an ***order history*** that shows 1-3 days back. Didn't know that there was an order template, order draft, had no need for standing orders & never used quick ordering because he can't remember all the product codes.
- **Technology:** Uses a Samsung S4 and likes to see ***scanning product codes*** incorporated to the smartphone, so that they can use it when going through the storage. On the tablet he would like to see the same functionality as on the desktop. Wouldn't use it when going through storage but might bring it with him to meetings.

6.1.3 Interview person 3

- **Background:** Woman close to 50 years old that is a kitchen assistant chef at a hospital. Has worked at his current position for 16 years and has worked with similar tasks since the early 80's.
- **Computer skills:** Medium computer skills.
- **Navigation skills:** Uses ***browsing*** and also uses product categories to help her find items. Wants to be able to sort / filter better.
- **Used functionalities:** Uses the ***favorites list***, which they want to be able to reorganize after their own product shelves. Didn't know that there was an order template, order draft & never used quick ordering because she can't remember all the product codes.
- **Technology:** Uses a Samsung S3, iPad and a laptop.

6.1.4 Interview person 4

- **Background:** Man around 35 years old, is a kitchen chef at a large restaurant chain. Has worked for the same employers for 13 years and has previously worked in the same industry before.
- **Computer skills:** Medium computer skills, but describes himself as not being a computer guy.
- **Navigation skills:** Has visited the site on a smartphone but didn't like that he had to zoom so he abandoned it.
- **Used functionalities:** Almost exclusively only uses a ***favorites list*** to find products and order products, since the company only orders from a small segment of product lines. Likes that it is fast and efficient. ***Order history*** is used sometimes e.g. when a delivery slip is missing. Order template, order draft, quick order are not used and standing orders are only used at other restaurants in the concern with larger product lines and quantities (hotel & restaurant).
- **Technology:** Uses a Nokia smartphone and a laptop and sees himself using a tablet in the office to order products. Don't see the need to use TINEs site on a smartphone other when sitting at the table. Due to the fact of having to carry extra things with him (pen & paper).

6.1.5 Interview person 5

- **Background:** Woman of 40+ years that is a kitchen chef at a service center. She has worked over a year with the current employer and has 20 years of experience at a similar position.
- **Computer skills:** Low computer skills. If the current system was be replaced she would be very lost.
- **Navigation skills:** Low navigation skills, has memorized were all the products are placed in the system to help her ***browse*** after products. Is afraid to lose what she has previously done. E.g.

forget to click update. Is perceived as afraid of exploring the system. Needs a better means of **filtering** products, doesn't want to see smaller household packages.

- **Used functionalities:** Uses a very long ***favorites list***, doesn't know how to add/remove items. As it is configured today items are added automatically to the favorites list when ordered. She has memorized at what lines different products are placed in the favorites list.
- **Technology:** Has owned iPhone 3, 4 & 5 and wants to use a company phone to add products to an order and rarely takes notes of what products to order. Wants the same functionality on a tablet as on the desktop.

6.1.6 *What they had in common*

- All used thin clients except one who used a laptop.
- Used printed hard copies.
- Many forgot to create an order before adding items.
- No one fills in information in “create order” except for choosing a date.
- Tasks take about 5-10 min to perform.
- All like the system, especially because it is effective to order online.
- In some way all use favorites list.
- Some use standing orders.
- Order history is appreciated.

(Full interviews & observations can be found in Appendix A)

6.2 STATISTICS SURVEY

In our statistical survey we gathered information on trust issues according to consumer and businesses as well as the main reason for aborted purchases.

6.2.1 *Trust issues (applies mostly to B2C)*

According to research conducted by the Swedish postal service in quarter 3 of 2013 the main factors affecting users **trust** with e-commerce sites according to **consumers** (*ranked in descending order*): (Posten, 2013 Q3)

- It's of highest importance that the site gives a serious and professional impression.
- Clear instructions of how to contact the company.
- Known symbols and brands such as “*Verified by Visa*”, *Posten* or *PayPal* on the site.
- The site is marked with trust certification such as “*Trygg e-handel*”.
- Have multiple payment choices.
- The possibility to track an order.
- Good reviews on price checking sites.
- Clear and visible return policy.
- If the site has been recommended by relatives.
- The trust towards the delivery company.

The same question regarding trust has been asked to the **companies** who ranked them as following (*ranked in descending order*): (Posten, 2013 Q3)

- It's of highest importance that the site gives a serious and professional impression.
- Clear information regarding delivery and purchasing conditions.
- Clear instructions of how to contact the company.
- Have multiple payment choices.
- The total cost of an order is clearly shown.
- Good reviews on price checking sites.
- Known symbols and brands such as "*Verified by Visa*", *Posten* or *PayPal* on the site.
- The site is marked with trust certification such as "Trygg e-handel".
- Clear and visible return policy.
- The possibility to track an order.
- The trust towards the delivery company.

According to **consumers** the main reasons that stops them from wanting to order on an e-commerce site is (*ranked in descending order*): (Posten, 2013 Q3)

- No contact information on the site.
- Haven't heard of the company.
- Media has portrayed the company in a bad way.
- Not sufficient information on which company owns the site.
- The payment method preferred is not present.
- Bad reviews on price checking sites.
- Friends and family speak ill of the site/company.
- The lack of known symbols and brands such as "*Verified by Visa*", *Posten* or *PayPal* on the site.
- The site is not marked with trust certification such as "Trygg e-handel".
- It's not possible to track what has been ordered.
- Not a clear and visible return policy.

6.2.2 *Aborting a purchase*

In early days of e-commerce (2007) about half of the users who abort a purchase state it is because not enough secure payment methods are available. Customers want to have different payment options to feel secure. (Dagens Handel, 2007)

Research conducted by the Swedish postal service in quarter 2 of 2013 **consumers** were asked what made them abort a started purchase process (*ranked in descending order*): (Posten, 2013 Q2)

- It was necessary to become a registered member.
- Invisible charges that were added at the checkout.
- The consumer changed his mind regarding the order.
- Technical difficulties.
- Attention was pulled to another matter.

7 PHASE TWO – REQUIREMENTS

The result from phase two is a requirements list that shows us what functionality TINEs users require when performing their tasks. Here we analyze what the users require and the problems they face for both a typical e-commerce and TINEs e-commerce.

7.1 TINE E-COMMERCE REQUIREMENTS

- Better structured/organized favorites list. (Provide a fix to the long favorites lists)
- Unified search when searching for products and categories.
- Filter out products and orders.
- Better sorting of products (by category and name).
- Reorganizing favorites list. (Allowing the user to reorganize the list themselves)
- Browse, ordinary browsing and after categories.
- Intuitive standing orders. (Make it clear on how to create and modify an standing order)
- Order history, and view 1-3 days back easy.
- Tablet should have the same functionality as the desktop.
- Site should be optimized for daily activities.
- Scan product codes with the mobile.
- The system must be designed so that users with low computer skills can handle it.
- Users need to be informed that their work is done. By e.g. e-mail or be given the ability to print out orders.
- Inform the user of changes, feedback from the system with the help of e.g. messages, animations etc.

7.2 HOW TO INCREASE TRUST FOR TINEs SYSTEM

- Clear information regarding delivery and purchasing conditions.
- Clear contact instructions.
- Clear policies.
- Clearly show the total payment.

7.3 INTERACTION PROBLEMS

- The system needs to have easy learnability and be designed so that the users can understand how the e-commerce works easily.
- People often miss that an order needs to be created before items can be added.
- Users miss that they have to click on update to register changes.
- The users were unaware of functionalities on the site such as order template & order draft.
- Users don't like to zoom on smartphones.
- Most users had long lists of products.
- The system lose track of conducted work e.g. by pressing the back button.

7.4 USER VALUE CHART – PRIORITIZING REQUIREMENTS AND INTERACTION PROBLEMS

A value chart prioritizes the most important factors according to severity. This chart helps us prioritize or requirements list from the interviews and observations. Note that these are only changes to the system, not taking into account functionality that the users are happy with.

	Affects few users	Affects many users
Small impact on user experience	<p>Low severity</p> <p>Scan barcodes</p> <p>Unified search for products & categories</p> <p>Reorganizing favorites list</p> <p>Clear policies</p> <p>Clearly show the total payment</p>	<p>Medium severity</p> <p>Order history optimized for daily activities e.g. show 1-3 days of order history, adapt the system to the most frequent/relevant tasks.</p> <p>Clear information regarding delivery and purchasing conditions</p>
Large impact on the user experience	<p>Medium severity</p> <p>Filter out products</p> <p>Clear contact information</p> <p>Keep information intact when back button pressed</p> <p>Unaware of functionality such as order template & order draft.</p> <p>Intuitive standing order.</p>	<p>High severity</p> <p>Better structured/organized favorites list</p> <p>Sorting products</p> <p>Users want to Browse</p> <p>Tablet should have same functionality as desktop</p> <p>Good learnability for new users</p> <p>People miss to create an order in the old e-commerce</p> <p>People forget to update changes e.g. quantity in forms</p> <p>Dislike zoom on small devices</p> <p>To long product lists</p> <p>Feedback from the system, the users want notifications conveyed to them with the help of e.g. messages or animations.</p>

Table 2: User Value chart (Tullis & Albert, 2008)

8 PHASE THREE – PROTOTYPE

The third phase is meant to test our design theory in combination with a requirements list for a real customer so that it can be validated as a legitimate design pattern. The prototype will also serve as a design suggestion that handles large amounts of information on a responsive interface.

8.1 MOBILE FIRST

By designing through mobile first we have been able to prioritize the content of the page. Since the space we have available is limited. In our design process we started with the most important content and progressively enhanced what is shown in the design. Note that all information is still available but for the larger screens it is just clearer. A responsive layout is chosen since it allows efficient way of modifying content according to the screen size. On the start page we show important messages clearly and the closest coming orders.

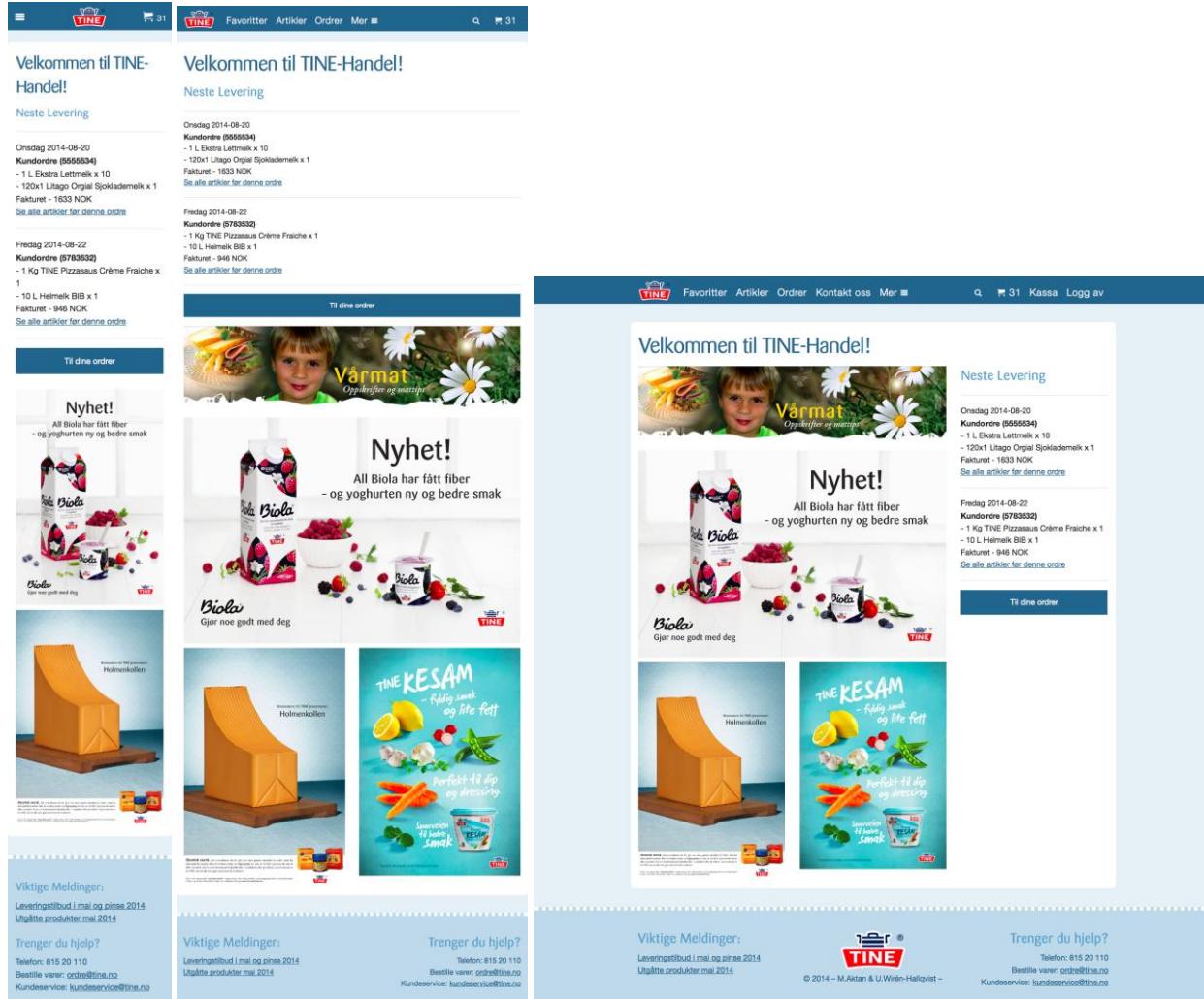


Figure 31: The start page showing both swapped out images and responsive design.

8.1.1 *Responsive*

By using foundation the page is divided into 12 columns, which we can place content in. Foundation lets us specify how many columns a small, medium, large screen blocks can occupy. E.g. by setting “small-12” the full width of the page is used on small mobile screens or by setting “medium-6” the block is allowed to occupy half the screen for medium/tablet size dimensions. In our implementation the resizing is linear/fluid for most blocks. Some blocks are transduced/reshaped to fit other screen sizes while some are transformed entirely by changing both the size and content of the block.

8.1.2 *Look and feel*

Throughout the design the same menus, sorting, filtering, colors, fonts & blocks have been used to keep the same look and feel on all parts of the e-commerce. TINEs colors schemes and fonts have been used to make the users feel more comfortable with a transition to the new design.

The original colors on TINEs e-commerce are used to keep users more comfortable with the design transition. New colors are lightened and darkened to create new colors. Headers for toggle menus are red while other site headers are blue so that users can easier understand how the navigation works. All corners of blocks, buttons and fields are given a radius border to curve edges giving a more uniformed design on all pages.

8.1.3 *Quality images*

High-resolution images are used to increase the level of detail of the page and font vectors are used when possible to provide good quality graphics that don't impede the loading speed of the page. The images used for mobile devices are of the same high quality as on larger screened devices. Images are also swapped out depending of screen size to acquire other dimensions e.g. a square image has become a rectangular.

8.1.4 *Swapped images*

By swapping images depending on screen size we are able to use different pictures for different screen sizes. This reduces load times and become more relevant depending on viewed screen.

8.1.5 *Icon-Font Vectors*

We have used icon-font vectors when possible to reduce load speeds while maintaining good quality. The icon-font-vectors also resized depending on screen size.



Figure 32: Icon-Font vectors are used to show e.g. search & shopping cart icons.

8.1.6 Footer

In the footer important messages and contact information is rearranged when going up to tablet view and a logo of the company is added for desktop. The same footer is used throughout the site to create a familiarity for the users on the site. Important messages are also shown as in the start page.



Figure 33: The footer for mobile, tablet & desktop view

8.2 CONTENT

One of the most important parts of an e-commerce is the content of the page. How the information is shown and how easy it is for the users to find what they are looking for. The texts used need to be explanatory so that they tell the users exactly what they want to say but no more.

We have designed the page so that categories, menus, buttons etc. are intuitive and have placed the prioritized content at places where the users intuitively look. An important message is for example shown at the top of the start page to make sure that the user receives it.

Our buttons and links have descriptive texts that really tell the users what they do. E.g. in our orders page we use the text "Show more coming orders" instead of just "Show more" which is more intuitive.



Figure 34: Important message placed at the top of the start page.

Figure 35: "Show more coming orders" & "Show more old orders" buttons in Norwegian

8.2.1 *Whitespaces*

With the help of whitespaces it becomes much clearer to view blocks.

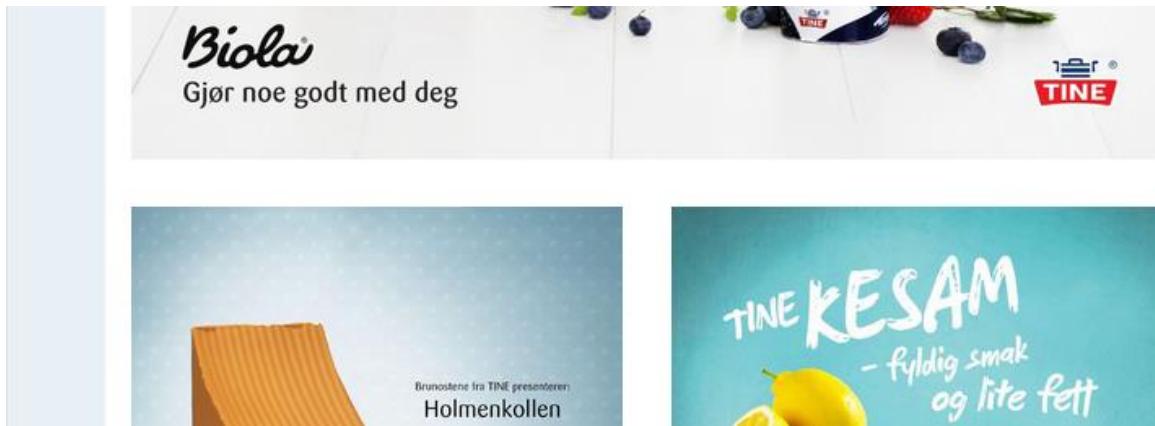


Figure 36: Start page images separated by whitespaces.

8.3 LOGIN & REGISTRATION

The login screen looks different depending on screen size; a full screen view is used for the mobile and a floating window on the desktop where the site responsively centers the login form. By using images the site becomes more alive e.g. we opted to use pictures of flags to change language.

Contact information is available straight from the first screen to ensure customers can contact TINE without having to login and tabbing is handled by using tab order in forms.

8.3.1 *Registration*

Users are required to register to access the e-commerce. The registration is performed on the login screen, which is the first thing visitors' encounter on the e-commerce. This solution was chosen mainly because the e-commerce is of the B2B type. The e-commerce is viewed as a member's page where most users pay by invoices. Since they are logged in from the start frequently ordered products can be accessed easy and discount on products can be shown straight away according to different users' profiles.

8.3.2 *Float labels*

By using float labels we can ensure that the users are reminded on what to enter in each input field. The input field contains hints on what to enter as long as no information is inserted in field, when the user starts to type a floating label is placed above the input field.

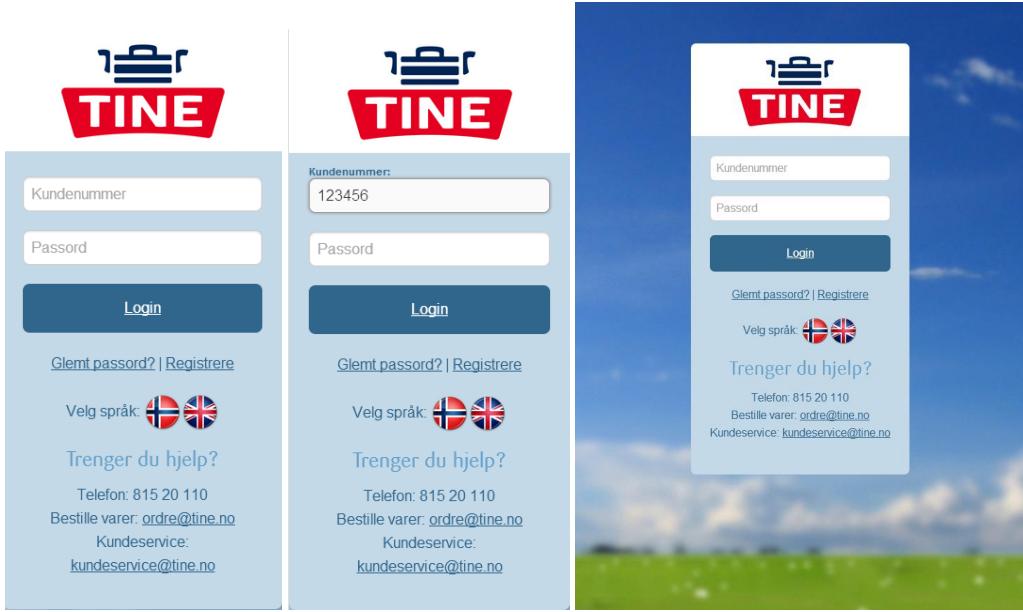


Figure 37: On the mobile view the login screen is connected to the top of the device and a floating login screen is used for desktop. A floatable above each inputfield helps the user keep track on what each input field does.

8.4 DESIGN CHOICES

Here we describe the different design choices we made.

8.4.1 A priority+ full screen toggle menu

TINEs e-commerce has a lot of products and categories and we were required to come up with a solution that can handle the large amount of information on a small screen. By using the priority+ menu to restructure a menu the most important and frequently used items become easy for the users to find while creating more space for other items.

A full screen toggle menu has been chosen throughout our design, it was chosen since it's easy and simple for users to understand. The menu also works on most browsers. The full screen option was added to handle the shear amount of information on the page making it easier to scroll and create better esthetics for the menu system. Scrolling is only allowed for the toggle screens allowing us to keep the same position in the background.

A key handler has been implemented through jQuery that closes an open menu window when the user is pressing the "Esc"-key. With this menu option the transition to larger screens is easy. All content is still available on all screens but some require more clicks to reach following Nielsen's recommendations. The responsive interface rearranges the amount of columns which data is presented in, one column for the mobile, two for tablets and three columns for the larger desktop screens.

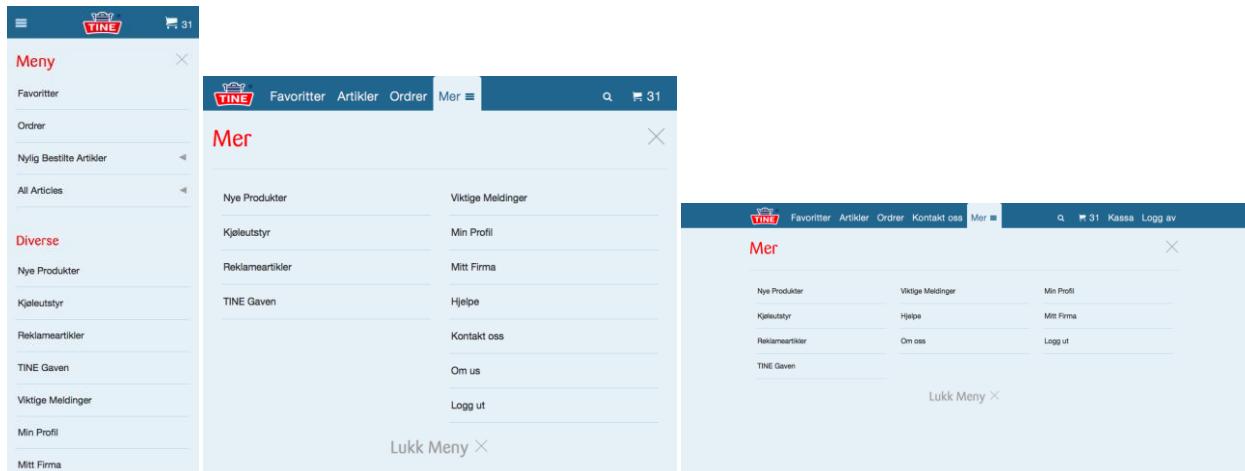


Figure 38: The priority+ Full screen toggle menu shown through mobile, tablet & desktop view.

8.4.2 Articles

In our solution products are accessible by both browsing and searching for products. The products are sorted according to categories and subcategories alphabetical. The articles interface dynamically updates the view if a category is pressed, product quantity changed or something has been entered in the search field.

8.4.2.1 Browse

A browsing functionality is implemented so that the user can click on icons to reach a product by different accordion type sublevels. The top level is the main category with e.g. Milk, Deserts or Pizza followed by a sub category containing e.g. low-fat milk or standard milk and product level showing the actual products where quantities can be filled in. Browsing gives the user the ability to casually go through available products and reasonably fast add articles to the checkout cart.

8.4.2.1.1 Main categories

In our solution for finding articles/products we have a main category for choosing e.g. Milk or Pizza.

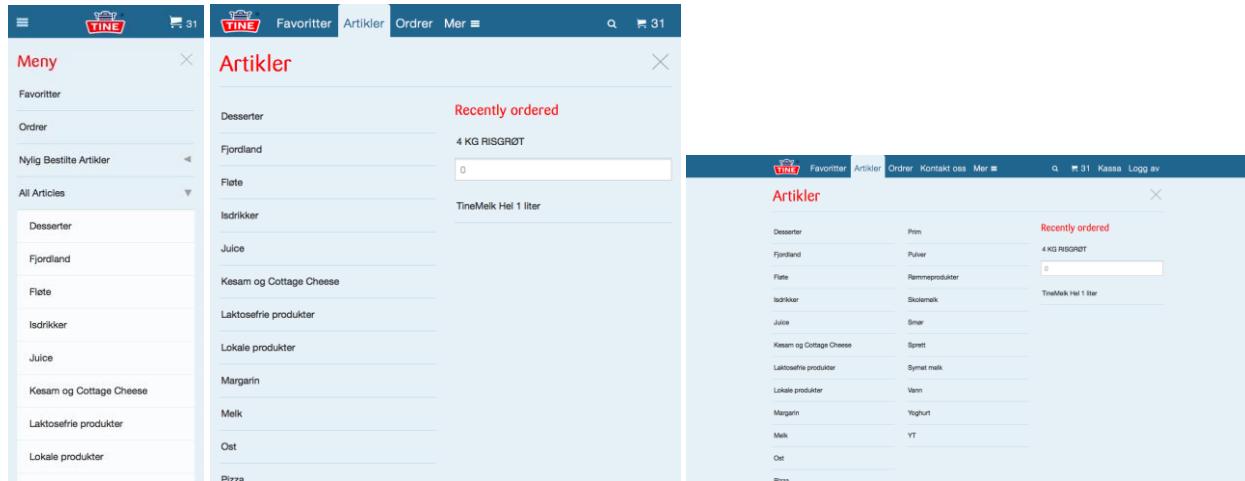


Figure 39: Main categories on mobile, tablet & desktop view.

8.4.2.1.2 Subcategories

We use a grid system to browse for products while inside different main categories. Showing what types of sub category products are in. An icon style interface is used to improve touch for mobile, tablet interfaces. The same icon style navigation is used on desktop. Another thing we focused on was to better show the grouping of products. With the help of whitespaces we show that it becomes much clearer to view the different subcategories.

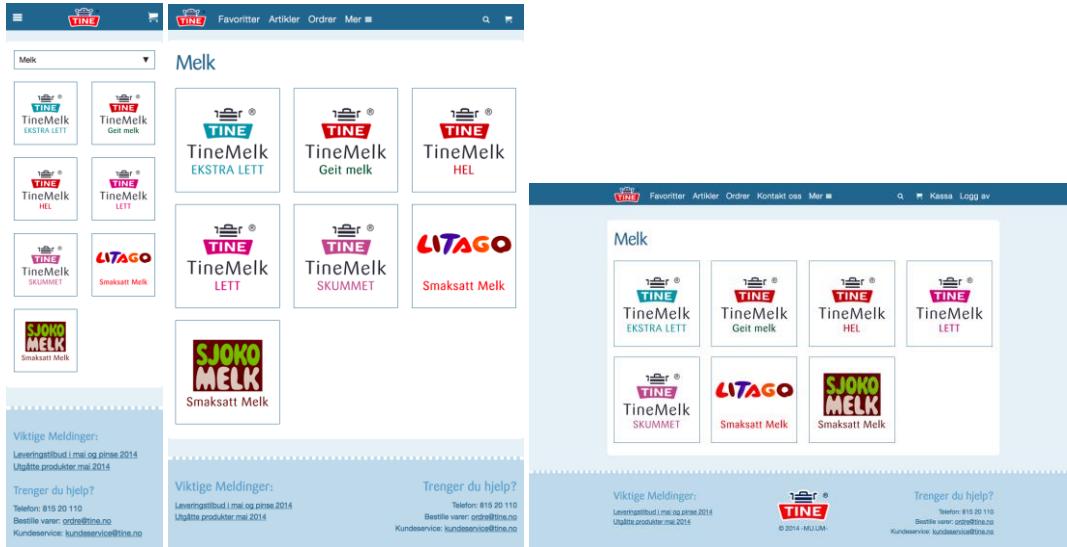


Figure 40: Subcategory Milk/Melk on mobile, tablet & desktop view

8.4.2.1.3 Subcategory accordion

Accordion style functionality has been implemented to show products for each sub category and doesn't require the page to reload when showing the products from the database. We restyle the pressed subcategory with a red border to show the clicked. In this view products can be added to the checkout cart dynamically by changing quantity. A heart icon is also clickable to mark a product as favorite for the tablet and desktop view.

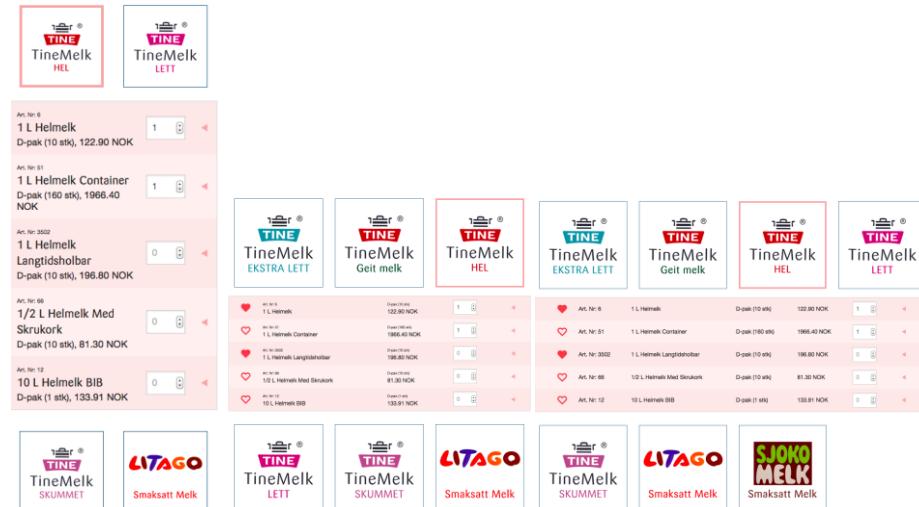


Figure 41: Showing the accordion in for subcategories on mobile, tablet & desktop views.

8.4.2.1.4 Product accordion

When the products are clicked a new accordion is opened and display information for the clicked product. The heart icon used to mark favorites becomes accessible in this view for mobiles. Placing a product in a standing order is also possible for the tablet and desktop view. For the mobile an extra level is required to show additional product information e.g. to reach the standing order block.

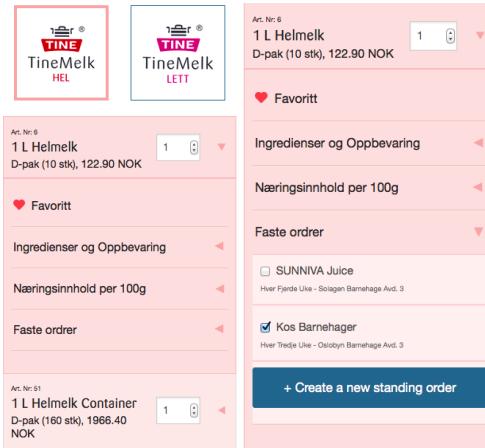


Figure 42: Showing the accordions for individual products on mobile view and showing that the standing order interface for products on the mobile view which requires an extra level to reach.

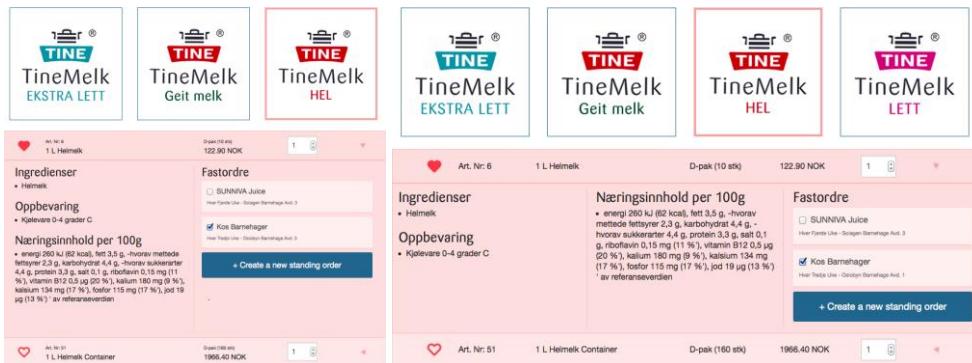


Figure 43: Showing the accordions for individual products on tablet & desktop view. Standing order doesn't require extra clicks to reach here.

8.4.2.2 Search

A unified search has been implemented that allows users to search for both articles and categories. This helps the user to quickly find what he is looking for by searching for multiple content in one field. The content is presented differently depending on device size.

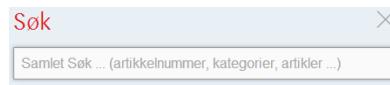


Figure 44: Unified search before typing in the search field.

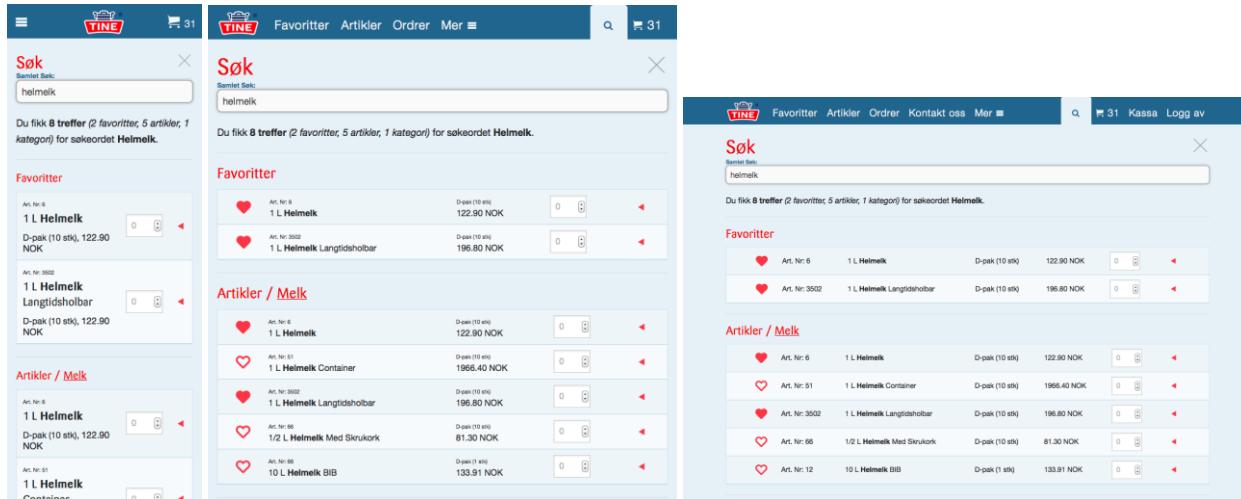


Figure 45: Unified search results on mobile, tablet & desktop views.

8.4.3 Orders

According to our priority list TINEs customers regarded orders as an important part of the system. We opted to restructure the old design by allowing a clearer way of filtering out orders and not to clump up the data too much on the smaller screens.

8.4.3.1 Responsive tables

Responsive tables handle the coming orders. We have chosen a “no more table” solution for the mobile view, this because the relation between information on rows and columns of different orders aren’t important for the users.

On the mobile devices the content becomes very clear by separating the data. We use an infinite scroll solution to scroll through the list, where in our variant of infinite scroll we let the users view 10 initial elements and use a “show more” button to show ten additional elements.

Ordre						
Filtrere mellom datoer						
<input type="text"/> fra ordredato.						
<input type="text"/> til ordredato.						
Kommende bestillinger						
Onsdag - 5555534						
Ordrenummer	5555534	Ordretyp	Kundordre	Levering	Onsdag - 2014-08-20	Status
						Fakturet
						Beløp
						10000000
Onsdag - 3324324						
Ordrenummer	3324324	Ordretyp	Kundordre	Levering	Onsdag - 2014-08-20	Status
						Fakturet
						Beløp
						123123
Onsdag - 42342						
Ordrenummer	42342					
Vis flere kommende bestillinger						

Ordre						
Filtrere mellom datoer						
<input type="text"/> fra ordredato.						
<input type="text"/> til ordredato.						
Kommende bestillinger						
Ordrenummer	5555534	Ordretyp	Kundordre	Levering	Leveringsdato	Status
						Beløp
	5555534	Kundordre	Onsdag	2014-08-20	Fakturet	10000000
	3324324	Kundordre	Onsdag	2014-08-20	Fakturet	123123
	42342	Kundordre	Onsdag	2014-08-20	Fakturet	3432
	123144	Kundordre	Onsdag	2014-08-20	Fakturet	100000
Onsdag - 3324324						
Ordrenummer	3324324	Ordretyp	Kundordre	Levering	Leveringsdato	Status
						Beløp
	655432	Kundordre	Lørdag	2014-08-23	Fakturet	11
	6554322	Kundordre	Lørdag	2014-08-23	Fakturet	113
	325432	Kundordre	Lørdag	2014-08-23	Fakturet	1122
	655222	Kundordre	Lørdag	2014-08-23	Fakturet	111232
	1231231	Kundordre	Lørdag	2014-08-23	Fakturet	11325432

Figure 46: Order screen showing “No more Table” on mobile and a standard responsive table for desktop.

8.4.3.2 Filter

A filtering option helps narrow the amount of data displayed for the users. Helping them find content easier. In our solution for filtering out orders by date we choose to implement a plugin called “*pickadate.js*”. The solution is touch-friendly and allows us to adapt the interface options shown to the users.

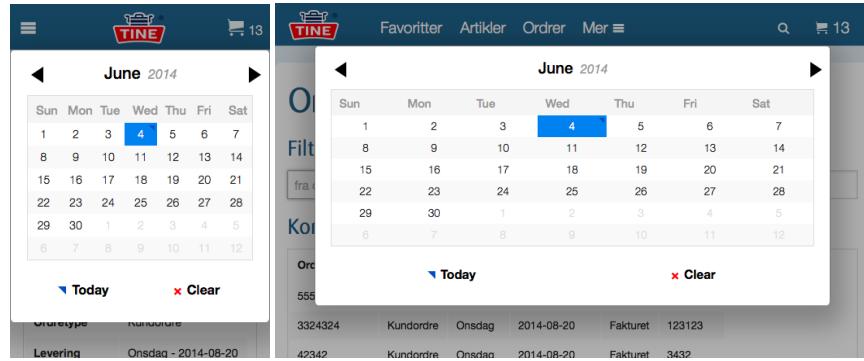


Figure 47: The date picker responsively adapting to different screen sizes showing the difference between mobile & desktop.

8.4.4 Favorites list

Our requirements study showed us that the most requested functionality was the favorites list. The problem with the old design was that it often became too long due to the automatic adding of products to it. The solution we choose was to add a “heart” symbol next to each product. By clicking the heart the product is added to the favorites list.

Products can be star marked in the favorites list, which places the product in a star marked group at the top of the page. By doing this frequently used favorites are placed at the top which is the space most frequently viewed by users.

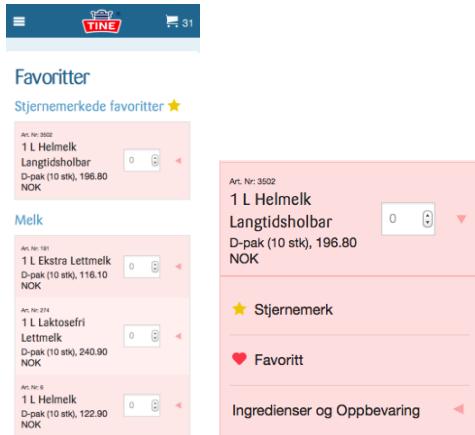


Figure 48: Favorites on the mobile view and the sublevel of a stared product.

Chapter 8 | Phase Three – Prototype

Favoritter

Stjernemerkefavoritter ★

	Art. Nr.	Produkt	Dose (10 stk)	196,80 NOK	Aantal	
★	Art. Nr. 3502	1 L Heimelk Langtidsholbar	Dose (10 stk)	196,80 NOK	0	
Melk						
★	Art. Nr. 191	1 L Ekstra Lettmelk	Dose (10 stk)	116,10 NOK	0	
★	Art. Nr. 274	1 L Laktosefri Lettmelk	Dose (10 stk)	240,90 NOK	0	
★	Art. Nr. 6	1 L Heimelk	Dose (10 stk)	122,90 NOK	0	
★	Art. Nr. 3502	1 L Heimelk Langtidsholbar	Dose (10 stk)	196,80 NOK	0	
★	Art. Nr. 3515	250 ml Sjokolade	Dose (10 stk)	120,00 NOK	0	
Pizza						
★	Art. Nr. 3649	550 g N/A Familiepizza Fullkorn/Spett	Dose (8 stk)	190,14 NOK	0	

Figure 49: Favorites on tablet & desktop views.

8.4.5 Checkout

In the checkout the same blocks are used as shown previous for the site. To fill in delivery date pickadate.js is used once again in a graphical interface for all views. A select menu is used for the dropdown where the location is set. A descriptive button is also used to show what happens if the order is confirmed.

Kassa

Leveringsdato:

18 September, 2014

Leveringsadresse:

Margarinfabrikken barnehage

Handlekurv

Art. Nr. 94 1,75 L Lettmelk D-pak (24 stk), 467,90 NOK	12	
Art. Nr. 191 1 L Lettmelk D-pak (10 stk), 111,98 NOK	1	
Art. Nr. 274 1 L Laktosefri Lettmelk D-pak (10 stk), 240,90 NOK	1	
Art. Nr. 51 1 L Heimelk Container D-pak (100 stk), 1966,40 NOK	1	
Art. Nr. 6 1 L Heimelk D-pak (10 stk), 122,90 NOK	1	
Art. Nr. 191 1 L Ekstra Lettmelk D-pak (10 stk), 116,10 NOK	11	
Art. Nr. 8155 1 Kg TINE Pizzasaus Crème Fraîche Lett D-pak (3 stk), 201,87 NOK	1	
Totalbeløp: 3142 NOK		
Legg inn bestilling		

Viktige Meldinger:
Leveringssted i mai og pinse 2014
Utgåtte produkter mai 2014

Trenger du hjelp?
Telefon: 815 20 110
Bestille varer: ordre@tine.no
Kundeservice: kundeservice@tine.no

Kassa

Leveringsdato:

16 September, 2014

Leveringsadresse:

Margarinfabrikken barnehage

Handlekurv

Art. Nr. 94 1,75 L Lettmelk	D-pak (24 stk)	467,90 NOK	12	
Art. Nr. 164 1 L Lettmelk	D-pak (10 stk)	111,98 NOK	1	
Art. Nr. 274 1 L Laktosefri Lettmelk	D-pak (10 stk)	240,90 NOK	1	
Art. Nr. 51 1 L Heimelk Container	D-pak (100 stk)	1966,40 NOK	1	
Art. Nr. 6 1 L Heimelk	D-pak (10 stk)	122,90 NOK	1	
Art. Nr. 191 1 L Ekstra Lettmelk	D-pak (10 stk)	116,10 NOK	11	
Art. Nr. 8155 1 Kg TINE Pizzasaus Crème Fraîche Lett	D-pak (3 stk)	201,87 NOK	1	
Totalbeløp: 3142 NOK				
Legg inn bestilling				

Viktige Meldinger:
Leveringssted i mai og pinse 2014
Utgåtte produkter mai 2014

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TINE

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Figure 50: Checkout shown from the mobile, tablet & desktop view.

9 PHASE THREE – PROTOTYPE EVALUATION

We asked five of Infors front-end teams developers for feedback on our prototype. They were asked to test in all three views and were asked to think aloud during the test stating both negative and positive feedback with our design choices.

9.1 MOBILE FIRST

Reflections on the responsiveness of the site, overall look and feel how mobile first may affect the final desktop design are stated below.

9.1.1 *Responsiveness*

The designers felt that the site responded well when resizing the screen and were very positive to the way we implemented it. The usage of the breakpoints between devices looked good for most parts of the site but needs further investigation to be perfected for all devices.

The way we implemented the grid system to handle different columns was pointed out and they liked that we used 1-2 columns for mobile 2-3 for tablet and 3-4 for desktop on most parts of the site. One of the designers would have liked to see better matching of the columns to the fixed breakpoints, where the size of some elements got too large before changing breakpoints.

9.1.2 *Look and feel*

The fonts, colors and theme used throughout the site were based upon TINEs colors which is good according to the developers. The developers were given a few different templates to choose between where they liked both solutions presented. When changing breakpoints the look and feel of the site is maintained which is good so that the users feel familiar with the site on different devices according to the designers.

9.1.3 *Mobile first design & interface*

On the mobile a full screen interface is used that looks good and the design turned out looking very professional and well done. The way whitespaces were used was very good on most parts of the mobile design. Only a few fine touchups were pointed out for them. The keyboards and different input field styling used on the mobile was good. It really helps the users to understand and fill in information.

9.1.4 *Tablet design & interface*

Interaction used for tablet is very similar to the mobile interface regarding touch, which works well. The design on the tablet showed that the content was prioritized well, making it easy to find what the users are looking for.

9.1.5 *Desktop design & interface*

Though the desktop design was very well developed, there are clear indications that the site was developed from a mobile first standpoint. The desktop design needs more progressive enhancements to match a desktop first designed site. E.g. Hovering functionality on some content was overseen or that the menu system isn't as clear as on the mobile view.

The input number fields where adapted to desktop that is good, making it easier to enter data by using the mouse.

9.2 CONTENT

The developers where asked to focus on if the texts used on the site are simple yet explanatory and if the placement of content was done in a good way.

9.2.1 *Placement*

Placing and showing the most important content fully visible for the users resulted in positive feedback. It was also good that text boxes used to describe different products were shown in a good ways.

It becomes easy to read the different blocks on the site much due to the fact that the most important content is placed well. It is good that product information is available just by clicking on a product without taking up surrounding space. The dropdown navigation is very intuitive and all information is placed where the eye wants to look.

9.2.2 *Images & icons*

The graphics used on the site looks well on all devices and it is good that the images used on the mobile are also of high quality. The developers at Infor had a disagreement on what type of font-vector icons should be used to show if a menu is opened or closed. Half stated that the icon choices used where good while the other half wanted icons facing the opposite way.

The use of a heart or star for favorites was also discussed however most of the developers agreed on that a heart is more recognizable and intuitive.

9.2.3 *Footer*

The information in the footer is relevant and concise. The developers thought the contact information was well placed. The resizing of the footer was smooth and looked good on all views adapting the content so that it uses the space well.

9.2.4 *Buttons*

The texts used to describe what the buttons does where well formed. However the layout of some close buttons could have been more intuitive by using e.g. red colors. Some buttons choices look good on mobile however could have better placement on tablet and desktop. Instead of placing buttons under each other a side-by-side alternative could have been a better solution.

9.3 LOGIN & REGISTRATION

The login uses both secure login and gives a professional first impression. It scales well to other devices and is very simple to understand. E.g. if a password is forgotten it is simple to understand where to click.

Users are required to register to access the e-commerce, which is understandable for B2B e-commerce. How to register from the login screen was also intuitive.

9.4 DESIGN CHOICES

The different design alternatives used are evaluated here.

9.4.1 Navigation

An accordion dropdown makes it possible to use additional submenus within our main menu. Finding products can also be done by unified search.

9.4.1.1 A priority+full screen toggle menu evaluation

The top menu looks good on all devices but isn't that intuitive with the full screen option on desktop. The problem with the existing design was that the popup menus looked too similar to the background. With a little better styling it could have been much more intuitive. A dropdown arrow icon or transparent sides could be a possible solution to the problem.

The content in the menu was clear and it was easy reach the most important content. However the content on the desktop view could have been better grouped. E.g. account related information could have been placed together in the same group.

It is good that the menu can use the full width of a mobile device. It is highly applicable on sites, where it gives a uniform design choice compared to slide out menus that may be confusing to users, especially when changing views. The most positive aspect of the full screen solution is that it can be applied while still looking good on all devices. The only real drawback was that navigation and popup windows weren't separated enough.

9.4.1.2 Browsing

It's possible to browse products by pressing product logotypes, which is understandable and recognizable. A hover indication would hovering make it clearer that the icons are clickable, on the desktop. An idea was also to see if modifying the category icons by including a dropdown arrow would make them more intuitive. By using a dropdown to show the products it becomes very easy to navigate between different brands.

9.4.1.3 Accordions

Throughout the site accordions are used to show sublevels of different menus and products and it is good that products can be found relatively easy and fast. It is good that the same type of interaction method is used for all parts of the site.

9.4.1.4 Searching

Good that one search word returns multiple requests. Automatically focusing the search field on all devices also works well, making convenient for the users to start typing straight away. The possibility to add a product straight from the search popup is a neat feature, that the users will have no trouble using.

9.4.2 Favorites

Different opinions about how the favorites list should be designed were stated. Some said that the use of pinned favorites is not necessary, and that recently ordered products should replace pinned favorites. Others said that the site should only use the heart symbol for favorites and skip the pinned. Another alternative was that the pinned, favorite and recently ordered products could all be shown using tabs. While some said that the presented solution handled TINEs cases very well, especially the fact of handling the long lists.

It is good that a product can be added and removed from favorites anywhere on the site and that products can be ordered straight from the favorites menu.

9.4.3 Responsive tables

The data shown with the “no more table” worked well, the idea of removing a table and creating something different when resizing is brilliant. The styling wasn’t finished on the orders page but the representation of data was shown well. The header of “no more table” could have been more thought out “Wednesday – 2014-04-01” might be interpreted as an interval i.e. the dates between Wednesday and 2014-04-01.

9.4.4 Dynamic updates

Their absence of an “add to cart button” might be confusing at start, but as the users go past the learning curve they will probably appreciate the “no button” solution. The graphics used to notify that a product is added to the cart is simple but yet functional.

A discussion that arose included the handling of changing an already filled in quantity field, if it’s clear to add more quantity at a later point or if it changes the total quantity of the product.

9.4.4.1 Float labels

The moving float labels where appreciated due to the fact that they made the site more alive. The labels filled their function well by explaining the different fields; however some developers wanted little bigger fonts and different colors.

10 DISCUSSION

In this chapter we discuss the results of the evaluated prototype and the created guidelines. How will different user groups react to our design guide? We also discuss how we faced the most severe items in our requirements list and lastly what further relevant work we recommend.

10.1 METHOD

Here we discuss the methods used to reach our findings.

10.1.1 *Theory*

By using the most relevant information from up-to-date credible sources we believe that the theory we obtained plays a crucial part of our design guide and prototype. A drawback is that we didn't compare enough of the same design solution from different sources. By not doing that we may have missed out on important downsides some of our solutions may have.

Most up-to-date theory on design choices are often presented by unpublished authors, which is why many of examples in the theory chapter are taken from online-sources. However, in our opinion the material available in academic research papers regarding design solutions weren't as relevant as the material we used. Where we combined research material from many different sources to confirm our finding.

10.1.2 *Design Guide*

The summarization of the theory allows readers to quickly remember what the truly important parts of which the design guide contains. The design guide doesn't explain the content as well as in the theory. The design guide is aimed to be used by developers that are familiar with different design patterns. The guide gives them a way of always keeping important design aspects in mind while developing an e-commerce.

10.1.3 *Interviews & Observations*

Our interviews gave us important user background information that helped us set a base line for our design choices, always connecting our chosen implementation back to the users. The in-depth interview method helped us connect with what the users truly felt about the old TINE e-commerce. The observation study pointed out important usability issues and habits that we wouldn't find without meeting and observing them face-to-face.

The way our interviews & observations have affected the design is that it gave us a requirements list of what ordinary users use in their daily interaction with a B2B e-commerce. Early user involvement provided us with feedback and influence that helped us form a guide which connects to users in a way which otherwise wouldn't be possible.

10.1.4 *Statistical survey*

The quantitative survey information gave us a broad information base on what the majority of users and companies felt are important for successful e-commerce. It also gave us an understanding of how the mobile market is changing. A qualitative study wouldn't be able to reach the same amount of participants. The relevance of the statistics couldn't be fully applied because we had a B2B e-commerce

relationship. However the statistics provided gave us knowledge on how trust plays a truly important part for B2C e-commerce. While trust is still important, for B2B commerce it isn't affected the same way.

10.1.5 Requirements list

We created a requirements list based on severity to the users with a user value chart. By prioritizing it we created a backlog for our prototype. Other analysis methods such as a SWOT or a sociotechnical analysis could have been used to create a requirements list to raise user acceptance. However we felt it more important to address functional difficulties that our users had provided us with. The user value analysis gave us a fast and reliable backlog that answers the most relevant threats to our design according to what the most users felt is important. This becomes more relevant since many of the other methods focus on raising the users' feelings towards the system.

10.1.6 Prototype

Our low fidelity prototypes gave us early design alternatives fast and allowed us to create a concept that would take much longer time to implement without them. The high fidelity prototype allowed us to capture the requirements of the users' well, which is shown in the evaluation of the design. With the iterative design method the prototype becomes more and more intuitive after each cycle. A traditional waterfall method wouldn't connect back to the users in the same way, offering a product that doesn't capture the users' feedback in the same way.

10.1.7 Evaluation

What are the drawbacks and strengths of the expert evaluation method? It gave us fast and thought out design feedback with a lot of experience behind. An ordinary user often says one thing but want another thing. By allowing them to state both negative and positive feedback on all aspects of our design choices we capture fast, reliable and broad feedback. The drawback of not testing the prototype for real by the existing users in their environment still exist with the risk of us underestimating or overestimating our design choices. Experienced frontend-developers often try to design and use new design concepts while some of the real users want an old fashion design that they are accustomed to.

10.2 THE DESIGN GUIDE

The design guide who has been tested and validated provides developers with a lot of useful information on how an e-commerce can be designed to amplify and capture the users' experience of an e-commerce. Even though the design guide worked very well to develop a prototype for TINEs e-commerce some design choices could have been executed better.

In our opinion the design guide needs to include a reevaluation phase that takes into account the drawbacks and positive design choices made into a final design. We believe that if for example in our case the desktop design was analyzed the feedback could have been transferred back to the tablet and mobile designs.

The usability experts at Infor haven't validated our modifications to the design guide, other than at a formal presentation, where they concurred with our modifications. We believe that the design guide needs more practical testing to see if it works for other online shopping sites. It also needs to be confirmed that our modification are valid or not more thoroughly.

It is also worth analyzing if the design guide can be used for devices outside of our scope such as smart-watches or e.g. Google-glasses.

10.3 PROTOTYPE

The prototype has become a suitable alternative to the existing site since we have designed by thinking about the effectiveness, efficiency and efficacy of the site. The time a user has to spend on ordering products should be reduced while still providing the functionality required without complications and shouldn't take longer than one second to load. Even though the design isn't perfectly executed it shows our concept of the design, which is supposed to be evaluated and improved in further iterations. With more iterations the prototype should have all minor touchups required to provide a full working e-commerce for TINE, since our prototype focus on design issues, interaction and design concepts leaving backend development open for other researchers.

10.3.1 Mobile first

We choose a mobile first design method because mobile design becomes more and more important. The traditional desktop first would have forced us to remove content or redesign it to fit on the smaller screens. Many sites we visit today don't support a mobile interface and the ones that do support an interface that don't provide the functionality we want to use which is otherwise available on the desktop site.

By using progressive enhancement we were able to prioritize the content of the site. Providing the most essential content on the mobile site and adding to it as time lapses forward. In our design we have followed Nielsen's recommendation of always providing full content on all devices.

What we learnt in our design of the prototype is that one shouldn't only think mobile first, it is still important to keep the desktop solution in mind. With only thinking mobile first it can become hard to scale the solution to the larger screens, our recommendation is to think scaling while developing mobile first to prioritize content and use blocks to design the interface. This also helps create a uniform look and feel to the design.

10.3.2 Responsive design

Because that there are so many different screen sizes on different devices we chose to implement a responsive design rather than individual sites for each screen size. This allowed us to utilize the available space better. With this solution only one page needs to be maintained for all views. The drawback is that the files can be very complex.

A 12-column grid system is used to divide the screen into 12 columns. For each column space a block can be placed. We chose to use foundation to implement the grid system. We looked at solutions from e.g. Twitters bootstrap but opted to use foundation mainly because the use of rem to calculate font size instead of pixels. Another contributing factor was that Foundation supported sass, which is also used by Infors developers. This gave us the opportunity to explore Sass better while learning more about pre-compilers.

The fixed breakpoints we used were the default set breakpoints used by foundation. Better fine-tuning of the chosen breakpoints and resizing of blocks is recommended. We used three predefined breakpoints set by foundations but the site would look neater for multiple devices if more breakpoints were used. This however would increase the complexity of the code.

10.3.3 Look and feel

We wanted to keep the same look and feel throughout the system with both content and colors. Our color theme was based upon the brand colors of TINE to create a familiar feeling to their existing customers. This is something we have succeeded with according to Infors front-end team. With a good look and feel the transition to other breakpoints is performed smooth.

We chose to design by blocks so that the components can be reused and moved to different parts of the site. The same look and feel is created since the same content can be modified for different devices. If we didn't use blocks and designed each view individually it would inevitably look different for each view and part of the site.

10.3.4 Mobile first design & interface

When accessing a site on a mobile, the screen size and lack of hardware input buttons for touch devices becomes important this is why we choose to use clickable images for navigating through products. Extra padding is required and used to support large thumbed users. A drawback with touch is that tooltips can't be used in the same way as on desktops. Our solution to the tooltip problem is to use explanatory texts whenever possible.

Float labels are used to remind users of what different fields should contain when an input field has entered data. A different solution then using floatables is to always show the label next to the field but doesn't look as good as with moving graphics, which also draws attention to where the user is typing. The limited space available on a mobile device screen makes float labels a clear candidate that saves space while still providing the needed functionality. When starting to type in an input field the touch keyboard is swapped out according to the data which should be inserted e.g. if numbers are to be entered a number pad is shown on the mobile device.

Since the quantity of products users want to order vary very much a select menu isn't optimal for our e-commerce e.g. some users want to order one item while another wants 50. In a B2C environment it might be suitable with a select menu but needs to be examined further.

10.3.5 Tablet design & interface

The touch and tips are handled the same way as for mobile devices but we are given more space to fine-tune the touch and labels that can be implemented.

It's clear that we have developed from mobile first standpoint were our mobile and tablet designs received higher appreciation than our desktop version. This was achieved by our prioritization of content and the time spent on creating a mobile and touch friendly navigation system.

10.3.6 Desktop design & interface

In the desktop view some newer computers have touch that would benefit from our design. It's possible to use a scroll-wheel to enter or change the quantities when focus is set on an input field. Add and decrease buttons are also placed in the field to allow mouse interaction for changing quantity.

It's also clear that the desktop version was developed by mobile first were the grouping of some content could have been done better and the design needed to be more progressively enhanced to reach a level where the desktop design meets a desktop first design. For example, hovering wasn't used on some elements. This would have been noticed if a desktop first design method was used. It's easy to overlook small things in the design if the main focus is put elsewhere.

10.3.7 Registration

Since the users are B2B customers that order very frequently, we chose to force them to register before viewing products. According to Nielsen the users will feel like they are in a membership club. Where they can get special treatment, the membership also helps providing extra features such as the favorites list, recently orders products and saved checkout cart independent of device.

10.3.8 Content

The different content used on the site helps the users perform tasks on the site. We have used a lot of explaining texts, images and texts on buttons to help the users understand that the true intention of each part of the site does without complicating things.

10.3.8.1 Placement

By placing the elements at the top and close to the items the user is working with we have created an area, which the users' attention usually is focused around. On our site this area is located top and middle of the site. By having prioritized the content of the site it also becomes much easier to place the most important content of the site at good locations.

10.3.8.2 Images & icons

By using font-icons we have been able to create layout that looks good and is fast to load. The icons are easy to place near texts making them very suitable for navigation buttons like e.g. our shopping cart or our "more menu".

Swapped images are used on the start page where on the smaller screens different content is loaded to clear a good-looking design. The pictures are swapped out depending on which view the site is portrayed from.

10.3.8.3 Footer

When looking for contact information such as phone numbers or e-mails one usually scroll to the bottom or look for a contact page in the header. On our site we have the contact information in the footer. Which can scale and adapt to the different views, we chose to also include a contact page in the top menu so that the information can be reached by two different ways since there isn't a real standard for how the information should be presented.

Important messages are also shown in both the footer and start page so that the first thing a user sees when logging in is the message and that it is always placed in the same spot when browsing through the site.

10.3.8.4 Buttons

The shape looks the same throughout the site so that they are recognizable. And texts used for our buttons are explanatory texts. Some input fields also have icons next to them to make it extra clear of their purpose. It is worth a try to see if the top menu popup buttons would benefit of font-vector icons.

10.3.9 Design choices

Here we discuss the different design alternatives chosen in our prototype.

10.3.9.1 Navigation

By studying TINEs product base and functionalities we found out that they had a lot of content on their site. A challenge for us became to fit all information on a small screen in a good looking but efficient way.

10.3.9.1.1 Priority+ Full screen toggle

The priority+ menu chosen gave us the structure required to fit in all the content in the menu and the rest of the site while still providing full content by extra interactions. The information is still easily accessible and the menu gives an intuitive way of reaching the full content. We opted not to remove any content so that all users are satisfied.

The full screen toggle for the navigation was chosen by both esthetical reasons and through thinking mobile first scaling. Since many users attention is focused on the top and middle of the screen we opted not to use side-sliding menus in the chosen design solution. The menu tabs are allowed to utilize more space, allowing us to use the full dimensions of the site without making the site look cramped with the help of whitespaces.

10.3.9.1.2 Browsing

Browsing for products is made possible by clicking on the product logotype, this allows access to different product category levels. By organizing products by categories and subcategories using an accordion style design the products are accessed and viewed. We chose this restructuring of the articles so that products that are related to each other can be found in the same place giving the users the option to order similar products and different types in the same view.

10.3.9.1.3 Accordion

The accordion style navigation implemented allows the user to click on a product to access extra product information and the options to add a product to a standing order or a favorites list from the mobile view. Without the accordion style implementation the space required to show the content would make the design look cramped and confusing. Browsing for products is sometimes done while not in a hurry, this makes it important for us to design the functionality so that the user can casually go through the products.

10.3.9.2 Searching

Searching for products is possible by unified search that allows the same search field to be used for reaching multiple queries. This solution provides full access without requiring extra space for extra search fields. A drawback is that it requires more space to show information since it reaches more hits than a traditional search. However it is still positive that groupings are by e.g. favorites, categories are shown.

Fuzzy search allows the users to spell words wrong and still get hits on the searched word. This functionality hasn't been implemented in our design and needs further examination. We however believe it could be a good feature to have for search fields.

10.3.10 Favorites list

In e-commerce favorites list are often treated as a shortcut to interesting products. The favorite products often differ between B2B and B2C, for B2B users they want to see frequently ordered products and B2C users' use it to mark potential future purchases.

We experimented with drag and drop solutions to demonstrate the possible resorting of starred favorite products. However, in the end we realized that with our categorization of products a simple alphabetical sorting is a more suitable and practical solution for TINEs users. This however should be studied further, whether a drag and drop sorting is requested by the users or if an alphabetical sort is sufficient.

In our opinion the users felt a need for resorting products due to the lack of proper categories, where in the old design the favorites list often became a very large list of products.

10.3.11 Tables

In our design solutions we used responsive tables to show orders. For the mobile view data was presented in a “No more Table” solution, this because the users don’t have a need to compare different rows and columns. For TINEs customers it is only important read individual orders and since they don’t have to compare them to different ones.

On the product page we use tables that convert columns to rows. This converts column space required to row space. Each product row becomes thicker but all information is still available. A good table according to our theory is when people understand the table and all information is available in some way. Our solution allows access to all information regardless of device while still esthetically making it easy for the users to comprehend the meaning of the table. The same solution used for products could have been used for the orders page.

We chose not to implement an e.g. vertical scroll for mobiles as we felt it would look bad and be unpractical for TINEs data. The reason we didn’t use “No more Table” for the product page was that the amount of products would be to long with this solution. Since orders are organized by date a filtering functionality can reduce the amount of orders viewed on the mobile efficiently. The filtering is done graphically since it becomes more touch friendly not having to enter dates and in the same way wonder in what format they should be typed.

10.3.12 Dynamic updates

Content is dynamically updated when added to e.g. the checkout cart. The reason for this is that during our observation we noticed that many users view TINEs site as an excel document, filling in all fields and then clicking update to store the information. The problem was that sometime they clicked back and forgot to add the items to the cart. With the dynamic solution implemented by us the products are automatically added to the checkout cart. Attention is drawn to the checkout cart by allowing it to flash creating a site that’s more alive. Without animations the site would become dull and user wouldn’t be sure if the system has recorded their actions.

If we didn’t use dynamic updates we would have to use an “add product to cart” button. This would either have to be placed next to each product, in the top or bottom of the window. Creating a space problem since it would take up a lot of space and wouldn’t look good on a mobile device. With to long list placing the button in the bottom gets ruled out since the users will have trouble locating it. This was a big issue with the old design that many of the users had trouble understanding often missing the update cart button.

10.3.13 Operating system & browsers

Throughout our design of the e-commerce we have used both Windows 8 and OS X to ensure that the site looks good in both environments. Plugins and colors often get modified depending on operating

system. For mobile devices we have used both Android 4.4 and IOS 7.1 where the select menus are different. We chose to use the prebuilt functionalities included in the different devices and their browsers mainly because the users are familiar with how to interact with them. This is important not to confuse the user. A drawback of using native functionalities is that it doesn't look the same way on different systems potentially confusing migration to new systems. The browsers we tested our system on where the latest IE, Safari, Chrome and Firefox.

10.3.14 Recommended improvements of the prototype

Color vision deficiency should be thought of to ensure that vision impaired users can use the site. Fuzzy search should be investigated if it is a good feature to implement correcting misspelled searches. Instead of using our own database the prototype should be connected to TINEs real database. Content shown on the desktop view should been overlooked to see if it can be better adapted while still fitting in to the mobile and tablet design.

10.4 THE NEED FOR A M-COMMERCE

By only looking at the statistics and what many of TINEs users said about ordering from an m-commerce it wouldn't be advised to implement one. But according to the growing m-commerce trend and that some of TINEs users wanted it makes it more and more important to have a mobile site ready as there is a growing interest. When launching a site today it's highly recommended to design for all screen sizes. Many users still want to use a mobile commerce to look at information on products and order from a desktop at a different time. This is the main reason we recommend the existence of a mobile ready commerce.

10.5 THE PURPOSE OF THE VISIT TO AN E-COMMERCE

The users must be guided towards a goal where they can recognize themselves in the design. The goal of an e-commerce is to sell products. But a user may visit a site for different reasons, some want to pass time, look up information on products, change an existing order or order a product. Our design is created to fulfill these four goals. This helped us better to prioritize what the purpose of the site was on all devices. On a mobile it is often more likely that they want to view product information than to create a big order. E.g. many e-commerce users have looked at cars with their smartphone but not that many purchased a car with the mobile device.

In the theory it was stated that it is important to keep track on what the users previously have been doing on the site. In our design we remind the user of coming orders when they login to the site. Recently orders can also be accessed from the articles menu and added straight to the cart.

Good usability is important to create good relationships for B2B where good user experience indirectly affects what the companies feel towards each other.

10.6 THE WORK IN THE WIDER CONTEXT

By including the users in an early stage of the development it tends to result in more positive feedback on the design. This one of the reasons we chose to use experts instead to evaluate the design. One of the problems with the chosen experts is that they might be biased to our design or still have feelings

towards their own old company' design. A design solution shouldn't be forced upon a user. It should be developed and presented in conjunction with the user so that they are more likely to accept it.

What ethical implications do our design choices have? By following the theory to creating an accepted e-commerce one should try to please the majority of users while still thinking of the expert users. This is why it becomes extra important to include all functionality on all devices even though many users would never want to use them on that device.

Some users might be afraid of change not being open to accepting the new design even if it is better. By having a more intuitive system that can be used by all personnel in a company some expert users in the old system might become obsolete.

TINEs municipal customers are often old-fashioned users between 45 and 65 years old and familiar with the old design. Therefore it's highly probable that this user group won't accept this design straight way. But when they recognize that the design is very similar to ordinary B2C e-commerce they are more probable to also accept this design. On the other hand a younger user group with a wider usage of e-commerce is more likely to accept the design.

Since many of TINEs users are afraid of changes in the system it becomes important to build the system so that it becomes intuitive and familiar to them. A form of start guide or handbook must exist so that they can quickly get acquainted with the system.

The implemented design hasn't been shown to TINE and their customers yet and we recommend researcher to validate our assumptions and findings further.

11 CONCLUSION

The purpose of this thesis was to develop a mobile-first design guide for e-commerce sites. The developed design guide makes it easy for designers to focus on important usability factors that affect the user experience in multiple platforms. With the guide it is possible to create prototypes of sales-oriented e-commerce sites that are appealing and easy to use.

A prototype implementation of an e-commerce site using the style guide showed that it is not enough to just develop blindly from a mobile first perspective; it is also important to focus on how the site can benefit from a desktop design perspective. A recommendation is therefore to start the design phase with a mobile first approach and then design for the desktop. Nevertheless, we believe that a mobile first approach is a good design strategy; it can aid developers prioritize content and create separate views for different screen sizes.

Future work includes research into how design guides can be used for developing e-commerce sites for other devices than smartphones and tablet computers.

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APPENDIX A

Interview questions for TINE Oslo business partners. *These interviews will help us with our master thesis on an alternative way of building web pages. The questions will help us show in what context TINE-handel is used today.*

1. Gender?
2. Age?
3. What do you work with?
4. Tell me about your typical day?
5. When did you start to work at your current position?
6. How would you describe your expertise in this occupation?
7. Is the language on TINE-handel easy to comprehend (information on products, buttons/links, labels, etc.)?
8. Do you have any disabilities, for example color blindness, nearsightedness? Does this create any obstacles when interacting with “TINE-handel”?
9. Are you familiar with ordering online?
10. What are your steps in making an order today, how do you know what products to order and how many, do have a message board that you use?
11. How often do you perform the tasks, are the tasks similar to each other, how long does it take to perform your tasks?
12. Do you want to use the TINE-handel website to order products or do you prefer to call them, email or chat with them?
13. Have you ever tried to visit the site on a phone or tablet? Why?
14. Do you usually finish your “assignment” at once or do you continue with it at a later point? How is that done?
15. Do you work alone or together with others when using TINE-handel?
16. How do you want to work?
17. How did you learn to use the current system (“TINE-handel”)?
18. When do you use the system? Where do you use the system? Who is responsible for making new orders?
19. Do you have an interest for technical devices?
20. What kind of computer, tablet, and smartphone do you use at work? Do you have Internet? Are you happy with them? Can you procure them?
21. What kind of phone, tablet or computer do you use privately?
22. Tell me three good things about TINE-handel.
23. Tell me three negative things about TINE-handel.
24. If you could change or add three things what would they be?
25. Have you ever experienced any problems with TINE-handels site? How did you cope?
26. If TINE-Handle existed on a mobile phone, what are the three functions you would like to have on the phone?
27. Would you prefer something else on the tablet?
28. What else should we have asked about?

Scenario

The scenario aims to show us how TINE-handel is used today and how the users interact with it.

- How do you use the TINE-handel site today? How often?
- Show us how you normally make an order?

Think out aloud and explain what you are trying to do.

Find products

- Find “*TINE Ekstra Lett Melk Mild Kakaosmak 250 ml*” and investigate what temperature it’s supposed to be stored at.
- Add two packages of this product to your shopping cart “*Handlekurv*”.

Miscellaneous

- Do you continue work at a later point? What happens if you have to leave your computer with an unfinished order?
- Make a draft (“*Ordreutkast*”) if you use it. Do you know what it is?
- Do you know what an “*Ordremål*” is?
Can you create an “*Ordremål*” with only “*TINE letrøme 300g*”, “*TINE Usaltet Meierismør 1/4 kg*” and “*Sunniva Original Eplejuice 1/2 l*”?
- Do you use quick order (“*Hurtigordre*”)? Do you know how it works?
- Do you use (“*Ekspresslevering*”)? Do you know how it works?
- Do you use standing orders (“*Fastordre*”)? Do you know how it works? Change an existing standing order.
- Do you use *favorites* (“*Plankjøp*”)? Do you know how “*Plankjøp*” works? Add a product to “*Plankjøp*”. Remove a product from “*Plankjøp*”.
- What do you fill in at the checkout screen? Would you like to see a discount in % or in NOK?
- Find an older purchase order. When do you usually look for an old purchase order?

Appendix A

Interview person 1, (IP1) Office worker managing kindergartens

1. Woman
2. 60+
3. IP1 is a municipal office worker responsible for kindergartens located throughout Oslo.
4. She handles various invoices for most of the time. Visits TINEs site daily, registering and handling orders. Usually only ordering the most typical four types of milk and porridge. Only at special holidays something different might be ordered.
5. Has worked at her current position for 6 years and at a similar position 3 years before that. Previously worked as kindergarten teacher.
6. Knows how the kindergartens and overhead operate well because of her experience in both areas.
7. The language used on the site is easy to comprehend.
8. No physical handicaps hinder her job using TINEs site.
9. Is familiar with ordering online, usually orders from e.g. online clothing stores.
10. At the kindergarten location a word document is filled in with how many of each product that should be ordered. This is mailed to HQ and printed out by IP1. The printed documents are used to fill in orders through TINE-handel. While IP1 registers the items at TINEs site she also looks for any irregularities in orders, e.g. quantities that don't match with what is usually ordered. E-mail conformations are printed out and documents are archived in folders.
11. IP1 spends around 5-10 minutes every day creating orders for the 26 kindergartens she is responsible ordering to. Orders for each kindergarten twice a week and kindergartens can respectively have up to three orders each.
12. Emails TINE sometimes because she likes to have things written down. Is proud in her abilities to use TINE-handel and doesn't feel that using it is very difficult.
13. She has never tried to visit TINE-handel on a mobile device and doesn't want to use a smartphone or tablet since she is happy with her present classic phone.
14. Knows that she can continue with her work at a later time and that the site can handle it but doesn't use this functionality since she prefers to finish her tasks at once.
15. She is the only one who knows how to use TINEs system, which makes her a key person at her office. Before there were six people working with this but now she is the only one left working with TINE-handel.
16. Prefers to have things written down and archived so that she can look things up for both herself and others.
17. Is self-taught through testing the system by clicking around until she understands how it works, describing herself as not being afraid to try new things.
18. Checks her mail in the morning for new order requests from kindergartens. Is responsible for the orders but not the content of the orders. Her experience in the business lets her verify the orders to see if something is out of the order. She checks her e-mail for new order documents continuously and regards the TINE orders as a relaxing task that she enjoys doing.
19. Enjoys using computers but don't understand how they work and is familiar with ordering products from e-commerce sites with her computer.
20. Uses a desktop computer with a large screen and Internet Explorer at her work place and states that she is learning to use Chrome. Tablets are available at the office but she prefers not using

them because she likes larger screens. At the kindergartens only personal smartphones and company computers are available, while some of the managers use company iPads.

21. States that she has a stationary computer with Firefox at home and handles the computer well. Privately she owns an old classic Nokia phone.
22. Likes the ability to pause deliveries, "*Opholdsperioder*" is a good feature but she feels that it could be more adaptive to holidays. Likes certain parts of the top menu. The order overview is good because of a status field that shows her changes. E-mail confirmation from TINE at certain times is also appreciated.
23. Doesn't like the left menu and would like to see more groupings of categories. Isn't using the whole page, e.g. not scrolling down. Wants the articles to be added to straight to the cart.
24. –
25. When a problem occurs she waits but doesn't understand why it happens. For example when the site isn't functioning as intended, e.g. when clicking on a button and nothing happens she believes it's her or her network connections fault.
26. She would like to have the ability to change an order on the mobile if she had to choose a feature. The reason for not needing that many other functions on the mobile is because she feels that tasks can wait until she reaches her stationary computer.
27. On a tablet she would like to change an order and have an easy way to look up information.
28. –

Appendix A

Scenario / discussion (IP1)

She likes that more detailed information is available on products that allows her to answer incoming questions. For instance they are keen on lowering sugar in children diets.

Our observations showed that IP1 entered the quantities of a product at the latest point. Skipping previous chances to fill in fields. Does not know how favorites ("plankjøp"), drafts ("ordreutkast"), order templates ("ordremal") and quick orders ("hurtigordre") work. She needed help to find where some of them were located.

Ordremal detaljer			
ARTIKLER			
Artikkelnummer	Artikkelnavn	Din pris (NOK)	Antall
114	1/2 L ISTE FERSKEN FL	14,28	2 D-pak
164	1 L LETTMELK	11,22	5 D-pak

[Oppdater ordreskjema >](#)

Figure 51 Order template.

An order template is used to move a set of predetermined items to the checkout basket.

Detaljer ordreutkast			
ARTIKLER			
Artikkelnummer	Artikkelnavn	Din pris (NOK)	Antall
270	1000G BIOLA APRIKOS	25,42	1 D-pak
4389	250 G COTT CHEESE ORIGINAL	16,79	2 D-pak
492	300 G CRÈME FRAÎCHE	18,42	3 D-pak

[Åpne ordreutkast >](#)

Figure 52 Order draft.

An order draft lets the user save the items in the checkout so they can continue with them at the next time they want. The draft is removed after usage in contrast to the template that is stored until manually removed.

She is looking for the functionality of a favorites list but isn't using "plankjøp" or "ordremal".

However she is using standing orders ("fastordre") for some of the kindergartens and she knew how to locate older orders.

We also learned that IP1 is positive to a new and better system. It can be hard in the beginning but she describes herself as not afraid of testing new things. However she is afraid that other persons might have problems with a new system.

She didn't notice the product catalog at the left bottom and claims never to have used it.

She is not interested in how discount is shown, but if she had to see it she would like to see it in a percentage format.

The kindergartens are able to mail IP1 if they want to find an old invoice but if they got any complaints regarding an order they have to call TINE themselves.

Interview person 2, (IP2) head kitchen chef at a hospital

(Interviews with person 2 and 3 where conducted at the same time.)

1. Man
2. 50+
3. Head kitchen chef at a Hospital
4. Works with different orders regarding daily operations, invoices and various projects. Supervising kitchen staff, having a lot of meetings with employees and suppliers.
5. Has worked at the current position since 1997 and worked with similar tasks since the early 80's.
6. Knows his area well and regards himself as an expert.
7. The language used is easy to understand but TINE has been bad at informing order status and out of stock items.
8. He has no problems interacting with the interface.
9. Is familiar with ordering online
10. Uses a printed out list handed to them by TINE in an excel document to take notes in while going through the supply rooms. Takes notes of quantities and usually orders the same products. Uses the computer at his office to access TINEs site.
11. Performs the same TINE task every day. It takes about 15 minutes to make an order.
12. Wants to use an electronic interface such as TINEs site to order.
13. Hasn't tried to visit TINE-handel on a smartphone or tablet.
14. Has changed/added more items to an existing order. Has encountered problems when accidentally pressing the back button and doesn't trust the system entirely.
15. Work together with his assistant (IP3) with the TINE tasks.
16. Wants to use a smartphone that can scan barcodes to help search for products. Scanning both the packaging barcode and internal barcode inside the packaging. The system is recommended to have an offline function, but IP2 suggested that Wi-Fi could be mounted easily in the storage area. The fax machine was easier to use, it had less steps needed to make an order. They want an easy digital way of working with few steps.
17. TINE introduced the site to them in a course.
18. Uses the system in the morning, registers in the office located away from the products, and is responsible together with his assistant (IP3).
19. Likes technical devices but wants them to be "bug free" and work great.
20. Uses a thin client, has a projector connected to it. Internet is available at the office area and they are on the hospitals intranet. The use of the thin client is perceived as not optimal even though it is on a wired connection. Tablets are available. Any technology such as smartphones, tablets better Wi-Fi coverage can be procured if needed.
21. Uses a Samsung S4, has previously used a S2 privately.
22. (Through discussion with the assistant IP3 and IP2 they stated three good things about *TINE-handel*.) They like the search function in "*etter artikkel*", it's good that it shows quantity and price. Likes that it warns if something is out of stock. However when notified it's hard to correct the order. Like that it goes fast when you use "*plankjøp*".
23. (Through discussion with the assistant and himself they stated three bad things about *TINE-handel*.) Wants to organize "*plankjøp*" according to own shelves and it's hard to correct an order after it has been done. There are too many actions/steps needed to perform a task, it should be more efficient. Questions the stability of the system, he has previously ordered but not received items. Order status doesn't work, and should be placed at a better location.

Appendix A

24. Would prefer a better sorting of items in “*plankjøp*”. Believes that the category names could be grouped and renamed in “*etter artikkel*”. Wants a scanning function on the smartphone that speeds up order registration.
25. There are seldom any problems but when they occur you can call TINE for support.
26. If TINE existed for the smartphone the following would be good to have. Offline support, ability to add a product without having to create an order first, order history that shows 1-3 days back. Wants to see if his assistant (IP3) has an unfinished order so that he doesn't make an unnecessary order. The navigation has to be clear and use colors, good fonts and understandable labels. A scanning function will help the user to add items into the cart quicker. The long favorite list (“*plankjøp*”) needs to be showed and organized in a way that's not confusing to the user.
27. Wants more functions on the iPad than on the smartphone, but the iPad might be too large to walk around with to scan products in the supply room. Would like to see the same functionality on a tablet as the desktop site.
28. –

Scenario / discussion see scenario for (IP2) and (IP3).

(Scenario / discussion with interview person 2 and 3 where conducted at the same time.)

Interview person 3, (IP3) Assistant kitchen chef at a hospital

(Interviews with person 2 and 3 where conducted at the same time.)

1. Woman
2. 50+
3. Assistant kitchen chef at a Hospital
4. Works as an assistant to the head chef, handling different orders needed for daily operations, invoices and various projects.
5. Has worked in with the same similar tasks since the 80's and at the same position since 1998.
6. Knows her work very well.
7. –
8. Has no difficulties interacting with the computer.
9. Orders from e-commerce sites at home.
10. Uses a printed out list handed to them by TINE in an excel document to take notes in while going through the supply room. Takes notes of quantity and usually orders the same products.
11. Performs the TINE task every day. It takes about 15 minutes to make an order.
12. She is happy with filling in on the computer
13. Hasn't tried to visit TINE-handel on a smartphone or tablet.
14. She usually finishes an order straight away.
15. Works together with her boss (IP2).
16. She would prefer an easier way of working and that TINE-handel to sort the products according to the hospitals inventory. Wanting the sheet they take notes on and the computer to be organized to match the shelves/items in their storage.
17. She learnt how to use "TINE-handel" through a course.
18. Uses the system in the morning, registers in the office located away from the products, and is responsible together with her boss (IP2).
19. We got the impression that she likes using new technology but don't want to be the pilot user.
20. Uses a thin client at work. Any kind of new technology such as a smartphone or tablet can be procured if needed.
21. She has a private Samsung S3 Android smartphone, iPad and laptop.
22. (Through discussion with the head chef IP2 and IP3 they stated three good things about TINE-handel.) Likes the search function inside "*etter artikkel*", it is good that the site shows quantity and price. Likes that it warns if something is out of stock. However when notified by the site it's hard to correct the order. It goes fast to order when you use "*plankjøp*", which is appreciated liking that it works and is fast.
23. (Through discussion with the manager and her they stated three bad things about TINE-handel.) Can't organize "*plankjøp*" according to own shelves, hard to correct an order after it has done. To many actions/steps needed to perform a task, it should be more efficient. Questions the stability of the system, has previously ordered but not received items. Order status doesn't work, and should be placed better.
24. Better categorization of products, improved sorting such as alphabetic, the ability to adapt "*plankjøp*" to the own inventory (have the items placed in the same way, be able to move lines in "*plankjøp*").
25. She seldom encounters any problems but can call TINE if needed.

Appendix A

26. She didn't comment when questioned about what she would like to see if TINE-handel existed on a smartphone, her boss (IP2) did the talking and she concurred with him.
27. She didn't comment when questioned about what she would like to see if TINE-handel existed on a tablet, her boss (IP2) did the talking and she concurred with him.
28. Mentioned the importance of the sorting again

Scenario / discussion with IP2 and his assistant IP3 (IP2 using the computer).

IP2 shows us how he works thought a projector, he uses an intranet and is forced to use IE. He tabs a lot to reach a new “text fields” where he enters quantities. Doesn't like that it cycles through the checkbox next to it for each new line.

Art. Nr	Artikkel >	Kategori >	Antall	Forspaking	Pris	Stykpris	Slett
16458	<u>26 HG LETT. NØKKEL SKFRI PP</u>			D-pak (1 k)	410,16	410,16 /k	<input type="checkbox"/>
181	<u>1 L LETTMELK CONTAINER</u>			D-pak (160 stk)	1 712,25	10,70 /stk	<input type="checkbox"/>
206	<u>1 L EKSTRA LETTMELK CONT.</u>			D-pak (160 stk)	1 771,49	11,07 /stk	<input type="checkbox"/>
230	<u>1 L SK. MELK CONTAINER</u>		24	D-pak (160 stk)	1 699,52	10,62 /stk	<input checked="" type="checkbox"/>
3725	<u>150 G RISLUNSJ M/SKOGSBÆR</u>			D-pak (6 stk)	41,31	6,89 /stk	<input type="checkbox"/>
3750	<u>430 G NA FAMILIE IT PIZZABUNN</u>			D-pak (6 stk)	140,51	23,42 /stk	<input type="checkbox"/>
4019	<u>8x125G SAFARI APEYOGHURT</u>			D-pak (3 stk)	84,28	28,09 /stk	<input type="checkbox"/>

Figure 53 Plankjøp Tabbing

They store sheets of article numbers in physical folders. Uses categories sometimes to find products, would be good if the site was dynamic, has to scroll a lot to add an item in the product cart.

He wants to edit items in the box showing the cart in the right side of the screen without first going to another page where he's able to change it. Probably because he is used to how newer e-commerce sites are built.

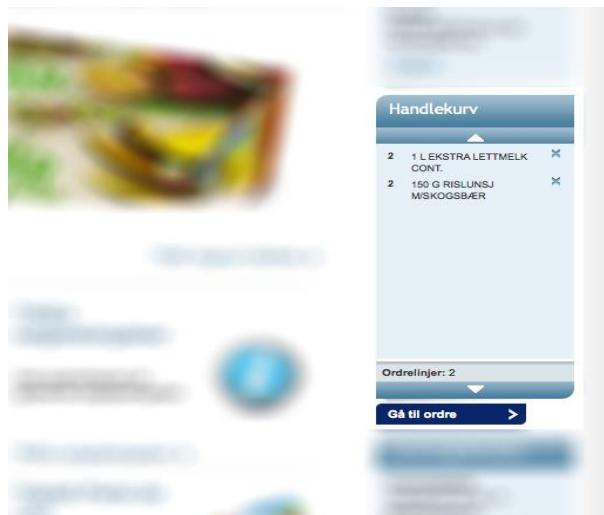


Figure 54 TINE-Handel Handlekurv.

When asked what they feel about the way discount is shown, they stated that it is not necessary but if it's shown it should be shown with percentage in the order conformation, they don't need to see the total amount.

Our observations showed that IP2 could not delete or change the quantity of an item the way he wanted to in quick order ("plankjøp"). Instead he got confused why the amount wasn't updated dynamically when he change it in the text-field, he tried the same thing multiple times. Probably caused by the fact that he is used to dynamic pages while TINE-handel uses an update button.

When asked to find "Lett Melk" the right menu was perceived as unclear but liked that ingredients and nutrition information was available. He tried to search with "Melk" in the "article number" field believing it was a unified search.

"Ordremål" is unclear to the user, didn't know what it was and has never used "Hurtigordre" or "Fastordre".

Both likes and dislikes that items are put automatically in "plankjøp", likes to have the option to see previously ordered products but doesn't like that all items ordered are put in "plankjøp" making it a very long list.

Did not know that TINE had included a printable version of "plankjøp" which could replace the one sent to them previously. However it could be done better for example by adapting the information to a more printer friendly view. For example with better fonts, text size, categories that span over different pages.

IP2 had no problems finding previous orders, but he only filled in the starting date leaving the end date open, which still worked. Only uses the left menu to find new articles or products, something that is done seldom since they usually use "plankjøp".

They didn't understand why an order had to be created so early (in the morning), even though it is digital.

Interview person 4 (IP4) kitchen chef at a large restaurant chain

1. Man
2. 30+
3. He is a kitchen chef at a restaurant belonging to a larger chain of 37 restaurants.
4. Makes orders, receives deliveries and prepares food. Performs office tasks when it is needed and a little of the office related work each day.
5. Has worked with the current employer for 13 years and before that he also worked in the restaurant business.
6. Knows his field well and has been responsible of ordering for 13 years.
7. The language used on the site is easy to understand.
8. Is colorblind but doesn't state it as a problem when using TINE-Handel.
9. He describes himself as not being a computer guy, but has ordered online before e.g. airplane tickets and sport goods.

Appendix A

10. When it's time to order products he goes around with multiple forms/sheets that he takes notes on for different suppliers. For TINE he only needs a simple piece of paper, since the amount of product lines are few.
11. It takes around 5-10 min to perform an order that contains about eight product lines and is done twice a week.
12. It's good to order online since it's faster on the computer, he has ordered products to the restaurant from home, and can get assistance in ordering if needed by his coworkers.
13. Has tested "TINE-Handel" on a smartphone, but it wasn't that user friendly, it required a lot of zooming and he hasn't tested it on a tablet.
14. Makes orders straight away, if the site doesn't work he has just tries it at a different occasion.
15. Works alone but he also has an assistant in the kitchen that shares the workload.
16. He likes the way he works now, ordering from different suppliers. A smartphone is not suitable, as you need to carry it with you together with a pen and sheets of paper for the other orders. Technical products also tend to break.
17. TINE requested them to use the site, which they learnt to use by themselves.
18. Makes orders in the evening at the office, the assistant has made the preparations so they can use "*plankjøp*".
19. IP4 doesn't have a technical interest, but his assistant does.
20. The office has two laptops.
21. Privately he has a Nokia smartphone, laptop and don't own a tablet.
22. It's good that you can get an older delivery note, which can be used if the delivery slip is lost. Likes the fact that you get an order confirmation and that they only need to use "*plankjøp*" to order.
23. The order system is not intuitive it is hard to know how to navigate. Information is also to spread out.
24. Likes to see a fix to the things stated in the previous question.
25. States that a bad Internet connection is used which might cause problems with the site, since it works well at home. Handles delay by waiting till it's resolved.
26. Doesn't have a need for the site on a smartphone to order products, as it becomes an extra thing to carry. But would use it e.g. when sitting at the table with a phone in his hand.
27. Sees a possibility to use TINEs site on an iPad, which should have the same functionality as the desktop.
28. –

Scenario / discussion (IP4)

He didn't have time to show us the system and since he stated that they almost exclusively use "*plankjøp*" we felt that our scenarios would become redundant. The main office in Trondheim decides what kinds of products are ordered, and the same type products are ordered until they change menu.

He felt that only the hotel chains that order more products would need to see the discount. Visually he would like to see the actual amount in NOK instead of a percentage.

He only use "*plankjøp*" and when they change menu his assistant helps him with setting up the "*plankjøp*". The restaurant uses standing orders ("*fastordre*") from other suppliers, but doesn't use it with TINEs site because they order too few products from them.

Doesn't use drafts ("ordreutkast"), order templates ("ordremål") and quick orders ("hurtigordre"). He would never use quick order ("hurtigordre") since he can't remember the article numbers and wants to see a clear name of what he's ordering.

Knows how to find an old order and likes the functionality.

A problem he has encountered on the site is that when he has checked out items believing an order has been done it hasn't been the case. He isn't clear on what the reason has been.

Since he's only ordering basic ingredients such as milk or yogurt he don't see the need of knowing the exact ingredients in products. Usually he only needs to know if it contains lactose or not. The main office that compiles the menu may have a better use of nutrition facts.

Hurtigordre

Figure 55 Hurtigordre (Quick order).

Appendix A

Interview person 5, (IP5) Kitchen chef service center

1. Woman
2. 40+
3. Kitchen chef at a service center / retirement home.
4. Works in the office for two hours during Fridays and attends various meetings regarding kitchen and non-kitchen matters. Usually makes her orders during her breaks.
5. She began at her current position one and a half year ago and has worked at similar positions for 20 years.
6. She is used to work regarding preparation of food and helps staff in the kitchen most of her time.
7. No complaints on the language.
8. No disabilities but the text could have been a little larger on TINE-handel, sometimes she needs to squint her eyes to see.
9. She orders a lot online at home.
10. She gets orders from two other service centers by fax and remembers what to order for her own service center without having to take notes.
11. Makes the orders two times a week, each taking about 10 minutes.
12. She wants to make the orders online. But still wants ability to call them if needed and did not like that the site didn't show any phone number.
13. She has never tried to visit the site on a smartphone.
14. She finishes her tasks before leaving the computer. Doesn't dare to leave unfinished tasks.
15. Got an assistant that helps her with various tasks.
16. She believes that it would be nice to order straight of bat when walking with a portable device.
17. Had a good introduction to the TINE-Handel desktop site, a representative from TINE came and taught her the system.
18. She uses the TINE site during her breaks and for two hours on Fridays at her office.
19. States that she doesn't have a technical interest but likes using her iPhone.
20. Uses a thin client at work that is unstable, iPad and smartphone would be possible to get at work even though they still use a very old stationary phone.
21. Got a private laptop, iPad and an iPhone 3. Previously she has owned an iPhone 4 and 5.
22. She likes the product quality that TINE represents, that they are on time, marketing campaigns and suggestions about new dishes.
23. They show too much information at the same place, it should be simpler, and the view should be adapted to her preferences. She would like to filter out smaller home packaging, that she don't have any use for.
24. The view should be adapted to her preferences.
25. TINE helps her by phone if there are any problems.
26. She only wants the ability to make orders, view "*plankjøp*" and order history on the smartphone.
27. The same functionality as on the desktop is desired on a tablet.
28. –

Scenario / discussion (IP5)

She usually looks for products by memory and has memorized the location of each product in favorites ("plankjøp") and in the left category menu. For example she knows at what line in favorites she is able to find a specific product like "Lett Melk". She is afraid of change, believing she won't be able to handle a totally new design. She wants to be able to add/remove items by herself in "plankjøp", as the list becomes too long and requires a lot of scrolling. Many customers TINE has are using more than a hundred items in the favorites section ("plankjøp").

The screenshot shows a web browser displaying the TINE website. At the top, there is a navigation bar with links for Startside, Artikler, Mine ordre, Fastordre, Kontakt oss, Min profil, Plankjøp, Etter artikkel, Kjøleutstyr, and Hurtigordreregistrering. On the left, a sidebar lists various food categories. The main content area is titled 'Plankjøp' and contains a search bar with the text 'Søk'. Below the search bar is a table titled 'RESULTATER' with columns for Art.nr., Artikkel, Kategori, Antall, Forpakning, Pris, Stykkpris, and Slett. The table lists several items, such as '1000G BIOLA APRIKOS', '1000G BIOLA SOLBÆR/VANILJE', and '1000G BIOLA MILD MAN/BAN/ANA'. To the right of the table, there are sections for 'Logget inn som', 'Handlekurv', and 'Leveringsdetaljer', along with a Facebook link.

Art.nr. ▶	Artikkel ▶	Kategori ▶	Antall	Forpakning	Pris	Stykkpris	Slett
270	1000G BIOLA APRIKOS	Biola smaksatt symet melk	<input type="text"/>	D-pak (6 stk)	136,01	22,67 /stk	<input type="checkbox"/>
4044	1000G BIOLA SOLBÆR/VANILJE	Biola smaksatt symet melk	<input type="text"/>	D-pak (6 stk)	140,10	23,35 /stk	<input type="checkbox"/>
4135	1000G BIOLA MILD MAN/BAN/ANA	Biola smaksatt symet melk	<input type="text"/>	D-pak (6 stk)	136,72	22,79 /stk	<input type="checkbox"/>
225	1000G BIOLA SYRNET LETTMELK	Biola Syrnet Melk	<input type="text"/>	D-pak (5 stk)	91,16	18,23 /stk	<input type="checkbox"/>
4223	250 G MAGER COTT CH. EPLI/PÆRE	Cottage Cheese Produkter	<input type="text"/>	D-pak (6 stk)	104,75	17,46 /stk	<input type="checkbox"/>
4389	250 G COTT CHEESE ORIGINAL	Cottage Cheese Produkter	<input type="text"/>	D-pak (6 stk)	94,01	15,67 /stk	<input type="checkbox"/>
4390	420 G COTT CHEESE ORIGINAL	Cottage Cheese Produkter	<input type="text"/>	D-pak (6 stk)	145,81	24,30 /stk	<input type="checkbox"/>
4391	420 G MAGER COTT CHEESE	Cottage Cheese Produkter	<input type="text"/>	D-pak (6 stk)	161,19	26,87 /stk	<input type="checkbox"/>
634	300 G LETT CRÈME FRAÎCHE	Creme Fraiche 18%	<input type="text"/>	D-pak (6 stk)	101,67	16,95 /stk	<input type="checkbox"/>
492	300 G CRÈME FRAÎCHE	Creme Fraiche 35%	<input type="text"/>	D-pak (6 stk)	104,59	17,43 /stk	<input type="checkbox"/>
4047	1000G CULTURA ØKO. NATURELL	Cultura Naturell	<input type="text"/>	D-pak (6 stk)	109,81	18,30 /stk	<input type="checkbox"/>
4045	1000G CULTURA JORDBÆR	Cultura smaksatt melk	<input type="text"/>	D-pak (6 stk)	126,39	21,07 /stk	<input type="checkbox"/>
4046	1000G CULTURA PÆRE	Cultura smaksatt melk	<input type="text"/>	D-pak (6 stk)	126,39	21,07 /stk	<input type="checkbox"/>
4048	1000G CULTURA SKOGSBÆR	Cultura smaksatt melk	<input type="text"/>	D-pak (6 stk)	126,39	21,07 /stk	<input type="checkbox"/>
3645	550 G NÅ FAMILIE PIZZABUNN	Deiger	<input type="text"/>	D-pak (6 stk)	158,20	26,37 /stk	<input type="checkbox"/>
3649	550 G NÅ FAM PIZZAB.FULLK/SPE	Deiger	<input type="text"/>	D-pak (6 stk)	175,30	29,22 /stk	<input type="checkbox"/>
3750	430 G NÅ FAMILIE IT PIZZABUNN	Deiger	<input type="text"/>	D-pak (6 stk)	140,51	23,42 /stk	<input type="checkbox"/>
600	1000G DrikkeYoghurt	DrikkeYoghurt	<input type="text"/>	D-pak (6 stk)	127,66	21,28 /stk	<input type="checkbox"/>

Figure 56 Plankjøp with a created order.

The site isn't dynamic causing her to be afraid of losing information she has typed in. If she forgets to press update, all information can be lost. She wants to see the stock information in real time. She wants to be able copy a previous order and continue with it. Editing the content to match what she desires and had a hard time changing an existing order.

She tries to add items to an order without having created an order.

Appendix A

The screenshot shows a web interface for a grocery store. At the top, there's a navigation bar with the TINE logo, followed by links to Startside, Artikler, Mine ordre, Fastordre, Kontakt oss, Min profil, Plankjøp, Etter artikkel, Kjøleutstyr, and Hurtigordreregistrering. Below the navigation is a search bar with the placeholder 'Søk' and the word 'Plankjøp' entered. To the right of the search bar is a user profile section titled 'Logget inn som' showing 'Bruker COOP OBS SANDEFJORD AVD 103 201363'. There are also sections for 'Selskap COOP VESTFOLD OG TELEMARK SA' and 'Logg av'. On the left, a sidebar lists various food categories like Annet, Brunost, Desserter, Dessertsauser/-kremmer, Ferdigretter, Ferskost, Ferskost geit, Feta, Fettprodukter, Fløte, Fruktdrikk, Gomme/myseprodukter, Grøter, Halvfaste spesialost, Halvfaste standardost, Importost, Is-te og kilevann, Juice, Kjøttmodnet og revet/ternet ost, Kosttilskudd, Kremost, Margarin, Middag/Matlaging, Muggost, Prim, Pultost, Pulver, Rømmeprodukt, Sauser, Småskalaoster, Smelteost, Smør, Søtmelk, Søtmelk med smak, Symet melk, Symet melk med smak, Yoghurt. The main content area displays a table titled 'RESULTATER' with columns: Sort., Art.nr. >, Artikkel >, Kategori >, Forpakning, Pris, Stykkpris, and Slett. The table lists various cheese products from brands like Biola, Cultura, and Deiger, along with their prices per piece.

RESULTATER							
Sort.	Art.nr. >	Artikkel >	Kategori >	Forpakning	Pris	Stykkpris	Slett
Vis sortering	270	1000G BIOLA APRIKOS	Biola smaksatt symet melk	D-pak (6 stk)	136,01	22,67 /stk	<input type="checkbox"/>
Vis sortering	4044	1000G BIOLA SOLBÆR/VANILJE	Biola smaksatt symet melk	D-pak (6 stk)	140,10	23,35 /stk	<input type="checkbox"/>
Vis sortering	4135	1000G BIOLA MILD MAN/BÅN/ANA	Biola smaksatt symet melk	D-pak (6 stk)	136,72	22,79 /stk	<input type="checkbox"/>
Vis sortering	225	1000G BIOLA SYRNET LETTMELK	Biola Syrnet Melk	D-pak (5 stk)	91,16	18,23 /stk	<input type="checkbox"/>
Vis sortering	4223	250 G MAGER COTT CH. EPL/PÆRE	Cottage Cheese Produkter	D-pak (6 stk)	104,75	17,46 /stk	<input type="checkbox"/>
Vis sortering	4389	250 G COTT CHEESE ORIGINAL	Cottage Cheese Produkter	D-pak (6 stk)	94,01	15,67 /stk	<input type="checkbox"/>
Vis sortering	4390	420 G COTT CHEESE ORIGINAL	Cottage Cheese Produkter	D-pak (6 stk)	145,81	24,30 /stk	<input type="checkbox"/>
Vis sortering	4391	420 G MAGER COTT CHEESE	Cottage Cheese Produkter	D-pak (6 stk)	161,19	26,87 /stk	<input type="checkbox"/>
Vis sortering	634	300 G LETT CRÈME FRAÎCHE	Creme Fraiche 18%	D-pak (6 stk)	101,67	16,95 /stk	<input type="checkbox"/>
Vis sortering	492	300 G CRÈME FRAÎCHE	Creme Fraiche 35%	D-pak (6 stk)	104,59	17,43 /stk	<input type="checkbox"/>
Vis sortering	4047	1000G CULTURA ØKO. NATURELL	Cultura Naturell	D-pak (6 stk)	109,81	18,30 /stk	<input type="checkbox"/>
Vis sortering	4045	1000G CULTURA JORDBÆR	Cultura smaksatt melk	D-pak (6 stk)	126,39	21,07 /stk	<input type="checkbox"/>
Vis sortering	4046	1000G CULTURA PÆRE	Cultura smaksatt melk	D-pak (6 stk)	126,39	21,07 /stk	<input type="checkbox"/>
Vis sortering	4048	1000G CULTURA SKOGSBÆR	Cultura smaksatt melk	D-pak (6 stk)	126,39	21,07 /stk	<input type="checkbox"/>
Vis sortering	3645	550 G NÅ FAMILIE PIZZABUNN	Deiger	D-pak (6 stk)	158,20	26,37 /stk	<input type="checkbox"/>
Vis sortering	3649	550 G NÅ FAM PIZZAB.FULLK/SPE	Deiger	D-pak (6 stk)	175,30	29,22 /stk	<input type="checkbox"/>
Vis sortering	3750	430 G NÅ FAMILIE IT PIZZABUNN	Deiger	D-pak (6 stk)	140,51	23,42 /stk	<input type="checkbox"/>
Vie		1000G					

Figure 57 Plankjøp without a created order.

She has never used the functionalities order draft ("Ordreutkast"), order template ("Ordremål") and quick order ("Hurtigordre"). She also believes that the nutrition charts are good but it's nothing she uses.

Doesn't want to mix work matters with her private smartphone, don't want a lot of emails coming in to the phone. A separate office smartphone is something she would like to use.