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for the future

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Modern Enterprise Resource Planning in the Fashion Industry

Metropolia University of Applied Sciences
Information and Communication Technology
Software Engineering
Bachelor's Thesis
5.4.2019

Author Title	Marika Nokelainen Modern Enterprise Resource Planning in the Fashion Industry
Number of Pages Date	46 pages 5 April 2019
Degree	Bachelor of Engineering
Degree Programme	Information and Communication Technology
Professional Major	Software Engineering
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<p>The goal of this study was to find out what would be the best ways of modernizing almost a quarter century old enterprise resource planning system called Dafo. The current system is outdated in both technologies and user interfaces. It was clear from the beginning that Dafo has to be modernized to be able to serve the loyal clients in the future. The business models of textile and fashion companies in Finland have changed considerably since the first release of the product in the '90s. Dafo was renewed in the past, but now it needed a more comprehensive renewal.</p> <p>This study investigates the industry trends and reflects the challenges of the current clientele of Dafo. The methods that were used in this study are from service design practices. They participate in all the stakeholders of a product in the design process to achieve holistic products and services. The study begins with an introduction to enterprise resource planning systems with a dive in the history of Dafo. Then it reflects on the fashion and textile industry trends from the systems perspective and shortly introduces service design theory. Service design methods were implemented in user research and co-creation of the new concept. The study ends with the introduction of the concept that was an outcome of this half-year project.</p> <p>Challenges found in the user research were related to the fragmented system that makes the use and conceiving of the system difficult. Memory-residency of the user and complicated access to product information and data are the first challenges that are going to be tackled with a pilot. Finally, the concept will modernize the whole system by bringing it a part-system at a time from desktop to browser.</p> <p>The fashion and textile industry is getting faster and that requires efficiency in the control of the supply chain. The enterprise resource planning system is in a big role in fast decision making that requires real-time data from production planning to sales. The consumers are more aware of the ethical and environmental challenges of the industry and demand for radical transparency is increasing. Easily available supply chain data is a valuable resource for the companies and in the future Dafo can offer it better than before.</p>	
Keywords	ERP, modernization, desktop software, service design

Tekijä Otsikko	Marika Nokelainen Moderni toiminnanohjaus muotialalla
Sivumäärä Aika	46 sivua 5.4.2019
Tutkinto	insinööri (AMK)
Tutkinto-ohjelma	Tieto- ja viestintätekniikka
Ammatillinen pääaine	Ohjelmistotuotanto
Ohjaajat	Konsultointipalveluiden johtaja Tuula Kaukonen Yliopettaja Erja Nikunen
<p>Tämän työn tavoitteena oli selvittää, miten toiminnanohjausjärjestelmän uudistaminen kannattaa toteuttaa. Dafo-järjestelmän kehitys on aloitettu jo 90-luvulla, jolloin Suomessa oli yhä paljon vaatteiden tuotantoa. Sen jälkeen yritysten toimintamallit ovat muuttuneet huomattavasti ja Dafoa on uudistettu asiakkaiden kanssa yhdessä vuosien varrella. Nyt kuitenkin haluttiin miettiä uudistamista pitkällä tähtäimellä, jotta Dafo olisi toimiva ratkaisu sen pitkäaikaisille asiakkaille myös tulevaisuudessa.</p> <p>Työssä tutkitaan toimialan trendejä sekä asiakkaiden keskuudessa ilmeneviä haasteita. Tutkimuksessa käytettiin laajalti palvelumuotoilun metodeja, jotka osallistavat kaikki tuotteen sidosryhmät, jotta uudistuksesta saataisiin holistinen kannattava kokonaisuus. Työ alkaa toiminnanohjausjärjestelmä käsitteen yleiskuvauksella, jonka jälkeen syvennyttään Dafon tarinaan. Sen jälkeen tutkitaan toimialan trendejä toiminnanohjausjärjestelmän näkökulmasta sekä lyhyesti perehdyttään palvelumuotoilun teoriaan. Palvelumuotoilun metodeja käytettiin käyttäjätutkimuksessa sekä uuden konseptin yhteiskehityksessä. Työn lopussa esitellään konsepti, joka oli tämän puolivuotisen projektin lopputulos.</p> <p>Käyttäjätutkimuksessa löydetty haasteet liittyivät järjestelmän sirpaloituneisuuteen, jonka takia sen käyttäminen ja hahmottaminen on haastavaa. Käyttäjän muistinvaraisuus ja tuotetietojen haastava tarkastelu olivat ensimmäisiä asioita, joita pilottivaiheessa halutaan ratkaista. Kokonaisuudessaan uusi konsepti siirtää Dafon työpöytäsovelluksesta selainpohjaiseksi sovellukseksi yksi osajärjestelmä kerrallaan.</p> <p>Vaatetusalan tahti kiihtyy ja se vaatii yrityksiltä tehokasta toimitusketjun hallintaa. Toiminnanohjausjärjestelmä on isossa roolissa nopeassa päätöksen teossa, joka vaatii reaaliaikaista tietoa tuotannon suunnittelusta myynteihin. Kuluttajat ovat jatkuvasti enemmän tietoisia toimialan eettisistä ja ekologisista haasteista, jonka ansiosta he vaativat yrityksiltä enemmän läpinäkyvyyttä. Helposti saatavissa ja käytettävissä oleva tuotteiden toimitusketjuun liittyvä data on yrityksille arvokas voimavara, jonka Dafo voi tulevaisuudessa entistä paremmin tarjota.</p>	
Avainsanat	Toiminnanohjausjärjestelmä, modernisointi, työpöytäsovellus

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List of Abbreviations

ERP Enterprise resource planning system. Software for managing the processes in the supply chain.

GUI Graphical User Interface.

UI User Interface.

UX User Experience.

Omnichannel Approach for serving customers in multiple different channels for a seamless experience. It includes the channels in the physical and digital environments and usually demands system integration between the distribution, promotion and communication channels.

BI Business Intelligence.

SSRS SQL Server Reporting Services.

1 Introduction

Dafo is an enterprise resource planning system for fashion and textile industry. The development of Dafo started in 1990's and various companies have used Dafo for years or even decades. The majority of Dafo clients are fashion brands, manufacturers, wholesale and work wear companies. Despite there are similarities, the individual system requirements of each company can vary considerably. In the beginning of this project, the team was clear that they want to continue covering service for the whole field and not specializing in one category. Today the team consist of manager, two help-desk members, two developers, development manager and sales executive and CGI is the current owner of Dafo.

Years of development has made Dafo very extensive ERP system that can offer solutions to the majority of needs of companies operating in the fashion and textiles industry. Because the development of Dafo has focused on the functionalities of the product rather than the user experience and user interface, the user interface is outdated and often difficult to understand. New users often require extensive training to learn how to use Dafo.

I suggested this thesis for Dafo from my personal interest. Before software engineering studies my background is in fashion. I have bachelor's degree in fashion and clothing from Metropolia University of Applied Sciences. I also have years of work experience from different positions in the industry. During this research, I noticed that the specific industry knowledge was beneficial when I was communicating with the clients and further communicating their needs to my team.

This study goes through what fashion and textile companies expect and need from a modern ERP system in the ever-changing industry. It analyses how Dafo meets those demands now and in the future. The study ends with concept that guides future development. Together with the team, we set three goals for this half-year project. The goals were user understanding, co-creation and usability testing and finally a concept for the future developments. In the user research, we want to identify the pain points of the user experience and to understand more the everyday life around the system. That will help us develop the future version of Dafo.

2 Enterprise Resource Planning

In their book Thomas F. Wallace and Michael H. Kremzar [1, p. 5], describe ERP system in a one extremely long sentence as following:

An enterprise-wide set of management tools that balances demand and supply, containing the ability to link customers and suppliers into a complete supply chain, employing proven business processes for decision-making, and providing high degrees of cross-functional integration among sales, marketing, manufacturing, operations, logistics, purchasing, finance, new product development, and human resources, thereby enabling people to run their business with high levels of customer service and productivity, and simultaneously lower costs and inventories; and providing the foundation for effective e-commerce.

As the description explains, ERP-system is for managing all the elements throughout the supply chain of a company.

2.1 Dafo

This chapter is based on an interview with Tuula Kaukonen who is the team manager for Dafo. She started working in a company called Dataform in 1983. The same company that later invented Dafo.

The founder of Dataform had worked for an underwear manufacturer in Turku. At that time, there was still a lot of fashion and textile manufacturing in Finland. Before software, the data was often stored on punch cards. Punch cards are paper cards that have holes to represent data. In order to read the data, a punch card is inserted into a computer. Dataform was found in the '80s and it was time to move on from punch cards to more modern ways of storing data. Dataform started developing customized IBM System/36 software for fashion and textile companies. Mikro-Teva was the first product that was sold as a one-user software package instead of being customized for a specific company. The shift from IBM to Microsoft products started in the '90s when the use of computers in homes and businesses was increasing. The Microsoft software products were customized in the beginning, but the team started planning a product that would be able to replace all the fully customized software. They believed that the development of a single, more generic software instead of multiple customized ones would decrease the amount of time and money invested for both Dataform and their clients. The project received

funding from Tekes (today part of Business Finland) and the first version of Dafo was released in 1995. One of the clients that took part in the initial pilot is still an important client for Dafo. [2.]

New versions of the software were released almost daily in the beginning, but when the basic features begun to function better, it caught the attention of client businesses of considerable size. Many of these businesses still use Dafo. The main reason for the companies getting Dafo was to shift from customized software to product that was continuously developed. The era of customized Dataform ERP systems had come to its end.

Later Dafo became an international success and there were agents and help desks around Europe in countries like Portugal, Lithuania and Sweden. For a long time, there were only few or no competitors, but it was not always a smooth ride. Dataform was acquired and the owner of Dafo has changed multiple times since. The team has adapted to many different organizations. Eventually, a decision was made to pull Dafo out of international markets in order to mainly focus on the Finnish clients. The software had an extensive selection of language options that have diminished over time, leaving only Finnish, Swedish and English. Many clients were lost when shoe and clothing manufacturing started steadily move away from Finland. Globalization and the new competition that came with it drove many client companies to bankruptcy. Some clients were lost when larger groups acquired them.

Business-to-business online sales platform was a successful new feature that brought Dafo a considerable number of new clients. The pricing was too high at first, but when a more accessible pricing was set, the feature started to sell. The feature started gaining even more profit when the service was transferred to the cloud.

Throughout the years most important part of Dafo has been the possibility to make wide range of colors and sizes for one product, product development and recipe management. These tools are especially made for the complicated products in apparel. Production planning features, being the area of expertise for Dafo, were the most important selling point in the beginning, but when the requirements of the clients started to change the system was forced to adjust. The apparel companies in Finland were beginning to move their productions off-shore and shifted towards purchasing. Dafo then responded to these gradual changes by developing the software's purchasing and logistic features

further, in order to keep attracting the same clientele. Only a few clients still use the original production features or parts of them. The latest change has been the growing importance of the features that support the sales.

The following chapter, The Fashion Industry Trends, reflects the trends in the fashion and textile industry and how those may affect Dafo and its clients. Dafo has renewed itself many times before and soon it is a 25 years old software. This study looks into the future and tries to predict and plan how it can succeed in the next quarter-century.

3 The Fashion Industry Trends

According to the study called The State of Fashion 2019 by The Business of Fashion and McKinsey & Company, executives described the fashion industry in year 2018 with the words “changing”, “digital” and “fast” [3, p.13]. To survive as a competitive software provider, it is unquestionable to keep up with the latest trends of this ever-changing industry. It is important to know what the potential clients expect and value to offer them a product that they need. Rapidly changing business environment require agility and risk management from a fashion company supply chain. This is where the real-time information comes in and is very important. In order to react fast and sustainably to changes the critical information about the products and the supply chain must be available in real time. ERP system is for managing this information and that is why the system is in an important role in managing a fashion company. [4, p. 29, 5 p. 29.]

The following chapters reflect on the trends that were published in The State of Fashion 2019. How these trends have to be taken in consideration when we are developing an ERP system for fashion industry? How can ERP system support the companies to transform along these trends?

3.1 Global Economy

Both developed and developing markets are predicted to slowdown in growth by 2020 regarding to the World Bank, International Monetary Fund and Organization for Eco-

nomic Co-operation and Development. In September 2018, 41 percent out of over thousand executives across industries expect global economic conditions to worsen in 2019. When in December 2017 only 15 % expected conditions to worsen in 2018. If the expectations become reality, it requires actions from businesses to stay profitable. The top 20 percent of economically profitable fashion firms over the past five years have succeeded to significantly lower average selling, general and administrative expenses and cost of goods sold, compared with the bottom 80 percent of the firms. Study suggests setting measures that will aim to boost productivity through greater efficiency and cutting costs. In order to achieve sustainable benefits over the long term companies are encouraged to find productivity from innovation efforts like automation of production, analytics-driven decision making, possibilities in omnichannel and reorganization for better agility. [3, p. 19-21.]

Currently Dafo offers the possibility to create work orders that include instructions for production at the factories. If the companies are able to shift to more automated production pipelines there could be a possibility to integrate the machinery data to Dafo that could indicate the production process of a product in real time, perhaps even send the order to start the production. Currently the users are responsible for doing this manually, but we could think of different, more automated options that would take away the need for manual input. In addition, some Dafo clients that work together are manually inputting the same information. That information could be transferred digitally between two Dafo accounts instead of exporting, emailing and inputting the same information back in the system again.

In Dafo user research that I will go through in detail later in this study, we found that there is a growing interest in analytical insights and not only the management, but in all levels of organizations and different kind of Dafo users. People are interested in their work results, like if the production and deliveries are on time or how well they succeed in sales. There is useful data inside Dafo that has to be brought to the users with clear visualizations that are easy to analyze. We have to think of what are the best channels and most beneficial ways to offer this valuable information to the users.

Dafo could take more proactive approach by offering omnichannel solutions. Right now, the omnichannel integrations are developed reactively for the clients. Only communi-

cating and promoting the ready-made omnichannel integrations could motivate more clients to add new sale channels to their portfolio. In order to keep up with the rapidly changing omnichannel environment Dafo has to follow the industry trends.

ERP can reveal the bottlenecks of the processes and even the reasons behind the occurring problems. From that perspective ERP can be a tool to view the organizational structure and help to find the dark corners or wasted hours that may affect the results of the company's success. In order to increase the productivity the management needs real-time information and longer time period analytics to make sustainable choices that carry results in the long term. In future Dafo could offer a clear image of the events in the supply chain that begins with a big picture from where the user can dive in to the smallest details.

United States and China have been setting trade tensions towards each other. American Apparel & Footwear Association has published a letter arguing against increased taxation of Chinese imports. 60 US labels including major brands like Levi Strauss, Nike and Under Armour signed it. Some fashion companies are reconsidering their presence and production in China. Trade war between China and US is not the only thing shaking the trading ground. In addition, factors like G20 countries setting trade-facilitating measures and Brexit affect or may affect international trading in the upcoming year. Some of these tensions can be predicted, but the uncertainty of the global economy might demand major changes at a short notice from fashion companies. Changes could be relocating production, offices, brick-and-mortar, raising prices or managing squeezed margins. In these situations, the real-time information about the inventory, production, purchases, orders, product cost-structure and other information managed in ERP systems are critical to make smart and sustainable moves. [3, p. 31-33.]

Emerging consumer markets are growing rapidly and with the majority of growth shifting from West to South and East. The new spending power of people is often expressed with style and fashion [3, p. 35]. There are new shopping centers rising, but the Asian online apparel market alone is estimated to reach US \$1.4 trillion by 2020. 18 percent of all goods in the world are consumed in China. It is no longer just a country for manufacturing, but also a great consumer market. In addition, India is increasingly becoming a focal point for the fashion industry for two reasons: rapidly growing middle-class and powerful manufacturing sector. The Indian middle class is expected to grow 19,4 percent by 2022.

The fashion brands willing to enter this fast-growing market have to recognize the cultural style differences that are strongly affected by traditional outfits in India. There are also various different climates in this geographically large country. Brands that are succeeding in India understand how people consume there, what kind of designs work through which touch points. The leading e-commerce players are using AI-based solutions to personalize the shopping experience for the consumers. Low-risk option for a brand to reach the growing markets is to partner with existing advanced e-commerce platforms operating there. This is a good way to test demand and consumer preferences in the area. [3, p. 24-35, 5, p. 40.]

To succeed in the global market Dafo has to enable agile management of the product range, production pipeline and logistics and help the users to plan them. Or in the future plan some of it for them. There could be AI and analytics taken in use and well selected inventory could be automatically send towards the areas where they are most likely to sell. AI and analytical solutions can reduce excess inventory in many ways for example in the production planning.

Darshan Mehta, President & Chief Executive of the fashion division of Reliance Brands tells that a significant portion of their brick-and-mortar sales were driven by online. If Dafo would expand its services with B2C webshop possibility and pair it with the already existing shop registers it could think of new ways of combining physical and online shopping. Basically the information of all the available goods in different in-house locations already exists in many use cases of Dafo. Combining all the different inventories of a company, in-store and in-stock, and making it easy to manage and available online could increase the availability and sales of the goods to consumers. [3, p. 28-30]

3.2 Consumer Shifts

Consumers have been trained to constantly crave for newness from their wardrobe. The ecological and ethical awareness has raised concerns and consumers have started shifting from fast fashion towards more sustainable ways of consuming. Rental, resale and refurbishment businesses are on the rise, and new business models are being developed. The need for ownership has decreased drastically. Currently, the only items coming back from consumers to Dafo clients are reclamations. Dafo has to stay alert and

perhaps make a start in developing returning product management to be prepared if Dafo clients want to start rental, reuse or resale functions in their business. [3, p. 39-44.]

Consumers are more and more used to fast service where everything is available and delivered within a day or in some cases in minutes. Developing new quick delivery models or omnichannel services backend information has to be up to date and available. In fashion field Asos and Zara have been able to offer new ways for product search or local store availability online with their modernized system architectures. Dafo could offer modern API to enable easier integration of new micro-services that enable production of new service models for Dafos clients. [3, p. 51-59.]

In the Dafo user research we found that brands do not always want to share price information with everyone, because the prices might differ depending on who is the buyer. It is the same reason why costs of manufacturing are not public. Some brands like Everlane have succeeded in launching radical transparency where production costs are exposed to everyone including consumer. It is not only the prices consumers are interested today, transparency interests in all aspects throughout the value chain including all the suppliers and their work conditions not forgetting ecological responsibility. The study expects that in the future non-transparent business might be a red flag and rise a question “what are they hiding?” Consumers trust less in companies, governments and media about what they are saying if there is no proof to support the statements. In any case was it a total transparency for consumers or query about a products origin from a reseller Dafo has to make all the possible information about the supply chain available for the users and client companies. In future Dafo could offer new ways for the clients to publish this information to consumers. [3, p. 60-69.]

3.3 Fashion System

Agility is no longer characteristic only for technology industry. Fashion industry has to follow. There are growing number of new agile, social media influencing challengers for established brands. Established brands are trying to stay in the competition by starting incubators and supporting startups. New agile supply chains enable faster to market pipeline, which is important when brands have to react fast on new trends.

The smaller fashion businesses that know how to please the millennials are rapidly growing. That means not all the companies have to be on the huge platforms if they know how to add value through differentiation of the product and service, because that is something millennials look for when they are buying. Big brands are starting their own innovation-labs that are looking for new ways to satisfy the group of buyers who are more interested in differentiation rather than the largely known legacy brands. The same group also seek for the trends through their peer and influencer social media channels. Because of the power of the social media, consumers are the ones who often establish the new trends. [3, p. 71-85.]

Before the trends were set by designers, retailers and editors. The industry is seeing a shift from “pushing” products to market to “pulling” them based on the actual demand. That is why the importance of shorter production pipelines with smaller production batches and an increased understanding of data and analytics is growing. Adapting to this model would reduce overstock and capital investment on a collection, but increase the production and transport costs. [3, p. 71-85.]

Dafo comes in when the planning and the production has to happen fast. Again the importance of a clear image of the whole supply chain rises. Dafo has to be the window to the supply chain of the company since that is where it is managed. One of the most important tasks of ERP system is to balance supply with demand. If they are well balanced, there will be less excess inventory.

4 Service Design

Service design is an important part of this study and the methods are broadly in use. The holistic approach considers so many aspects in the design phase that there is a smaller risk in the implementation of the changes. Multiple iteration rounds and testing during the concept creation ensure that most of the failures and mistakes should be gone through before final version of the concept. [6, p. 84.]

Service Design does not have one clear structure or process. The methods are selected depending on the case. Projects do not often have a clear ending because service design is meant to be an iterative process and at its best, a part of the company working culture.

It should be like a circle where you learn, develop, try out, iterate and learn again. Outlining the structure of the iterative process eases the communication with stakeholders about what service designers are actually doing. The outlined structure of the process is articulated, but it is as important to communicate that everything inside the lines is iterative. Iterations are made as long until the design is validated with the user. [7, 8, 9, p. 79.]

The service designers use methods and tools from various disciplines like design, management, social sciences and engineering. The goal of this interdisciplinary approach is to develop a holistic service to the user. The end result aims to be useful, usable, efficient, effective and desirable. Service design can be used to create new services or to improve existing ones. [9, p. 17-19.]

Service design is user centric and focused on the user experience. What is often forgotten is that it is interested in both the final user experience, but also service provider experience. In case of Dafo there is the service we are offering to our clients and the product itself, Dafo. For example what we are offering could be developed by asking a question of how our help desk can offer their expertise to the users better than before. For that, we have to think about the processes, who needs help, when, why and how urgently. We also want to know how our clients can better serve their clients and stakeholders with Dafo. In the following figure, different levels in two different service processes are visualized. The one on the right is between Dafo team and Dafo clients and the one on the left is between Dafo client and their stakeholders. These levels are a good starting point for a service blueprint, which is explained later in this study. [10, p.17.]

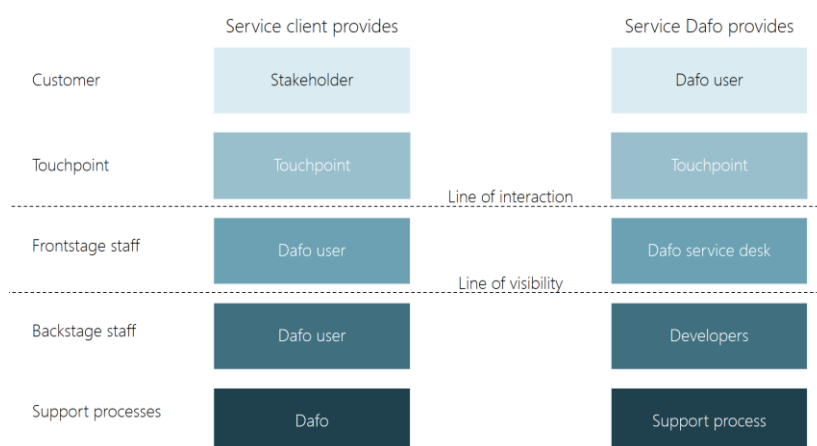


Figure 1. Levels for service blueprinting [6, p. 24-25].

5 Project planning

In this phase, it is important to understand the culture, strategy and goals around the product we are going to work on. Exploring and understanding the product I work with and what are challenges in it from the company's point of view. After this phase the challenges are articulated from organizational perspective and later studied from the perspective of a client. [9, p. 83.]

After settling to work at CGI and getting familiar with the company's culture I was introduced to the core abilities of Dafo to have better understanding of what the users work with. In the first workshop, the team was introduced to service design. We discussed why we are starting this project, what we want to achieve in six months and what we need to learn from the users. Everyone gave his or her thoughts on what they think need to be changed in Dafo. We discussed all the challenges together and mapped them depending on if fixing them would bring value to the user, value to the business or both. Challenges that came up the most were outdated and complicated user interface, lack of services online and mobile and lack of reporting tools. These challenges were to validate with users and they were good foundation for the user research questions.

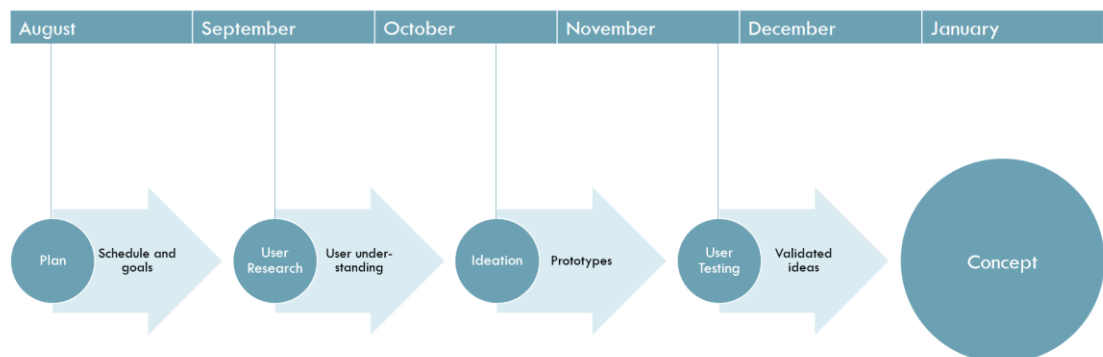


Figure 2. Process and schedule plan

The process is based on service design theory. Similar model was introduced in the Service Design Toolkit that was developed by Jyväskylä University of Applied Sciences between 2010-2012 in cooperation with Palmu Inc. [8.]

In the end of the planning phase, I had summed up the schedule, research questions, research group and goals for the project. We chose a group of clients I contacted about

the research. We also had a meeting where we went through what is the history of the client relationships of whom we had chosen. This way I had better understanding about the history and the starting point of each client that may affect their opinions and experience. The goals for the project were user understanding, co-creation and usability testing and finally a concept for future development of Dafo.

6 User Research Methods

User research is all about gaining understanding of the product or service from the users' point of view. It is not about finding solutions to the previously thought challenges. It is about trying to find the challenges of a user. Those can be different from what the team had earlier assumed. The holistic approach looks at the everyday life of the user and not just the use of the product. The goal of the user research is to gather user understanding that can be communicated to the stakeholders. [9, p. 83-84.]

We have to understand the processes and environment around the user because they are tight together with the system. On top of those users personality, skills, background, cultural values and motives effect on how the products has to be designed to meet them in features, shapes, textures, colors and functions. [4, p. 30-31.]

With emphatic design approach, we want to figure out users hidden needs. Those are usually something users do not even know to expect from a product. Emphatic design methods take place in the environment where the product is used. The process following: 1. observation, 2. collecting information on: why it is used, how does it meet the needs, is the user editing, changing or adding something to get their tasks done, 3. analyzing the outcomes, 4. ideating solutions and 5. prototyping solutions. [4, p. 31-32.]

The most methods used in this study are from service design. Some of them were combined and for example, system mapping offered a great platform to discuss why things are done the way they are and it offers the participating company a possibility to reflect on their processes at the same time. One of the most interesting research days was when four Dafo users from the same company were first in-depth interviewed and the day ended with a group discussion. All the users had their best and worst Dafo cases freshly in mind and the group discussion offered them a possibility to talk about just Dafo

related issues that are affecting their work. Otherwise, they are often buried under something else more important. In addition, the discussion functioned as a platform for learning better ways to use Dafo from others. As a facilitator, I got a deeper view of the relations, unwritten rules and the processes of the company.

6.1 Contextual interviews

As the name implies contextual interviews are conducted in the context or the environment where the use of the service happens. The users interviewed were from different roles like technical designer, production manager, warehouse controller, sales and customer service employees. Because being intensively observed is not the most natural way of working it is crucial to make the participants feel comfortable and trust the interviewer. To support the insight from this method it is common to use photography, audio recording or even film the processes. In this case we took pictures from the work desks of different users to support the content from the interviews. These interviews and the images revealed well what kind of tools users have to help their work and use of Dafo. We found out what they have printed out, what kind of written notes they have, what they manage in Excel files, how many screens they use and which Dafo programs do they keep constantly open. [11, p. 162-163.]

6.2 In-depth interviews

The goal of the interviews is to understand the everyday life and thoughts of the participant. In this case, we want to understand what Dafo user is doing and why. Interviews were organized in a reserved space where the participant could feel comfortable and focus on the discussion. There were always some questions decided before the interview, but the structure was not strictly decided beforehand to leave space for iteration and interesting notes could be followed to explore something new. With this method, we could find the real motivational factors that are lying under users actions. This was the most used method in the user research and we found interesting connections and reasons for process bottlenecks in different companies. This method also revealed some of the most important factors that are slowing or blocking users from reaching their goals. These are the points that we want to help solve with Dafo customers. [11, p. 147-148.]

6.3 Group discussion

Group discussion similar to the “focus group” method was used once. It was conducted at the end of the day when all the participants had had their own in-depth interviews earlier the same day. This trial came out to be one of the most interesting methods. All the participants had the earlier discussions freshly in mind and they had little time in between to think about the subject on their own. The facilitator starts the discussion with a few facilitative questions and then observes when the discussion goes on adding more questions on the way. Users found out what and why others were doing in Dafo and how they could use Dafo better. As an output, this method tied the earlier interviews to a network of relations in a company where the problems and bottlenecks could be better located. Interviews and the group discussion was conducted in the same meeting room at customers’ premises. [12, p. 27.]

6.4 System mapping

System mapping can be used in different stages of service design process. System map in service design can mean different kind of visualizations of systems. In this case, we used it to research the user groups and internal stakeholders and their relationships to Dafo and other systems. This method was used as a combination with the group discussion and opened different perspectives of the users to one-another. This method helped with finding user groups that use certain programs. This was helpful information when the system was grouped to part-systems in the later phases. [12, p. 57.]

6.5 Service Blueprint

Service Blueprint is a tool for visualizing and analyzing service processes and the relationships between the components in it. It includes customer actions, service frontstage and backstage actions and the support processes. Dafo should be one of the latter. The aforementioned titles are separated with the following lines: interaction, visibility and internal interaction. The following figure is an example of a service blueprint template from Nielsen Norman Group. [13.]

SERVICE BLUEPRINT 101

A diagram that visualizes the relationships between different service components (people, props, and processes) that are directly tied to the touchpoints throughout the customer's journey.

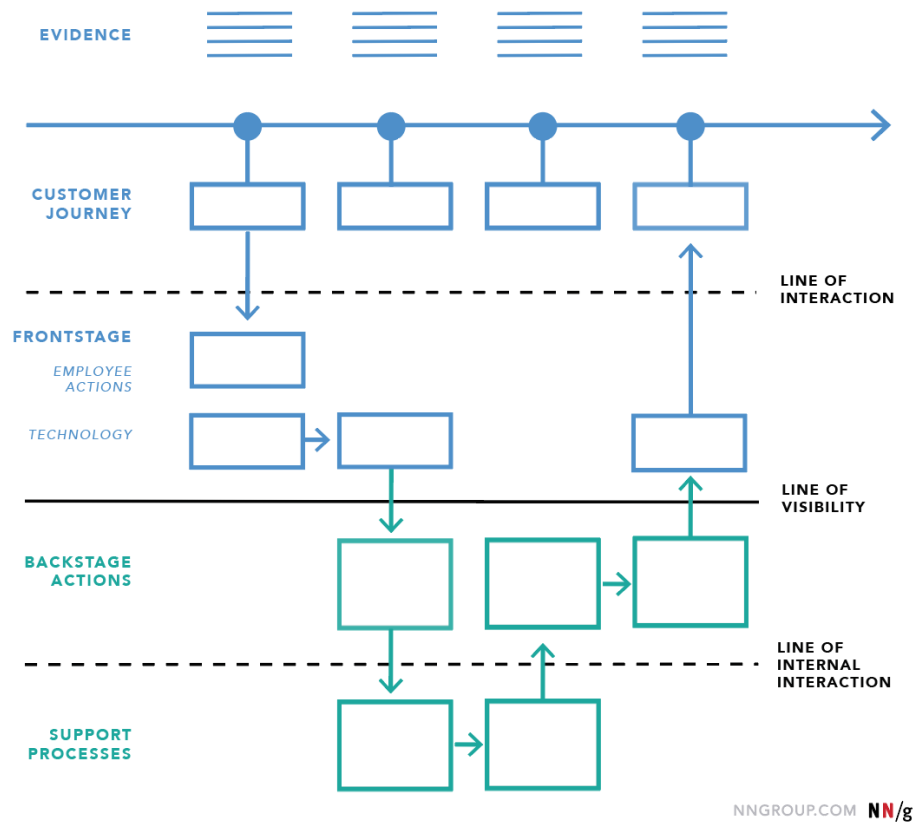


Figure 3. Service Blueprint Template [14]

With one customer, we had collaborative workshop where the users were split in two groups to create a Service Blueprint of chosen service process. I was facilitating this workshop alone. There were six participants from different roles in two groups of three. For better results, there should have been at least a facilitator per group. Service Blueprint is a good way to bring in different perspectives from different departments of the company to explore the steps included in the user journey. This method is great for revealing duplicate work and overlapping tasks. We found out where Dafo users have to use other systems, notes or services to support their work. We also found that some information is first processed in Dafo, then outside the system before returning it back to Dafo. We can use this finding to ask question “What needs to be done so that the user will be able to process the data only in Dafo and achieve the same result?” during the ideation. [11, p. 204-205.]

7 User research outcomes

The participant group of the user research was 48 active Dafo users from different positions in 11 different companies. The used research methods were introduced in the previous chapters and those were contextual interviews, in-depth interviews and workshops including group discussion, system and journey mapping methods. The user research gave us a great amount of data that I started sorting to headlines. Still, when I introduced the headlines to our team they could be considered as a raw data and chapter 8.1 “Choosing the challenges” will introduce how we processed them to key challenges that we wanted to solve.

The following chapters introduce the findings from the user research. These findings are the processed version of the outcomes and I was writing them for this study during the project. The best sides of Dafo are trust that comes from long-term partnership, great customer service and support and fast development of customized functions for special needs. The last mentioned is not only positive, because it has caused some of the main challenges like fragmentation of the system and complicated user interfaces.

7.1 Reliable longtime partner for the industry

Those users who had ever been in touch with Dafo team and helpdesk shared similar view of how Dafo team serves the clients. Descriptions varied from Dafo team as co-operational, fast in returning to messages, service is reliable and the help is there when ever needed.

I have to say, the service I have experienced has been first-class.

This was a translated quote from an interview with Director of Finance and Supply Chain of a customer. The comments about the service were extremely positive. That is something Dafo team wants to hold on to no matter how the Dafo itself changes.

IT personnel and especially long-term users agreed that Dafo is trusted. The help desk team is available and the system is always trusted to run in the background. The trust in the system has been a critical reason to stick with Dafo when other systems have been under evaluation. Switching to a new ERP system is always expensive project, but as

long as Dafo has been trustworthy and there is no similar guarantee for the competing system, it has been safer for clients to stay with Dafo.

Users are thankful for the flexibility of the system. They appreciate that all the information about the product can be set as they need them to be. Products in fashion and clothing can have tons of different color and size variations and Dafo has managed to deliver good tools for managing all of them. The product itself can also be a complicated formation of different materials and pieces. The product is still the core of most client businesses and that is why product management is the most important part of Dafo.

7.2 Difficult report generation

When it comes to reporting there were two types of clients found from the research group. The first was advanced reporters who already had taken third-party business intelligence tools in use and were exporting data from Dafo database to those. Their problem was that the data was not transferred automatically and they had to manually get it out from Dafo to their selected platform where they could use it. The data that was not exported from Dafo was only available for them in the system even they wanted it to be available regardless of the device, place or time. Getting the data out is a simple process, but if the information needs to be changed and the variables of the exported data had to be changed, the process was found difficult.

The second group was reporting only if necessary. The most important reporting needs were by government obligations for bookkeeping. These companies were working with minimal resources and they do not have time or money to invest in reporting. When they were asked about their interest in reporting services they were interested, but it would have to be intuitive to use and inexpensive. They make reports for their clients if necessary and similar reports are generated repeatedly through a complicated Dafo report generator. The parameters can be saved, but they often were not. In decision-making, these companies trust their gut feeling and experience instead of reflecting on data.

7.3 Users memory residency

Users sometimes forget to finish orders that can cause time and money loss in the business. The system does not indicate clearly enough if there are open orders that have to be confirmed. This applies to material and product purchasing, manufacturing and orders in B2B online store. This effect on sales and delivering products on time.

The biggest supply chain issue visible to the retailers and other clients of Dafo clients are the late deliveries. Account responsible has to stay alert if their client is waiting for an order and check that everything in the supply chain is happening on time. Material buyers have to monitor and make sure the materials are ready at manufacturing facility when needed.

Most of the users use Excel to follow their own tasks. They maintain information about products, orders, clients and dates when something needs to be checked, ordered, delivered and so on. Excel works as a checklist for the users to make sure everything gets done.

7.4 Fragmented and outdated system

People learn to work with surprisingly complicated software and user interfaces when they are motivated. Ability to perform a work task is a valid reason to increase the users' motivation to learn. [15, p. 95] There was noticeable difference in opinions between old and new users. Users that had worked with Dafo for years were surprisingly fine with how it is. They are used to how it is and know how to get their tasks done. They rather stick with the ways they learned to work even if there are new features added that would make their tasks easier or faster. New users were more frustrated with the system and how it works. In addition, people who have to train other people were giving more negative feedback about how difficult it is to understand. A participant who has to train the shop personnel to use Dafo from a company that has chain of shops in Finland was extremely frustrated about how much time the training takes from other work.

Users have adopted ways of working that get their work done, but may cause false information in other parts in the system. Users do not always understand how their actions

carry off in the system. They might make a fake order to get a nice listing of the wanted products to an offer or confirm some states in the production that are not really done yet to get out a certain sheet of information. These kind of actions can cause issues like producing too many or not enough items and negatively affect the business. Some companies have taken fields to different use than what they are meant for. This may not cause trouble immediately, but when the system is developed and the field information is used in another place, it might cause false information or make the use of the system more difficult. All the fields and options are there for a certain reason. If clients want a customization or small edits in the software they have to pay for it. As long as there is an option to come up with a workaround, they probably will find it.

Buttons for the same use might have many different descriptions on them in different parts of the system. In the following figure we see how some buttons use text, some icons and some just number or a letter. Icons that are used are not self-explanatory. Users only learn the ones that they need regularly. That happens often and the users do not know what is behind other buttons than the ones that they use. That is limiting the use to what the user knows and has time to learn. Users often told about which program they are talking about with the icon or at least how they interpret them. For example, product information (tuotetiedot) in the following figure was called bathrobe and I started guessing which program the user was talking about.

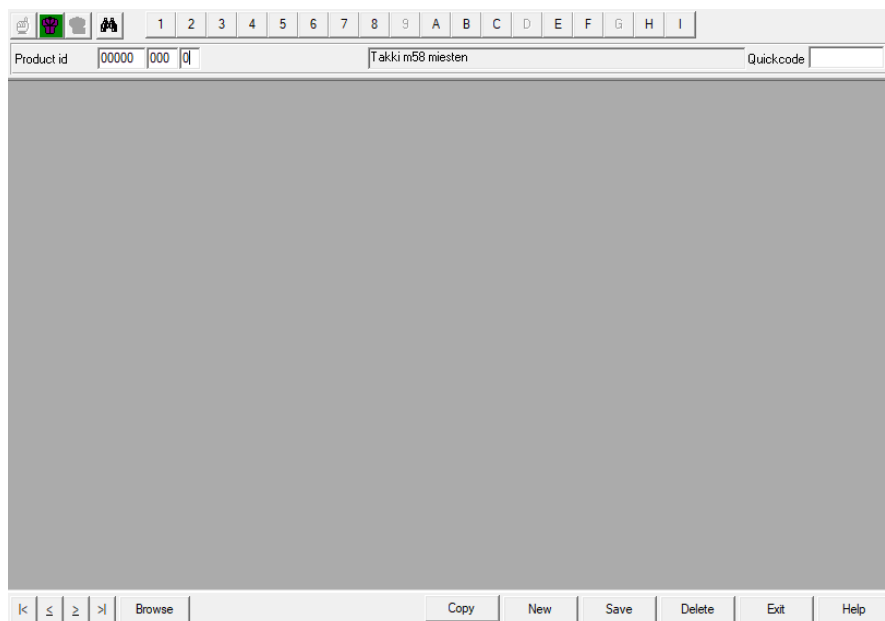


Figure 4. Buttons of the product information program

The development of the system is often due to a specific need from a client. Because of that the system has become fragmented and it consists of multiple .exe files that all serve more or less a different need. There are multiple almost similar file programs that are made for almost similar need, but they are ordered from a different client with different specifications in the order. In addition, the user interface of these program files is often fragmented due to adding new fields for new features over the years. Not all the clients need all of the fields and it has become complicated to users that would only need a simple version of the programs.

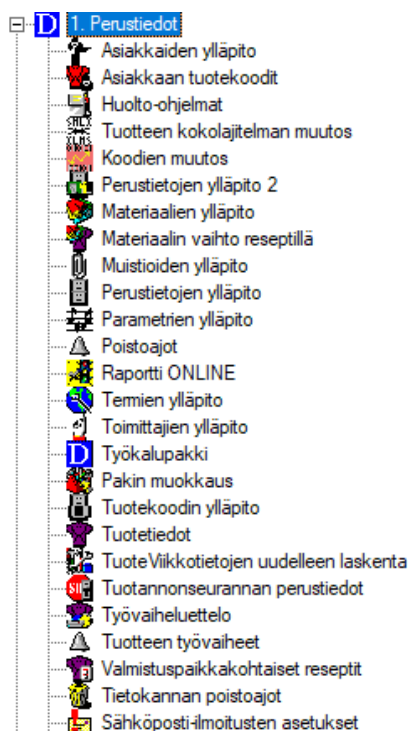


Figure 5. Screenshot of the basic information in the tree menu with icons.

Dafo is developed with .NET and the last version of Visual Basic 6 that was published in 2004 [16]. Some searches and only starting some of the programs can take a lot of time. One participant said that she knows when she has time to get a coffee before the program is ready with the wanted output. The Visual Basic graphical user interface is outdated and the old look was often mentioned in the interviews. Users want moving between information to be easier. Now they have to open one program to find a piece of information and to put in to another. Even the copy-paste does not always work and they have to remember, write down or keep both programs open to move the information. Users want more straight links from a program to another.

The most important information stored and managed in Dafo is product information. Products are the core of the businesses that use Dafo. It is one of the most important differentiating factors when they have chosen Dafo. To manage the big variety of products with multiple size and color options. Yet users often find the product search complicated. Filtering and listing certain types of products is even more difficult. To find a product information users have to know what they are looking for or look it up from order, catalogue, online store or other place where for example the product code is easier to find from. The search opens in a new window and it is not intuitive for the user. Many users said that they “do not understand the logic” and it had to be learned. There is also a quicker way of search that is often used. It is search by product code, but then user has to know the code of the product that she is looking for.

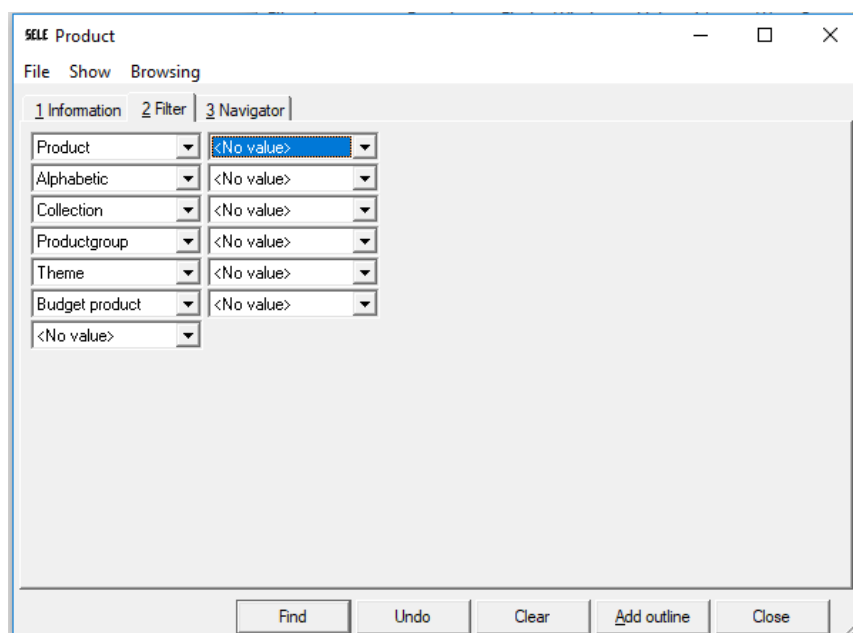


Figure 6. Screenshot from product search

Dafo has online store possibility for B2B sales. This is the only service from Dafo that works in a browser. The look is outdated and it received a lot of critique in the user interviews. Even it is not for consumers brands are worried about their brand image that is not translated through Dafo B2B for their wholesale clients. In some cases of work wear companies the consumers are ordering from there too. The look is not the only issue, there are many more with the user experience. Customer services have to explain and help their clients to order from the store. In this time when online shopping is getting more and more popular and people are used to buying from online that should not be

the issue anymore. Dafo B2B online store needs the update and modernization both in user interface and user experience.

7.5 Complicated communications

Dafo has been offering a reactive service for their customers. If there is a need there probably is something already build to offer with a new license payment or it can be built if the customer pays the development costs. In the interviews, I was asked about many things if they already exist, but unfortunately, I often did not have an answer. The variety of features and programs is so massive that it takes a long time to remember all of them. Sometimes the team that has been developing them does not remember what is there anymore. The following figure has been on the CGI sites describing what Dafo is. It has many abbreviations and the outer fields are used to describe many or just one thing.



Figure 7. Visualization of Dafo [17]

The figure should give a quick understanding about what Dafo holds, but this figure can be found confusing. Dafo B2B online store solution has two marketing names in use – WebDafo and Azunne. It took me a while to understand that they stand for a same thing. Billing was also found confusing and in many places, I heard that it takes a lot of time to go through what exactly the customers are paying for. Manuals and instructions were not easy to read either. Users said that the communications follow the same logic as the programs that they do not understand.

8 Co-creation

After sorting out the challenges we wanted to solve it was time to co-create the solutions. The goal of co-creation is to give an opportunity for everyone including the team and users to have a chance to get their voice heard for the final concept. The most important part of co-creation is not to judge any ideas. In this phase, it is important to try out as many ideas as possible. It is important to try out and fail often to find the winning options in between. Failing in the co-creational phase is a lot cheaper than failing when the new features are launched. Co-creation is a highly iterative process, where the tested ideas are developing along the way. [13, p.117, 9, p. 84.]

One of the biggest challenges in this phase is to get the team think outside the box and in new ways without sliding back into their old habits. Including the interdisciplinary team and all the stakeholders including the users in co-creation is rewarded with a holistic solution that is sustainable in the long run. [9, p. 85.]

Creative problem solving demands divergence and convergence. Divergence means producing as much innovative ideas as possible. It is combining things in new ways and trying to find new ways for solving things. Convergence is analytical and based on facts. It is for evaluating ideas that were outcome from divergence. It is important that these two ways of thinking do not mix up, but are used as a loop in the iterative process. [13, p. 113.]

8.1 Choosing the challenges

First we started by going through the challenges that were found in the user research. There were over 70 small challenges as headlines introduced to the team. The next step was to group the 70 challenges in themes. This is a difficult, but important step. This way we can develop a bigger picture of the challenges we have in this project. Seeing the connection will help us going towards the solutions needed. The headlines were printed out on paper. We discussed with the whole team if there are themes or patterns that we can recognize from the results. The team ended up with six themes: supporting the work of the user, reporting, development of the system, completely new features, need for training, communicating the possibilities of the system. All the problems were divided

under these theme titles. After that, we voted the most important problems under each theme that we want to solve. Everyone got five votes that they marked on the problems they found most important. The most voted problems became the key challenges of the theme. [18, p. 22.]

8.2 Ideation

In the previous chapter, we created themes and key challenges for ideation. Next, these themes and key challenges were translated into challenge questions. The questions were prioritized again by voting in the same way as the key challenges. The seven challenge questions that had most votes were the initiative questions for idea remix.

8.2.1 Idea remix

In idea remix the ideas of other participants are developed, evolved or build-up to new ones. It includes the opinion of all the participants for each final idea. I created a structured A3 template for the idea remix. The first side had a field for the challenge questions and six idea iterations. The second side had fields for repeating the challenge question, description and visualization of the final idea. [18, p. 26.]

The instructions for the idea remix were following:

1. Write down the challenge question in the question field
2. Come up with a first idea in the field "Idea 1"
3. Give the paper to the next participant
4. Fill in the next empty idea field by developing, evolving or building up on the last idea
5. Continue the steps 3 and 4 until all of the six idea fields are filled and give the paper to the next participant
6. Read all of the ideas and turn the paper
7. Write down the initiative question, compile final idea from all of the previous ones and visualize how the idea works as clearly as possible

The idea remix also had the following rules:

1. Do not judge.
2. Favor imaginal ideas.
3. Build on top other ideas.
4. Focus on new ideas.
5. Use visualization whenever possible.
6. Let all ideas be heard and further developed.
7. Quantity over quality.

After the idea remix we had seven ideas explained and visualized. Next, we needed to prioritize them. For this, we used a matrix template that is broadly used in service design to evaluate the ideas on their value for business and user. Y-axis presents the value for user and X-axis value for business. We positioned all the ideas on this matrix with an open discussion with the team. [13, p. 106.]

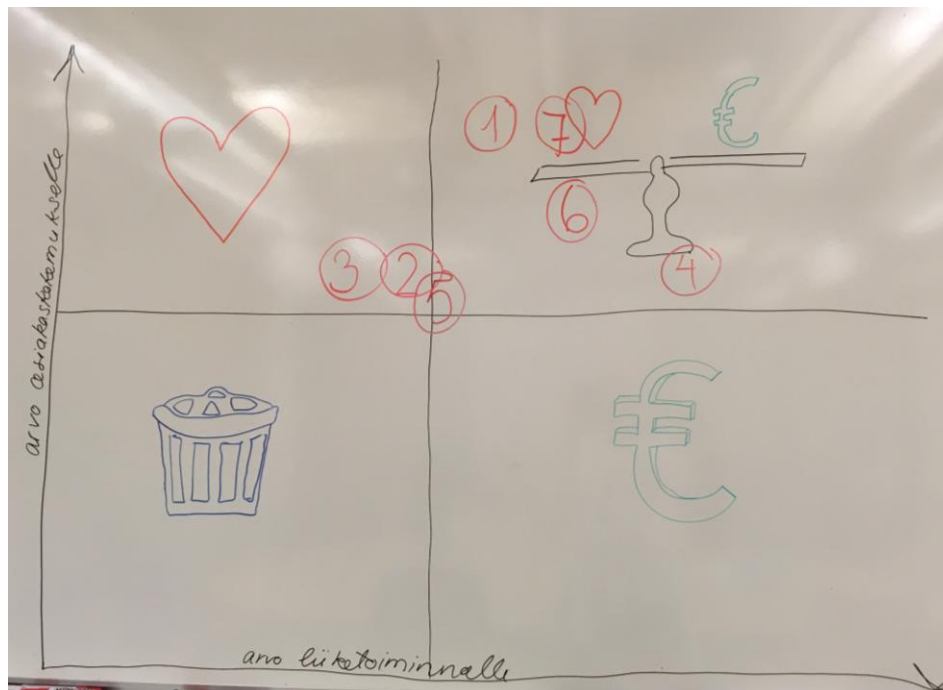


Figure 8. Prioritization of the ideas. X = value for business, Y = value for user experience.

Ideas that were nearest to the top-right corner of the matrix were selected for further development and those were: basic reporting set on SQL Server Reporting Services that can be supported with customizing and training, personal task list, product dashboard that can be customized for users' needs and visualizing the supply chain. The following chapters describe the development and testing of these ideas.

8.2.2 Prototypes

Prototypes are made to develop and test the ideas that were the outcome of the ideation. Early stage prototypes have to be done quickly and work as a starting point for more developed prototypes. They are tested, iterated and retested until they meet the expectations of the users and stakeholders. Iteration is repetitive design that is in the core of service design. It is based on developing ideas, trying them with the users and taking the results back to developing the ideas. In this way, it is possible to learn fast from the users if the ideas are viable or not. [12, p. 140.]

The whole team was taking part in making the prototypes. We had a workshop where I brought examples. Some were making prototypes on their computers, some draw and some commented on the examples. After the workshop, I put together different types of prototype pages that combined the thoughts from the workshop. Ideas started coming together, visualization of the supply chain became part of the product page, and the dashboard included the users' tasks. Data visualizations were brought to product page and dashboard. In the following chapter, I will go through the tested prototypes, user feedback and iterations of the prototypes.

8.3 Usability testing

In the usability testing, I used paper prototypes. They were made in Balsamiq Mockups 3 that is a handy tool for quick prototyping. The goal in the usability testing was to figure out if the service would include necessary information and functions for the user. The prototypes were not interactive or hand-drawn as paper prototypes often are [12, p. 140]. In the interview, I gave the test participant the prototype, a pen and the following instructions:

1. Cross the things that are useless
2. Circle the things that are important
3. Add question mark where it is unclear
4. Comment or draw development ideas

During and after this task we discussed what came up in the users mind and then moved on to the next prototype. In between the user tests, I made iterations of the prototypes. The iterations that led to the final concept are introduced in the following chapters.

8.3.1 Dashboard and task list

Two of the selected ideas, dashboard and personal task list, were combined in one in the prototyping phase after some prototype iterations. The big picture of the service started coming together. The dashboard would be the heart of the service that would tie different part services together. It will be the first page where the user will land after login. The following figures represent the first version of the dashboard and the task list.

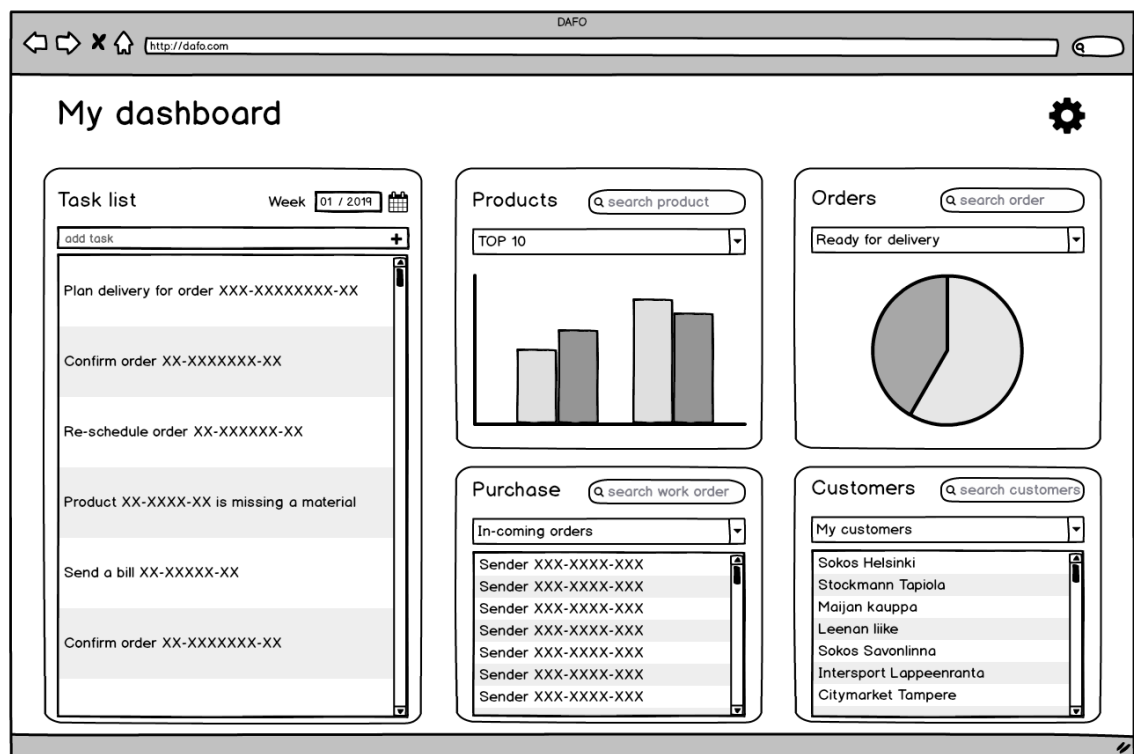


Figure 9. Dashboard prototype

In the following figure, the same dashboard is presented with a task selected and active. That opens a task window on top of the other sections of the dashboard.

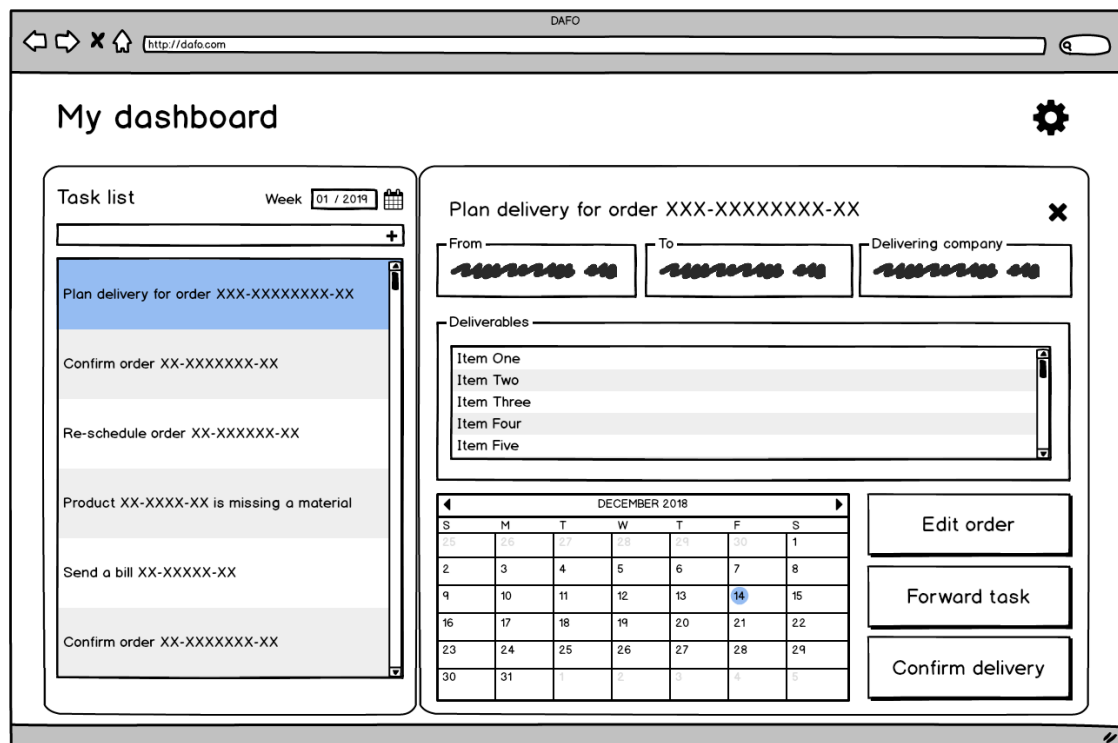


Figure 10. Dashboard prototype: task active

The feedback was positive on the first version of the prototype already, but I noticed that a simpler model for task list would be enough. The participant mentioned that it is important to get personal notifications that can be adjusted. They have to be useful and include the buttons for moving to the task, forward the task or mark the task as done. A good task notification would include the task and the cause of it. For example, cause: delivery is late, task: reschedule delivery and notify customer. Done tasks should automatically launch following tasks if there are any. The dashboard graphics were not satisfying for different kind of users because they have different needs for the information depending on their role. I decided to simplify the design for the second iteration. The following figures are the second iteration of the dashboard and task lists.

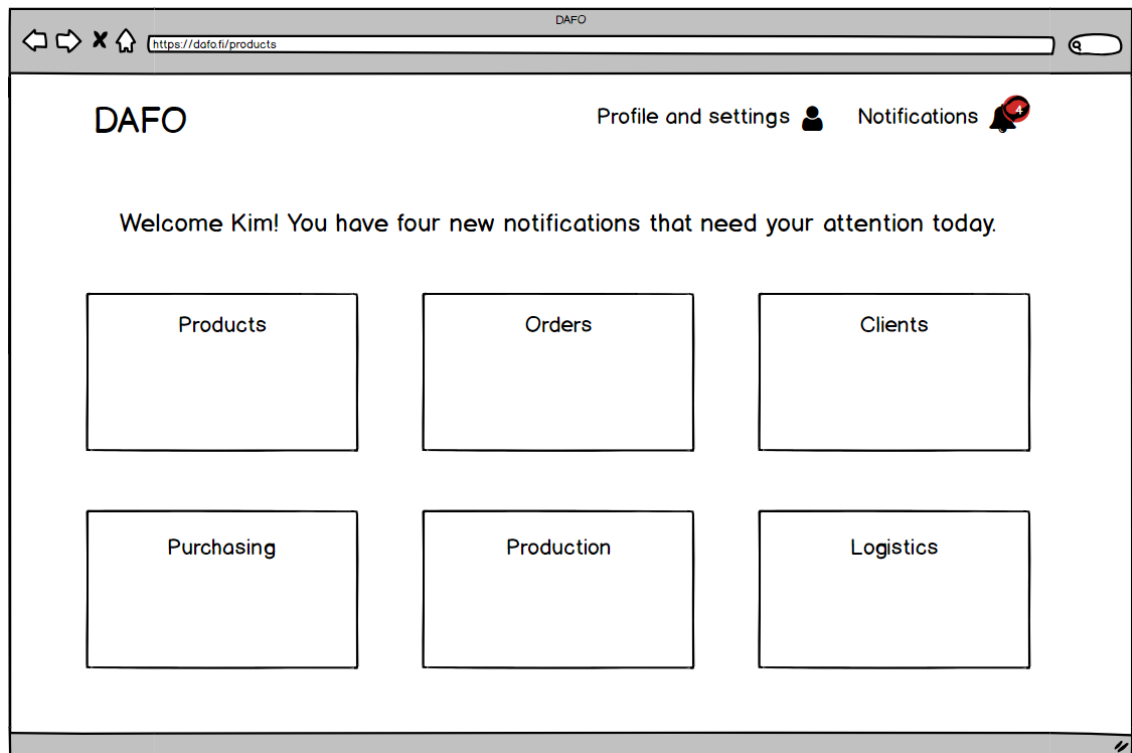


Figure 11. Dashboard prototype: notifications menu closed

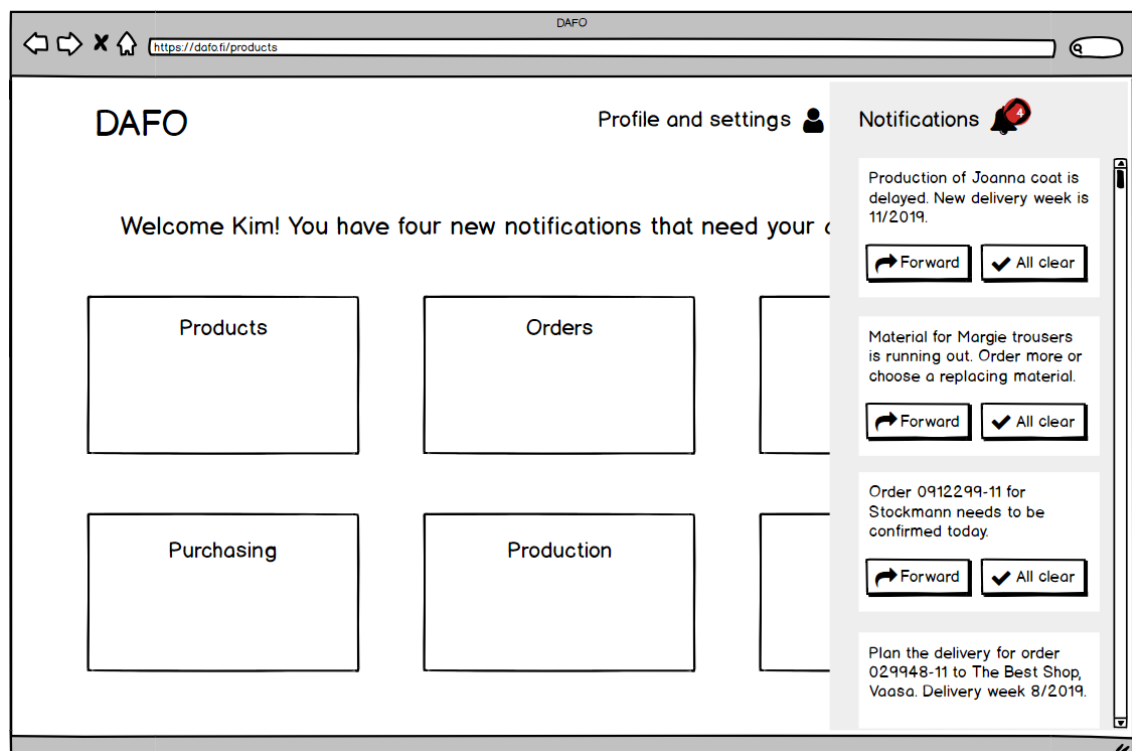


Figure 12. Dashboard prototype: notifications menu open

The second dashboard version was easier to understand for the participants. I left empty space in the title boxes to see if the participants would come up with something useful in them and they did. The empty windows could have for example a direct search field under the title.

It is important that by clicking a task it would forward you straight to where you the user can complete the task. Again the feedback indicated that the task have to be customized for the user needs. Users want to control what kind of tasks they receive. This was the final iteration of the dashboard and task list.

8.3.2 Product search

Before getting to the product page, we need to know how to get there. As we learned in the user research that searching the products is difficult and slow in the current version of Dafo. When the product is in the center of everything it should be easy to find. Also looking for similar products and substitutive products should be easier. To search I added a feature where you can collect products for different use cases like orders, offers, assortments and so on.

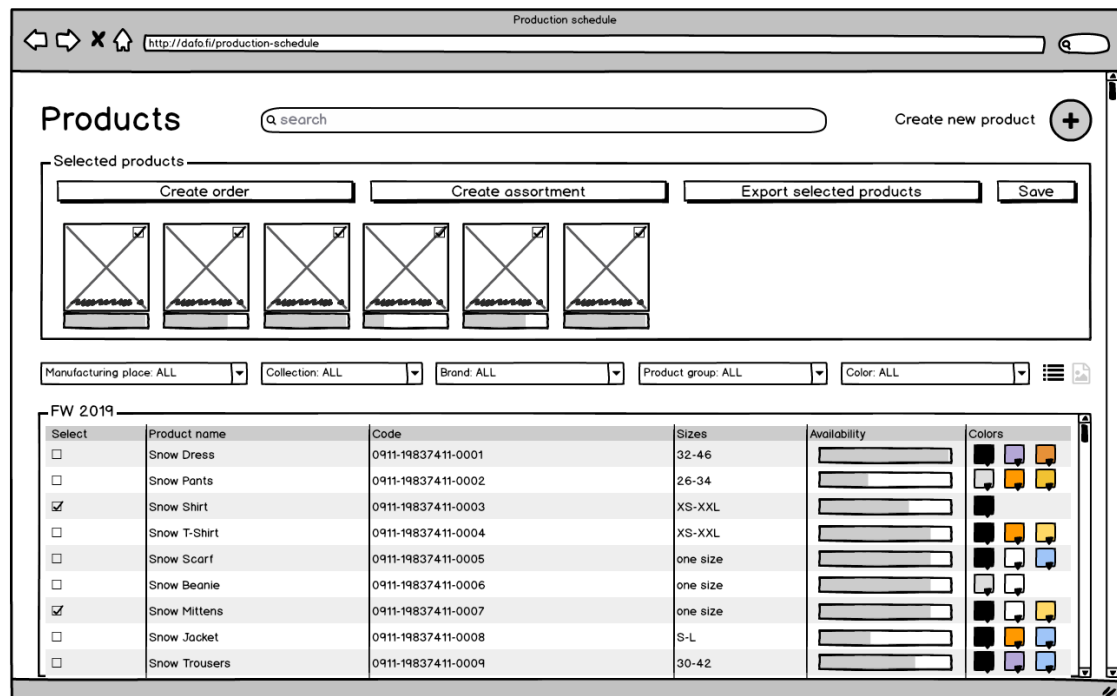


Figure 13. Product search

Participant said that it was good that the results can be shown as a list or images. A stock location should be added as a filter. Exporting the products should include the possibility to select what information is exported. Listing should be by colors of the products.

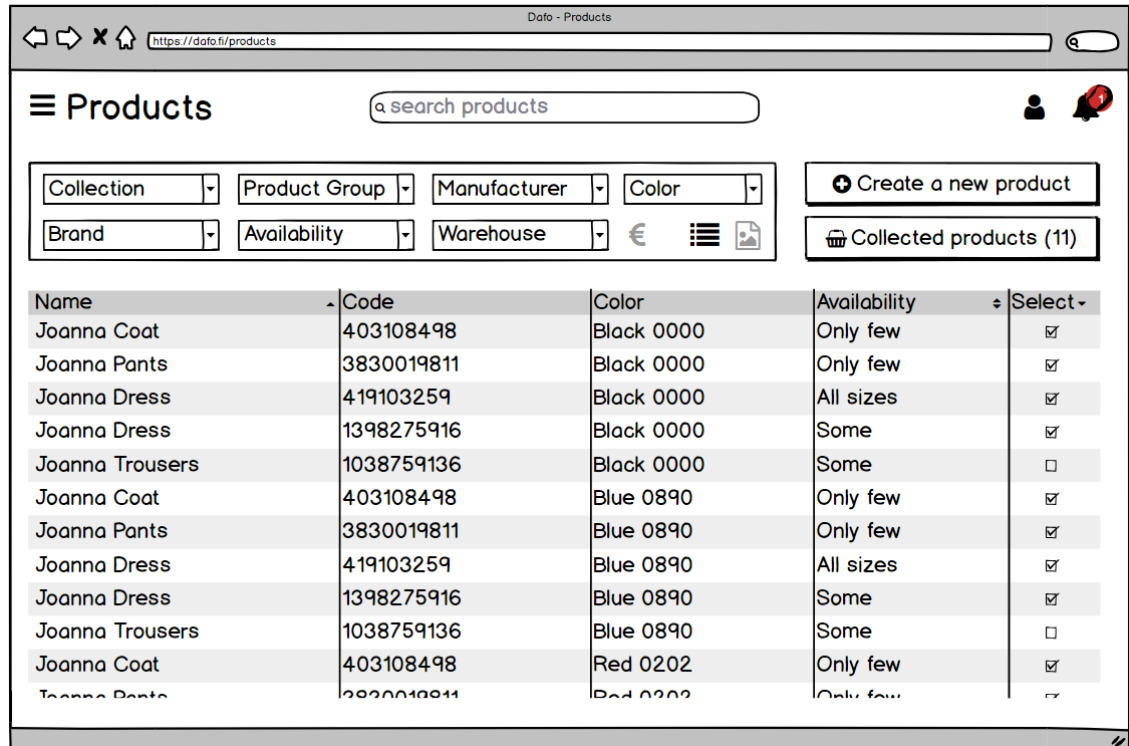


Figure 14. Product search

It should be possible to export the products to different parts of the system like production planning and work orders. The search has to be intelligent and find options with different product relating terms, because it is most likely used for finding a specific product whereas the filters are used to find certain types or groups of products.

8.3.3 Product page

Next we move on to the actual product page. It was developed for easier and faster inspection of the products. It also should enable the inspection of the whole value chain of the product with important information like what is sold, what is in production and what is in stock. On the first round we had multiple different version from which the three most potential ones are presented in the following figures.

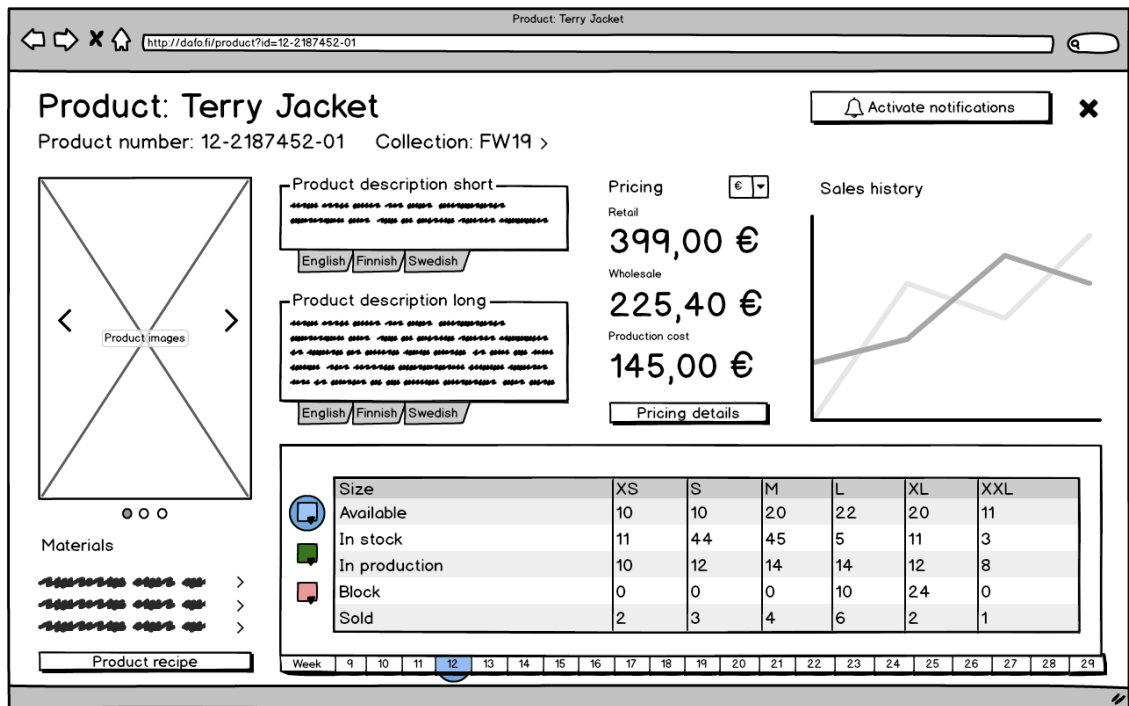


Figure 15. Product page

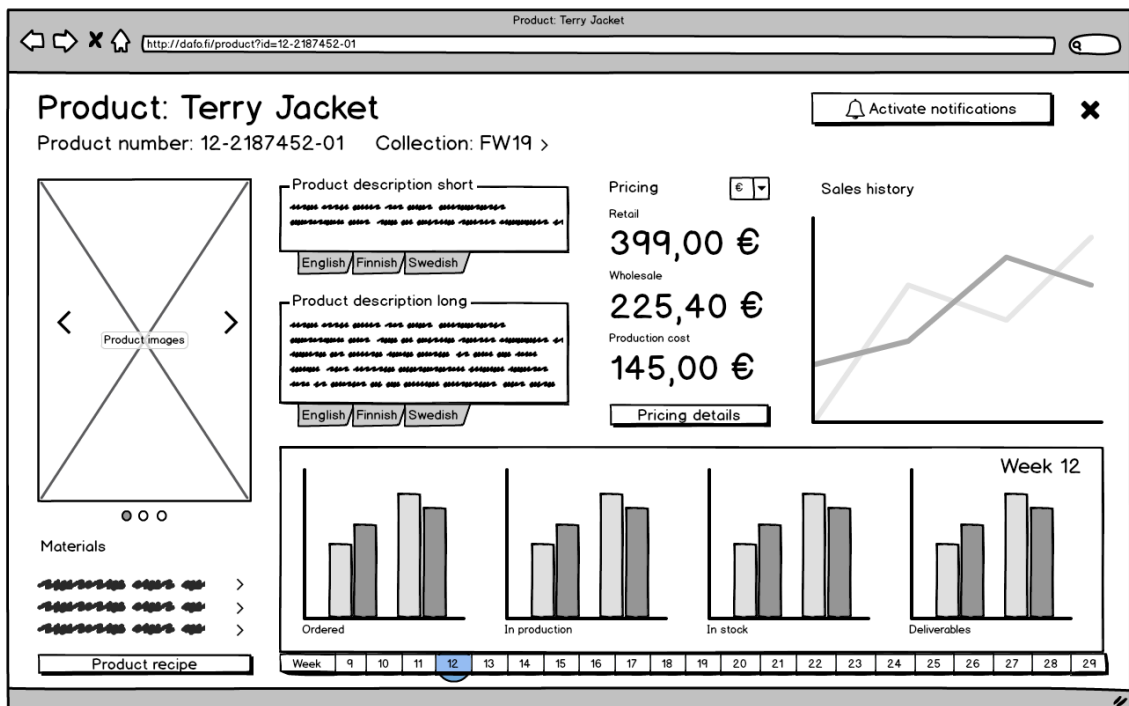


Figure 16. Product page

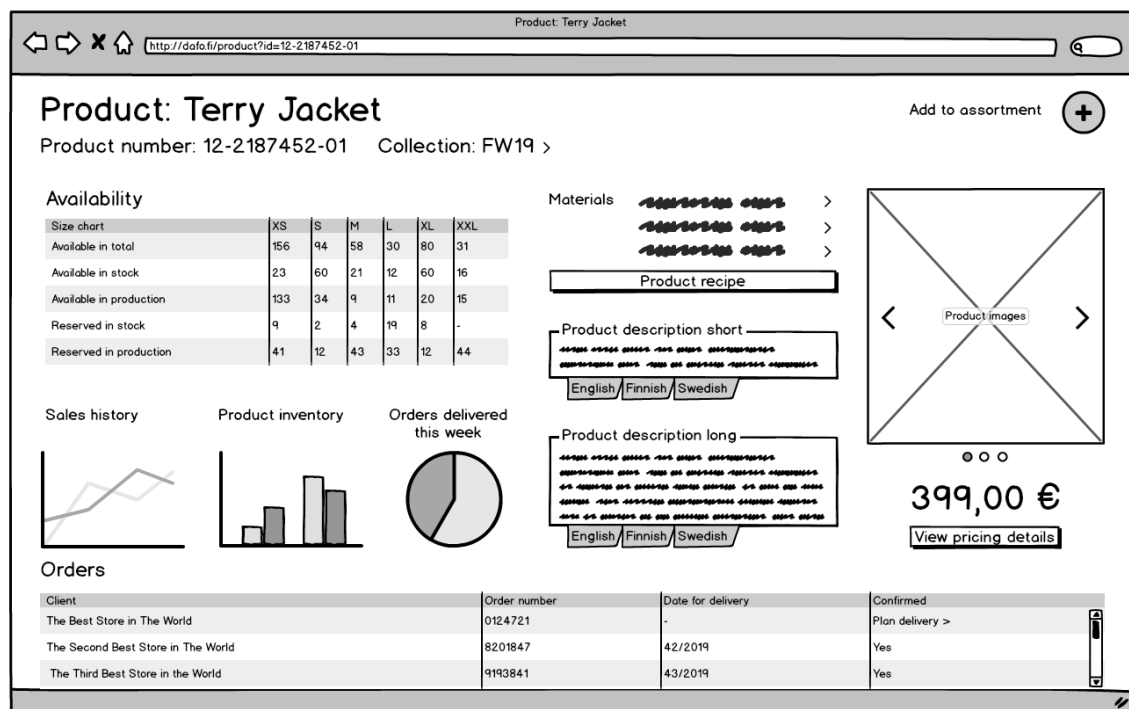


Figure 17. Product page

The first participant was responsible for production and she was hoping for information about for how many products there is enough material left in the stock. In addition, if the materials were running out it would indicate it to the sales. The page should also clearly tell if the product is seasonal or continuing. If it is seasonal, it should tell when the season are. The participant thought that this kind of page would be a good window for the designers about the success of each product. This person would want similar page, but with focus on production place. It should include information like production place, work order amounts and amount of the materials in stock.

In the following iterations of the product page, I tried to make the product pipeline more clear and emphasize the parts that seemed most important in the first round of testing.

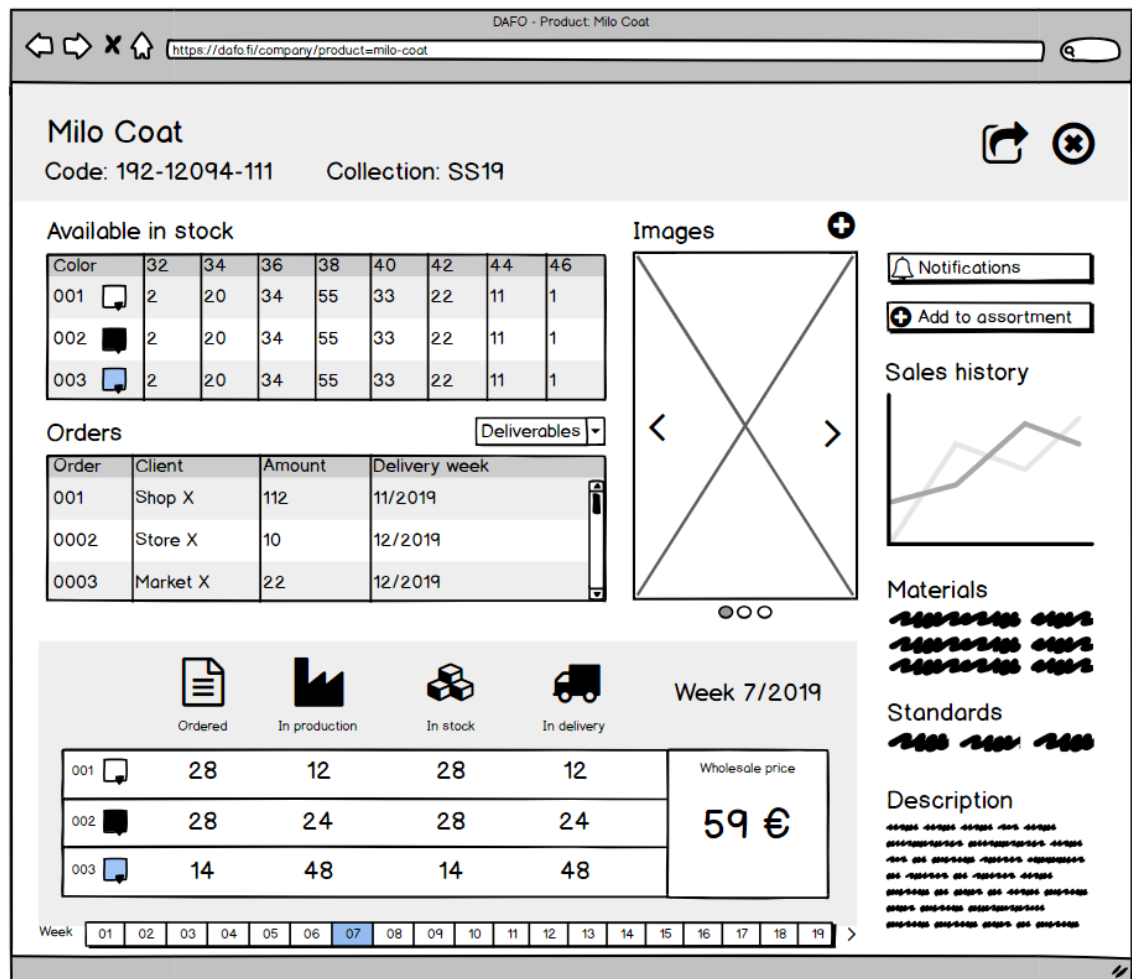


Figure 18. Product page

The difference between the previous and the following figure of the product page is in the way we present the orders. In the first there are certain orders listed and in the second there is order data visualized.

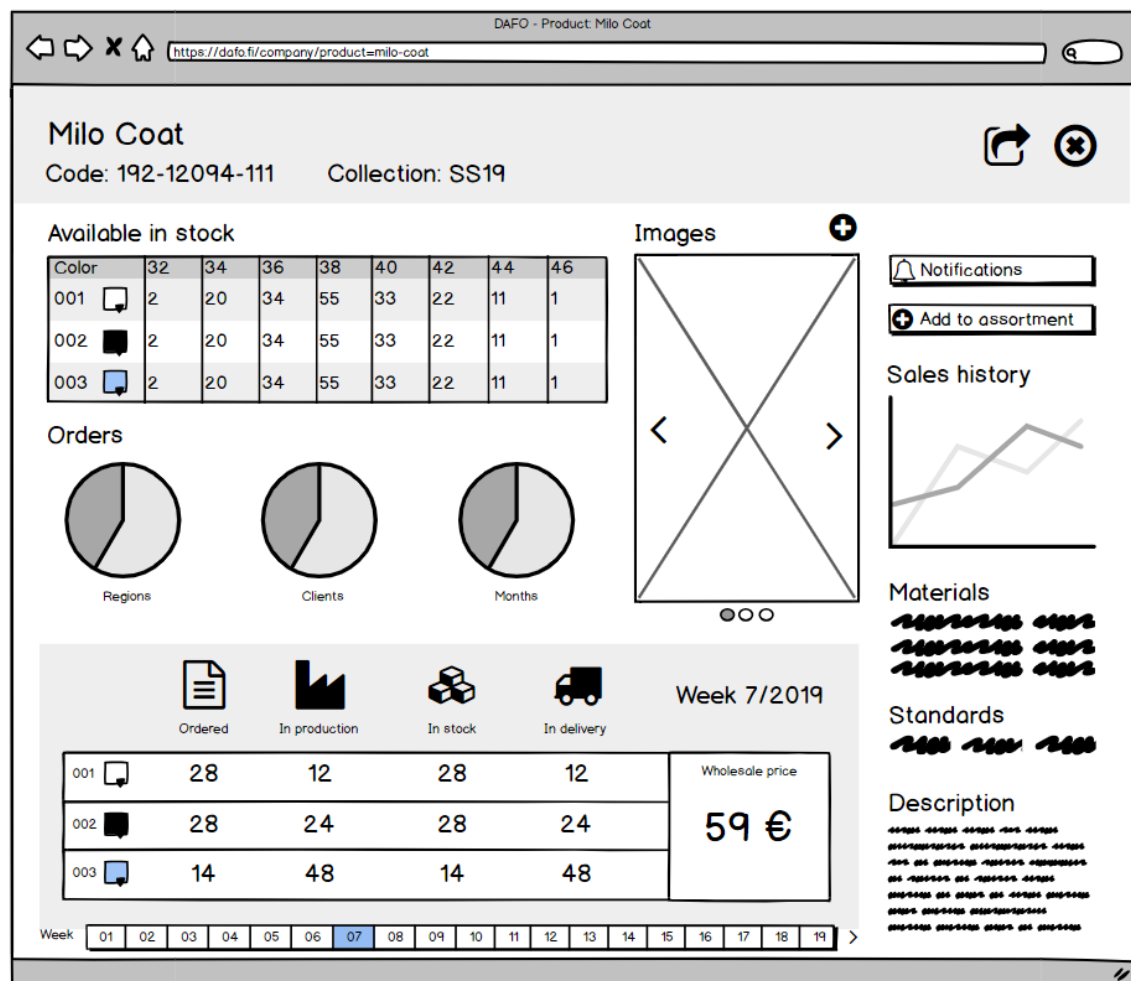


Figure 19. Product page

Two participants from different companies tested these iterations. They wanted to see more clearly if the sales were done in advance or during the season from the stock. It is crucial to make clear from what the availability consist of. If the availability includes the available goods in stock, production or even the products in the production planning. In addition, it has to be clear what the period under inspection is. If there is not enough available stock now there might be a filling order coming in the following week. This page could also indicate if something demands action. For example, there could be a message in the price area if a price is missing. The three most important things that have to be in the final concept were the amount of available goods to sell, products in stock and products in production. Moreover, all of them by color.

The last iteration of the product page tried to tie together all the input received from the usability testing so far.

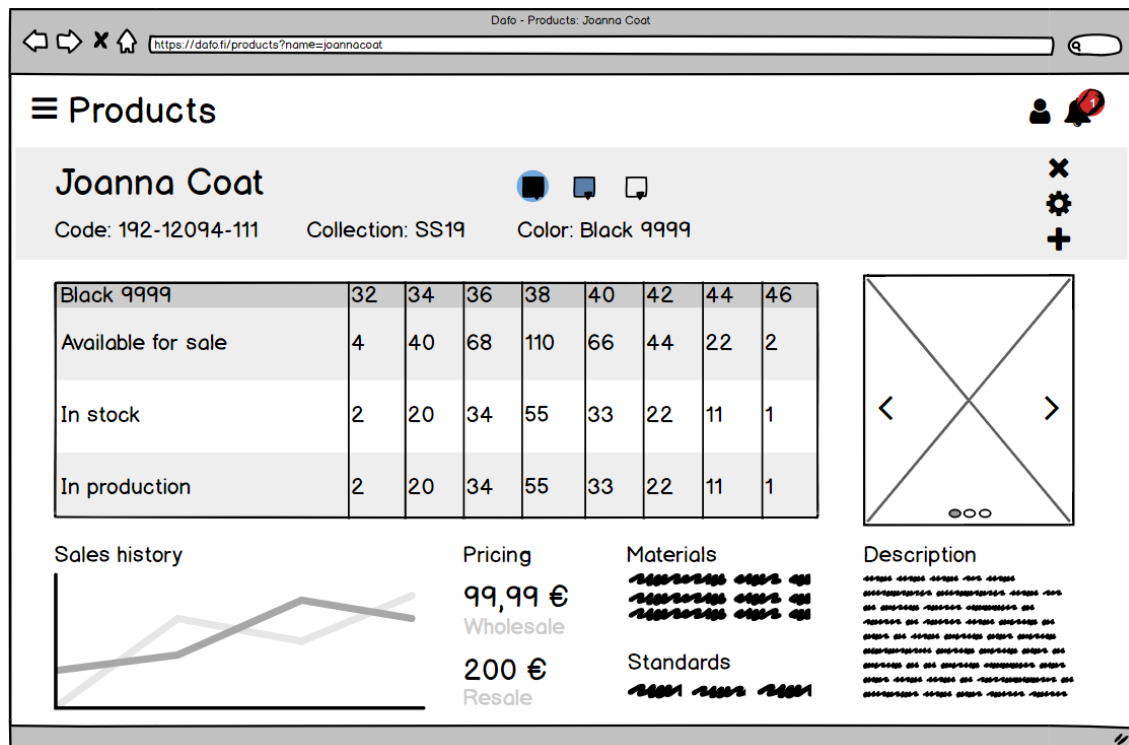


Figure 20. Product page

Two participant from the same company tested this iteration. It is important to get to edit the information straight away when necessary. It should be possible on this page or the information should link to where it is possible. On top of the sales history, production and purchase history would be interesting. When the amount of sizes or colors grow the user interface should scale to that. It is important to indicate the period under review clearly. This was the final iteration for testing. After the last usability tests, we started developing the final user interface for the new service.

8.3.4 Simplifying communication

This study started with learning what Dafo actually is. It takes a long time to conceive all the parts and possibilities it has to offer. Even the team that has been developing Dafo since the beginning are not sure anymore what it includes. Clients have hard time understanding all the benefits they could get from Dafo. That is why I decided to test some visualizations of the system with the users. The system is so massive that it had to be split to larger wholes. That way the system is easier to communicate to clients. The following figure represent the first version of the system visualization. The final visualization

will replace the current visualization that was presented earlier in the user research outcomes. The visualization was tested accompanied by questions like is this how you conceive Dafo? Is there something missing? Is there something you did not know that exists? Only testing these visualizations in the usability testing grew new interest towards system parts that were not in use by the client before.



Figure 21. First version of the system visualization

In the first version, the POS (Point-of-sale) was unclear and the participant asked what it means. The first participant was working in the manufacturing side of the business and she was not familiar with the term that is common for payment system in stores. B2B online was assumed to be a portal for business between the brand and their manufacturers. That assumption might again reflect the role of the participant. It was meant to mean B2B Wholesale e-commerce. The round circle shape brought out a question of does the order matter and it might be confusing since the clients have different models in their business.



Figure 22. Second version of the system visualization

The second version of the system visualization was already a lot clearer. The comments were questioning if Dafo is really offering all these abilities or is it actually over selling the system. Later the same visualization was brought to a real sales meeting with a potential client. The sales presentation was built around it. When we were making the presentation, I noticed that some parts were clearly broader than others and I thought it would be more clear if those were split to smaller – own units. In the end they were actually put to even larger wholes. The last visualization draft is introduced later in the concept chapter. Separating the communication of the system to clear parts makes the external and internal communication easier.

8.4 Reporting and Analytics survey

The reporting service idea was tested differently. We decided to send out a survey in hope to get wider opinion on what kind of reporting services would be the most interesting for the clients. We received eight replies from which most were from management roles. The respondents had all been participants in the interviews so the result was just confirming our first assumptions. Half of the participants answered that they are only taking out reports when necessary and rest half were actively using third party BI-software.

Four out of four respondents who told that they are using BI-software told that they use Microsoft PowerBI. Seventy-five percent of the respondents told that they have planned to extend the use of analytics in their business. When they were asked how the new analytics service should be, they described it as following: easy to use and edit, graphical, real time and automatic.

The most followed data weekly were sales, stock, billing and marginal profit of products. Yearly and monthly the most followed data was sales, purchase, stock, production, deliveries, billing and marginal profit of products. Respondent mentioned late or undelivered order book, product life cycle, turnover rate, client profitability and sales per client data when we asked what is currently not possible or easy enough to analyze.

We gave the respondents three hypothetical options of solutions that Dafo could offer and the most interesting was an integration to external analytic/BI-service where they could make their own data visualizations. Seven out of eight said that they would be interested in it. Other options were an integration to external analytic/BI-service with readymade data dashboards and a data analytics dashboard inside Dafo with ready-made basic reports and visualizations.

Seventy-five percent of the respondents said that they have data analytical knowledge in their company. The same percentage answered that they have experience from visualizing data themselves.

After this survey, the team decided that it would be best to offer an integration to third-party BI software. From all the respondents that were already using one were using Microsoft Power BI. It also got recommendations from CGI's analytics department. The reporting services are not further discussed in this study. It is not included in the final concept, but the concept includes data visualization that is partly responding to the same challenges with the reporting services.

9 Concept

Concept is a way to simplify a big picture. It draws the outlines for a new service and it is not detail oriented. It leaves space for further development. It answers to questions like which needs the concept aims to meet and how it aims to meet them. [13, p. 191.]

The final concept is a browser-based service that will eventually have all the main features of Dafo. It will enable mobile use of the system and enhance the user experience. It aims to meet most of the challenges presented in chapter User Research Outcomes. It combines co-created solution ideas that were iterated in the usability testing.

It is crucial to get feedback from piloting. In digital services, it is common to launch a beta version for the users to test. The most enthusiastic users get to test and give feedback on the service before it is officially launched. We are going to select one or two pilot clients during the spring 2019 to collect feedback about the new concept. The way of collecting feedback is not yet defined, but my proposal is to select both quantitative and qualitative feedback and preferably some in face-to-face interviews with the users. The pilot group has to include different kind of users who have different levels of experience in digital services to make sure that the user interface is intuitive for the user and that way demand less training. The design tries to follow the UI design best practices and only include the necessary information. [13, p. 232-233.]

The team chose the product page to be the pilot for the new service. It will make all the essential information about a product visible at one sight and that will reduce the need of jumping between the windows. Users do not have to generate product related reports when the key figures are already presented in the product page. This will bring value especially to the companies who are not yet exploiting data analytics on their daily basis. The first pilot is for viewing the information and later the page will enable editing of the product information on the same page or have a straight navigation to where the data is edited. The product page will initially have eight components. Those are the basic information, inventory, materials, price, sales, images, sell-through and description. The price component will have two different ways in which it can be displayed depending if there are multiple different prices for a product or just one. Both options are displayed in the following figure, but in reality, there will be just one of them visible at a time. The following figure represents the latest iteration of the product page.

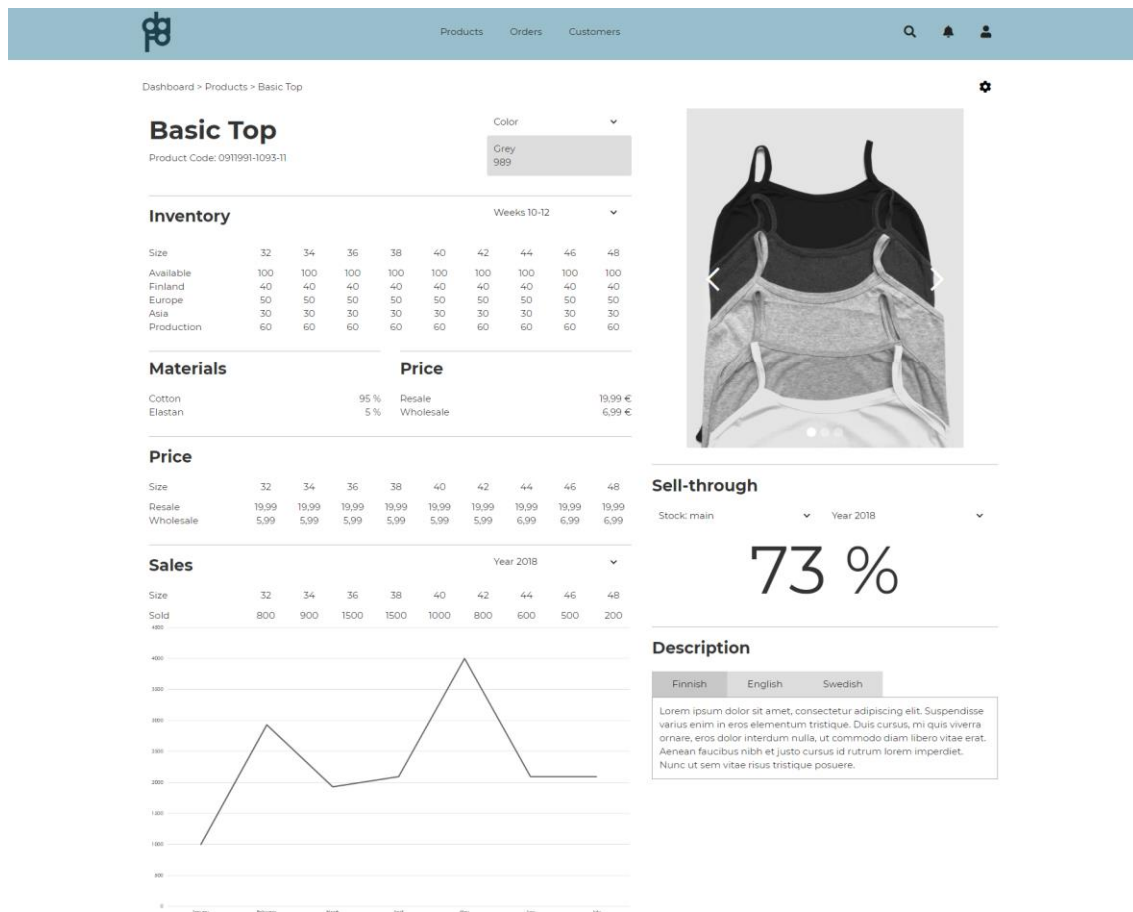


Figure 23. Product page

Navigating to a right product page will naturally happen through product search. In the user research one of the challenges was the difficult search of the system. The current search follows complicated pattern of filtering and it had to be simplified. The product search page has a field for open search where user can write the product name or code. The listing of the results can also be filtered with the filters visible in the following figure. They are season, collection, theme, color and stock. Products can be listed as a traditional list or image cards as in the following figure. The search has to be tested with users when it is developed and iterate it to make it as effortless as possible.

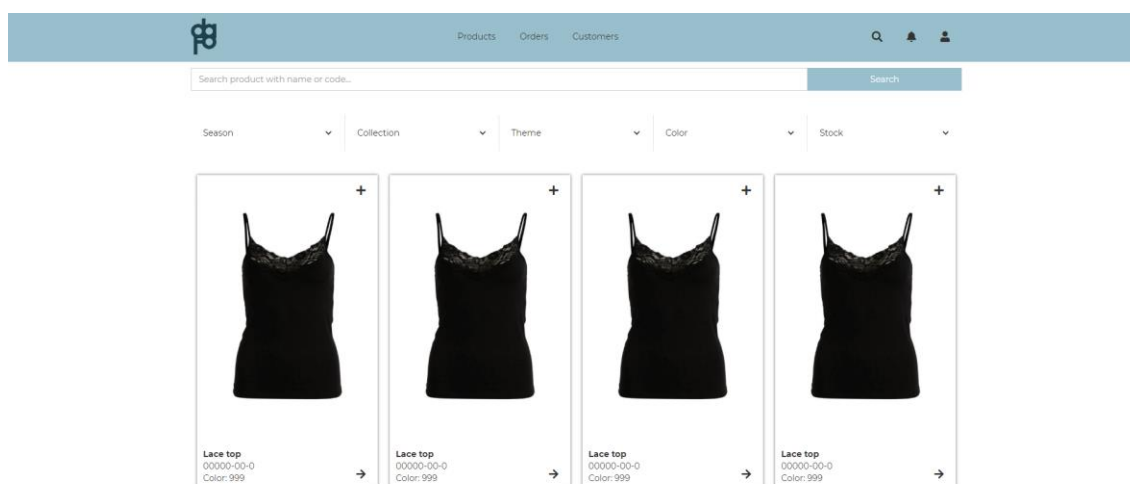


Figure 24. Product search page

After the product search and -page the following development will be the dashboard and notifications. Notifications started from the idea of a task list. The notifications are familiar from social media services for the users and that may increase the ease of adopting them. They will reduce the memory residency of the user and the tasks are more likely to finish on time. This might even decrease the amount of late deliveries and that way add value for the client business.

The direction of the design and development might change during the pilot since the concept will be constantly evaluated and iterated with the pilot clients. However, the preliminary plan is to develop the dashboard and notifications and then the next part-systems to support sales and service: orders and clients.

The team allocated time for the development of the new online service. The service is built on Azure Cloud Platform and the developers are adapting to modern ways of working with Azure DevOps. Azure will enable easier monitoring of costs per client. The development will follow SCRUM practices.

The following figure is the latest draft for visualizing the system and it will be further developed with marketing department of CGI. This visualization is only a small part of fully reforming the communications and marketing.

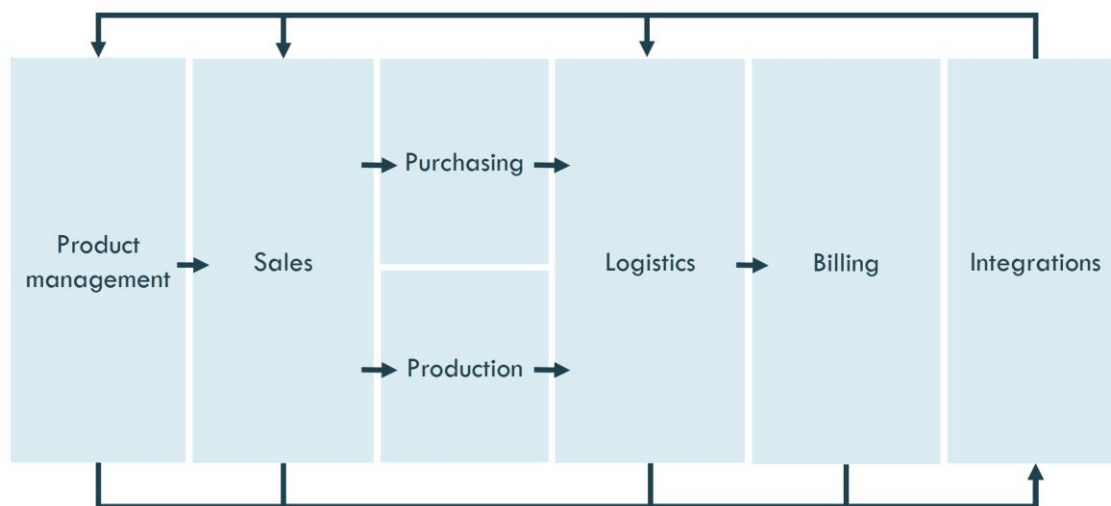


Figure 25. System visualization draft

10 Summary

The goals of this study were user research and understanding, ideation and usability testing and finally a concept for the future developments. All of the goals were achieved in the set period. Because it is essential to study the industry trends when an industry specified software is designed, we additionally reflected on The State of Fashion 2019 by The Business of Fashion and McKinsey & Company. This study gave practical examples on how Dafo as an ERP system could adapt to the major industry trends.

The first major trend was the prediction of the global economy slowing down. To survive downhills of the economy companies might have to boost productivity. Yet the productivity has to come through sustainable decisions and not at the expense of the nature nor the workers, because the second major trend was consumer shifts and those are towards ecological and ethical companies that can operate transparently. Dafo can immediately adapt to both of these trends by getting out all the useful data it already has and make it easily available and usable for the clients. The final concept takes this in consideration. Another way to adapt is to increase the amount of the integrations to decrease the need for manual input. Dafo already has a broad portfolio of integrations, but it could look for interesting partnerships with other industry specified services. In the future Dafo could add artificial intelligence in the system. For example in tools like inventory management and production.

Before involving the users in this study, the challenges of the system were identified by the Dafo development teams' point of view. The identified challenges were the starting point for the user research. The goal of the user research was to identify the pain points of the user experience and to understand the everyday life around the system. That is why the user research was done in the context at the workplaces of users. Looking back I would cut down the amount of user interviews at this point and add more of them to the end when the concept is starting to come together and the ideas need to be tested. Gladly the testing and iteration can be an ongoing when the product is developed with agile methods.

The broad research group was enthusiastic to participate and the participants were eager to give their opinion, which is a good sign of the partnership that Dafo has with their clients. That was also one of the outcomes of the research. Rest of them were more challenging and set the ground for ideation of the new modern version of Dafo. The new concept was created to meet the challenges concerning the user memory-residency, difficult and time-consuming tasks, complicated and fragmented system and unclear communications. The concept will be developed starting with a pilot that is the product search and product page. During the development it will be tested with one or more pilot clients that are selected during the spring 2019.

In the future, the fashion and textile industry might start adapting to the trend of circular economy where rental, reuse, refurbishment and recycling of goods is in and ownership of the goods is no longer a necessity. That would add new requirements for Dafo as the goods might start returning to the inventory from the user. The products would have to carry more identifying information in them. This could be an interesting research subject to look at from business, user and technological points of view.

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