PACKAGING DESIGN FOR E-COMMERCE

Development of a secondary packaging with focus on easy handling and creating a positive unboxing experience

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Industrial Design Engineering, master's level
2018

Luleå University of Technology
Department of Business Administration, Technology and Social Sciences
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I would like to start by showing gratitude to Arcwise for the opportunity to an interesting and developing thesis project. I am thankful that you found the time to take me in to your team, your positivity and openness has from the beginning made me feel welcome. I would also like to send a special thank you to my supervisor Mattias Bodell who has taken time to help me whenever needed. During this thesis I have learned a lot about a business area I earlier knew almost nothing about, much of this is due to your guiding. Finally I would like to thank my fellow students that have given me valuable input and thoughts regarding my packaging solutions, and of course also my LTU supervisor and examiner Åsa Wikberg Nilsson.

Luleå 10 October, 2018
Abstract

The e-commerce is an area that has grown considerably in recent years and continues to grow at a rapid pace. It is thereby becoming more and more important for companies to distinguish themselves amongst others, not least when it comes to getting customers to return for a second purchase. A good way to do this is to create a positive experience for consumers. As the interaction with the customers has shifted from physical meetings to a computer screen through the spread of online retail, it is important to nourish the few encounters that remain. An important point of interaction is the receiving of purchased goods. The packaging in which the goods are shipped, is thus an important source of communication to the customer, and a perfect means of displaying the company values.

This thesis project aims at examining how an optimal packaging for this area can be created, and this was done in collaboration with Arcwise, a SCA business unit, who works with a special type of corrugated cardboard that allows for the production of rounded shaped packages. During the contextual work of this project, where a basic analysis of the market was made, a number of needs could be established. To be able to create a positive user experience and thus a competitive edge in the market, these needs must be fulfilled by packages made for shipping online-bought items.

Following these needs, the project’s design phase was carried out with the aim of creating a packaging solution by using the corrugated board developed by Arcwise. This work was done by using creative methods such as brainstorming, workshop and prototyping. To evaluate the ideas, a weighting against criteria was done, and tests were made when the packaging concepts were shipped from Sundsvall to Luleå, to test their durability.

Six concepts were narrowed down to a final package, which clearly exhibits the properties of the material. It was designed with the aim for easy folding and packing, and to create a positive unboxing experience for the end customer.

**KEYWORDS:** Industrial design engineering, product design, packaging design, e-commerce, user experience, unboxing experience.
Sammanfattning


Detta examensarbete har syftat till att undersöka hur en optimal förpackning inom detta område kan skapas och ett samarbete har gjorts med Arcwise, en affärsenhet vid SCA som arbetar med en speciell typ av wellpapp vilken gör det möjligt att skapa förpackningar med rundade former. Under kontextarbetet där en grundläggande analys av marknaden gjordes, kunde ett antal behov uppfyllas av en förpackning tillverkad för användning inom e-handeln för att skapa en positiv användarupplevelse och därmed en konkurrenhsraft på marknaden.

Utefter dessa behov genomfördes sedan projektets designarbete där målet var att med användning av Arcwise wellpapp skapa en förpackningslösning. Arbetet genomfördes med hjälp av kreativa metoder så som brainstorming, workshop och prototypande. För att utvärdera idéerna genomfördes en viktning gentemot kriterier samt tester där förpackningarna skickades, från Sundsvall till Luleå, för att testa dess hållbarhet.

Sex koncept sättades ner till en slutgiltig förpackning, som på ett tydligt sätt visar upp materialets egenskaper och har utformats för en förenklad hantering, och för att skapa en positiv unboxing experience hos slutkunden.

**NYSEKELORD:** Teknisk design, produktdesign, förpackningsdesign, e-handel, användarupplevelse, unboxing experience.
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This report covers a master thesis concerning the area of packaging design for the e-commerce, which is the final project for the program Industrial design engineering at Luleå University of Technology. This was an in-house project carried out at the business unit Arcwise at SCA forest products in Sundsvall, during a period of 20 weeks in the spring/summer of 2018.
BACKGROUND

Arcwise is a new packaging concept that allows for curved shape packaging design. The technology is developed and patented by SCA Forest Products and is licensed to corrugated board manufactures around the world. Today there are eleven licensees that can produce Arcwise in about thirty factories in Europe and the Middle East.

The technology of Arcwise is for example well proven in the beverage segment, where the round shape of bottles and cans fits perfect in a round shaped box. Arcwise is also suitable in other packaging segments where the unique rounded shapes can help create attraction on the shelves in stores. The rounded shapes also gives the opportunity to evoke curiosity by the use of seamlessly extending graphic design around the packaging.

The main purpose of the packaging when shipping products has always been, and still is, to protect the product. But as DS Smith (n.d) states, the e-commerce is an area that is rapidly growing and is under constant development, which means that it becomes more and more important for online shops to increase their competitiveness. A way to do this is to focus on the unboxing experience. An aesthetically pleasing package can help making the consumers feel special and taken care of, an attribute that easily gets lost in the transition from bricks and mortar business to online shopping (Billerudkorsnäs, n.d). As a study done by Dotcom Distribution (2013) shows, consumers are more willing to recommend a store to a friend, or come back for future purchases, if a little extra care has been put down in the packaging of the products. Studies have also shown that a positive unboxing experience greatly increase the chance of the consumers posting a picture of the packaging and/or product on social media, which can be seen as beneficial for marketing purposes (Dotcom Distribution, 2013).

Other details that can increase the positive experience of unboxing a product is the size of the packaging and if it is are easy to open. According to Ameripen (2017) many customers are bothered by large and bulky packaging containing a mass of filler material, since this creates a problem in the means of recycling. This is something that is also mentioned by DS Smith (n.d).

Even though the consumer experience is growing more and more important it is, as earlier mentioned, still the protecting of the product that should be the packaging’s main purpose and can therefore not be compromised. As Ameripen (2017) states, material and durability are of a greater importance when goods are purchased online than in a physical store. This since those products go thorough a longer chain of touch points and will be handled about 20 times more before reaching the end consumer, the return ratio is also significantly higher for online purchases.

The conclusion of this can be that at the same time as the handling and packing of the products must work in a smooth and easy manner, the unboxing experience is an important moment for the consumer when buying a new product. This opens for great opportunities for Arcwise to offer unique solutions. How this will be done is something that needs to be explored, and is also what initiated this project.

Figure 1. Arcwise packaging for lemonade bottles.
STAKEHOLDERS

According to (Olander, 2006) a stakeholder is someone who has an interest in, and is affected by, the outcome of a project. In this case it can be said that Arcwise themselves are the projects primary internal stakeholder, this since they are the initiator of this project and are thereby involved in the process. There are also external stakeholders, which are those who are affected by the outcome of the project but not directly involved. Such external stakeholders can for example be the licensees of Arcwise, who are the ones that will manufacture an eventual packaging solution, or all the people that in some way are handling the packaging on its road from manufacturer to consumer. They are affected by the packaging in the means of how manageable it is; is it easy to fold, pack, carry and pile? Finally, the end consumer is an important external stakeholder since it has been determined that a positive unboxing experience plays a great role in the means of company marketing.

OBJECTIVE AND AIMS

With this thesis project the aim is to explore the market of the e-commerce in order to find out what makes an ideal packaging for this area. The pros and cons of using Arcwise as material for such packages will be investigated, and all of this will be done with the goal to develop a multi-functional packaging solution that, at the end of the project, can be offered to the market.

To get a clear picture of the work direction, some main questions have been formulated. These questions will lay the foundation for the work to come and the goal is for these to be answered during the time of the project.

RESEARCH QUESTIONS

1. What distinguishes a packaging made for the online retail?

2. How is value defined and created in this area?

3. What is needed to create a positive unboxing experience?
PROJECT SCOPE

Since this thesis is carried out during a period of 20 weeks, with approximately 50% of the time assigned to school-related work, such as carry out a literature study and writing this report, the main boundary is the time limit. In order to best perform the project and to create the best possible packaging solution, delimitations regarding the focus area had to be made. With the help of research and discussions with the Arcwise-team, it was decided that the main goal for this project is to develop a packaging solution with focus on creating a positive unboxing experience for the end consumer.

A further delimitation that here was decided on was to focus on the development of a packaging for products in the category Beauty & Health. This due to the results of a survey done to examine online shopping habits. More about this survey can be read on page 46 and in appendix B.
This thesis report is divided into the following 8 chapters.

**Chapter 1: Introduction**
Gives an overview of the project where the purpose and background will be introduced along with stakeholders, objectives and aims and the project’s delimitations.

**Chapter 2: Context**
Covers the current state of the packaging industry and what solutions that are available today.

**Chapter 3: Theoretical Framework**
Presents the fundamental theory that is the scientific base for the project.

**Chapter 4: Method and Implementation**
Describes the process in which this project was carried out and the methods that were used. The execution and reliability of the methods are also discussed here.

**Chapter 5: Results**
Reveals the results of the project’s different stages. The chapter ends with displaying the final result.

**Chapter 6: Discussion and Conclusions**
Includes a discussion and argue of the final result that is based on the implemented theory and methods. Recommendation for further work can also be found here and finally the research questions are answered.

**Chapter 7: References**
Lists all the references used during this project. This was done according to the APA reference system.
In this chapter the basic insights that lays the foundation for this project are presented. This includes the current state and benchmarking, and the information is mainly gathered through the studying of news articles and reports.
CURRENT STATE

Here it can be read about the current state of the e-commerce and what role the packaging plays when it comes to create a positive consumer experience.

E-COMMERCE

Billerudkorsnäs (n.d) explains the e-commerce as a business sector that involves the selling and buying of products and services online. These products are thereafter packed and shipped to either the consumer or to a pick up-point.

The area of e-commerce is growing larger for each day and the complexity of products sold online is constantly increasing (Billerudkorsnäs, n.d; Smurfit Kappa, n.d). Packaging World (2018a) is referring to a research done by Smithers Pira and state that the market for e-commerce will continue with an annual growth of 14.3% until the year 2022. The rapid growth of the e-commerce is also discussed by Alsadir (2018), where he says that online retail is growing with a double digit percentage in the western European countries, and in Britain 1 of 5 purchases are done online. DS Smith (n.d) explains that in 2015 one of five businesses had an online retail and they thereby state that online shopping today is a common alternative to going to a store.

Even though almost all items that are sold in today’s society also can be bought online, Packaging World (2018a) mean that the goods mostly sold in the sector of e-commerce is home electronics, books, media products, fashion, toys and hobby and sports equipment. Billerudkorsnäs (n.d) continues by explaining that music, books and video games are the items that are most popular when in comes to online purchases. They further discuss that the variation of goods sold online has heavily increased in the latest years, which put high demands on the packaging. A challenge is to find a package that can handle orders containing several different types of items that are to be shipped together.

A question we can ask ourselves is why the e-commerce has had such a rapid growth range lately. Osment (2017) explain that consumers no longer want to be dependent on opening hours in order to make their purchases, they want to be able to shop whenever it is convenient. The consumers are also putting all higher demands on fast shipping and accessibility. They want their purchases to feel personal and be of good quality, and at the same time the awareness concerning environmental friendly products and sustainability increases. All this has led to a change in the retail market.

Arne Andersson who is an e-commerce Spokesman and Advisor on PostNord states that “one of the biggest e-commerce challenges today has to do with the seamlessness of the consumer experience. Consumers are generally impatient and want to decide what, when, where and how to make their buying decisions. Ultimately, it is more important than ever to let consumers feel that they are in control” (Billerudkorsnäs, n.d, p. 22).
There are significant differences that can be seen in how packaging and transportation of goods are handled whether it concerns online purchases or brick and mortar retail. Packaging world (2018b) explains that earlier when online shopping was unusual and almost all items were sold in physical stores, the goods were packaged and shipped in large quantities to distribution centers. From there they were sorted and transported to the stores. This is something that has changed with the growth of e-commerce and today single packages are transported directly to the end consumer with approximately 30 handling stops along the way. A transformation that now put high demands on the packaging characteristics. Billerudkorsnäs (n.d) explains that how a packaging is to be designed and created should differ essentially depending on if it is meant for products that are to be sold online or in a physical store. This since these two ways to shop are different from each other, not least when it comes to logistics and the handling of the packages. They, just as Packaging world (2018b), mean that the e-packages go through far more touch points to their way from the manufacturer to the consumer, than the packages for in-store sales.

Osment (2017) continues by saying that this change from brick and mortar stores to online shops opens the market for corrugated packages with the opportunity to offer more area specific packaging solutions, since the needs for a products packaging differ depending on retail channel. This is something that is agreed upon by Packaging World (2018a) who talks about the future forecast for corrugated packaging and explain that the growth of the e-commerce means great opportunities for these types of products. This fast growth of goods sold online is likely to have caused a lower priority of the value of the packaging that is used to ship the products. This since focus has been placed on just getting the purchased items to the consumer in one piece (Osment, 2018). Billerudkorsnäs (n.d) agrees on this, and discusses the fact that packages are a bit disregarded and do not get as much focus as other aspects in the supply chain even though the packaging is an essential part of the e-commerce - without it the whole concept of shipping products wouldn’t work. Billerudkorsnäs mean that the great volume of items sold online contributes to the main focus for the e-retailers, which has been the transportation and shipping of the products. Something that has resulting in that the aesthetic part of the packaging often is overlooked. This down prioritization of the physical appearance of the packaging means that few packages are tailored to fit the products, and often too big packages are used, which highly increases the need for void filling (Packaging world, 2018b). This has neither positive effects on the environment nor for the experience of the consumer, who often gets frustrated knowing they carried home a big and bulky box containing only a small item (Smurfitkappa, n.d). Packaging world (2018b) agrees that many consumers get irritated over the access material that comes with too big packages, knowing that they are the ones that have to sort and recycle it.

Smurfitkappa (n.d) says that more challenges to consider when chaining retail channel are the high return rate of online purchases. This means that the packaging must be
constructed to manage the extra handling, and additionally it has to be easy for the consumer to open, send back to the retailer or recycle. They mean that both the need of having to use tools to get the packaging open, and having a lot of access packaging material to take care of, can affect the consumer experience in a negative manner. A packaging that is easy to reuse for return purposes does not only make the purchase experience more pleasant for the consumer, it can also work as a guarantee for the retail company, knowing the products will return in a good shape.

Storaenso (n.d) agrees that the e-commerce packages need to be more focused on the consumer needs and discusses some important characteristics. First of all they found in their research that the consumers appreciate a packaging that is easy to re-seal and return, or to fold and recycle. A packaging that is easy to open without the need of tools is important, and so are clear markings on how it is opened. A perforation that can’t be seen only creates frustration amongst the consumers. Excess material, or material that is classed as unsustainable has a negative effect on the overall experience, and mixing different materials makes it more difficult for the consumer to recycle. The packaging should be easy to carry, and if it is designed to have a second life it is often really appreciated (Storaenso, n.d).

MARKETING

Dotcom distribution (2013) talks about the value of a premium packaging and mean that a positive unboxing experience is something that leads to 52% likeliness for a repeat purchase. They also mean that 4 of 10 consumers are prepared to share a picture on social media if their purchased item arrives in a premium packaging, which is a great opportunity for brand visibility. The packaging is the first thing the consumer sees after an online order and is thereby a great extension of the brand, and an exclusive packaging can be what keeps the consumers to come back instead of turning to competitors (Smurfitkappa, n.d). Billerudkorsnäs (n.d) on the other hand states that for an online purchase that is done for the first time, most consumers does not spend much thought on the aesthetics of the secondary packaging, they just want the goods to arrive functional and in one piece. But at the same time they agree that when it comes to getting the consumers to come back for future purchases, the packaging plays a great role in the marketing. A high quality secondary packaging gives the impression of a quality brand and a feeling of providing that little extra care.

Smurfitkappa (n.d) continues by emphasize that the main purpose for the packaging, which historically has been to protect the product, now has to chance to being a marketing tool. And since the packages are arriving at the consumers doorsteps, it is important that they exhibit the retailer’s brand values and message.

The marketing is something that is a concern when expanding to online retail, explains Packaging world (2018b). Hard-earned brand awareness can easily get lost in plain packages containing different types of products. The screen becomes the new
Unboxing is a word that refers to the unpacking of a purchased item, often high-tech or luxury. Unboxing videos can be found over the internet where people have filmed their opening of a retail box and shows the content and its features, often along with comments. This is a phenomenon that has become highly popular and these types of videos appeal to the feeling of opening a wrapped gift, and often reveal emotions such as excitement, joy, anticipation and surprise (Storaenso, n.d; IT-ord, 2014).

Storaenso (n.d) mean that the packaging design should reflect the brand image and quality of the products. This enhances the company perception at the same time as it creates a positive experience for the consumers. They continue by explaining that consumers more often expect brand consistency and that the company value should shine through both physical and digital touch points. DS Smith (n.d) continue by stating that in the world of e-commerce a poor packaging is the same as poor customer service, which is a huge cause of concern since it can lead to loss of customers.
The European Federation of Corrugated Board Manufacturers (FEFCO) has together with European Solid Board organization (ESBO) developed an official system for packaging constructions that consists of simple symbols and groupings. This to facilitate communication and avoid language complications within orders and packaging specifications. The different packaging constructions are all given a four-digit number and are sorted in groups starting on the numbers 01 to 09 based on their type. If two packaging constructions are combined, for example the top flaps from 0204 and the bottom flaps from 0215, it can be described as 0204/0215 (FEFCO, 2007).

FEFCO (2007, p. 7) describes the groups as follows.

**01 - Commercial rolls and sheets.**

**02 - Slotted-type boxes**
Slotted-type boxes consist of basically one piece with a glued, stitched or taped manufacturers joint and top and bottom flaps. They are shipped flat, ready to use and require closing using the flaps provided.

**03 - Telescope-type boxes**
Telescope-type boxes consist of more than one piece and are characterised by a lid and/or bottom telescoping over the body of the box.

**04 - Folder-type boxes and trays**
Folder-type boxes and trays usually consist of only one piece of board. The bottom of the box is hinged to form two or all side walls and the cover. Locking tabs, handles, display panels etc., can be incorporated in some designs.

**05 - Slide-type boxes**
Slide-type boxes consist of several pieces of liners and sleeves sliding in different directions into each other. This group also includes outside sleeves for other cases.

**06 - Rigid-type boxes**
Rigid-type boxes consist of two separate end pieces and a body and require stitching or a similar operation before they can be used.

**07 - Ready-glued cases**
Ready-glued cases consist of basically one piece, are shipped flat and ready to use by simple setting up.

**09 - Interior fitments**
Interior fitments such as inside liners, pads, partitions, dividers etc., whether tied to Case Design or as singular items. Any shown number of panels is arbitrary and may be increased or decreased as required.

On the next page, in figure 2, some FEFCO constructions commonly used in the e-commerce are shown. Also Arcwise has, according to the same system principle, developed a catalogue with their most common packaging constructions. An example of this catalogue can be seen in appendix A.
Figure 2. Packaging constructions commonly used in the e-commerce.
When sending your parcels to the consumers there are several services to choose from here in Sweden, extending from the larger shipping companies such as Bring, DHL, PostNord and Shenker to smaller more local services. How to choose among these depend on your shipping extent, ratio and location, but also on the size and weight of the parcels. Each company offers different types of agreements and to give some examples PostNord’s most common alternatives for e-commerce shipping are the following.

The information on the right side is retrieved from: https://www.postnord.se/foretag/skicka/inrikes/paket/till-konsument.
Can be used to send items both domestically and internationally. The parcel is delivered direct to the receiver's mailbox, but if it is too big to fit the mailbox the parcel will instead be sent to the closest pick-up point and the receiver is notified. The new measurements from May 2nd 2018:

<table>
<thead>
<tr>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight: 150 g</td>
<td>2 kg</td>
</tr>
<tr>
<td>Length:</td>
<td>34 cm</td>
</tr>
<tr>
<td>Width:</td>
<td>24 cm</td>
</tr>
<tr>
<td>Height: 1,5 cm</td>
<td>7 cm</td>
</tr>
</tbody>
</table>

Rolls can not be sent as Varubrev.

**Earlier measurement restrictions:**

Length: 14-60 cm. Width: 9-25 cm. Height: maximum 3 cm. Length + Width + Height may together have the maximum measurement of 90 cm.

---

**MY PACK SMALL**

For smaller parcels. Delivered direct to the receiver's mailbox or to the closest distribution center.

<table>
<thead>
<tr>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight:</td>
</tr>
<tr>
<td>Value:</td>
</tr>
<tr>
<td>Length:</td>
</tr>
<tr>
<td>Width:</td>
</tr>
<tr>
<td>Height:</td>
</tr>
</tbody>
</table>

---

**MY PACK HOME**

Parcels are collected at the e-commerce company and delivered directly to the customer’s door.

<table>
<thead>
<tr>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight:</td>
</tr>
<tr>
<td>(within the Nordic region)</td>
</tr>
<tr>
<td>Weight:</td>
</tr>
<tr>
<td>(outside the Nordic region)</td>
</tr>
<tr>
<td>Length:</td>
</tr>
<tr>
<td>Length + circumference:</td>
</tr>
</tbody>
</table>

---

**MY PACK COLLECT**

Parcels are collected at the e-commerce company and delivered to a pick-up point close to the recipient.

<table>
<thead>
<tr>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight:</td>
</tr>
</tbody>
</table>

**Parcels sent within the Nordic region**

| Length: | 1,5 m |
| Length + circumference: | 3 m |

**Parcels sent within Europe**

| Length: Maximum | 1 m |
| Length + circumference: | 2,5 m |
1. An omni-channel research is often done by the consumer before purchase.

2. When decided on buying an item and from whom, the order is placed by the consumer and received by the e-company.

5. Outbound logistics - The parcels are shipped to distribution centers and there sorted once again to be shipped to the right pick-up point, or directly to the consumer.

6. The orders are delivered, either by being picked up by the consumer or delivered to the consumer’s doorstep or mailbox. Eventual returns are after this also made.
3. Inbound logistics - Here goods arrive from manufacturers and are then unpacked, sorted and stored.

4. After an order is received it needs to be prepared by making order lists and picking the products. If there are multiple orders, these need to be sorted and then it is time to choose the right packaging and pack the orders.

Shipping preparations are also made here where the parcels are compiled into carts or pallets.

Figure 3. The journey of an e-commerce package.
In this chapter you can read about relevant theories relating to this project such as Industrial Design Engineering, Packaging Design, User Experience & Usability, Human Centered Design, Material & Processing and Sustainable Design. To gather this information research was done in the form of a literature review based on books, articles and reports.
Industrial design engineering, which is the area of my education and therefore constitute the base for this project, involves the development of clever human centered design solutions, with focus on usability and ergonomics, combined with technical knowledge (Smets and Overbeeke, 1994; Tovey, 1989). These are all factors that, from my point of view, can be connected to the area involving packaging design. How can we for example find innovative packaging solutions that do not contribute to environmental degradation, are easy to use and helps to simplify the every day life for people?

According to Veryzer and Borja de Mozota (2005) industrial design is an important element in the development of new products and offers a great way to integrate design with engineering. This is agreed upon by Tovey (1989) who says that industrial designers and engineers have a lot in common since both are concerned with the development of technology and artifacts made by man. He further say that in most product development processes the industrial designer and engineer work close together, most like the relationship between architects and civil engineers. Veryzer et al. (2005) continues by explaining the importance of design when it comes to the development of products due to the trends in increasing product complexity and aesthetics. They quote the Industrial Design Society of America (IDSA) who describes industrial design as “the professional service of creating and developing concepts and specifications that optimize the function, value, and appearance of products and systems for the mutual benefit of both user and manufacturer” (p. 130). In the paper written by Tovey (1989) other quotations can be found, and here industrial design is defined as “the conditioning factor with those parts of the product that come into contact with people” and engineering as “the use of scientific principles, technical information and imagination in the definition of the mechanical structure, machine or system to perform pre-specified functions with the maximum economy and efficiency” (p. 26).

Veryzer et al. (2005) describes engineering as an occupation with the primal focus on technical issues, while industrial designers are more concerned with the functionality and finding value in a finished and usable product. Continually, they explain that industrial design has a tradition of being seen as a service rather than a business resource, but is an area that lately have been evolving alongside new product development.

The industrial designers main responsibilities is according to Tovey (1989) to determine the ergonomics and visual appearance of a product by finding the user needs and market requirements. But also to ideate alternative solutions and create a final concept.

But what is then Industrial design engineering? According to Smets and Overbeeke (1994) it can be referred to as a mix between both design engineering and design aesthetics. Apart from being creative and have a deep understanding of both the products and usability, an industrial design engineer need a high degree of technical knowledge, with an education based on mathematics and engineering courses.
Incpen (2014) explains that different types of packaging has been a part of the humans lives since the earliest civilisations. Examples they mention is the pottery jars that were used in the early Egyptian, Greek and Roman empires to store oil, wine and dried foods, and then the metal packaging that were used for preserved foods during the Napoleonic Wars in the beginning of the 19th century. Incpen further says that the innovations of packages since then has evolved and are today a part of our everyday lives and plays a great role in the retail business.

The main purpose of a packaging is to protect the product, but it is also a great platform for communication and marketing, especially in the sector of consumer products (Rundh, 2009; Incpen, 2014). Rundh mean that in some cases the packaging actually is considered as a part of the product as it contributes to the usage. Material, shape, size and colour are all important parts of the packaging, but also graphics, logotype and texture can be of great importance.

To create a successful packaging it has to fulfil its purposes in all elements of the packaging system, like protection, handling, marketing and usage (Incpen, 2012). Rundh (2009) explains that the packaging also has to be produced in a cost efficient way, be storable and easy to produce. A well designed package can even add extra value if the consumer wants to keep it for other purposes.

Rundh (2009) mean that when it comes to different packaging materials the choice depends on the purpose of the packaging. Is it for example supposed to store liquids or to ship clothes? He explains that a successful packaging design needs to be able to fulfil the demands of the industry as well as the values of the consumers, such as be environmental friendly and of high functionality.

Due to lifestyle factors the consumer behaviour and consumption pattern is constantly changing, something that affects the packaging industry. It gets more and more common to eat out and take away options are increasing, and people are getting more aware of a healthy lifestyle and of our environmental actions. At the same time media plays a great role in affecting the consumers and their decisions, for example in what materials that are seen as trendy or best for the environment. All this, in combination with international influences and governmental regulations, are what contributes to changes in the packaging industry (Rundh, 2009).

Incpen (2012) explain that most packaging that are used are designed for in-store sale of products, but since the e-commerce is so rapidly growing this needs to change. Packages used for home delivery and packages used for in-store retail has different requirements when it comes to quality and attributes. As an example a retail package primarily needs to provide legal information and instructions, and also to function as a last element of marketing that contribute to purchases. The outer packaging used for home delivery needs, on the other hand, to provide protection of the goods and from theft. It also have to prevent the items from bouncing around in the transport and it might have to be able to contain a number of different goods. It further needs
to show information about the order, delivery address and distribution tracking, and to allow for returns and be easy to open by the consumer.

Incpen (2012) further state that the packaging is a critical part of any delivery system and that it is important to ensure that the packages are designed in a resource efficient way and not only to protect the product. They mean that even though some companies are well aware of what influence the packaging has on the user experience, others use far more packaging material than is necessary, which often result in unpleased consumers or damaged goods.

In an ideal world every packaging should be designed for a specific order, something that is not possible in reality since it would be way to costly and require an infinite number of packaging shapes and sizes. Producing a separate box for every order would also have more negative effects on the environment than transporting over-sized boxes and air (Incpen, 2012).

How businesses decide on the number and type of different outer packages is on their own judgement, automation and packaging lines. One alternative is to just go with one specific packaging type for all orders, but this will often result in oversized packaging with lots of void to fill. An other alternative is to have several different packages to chose from, which most likely will decrease the use of filling material and the transportation costs, but with need for larger storing space and higher cost per packaging (Incpen, 2012). Retail businesses must also meet a set of packaging standards and requirements regulated by law to ensure that:

- Packaging contains less than 100ppm in total, of lead, cadmium, mercury or hexavalent chromium.

- Essential requirements are met regarding:
  - minimising packaging volume and weight in line with safety, hygiene and product/consumer acceptance.
  - designing packaging to permit recovery or reuse and recovery.
  - minimising the impact of packaging waste on the environment.
  - manufacturing packaging to minimise the presence of hazardous substances in emissions, ash or leachate when packaging waste is incinerated or landfilled.

(Incpen, 2012. p. 13)
One of the main goals for this project is to create a packaging that helps making the unboxing of new products a joyful moment for the end user. To do so, basic theory of user experience and usability is of relevance.

It is said that Don Norman is the one who coined the expression user experience (UX) design and in later years this is an expression that has become widely spread, often referring to the design of websites or applications. This is however something that Norman means is a misunderstanding of the terms true meaning. He explains that the word covers much more than that, and should refer to all aspects of the humans experience and interaction within a system (Axbom and Royal-Lawson, 2016).

According to Lidwell, Holden and Butler (2015) things that are aesthetically more pleasing is often perceived as more easy to use and generates over-all more positive attitudes than objects seen as ugly, something that could be seen as one aspect of user experience design. Kujala, Roto, Viinäinen-Vainio-Mattila, Karapanos and Sinnelä (2011) mean that the goal for UX-design is to create satisfaction amongst the consumers, to interact with a product should be joyful and easy. They discuss that the highest peak of a product-user relationship often occur at the end of a products life, and thereby should more effort be placed on the improvement of the user experience and the attractiveness of products over time. Kujala et al. (2011) explain that the consumers memories of the use of a product is more important than the actual usage, since an overall positive experience is of grater value than single experiences.

According to the International Organization for Standardization (ISO 9241-11:1998), the term usability can be defined as an “extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.” Which refers to both the users feelings - how pleasing the task was to perform, and the actual usage - how well the task could be performed. Hassenzahl and Tractinsky (2006) agree on this definition and mean that the user experience is a consequence that is dependent on the users needs, expectations and feelings, the characteristics of the system or product and the environment where the interaction occurs. They state that the enjoyment of the usage plays as big role as the usability when it comes to user experience design.

In the study made by Kujala et al. (2011) they found that user experience is something personal and that it differs from person to person, since the user characteristics plays a great role in the over all experience. If the product of concern is of high technology, a user who is well orientated in that field may not all have the same difficulties as other users. They further state that a product that matches the identity of the user and look appealing in the eyes of others increase the opportunity for creating a positive user experience. Chen, Germain and Rorissa (2011) has found that the definition of user experience design differs and that some find user characteristics as the factor with highest impact, while others also include the attitude of the users. They further discuss that usability is a complex topic and that a more holistic definition with standards based on collective wisdom, would be helpful for future development of products and systems.
According to IDEO (2015) human centered design, HCD, means believing that all problems are solvable and that the key to solving these problems lays in the people facing them. Therefore, they state, it is in a HCD approach important to understand the target group, to truly see the people’s needs. This is agreed upon by Norman (2013) who says that people often get frustrated with the items used in their daily life, because how to use them is to hard to figure out. He mean that the solution to this frustration is to implement an human centered design, which is based on the humans needs and behaviour. Norman further explains that every new design or invention needs to be tested and based on studies before being released to the market.

IDEO (2015) mean that when moving through a HCD process every designer go through three phases: Inspiration, Ideation and Implementation. They explain these as followed.

**INSPIRATION**
"In this phase, you’ll learn how to better understand people. You’ll observe their lives, hear their hopes and desires, and get smart on your challenge.”

**IDEATION**
"Here you’ll make sense of everything that you’ve heard, generate tons of ideas, identify opportunities for design, and test and refine your solutions.”

**IMPLEMENTATION**
“Now is your chance to bring your solution to life. You’ll figure out how to get your idea to market and how to maximize its impact in the world.”

The practice of a human centered design is a requirement for good design which Norman (2013) explains as the understanding of technology and psychology. He means that to be able to create a good design the designer must be focused on the communication, the feedback from product/system to human. When trying to figure out what needs people have, observation is one of the best methods to use. This because most people are often unaware of what their true needs really are, they’re often to focused on the problem in front of them to see a greater picture.

"Know your user” is a sentence often used in the field of human centered design, but how is this implied when designing a product that is to be used by almost everyone? As Norman (2005) sees it, this is one of the problems within this field. He mean that many products, such as cars, kitchen utensils, cameras etc. has been designed even without the approach of HCD, and they are all well functional. The reason for this is that they were all developed with a great understanding of the task they were supposed to perform. Norman (2005) calls this activity centered design, ACD, and mean that this is the key to create great design, instead of ”just” good design. The devices should be designed with the requirements of performing the underlying activity, but in a way that is also understandable by people. Norman explains that human and activity centered design are much alike, both with the goal to meet the needs of the user, but in ACD a deeper understanding is required. Norman mean that as a designer it is important to listen to the user, but with the ability to ignore what the say and do what you as a designer know is best for them.
The material of concern in this project is corrugated board which is defined as one or several sheets of paper, called liners, that are glued on to a core of a wave-formed paper, called fluting (FEFCO, n.d).

The way the layers are assembled in corrugated board gives the structure far better strength and characteristics than for each separate layer, and this type of structure is known for it ability to support heavy weights. The spacing in the flute also gives room for air to circulate, which has been proved to have a good protection against variations in temperature (FEFCO, n.d).

There are many different types of corrugated board and the thickness is controlled by the wave profile of the fluting, B- and E-flute are two common used variations (SWIF, n.d.a). The variation in flute size and profiles gives many combinations that can be cut and folded into an infinite variety of shape and sizes to create packages and boxes with different characteristics and performances (SWIF, n.d.a).
Arcwise, which is the specific type of corrugated board that is used in this project, has special properties that allow the material to bend in one direction and thus create curved shapes, even though it is made with double layers of liners. Conventional corrugated board on the other hand can only be bent to a very small extent without damaging the material, and a single faced corrugated material can be bent in one direction but with much lower bending stiffness. Except for the possibility to create curved shapes, the properties of Arcwise makes it a good alternative compared to stiffer range card board in the means of minimizing the use of material. A curved shaped packaging can withstand higher pressure than a similar package with sharp corners, which make a reduce in material thickness possible. The ability to create curved shapes also allows for easier customization of the packaging, something that too could contribute to material reduction.

Just as any type of corrugated board, Arcwise can be produced in existing machines and then be shipped flat from producers to brand owners, where the boxes are to be erected and packed.

Figure 6. Collage displaying some Arcwise packages.
The paper sheets that build the construction of corrugated board are made of cellulose fibers, which can be either virgin or recycled. Today corrugated boxes are 100% recyclable and about 88% of the fibers used in the manufacturing of corrugated comes from recycled paper. Boxes made of corrugated board are today one of the most recycled products and has a well-established market for the reuse of secondary materials (FEFCO, 2018). Svenska wellpappföreningen, SWIF (n.d.b) explains that the renewable raw material that is needed for the manufacturing of corrugated board are derived from the annual growth of pine and birch forest and is produced in Sweden and other forest countries.

SWIF (n.d.c) further refer to corrugated board as the material of opportunities since it is strong, flexible and opens up for endless possibilities when it comes to creating packaging solutions. They mean that this is a material well suited for packages that are to be used both for transport and in retail.

SWIF (n.d.d) explain that corrugated board first was manufactured in the means of being used as a material for packaging in the early 1870s, but that the production really came along during the second world war when the military transports demanded a protective material with specific characteristics, and today corrugated board is one of the most common used materials in the packaging industry SWIF (n.d.e).

SWIF (n.d.f) mean that a corrugated-board packaging is a perfect element for displaying important information and other messages. This since several different printing methods can be used to bring just the desired appearance to the packaging.

The most common printing method in the industry of corrugated is Flexographic printing. One of the most obvious advantages with this method is that the colours are odourless and dry very quickly, which makes it possible to print several layers directly on top of each other without the risk of smearing. It is also possible to process the corrugated board after printing when using this method SWIF (n.d.g). Other printing methods that can be used are Screen printing, Offset printing and Digital printing.
SUSTAINABLE DESIGN

Sustainable design or sustainability is a subject that is most relevant for this project, first of all since corrugated board often is seen as a environmentally friendly packaging material compared to for example plastics or aluminium. But also because this is a subject that is highly topical in todays retail business, and the consumers are getting more aware on how their actions affect the environment.

According to Rundh (2009) the environment is an issue whose importance increasingly is growing and needs to be considered by all business areas. He mean that many countries have introduced regulations regarding the usage of different materials and the implementation of trade practices, and that the European Union has started to realize the need for legislations to encourage companies to act in a more environmentally conscious manner. This is something that for the packaging industry has meant directives concerning minimization of waste and the amount of material and packages that should be used for recycling and reuse.

To find a packaging that is low in costs, perfect fits its purpose and has a minimal impact on the environment is a big challenge for the companies and is a quite complex process, says Incpen (2012), and mean that this is not appropriate in the daily business. Besides, the packaging only plays a small part in the chain that includes products, packages, transport and delivery. A package has many touch points on its journey where it interacts with different factors, therefore Incpen state that to only look at the environmental impact of the packaging itself can be a bad idea. A packaging with reduced environmental impact that in some way complicates the handling in other steps of the process could mean that the overall impact still is negative. They thereby supress the importance of looking at the whole packaging chain.

(Incpen, 2012) mean that all types of materials, and mixes between different types of materials, can be used for retail packs. But when it comes to the outer packaging, paper and plastics are the two most common used materials. Neither of these two has a clear advantage over the other, and which one is chosen often depends on what packaging attribute is seen as most suitable. Although, it is important to know where the material comes from, and to only use sources with proven certification (Incpen, 2012).

(Incpen, 2012) state that advantages can be found in the usage of packages made of recycled material. The energy consumption is for example often lower when it comes to producing packages from recycled, compared to raw, material. Important to keep in mind, however, is that the recycled material must be able to meet certain criteria to be used in the same way as raw material.

Theoretically, all materials can be recycled but in reality small details can have great impact on the quality and if the new material is possible to use or not. Such things could be prints, labels or adhesives (Incpen, 2012).
Incpen (2012) mean that the packages after all don’t have that big impact on the environment, at least not compared to other segments like home heating or personal transport. These two posts has 20 respective 30 times the environmental impact of packaging. Incpen instead state that the use of packaging overall has a positive impact of the environment since it “protects far more resources than it uses and prevents far more waste than it generates” (p. 3). But they also mean that it is important to continue the innovations in the packaging business, since there always are room for improvements.

Incpen (2018) discusses the packaging’s environmental impact and gives an example where it was investigated if there were any better alternative for supermarkets to sell apples than in the four-pack polystyrene tray that often was used. The study found that just skipping the use of the tray and selling the apples loose, resulted in a 25% higher waste. This since more apples was damaged without the extra protection. But at the same time this resulted in less non-biodegradable waste.

Incpen (2018) also explain that the growing concern about the sustainability in the modern society has put demands on businesses to measure their environmental impact. A way to make these measurements is by doing a lifecycle assessment (LCA), which shows the negative environmental impact a product, process or activity has over its whole lifecycle. This is however a complex process that results in several different numbers concerning the environmental impact of different areas such as energy and material. These numbers are not possible to merge to a final score since they concern such different areas. A newer way to measure the impact on the environment is instead Carbon footprinting. This is a simplified method more concentrated on a smaller section of areas compared to a LCA. Carbon footprint is restricted to measure just the greenhouse gas emissions of carbon dioxide, nitrous oxides and methane. This gives one single value that is easier to compare. Carbon footprinting addresses one of the biggest environmental issues; climate change and greenhouse gas emissions.

The result of carbon footprint measurements can however never be exact, since many assumptions has to be made in order to make the calculation. This mean that it is hard to calculate the environmental impact between different products. Although, one of the benefits by carbon footprint is that it can help companies to find weak spots in their own business where the emissions are highest (Incpen, 2018). One of the problems that can be seen in this measurement method is that it doesn’t consider other factors like “water consumption, efficient land use, animal welfare and resource conservation”, which under some circumstances can be even more important.

Incpen (2018) mean that a full truth can not be provided that by doing a LCA or by measuring the carbon footprint, but this can provide insight and be used as a way of more sustainable thinking.
METHOD

The design process followed during this thesis is here described along with a project plan. How the work was conducted during the four phases of this project; Discover, Define, Develop and Deliver can in this chapter also be read about.
After studying different design processes, it was decided that the one who mainly was to be followed during this project is the double diamond model, which consists of four stages; Discover, Define, Develop and Deliver. This is a model that was created by the British Design Council and illustrates the divergent and convergent stages of a creative design process. According to the Design Council (2018) all creative processes start with divergent thinking where a large number of ideas are created. These are later sorted and weighted against each other to be narrowed down to the best possible solution, so called convergent thinking. They further explain that this is something that needs to be done twice in the design process, first to define the problem and then to develop a possible solution. This is what the double diamond illustrates. According to ThoughtWorks (2018) the Double Diamond describes a linear process that is specifically developed for the area of Industrial design.

Even though this model describes a linear process the Design council (2018) emphasizes the importance of an iterative creative process in the development of good design, and mean that this model should be gone through a number of times during the development of new products. The four different stages of the model are described as follows.

**Discover**

The first stage that starts a new project. Here should necessary information be gathered and the Design council (2018) mean that the designers should try to see the world in a new way.

**Define**

In this stage the problems and needs are to be defined. All information gathered in the previous stage should be sorted and all the possibilities identified. A good way is to here develop a design brief that frames the challenges.

**Develop**

The third stage of the process gives room for the idea generation and the development of concepts and prototypes. This is a stage of trial and error and tests should be made to verify the concepts.

**Deliver**

This last stage is where the details are developed and the final concept is finished and produced. In this master thesis project this will also be the stage of presentation and the finishing of the report.
Other design processes of interest that have been investigated are for example; Addie, CDIO, Design Thinking and IDEO’s six step process. All of these design methods are similar to each other but with small deviations. The reason that the Double Diamond model is the one that was chosen is that it is a straightforward and easy to grasp process that only consists of four different phases, which in my opinion suits this type of project. The work-flow of this project will be an iterative process, with the opportunity to always reconnect to previous phases.
PROJECT PLANNING

During the first week of the project a project plan was made and the above described design process was decided on. A timetable showing important dates and deadlines was created and the projects delimitations, goals and expected results were here brought to the surface. Relevant research questions were formulated, and all this was done to get explicit guidelines for the work to come.

PROJECT BUDGET

The costs for the execution of this project are foremost the estimated time, which is 800 hours. Other than that there are the travel expenses from Sundsvall to Luleå at the time of presentations, which there will be two of, one half way through and one at the end of this project. The total cost for these two travel occasions are estimated to 1600-4000 sek depending on travel dates and means of transportation. The exact costs for the development of prototypes in this project are difficult to determine in advance. But what can be calculated is the cost of the material, which is about 5-25 sek/m² for standard corrugated board, depending on the thickness and paper quality. How much is needed for the prototype building depends on the complexity and the size of the packaging. It is agreed upon that the cost for travels will be paid by the student, and the costs for the construction of prototypes will be paid by Arcwise.

LITERATURE REVIEW

A literature review is according to Milton and Rodgers (2013) a good method to use in the need of gaining knowledge and different viewpoints of a subject. They describe a literature review as a presentation and discussion of information that has already been established by other authors. This information can for example be found in scientific reports, articles and books. Further they conclude that the first step of the literature review is to decide the subject you want to discuss or what question you want to answer, and then collect data concerning the subject. After this it is important to go through the information you found for an evaluation, to make sure that the sources of the information are valid. Finally it is time for own analysis and interpretation to endorse a discussion of the subject.

In this project the search for articles and reports to study has been done by using search services like Google Scholar and the LTU Library search. Previous master thesis reports have also been used as research material in order to find references of relevance, and books and student literature has also been a great source of information.
PROJECT PLAN

- Fundamental planning of the work to come.

LITERATURE REVIEW

- Learn more about the material properties and manufacturing of corrugated board and Arcwise products.
- Get an overview of packaging that are used today.
- Survey to examine consumer habits.
- Interview with retailers.

DISCOVER

- Define problem areas and needs.
- Create personas.
- Create moodboards for inspiration.

DEFINE

- Creative methods; different variations of brainstorming etc.
- Workshop.
- Sketching.
- Evaluation of early ideas to decide on a few concepts for further work.
- CAD.
- Build prototypes.
- Evaluate prototypes and choose a final concept.

DEVELOP

- Define details and finish the final prototype.
- Prepare for presentation.
- Finish the master thesis report.

DELIVER

- 50% thesis
- 30% thesis
- Final presentation

Image 8. Time table displaying dates and deadlines for the project.
This is the phase to gather all the relevant information that is needed to carry out the project, and this was started by doing an essential analysis of the market. It was here investigated how different packages that are used for the e-commerce today are developed and designed. A survey regarding the consumer experiences were posted online and interviews were held with retailers. Parallel to this work the literature study was made.

BENCHMARKING AND CURRENT STATE

In order to get a clear overview of the market concerning the current state of packages for the e-commerce, a benchmarking was made. This is a good way to investigate the business sector of concern and according to Lankford (2000) benchmarking refers to a method of gathering information and knowledge from others to improve the own organization. Ulrich and Eppinger (2012) explain this research method as “the study of existing products with functionality similar to that of the product under development” (p. 127).

The phrase “do not invent the wheel twice” is often mentioned in the means of benchmarking and as Elmuti & Kathawala (1997) says, this is a great way to find and implement new ideas for improvement in a business. But they also mean that there is more to benchmarking than just gathering data. This is something that is agreed upon by Lankford (2000) who says that benchmarking should be done to add value, and not copy other businesses. He mean that no changes should ever be made if there is no improvement involved, and this method should be used to get ideas for new solutions not to "steal" others. There is therefore important for business to never stop being creative.

Elmuti & Kathawala (1997) continues by saying that "The essence of benchmarking is the process of identifying the highest standards of excellence for products, services, or processes, and then making the improvements necessary to reach those standards” (p. 229). They also mean that by using methods such as benchmarking, companies can get to know where they stand in relation to others.

Fridley et al. (1997) say that benchmarking is a tool that has been used for many years and should be used to find the best solutions in the referred area, which for example could be products, businesses, systems or customer relations. They mean that this is a good tool to use in the means of investigating the market in order to develop new superior products, systems or services.

In order to best perform a benchmarking Lankford (2000) gives an example on steps that should be followed. First he mean that the area that needs improvement should be identified. Secondly, one or several organizations that has succeeded in that area needs to be found. These organizations should then be talked to, preferably visited, to study their work processes. After this the data that has been gathered needs to be analysed, and finally this information should be used as a base in the improvement of the own business.
In the case of this project the benchmarking was done to get a deeper understanding of the business areas concerning the e-commerce, packages and corrugated board. This was mainly conducted by the help of online research and by studying written reports. A large amount of the material that has been gone through were provided by the Arcwise group and consisted mainly of reports and whitepapers written by e-commerce logistic partners, wood and biomass companies and packaging producers. The research also consisted of reading news articles and studying the websites of FEFCO and SWIF to learn more about corrugated board and packaging standards. Lectures provided by my supervisor Mattias Bodell has also been a great recourse in learning more about this business area.

Figure 9. Some of the reports that were studied during this phase of the project.
CONSUMER HABITS AND RETAILER DEMANDS

In the means of designing new products the core values and needs are important to identify. In order to in this project do so, questions needed to be asked both to the end consumers and to the retailers. The opinions of these two groups of people are the ones of most importance when it comes to the handling and investment of new packages.

SURVEY

To reinforce the information obtained from the earlier research, an digital survey with questions concerning online purchases and how important the consumers find different attributes of the secondary packaging, was posted on social media. This choice of publication was done in the means of being able to reach as many users as possible.

According to Osvalder, Rose, & Karlsson (2011) a survey is a method of seeking information where the participants in a written text get to leave their answers. This could be seen as a form of interview although there is no personal contact between the interviewer and the one who is interviewed. When seeking information in this manner Osvald et al. mentions that it is important to in beforehand have identified the group of target, so that the right people are the one who are asked the questions. They further state that the way the questions are asked is of great importance to actually get the answers that are required. It is also important that the questions are clear and easy to understand.

A survey can consist of both questions in check box-form and questions with open answers. The first alternative is often both easier to answer and compile, but open questions can be better for more qualitative analyses (Osvalder, Rose, & Karlsson, 2011). They continue by explaining that there are both pros and cons by using a survey as a research method. First of all it is a cheap method that is clearly effective in getting large quantities of answers. The people questioned can also take their time in answering and therefore need to feel no stress, something that otherwise can occur in interview situations. There is however a large risk for misinterpretation of the questions and this is something that needs to be calculated when completing the answers.

The questions in the survey concerning this project were based on the packaging attributes that were stated as important in the reports and whitepapers earlier studied, and consisted of different types of answering alternatives. There were bound answering options mixed with scaling alternatives and open questions. The survey were created by the use of Google Forms, and with the reason to be able to reach as many online-shoppers as possible the chose of media for publication of the survey was Facebook.

A total of 483 answers were collected and the survey questions and answers can be found in appendix B.
INTERVIEW

In order to get insights from the retailers view on important packaging features telephone interviews has been held with two e-commerce companies, My Muse and Lyko. Attempts were done in the means of interviewing two more companies, but since this was done during the summer, vacation-time got in the way and the persons I was directed to talk to haven’t yet had the opportunity to call me back.

Osvalder, Rose, & Karlsson (2011) explain that interviews are the most common method for gathering data on peoples thoughts and experiences. An interview can be based on different structures and as Osvald et al. states, there are three main categories for interviews; unstructured, structured and semi-structured. Overall it can be said that if quantity is to prefer over quality, a structured interview is the method to choose, this since this interview form follows a clear plan with questions that often acquire short answers that can be used for quantitative analyses. An unstructured interview on the other hand does not follow a predetermined path. Instead it is based on open question that the user can answer freely. This interview form generates general data and can be seen more as a conversation. The third variant, semi-structured interview is a combination of the first two. It consists of in beforehand determined questions but with the opportunity for the interviewed to answer freely. Depending on the questions asked, this form allows for gathering of both quantitative and qualitative data (Osvalder et al, 2011; Wikberg Nilsson, Ericsson & Törlind, 2015). Osvalder et al. further explains that it is the purpose of the interview that should determine the type of structure, and the interviewer need to decide on this before the interview is held. It is also important to start the interview by explaining the purpose and have a plan for how the answers will be documented.

The interviews that has been held in this project was of a semi-structured character to give the opportunity for supplementary questions. During the first interview that was held with My Muse notes were taken by hand, but to ease the transfer to text and ensure that nothing was forgotten, the second interview was instead recorded.

The interview questions and answers can found in Appendix C.
DEFINE

The information gathered in previous phases was here compiled to define concrete needs that the result of this project has to meet. These needs were also described with the help of personas, and a moodboard was made as inspiration for the continued work.

PERSONAS

According to Marshall et al. (2013) a persona is a fictional person that represents a group of people with equivalent interests and actions, and is often described with real attributes such as name, gender, age, interests, goals and tasks. The creation of personas is a tool often used in interaction design that was initiated by Alan Cooper, who says that the basics of the method is to “Develop a precise description of our user and what he wishes to accomplish” (Cooper, 1999, p. 123). He further explains this method as “We make up pretend users and design for them” (p. 123). Marshall et al. continues by saying that “personas within the Inclusive Design process for any product or service can be a powerful tool for understanding and visualizing user goals, motivations, relationships with existing products and contexts of use” (p. 311), and in a typical designs process one to seven personas with different goals are often used. Nielsen & Hansen (2014) explain that to create a persona, collected data from research methods such as interviews and observations should be used, and the purpose of personas is to identify the users needs. Thus, the use of personas give a deeper insight into the user’s point of view and they mean that just the process of creating personas can be of value, even if the persona is never used. This since the collection of data gives a deeper understanding of the user and its needs.

With the use of the information regarding problem areas and user needs, which were collected in the online survey, three personas were created. Each given a different scenario to illustrate their difficulties and needs. These personas were then used throughout the project to help with concept selection and evaluations.

MOODBOARD

Martin & Hanington (2012) explain that moodboard or an imageboard can be seen as a collage of pictures, sketches, colour pallets and words that typically are used for visually explaining a design direction, context or a target group. They mean that this is something that for the designer can work as an inspiring tool or a visual reminder of the context for the project, but it can also be used to communicate a concept or design intent for a client.

For this project a moodboards was created with the purpose to evoke a feeling for the product area that was chosen as delimitation for this project, which is the beauty and health industry. This was done by searching for related pictures on websites such as google, pinterest and behance.
Figure 10. Moodboard showing some products from the category that was chosen as target area for this thesis project.
Here it was time for the work to be of a more creative character and information from the previous phases was used to start the idea generation. Different creative methods were used alongside sketching and simple prototypes to create a large amount of ideas and at the same time test possible solutions.

**WORKSHOP**

To kick-start the idea generation for this project a workshop with the Arcwise team was held.

When working alone in a project it can be a good idea to facilitate a workshop for outside thoughts and ideas. Even the simplest sketch can trigger new viewpoints and others can have ideas that you never would have thought of yourself Ulrich & Eppinger (2012). This workshop was divided into six areas and the tasks performed during a period of two hours. According to Wikberg Nilsson, Ericsson & Törlind (2016) it is always preferable to start a workshop with a warm up session to get the mind going. For this it was decided that a word association would be a good practice. 15 adjectives were written down on separate notes, folded and put together in a box. The participants were told to take one note each, and from that word sketch any idea of a packaging. The sketching time was set to two minutes per word and this task was done in three rounds.

The next session consisted of visual association. Here five images of random selected products were printed out and handed to the participants, one image at time. The task was to draw, or in text explain, a packaging solution for each product and the time limit was set to three minutes per image. These sketches were then distributed evenly amongst the participants so everyone had five sketches each, and none of their own.

These packaging sketches were numbered one to five and used in the third session of the workshop. The idea was here to further develop each other’s sketches according to the needs that were found in the survey previous done in the project. The sketching time for each need was set to three minutes and the task questions were formulated as can be seen to the right.

In the fourth session of the workshop the participants were asked to come up with any ideas of a packaging solution concerning the focus area of this project, which is packages for beauty and pharmacy products, vitamins and supplements. Room was here given for a larger amount of creative freedom and the participants could chose between sketching, writing and making quick prototypes using scissors, paper and tape. The time limit for this task was set to five minutes.

After this, everyone got to shortly explain their ideas and were then asked to send their work to the person sitting right to them. During one minute they then had the opportunity to elaborate each other’s work with further thoughts and ideas. This was done until everyone got their own sketch or prototype back.

The last task for the workshop was a brainwriting session concerning the area of packaging re-use. All participants got a pile of post-its and was during five minutes asked to write down all ideas they could come up with that answered the question; what can a secondary e-commerce packaging be re-used as? When the five minute time limit was up, the participants were asked to put their post-its on a whiteboard where the ideas was clustered into areas of similar solutions. After this a discussion followed where everyone had the opportunity to further explain their own ideas and sketches.
1. How can you make packaging number one simple to carry?

2. How can you make packaging number two easy to re-seal?

3. How can you make packaging number three more environmentally friendly?

4. How can you make packaging number four easy to recycle?

5. How can packaging number five be developed to minimize the need of unnecessary filler material?

Figure 11. Pictures taken during the workshop held with the Arcwise-group.
BRAINSTORMING

Wikberg Nilsson, Ericson & Törnqvist (2016) talks about the creative method brainstorming and explain that it was first created during the 1960’s by Alex Osborne, but now exists in many variants. The most common way to use this method is to let a group of participants freely discuss a subject or a word to generate as many ideas as possible regarding a specific scenario or problem. Brainstorming is a method often used in the means of generating as large amount of ideas as possible, addressing one of its key words “quantity before quality” (Martin & Hannington, 2012).

Wikberg Nilsson et al. mean that even though brainstorming often in used as a group activity there are clear benefits also when used by a single person. If you for example don’t feel entirely comfortable in a group there is always a risk of creative delimitations. To brainstorm alone can thereby cause both greater quality and quantity.

One of the most important rules in this type of activity is to never criticize, neither yourself nor others, since this can inhibit the creative flow (Osvalder, Rose, Karlsson, 2010; Martin & Hannington, 2012; Ulrich & Eppinger, 2012).

Brainstorming as a creative method is good to use in an early stage of a design project and the aim is to generate as many ideas as possible, how crazy they may be. A completely unrealistic idea can at a later moment give rise to new ideas that actually are viable (Osvalder et al.)

During a brainstorming session the documentation can be done in various ways. One common variant is to have a facilitator who is in charge of the note taking. An other is to have the whole group gather around a whiteboard so that everyone can contribute by writing or drawing there ideas down. In this way can the group also get inspired by each other, in this variant post-its can also be used (Osvalder et al.).

In this project brainstorming was used first during the workshop held with the Arcwise team, and then single-handed. In the single session the ideas were written down or sketched. The viability of these ideas was often directly tested by the creation of simple paper prototypes, something that also helped generating new ideas. This has been a re-current work-process during this whole creative phase of the project.
PROTOTYPING

According to Wikberg Nilsson, Ericson & Törlind (2016) the main goal of creating prototypes is first of all to gain insights regarding if an idea works as intended or not, but also to get a clearer view one what needs to be done in the continuous work process. This is agreed upon by Ulrich & Eppinger (2012) who says that “Prototypes are used for four purposes: learning, communication, integrations and milestones” (p. 294). They mean that prototypes should be created in the means of answering two main questions; will it work? and, will it meet the needs?

Wikberg Nilsson et al. explain that prototyping should be done to test different possibilities, solutions and combinations, and they mean that prototypes can consist of anything from simple sketches to 3D-models. They state that the main reasons for creating prototypes are to better understand the problem areas, to test functionality, and to see how well the interaction between human and product works and what experiences it creates.

The two variants of prototyping that mainly were used during the idea generation of this project were sketching and quick paper prototypes. Wikberg Nilsson et al. discusses the use of sketching as an important part of the creative process and mean that it’s not mainly the result of the sketching that is most important, but instead the thoughts and new ideas it generates. They explain that sketching is an important communication tool, both internal and external.

Wikberg Nilsson et al. further explain that quick prototypes are a good tool to use in the beginning of a design process. Paper, clay or Lego are examples of material that can be of use for this type of models. This prototype method is a perfect tool for communication, and can help generate new ideas and solutions. Quick prototypes are good to use when a basic understanding of functions are necessary.

This way of prototyping was, during this project, done by using regular printing paper, scissors and tape, and has by far been the most used method during the idea generation of this project. With no earlier experiences in the area of packaging design it was hard to imagine the transition from 3D sketches to 2D construction-drawings, and therefore creating quick paper models really helped. This has all been a very iterative process, and as soon as an idea of an possible solution came to mind, it was sketched and folded multiple times. Since packaging used in the e-commerce first of all needs to be able protect the products, it was by the help of paper prototypes easy to see if an idea was worth to continuous work on or not. Many of the different ideas that needed modification ended up in similar solutions, so the use of paper prototypes was very helpful when deciding on viable ideas that should be tested further.
Ulrich & Eppinger (2012) talks about 3D CAD and mean that one of this modelling type’s greatest advantages is the ability to easy visualize the true form of the design and create realistic renderings. This is also how it was used during this project. To get a deeper understanding on what the paper prototypes with the highest potential would actually look like, they were sketched in ArtiosCAD, which is the CAD-program that was provided at Arcwise. This is a software program dedicated to the design of packaging, mainly in the corrugated and cardboard industries. The program was developed by ESKO and is a great tool for designers working with corrugated, folding cartoon or displays (ESKO, 2018).

The designs are in ArtiosCAD sketched in 2D, and then transformed into 3D-models. A plug-in program to Illustrator allows for graphics to be placed on the model and here a render function is provided. The 2D drawings can also be exported to a cutting table, where the designs are cut out of the provided material, to then be folded and tested.

When the first step was taken to create real corrugated board models of the early paper prototypes, some problems occurred regarding the shape of the packages. Therefore, a lot of twisting and turning of the different concepts were necessary. Functions and attributes were moved from one concept to another, and sometimes several ideas were combined to a single new concept. Throughout the whole process of the idea generation, the work has therefore shifted greatly between sketching, creating paper models and CAD. By cutting out models in corrugated board it was also easy to see if an idea was suitable for its task or not. Therefore a selection occurred very natural during this process and finally the ideas were converged into six concepts that were presented for the Arcwise team.
Figure 12. Collage showing the cutting-table at SCA R&D Centre in Sundsvall, and some of my cardboard prototypes.
This phase involves the implementation of solutions into a final concept and here more defined prototypes were constructed to examine different solutions. The testing of usability and user experience is an important part in this phase and such evaluation tests were made with the help of the employees at Arcwise and university colleagues. The development of details such as graphics and optimizing the construction of the final concept were also done here.

**CONCEPT SELECTION**

When the concepts had been narrowed down to six, three colleagues from the Arcwise-team helped with the evaluation of these. The concepts were presented and then reviewed one by one. Everyone had the opportunity to contribute with thoughts and opinions and after this the concepts were evaluated against the needs and demands. This evaluation later served as base material for an evaluation matrix.

Wikberg Nilsson, Ericsson & Törlind (2016) mean that to use a matrix to evaluate the concepts against the criteria is a good way to get an objective result without personal opinions. The matrix used in this project is of similar type as the one described by Wikberg Nilsson et al. and consist of two steps. First the criteria, or in this case the needs, were weighted against each other as can be seen in appendix D.

If the criteria listed in the top row of the matrix were seen as more important than the one to the right, it was marked with the number 2. If both criteria were seen as equal important it was marked with 1, and if the criteria in the top row were seen as less important than the one to the right, it was marked with the number 0. The points were thereafter summarized and each need from the top row got a final score telling how important it is compared to the others. These scores were thence transferred to the matrix seen to the right, where the concepts were evaluated in the means of how well they fulfilled the different needs. The points used here were 1 to 5, where 1 meant that the concept did not at all fulfil the need, and 5 meant that the concept very well fulfilled the need. Each score were then multiplied with the correlative weight factor from the first matrix.

From this evaluation the concepts were narrowed down to four, where concept #1 and #6 were the two eliminated. This since these two were the concepts with the lowest score in the matrix, and due to the fact that the now four remaining concepts all have different shapes and constructions, which makes further development more interesting. Similarities in shape could be found between concept #1 and #2, and between concept #3 and #6 (see page 58 for images).
Table 01. Concept evaluation matrix.

| Easy to carry | WEIGHT FACTOR 6 | 6x3 = 18 | 6x3 = 18 | 6x2 = 12 | 6x1 = 6 | 6x4 = 24 | 6x2 =12 |
| Easy to open | WEIGHT FACTOR 11 | 11x3 = 33 | 11x4 = 44 | 11x4 = 44 | 11x5 = 55 | 11x5 = 55 | 11x4 = 44 |
| Easy to re-seal & return | WEIGHT FACTOR 8 | 8x3 = 24 | 8x4 = 32 | 8x2 = 16 | 8x5 = 40 | 8x2 = 16 | 8x3 = 24 |
| Easy to flatten & recycle | WEIGHT FACTOR 8 | 8x3 = 24 | 8x4 = 32 | 8x2 = 16 | 8x5 = 40 | 8x4 = 32 |
| Easy to fold and pack | WEIGHT FACTOR 12 | 11x4 = 44 | 11x3 = 33 | 11x4 = 44 | 11x2 = 22 | 11x4 = 44 | 11x2 = 22 |
| Aestatically pleasing | WEIGHT FACTOR 3 | 3x4 = 12 | 3x4 = 12 | 3x3 = 9 | 3x5 = 15 | 3x5 = 15 | 3x3 = 9 |
| Can be re-used | WEIGHT FACTOR 1 | 1x2 = 2 | 1x4 = 4 | 1x1 = 1 | 1x4 = 4 | 1x1 = 1 | 1x4 = 4 |

| 157 | 175 | 158 | 158 | 195 | 147 |
To test the strength of the four constructions and to see if they had any weaknesses, it was decided that a shipment test should be made. The destination for the packages was decided to Luleå where help was received regarding collecting the packages at the pick-up point, open them and then returning the packages to Sundsvall. Feedback was also provided here regarding how manageable the packages were when it came to opening and re-sealing them, and input was given concerning the aesthetics of the packages.

Unfortunately, the parcels seem to have got lost on their way back to SCA and therefore a full evaluation of the shipment could never be made. But the packages shape after being sent one way can be seen in appendix E.
In addition to the above methods, discussions with my supervisors and others at Arcwise, as well as study colleagues, have been helpful in the selection process. After the concepts passed through the shipment test, it was time for further selections and to choose the project’s final concept. This was done by listing the pros and cons of the four concepts and compare them against each other.

After this evaluation the first concept to be deselected was number #3, this with the reason that a packaging that holds a risk of opening during transport is not fit for being used as a e-commerce packaging. Concept #2 was here also discarded because of its simple form, it look much alike the packages already in the e-commerce market and does not show the material properties as well as the last two concepts.

**Concept #2**

**Pros:** Has a solid construction, no gaps. It is easy to open and re-seal.

**Cons:** Looks a bit “dull” compared to the other constructions and do not show the full potential of the material. This concept is also a bit trickier fold compare to concept #3 and #4.

**Concept #3**

**Pros:** Very fast to fold due to the construction of the sides, that easily are folded into the packaging. Those side flaps can also be used to hold smaller products in place, which reduces the need for filling material. The shape shows the material properties in a better way that concept #2.

**Cons:** Does not completely close and with rough handling there is a risk of the sides to open.

**Concept #4**

**Pros:** An exiting form that stands out and makes a god job in showing the possibilities with the material. Very easy for the consumer to open and re-seal.

**Cons:** Quite tricky to fold and by far the most time consuming of all the concepts. There is also a risk that the shape of the packaging can cause difficulties when it comes to packing products of different shape and sizes in the same packaging. It may also be considered as difficult to stack and transport by the shipment personnel.

**Concept #5**

**Pros:** Easy to fold and pack, especially if help in form of a jig is provided. The shape of the packaging shows the characteristics of the material in a good way.

**Cons:** Can be a bit tricky for the consumer to re-seal in case of a return. This is the construction with the largest roundings, which means a risk of gaps in the material.
DETAIL DESIGN

A further development of the remaining two concepts, #4 and #5, hereafter proceeded. A step back to the sketching table was taken, and brainstorming was made concerning how these two constructions could be simplified without compromising too much with their shapes. Inspiration was here found in the construction sketches of earlier concepts.

A test were made due to creating construction drawings of concept 5 in ArtiosCAD and cutting the model out in cardboard. These adjustments showed to have a positive outcome on the folding of the packaging which now was clearly simplified. Concept #4 was then also successfully constructed according to the same principle. The remaining step was now to choose the final concept and the two constructions was ones again compared to each other.

When comparing concept #4 and #5 they are now both easy to fold due to their similar constructions, and they both do a great job in showing the material and creating an interest. But in the means of transport and ability to pile, concept #5 is the more credible one, and was therefore chosen as this projects final concept.

The remaining development in this phase concerned finding suitable graphics to in the best way display the packaging, and to show how it could look like if used in the e-commerce business. This was started by searching the internet for inspiration and to see how existing e-commerce packaging within the chosen product category look like. The graphics were then developed in Illustrator, and the Illustrator plug-in program for ArtiosCAD were used to apply the graphics on the 3D-model for rendering.

METHOD DISCUSSION

In the beginning of this project I was very satisfied with my chose of design method – the Double Diamond process, I think is an easy to follow model with clear sections that divides the project into its different phases. But if I were to do this thesis again I would have gone for a three-phased process. This was nothing I thought about until I got to the writing of the result chapter of this report, and were about to display the result of every step in the project, I here had a bit of a hard time sorting the results in to the four phases Discover, Define, Develop and Deliver. I realised that Define really is the result of the work done during the Discover-phase, and maybe this also mean that Deliver should have been my results of Develop. In some way I guess that’s how it also is, but this does not exactly follow my work path. Now, afterwards, I think that a more appropriate model for me to follow would have been a three-step process, something like the HCD process that consists of the phases Inspiration, Ideation and Implementation. It would then have been easier to section my work into these phases. But despite of this realisation this report will follow the structure of the Double Diamond method, since this is the process that I have used as a guideline along my work.

Something I can say about the benchmarking is that it have really helped me to learn about this business area, when starting this project both packaging design and the usage of corrugated board was very new to me. So I am grateful that I got the opportunity to learn all that I have. If I would have had an opportunity to give myself a tip before starting this project, it would have been to try to do some field studies. I think that observing a packaging line and see how the handling of goods are made would have given me valuable information, and maybe also opened my
mind for new or other ideas. This was something that occurred to me a bit too late into the project, since I from the beginning mostly was focusing on the packaging from the consumer’s point of view, and not from the retailers. But I think such a visit could have given some valuable insights.

I would also have told myself to think about the timing of my interviews, I would have planned them a bit earlier and started to contact retailers before the summer months, as I think this would have strengthened my chances to talk to more people. But on the other hand, I am not sure if interviews held earlier in the process would have been possible, since I wanted to be sure on what questions to ask.

When it comes to the survey I am really amazed that I got so many answers, but something that could be mentioned here regards the answers I got. In one of the first questions in the survey I asked about the gender of the participants, which in some extent is not important, but I wanted to ask this question to see if any patterns could be found. This was however something that I wasn’t able to investigate, since of the 483 people that participated the survey, 95.6% identified themselves as female. How this has affected the result is hard to say, but it can be thought that it had some affect on the answers of bought items. As an example beauty products were rated really high, which may have been different if there would have been more male participants. But this is something that is hard to know and therefore only can be speculated about. And besides, about half of the population is female, which I think makes a valid point that the survey is still useable.

Something I can critique myself on and try to do differently in the future, regards the arrangement of the workshop. I am satisfied with the tasks given and the result, but not so much with my performance as a workshop leader. I hadn’t at the time gone through the agenda properly, so in the moment of the workshop I didn’t feel entirely secure in my role. I here had a few options regarding time limits and how some of the tasks should be performed, and therefore asked the participants a couple of times “do you think this is fine, or should we maybe do like this instead?” which of course is not the best way to lead a group. So from this I learned to better prepare for the next time, to have clearly defined tasks and be secure in the role as a leader, since this is something that I think also will show in the results. An other thought I after the workshop had, was that one or two group (or pair) exercises could have been suitable, something that I myself enjoy more than single exercises, since it lightens up the pressure of performance a bit.

Regarding the idea generation of this thesis I found the quick paper prototypes to be the best method that by far generated most of my ideas. It was at the beginning of this project hard for me to visualize how a construction drawing should, or could, look like from seeing the outer shape of a packaging. So, by folding something that looked like my sketches of the outer shapes, I was able to make this connection. When having a 3D paper model, I was able to take it apart piece by piece until I got a 2D shape of a package that then could be folded back together. By using this creative process my ideas always evolved into new ones and I had the possibility to try several constructions for the same 3D shape, and thereby find the most suitable one.

The narrowing of my ideas to the six concepts that was used for prototype building and further testing, was done by a natural selection due to construction weaknesses. After this the construction of the packages, their ability to meet the user needs, being easy to handle, and how well they displayed the material properties, were what was considered during the evaluation procedures.
RESULTS

This chapter presents the results of the main phases of this project, and ends with an explanation of the final design.
During the benchmarking, research was also made concerning what items mostly are sold online. This is something that primary were of interest since delimitations concerning the projects progression were about to be made. Packaging World (2018a) explained that the goods mostly sold in the sector of e-commerce are home electronics, books, media products, fashion, toys and hobby and sports equipment. BillerudKorsnäs (n.d) on the other hand stated that music, books and video games are the most popular items when it comes to online purchases.

The results of the benchmarking that was made are first and foremost a better understanding of the e-commerce market and the packaging industry. I’ve learned a lot of what a packaging needs to withstand and what the differences are between an e-commerce packaging and a primary packaging for in-house sales. For example, an e-commerce package goes through a significantly longer chain of handling points and therefore needs to be designed to handle this. This type of packaging’s primary purpose is to protect the products it carry, while a primary packaging instead has a clearer purpose of serving as a port of marketing and attract sales. Except for this deeper insight of the market, the benchmarking has resulted in the following list of needs that a well-designed e-commerce packaging needs to fulfil. The packaging should:

- Protect the product
- Be easy to carry
- Be easy to open
- Be able to re-seal an be used for returns
- Be easy to flatten and recycle
- Be as small as possible without unnecessary filling material
- Be designed an developed with focus on environmental impact
- Be aesthetically pleasing and have a well thought through form and graphics
- Be able to be saved and reused for other purposes
A survey was posted online with the purpose to gather material for own comparisons, and hopefully to strengthen the result from the benchmarking. What first of all could be seen it that the items most frequently bought online by the participants were clothes and accessories, books, beauty products, vitamins and pharmacy items, sports and outdoor equipment.

The above listed needs that were found during the benchmarking was also used in the survey with the aim to get a perception on what consumers see as most important and how these needs can be weighted against each other. It could be seen that the need for a packaging to be easy to open not at all was considered equally important in comparison to if the packaging were to be manufactured with respect to the environment, or if its size were to be optimized. Highest ranked of all the needs was the function to re-seal the packaging so it could be used for returns. Right behind this came the need of minimal use of excess filling material, and that the packaging should be easy to carry. On the bottom of the ranking, the needs for physical attributes such as an aesthetically pleasing packaging, or that it should be re-usable, could be found.

Questions was also asked if the participants would be willing to send empty packages back to the retailers, if the same packages then could be used again for other orders. The answers here were that many could imagine doing this, but only if the logistics would change. No one were willing to take the packaging back to the pick-up point, but suggestions were made that if the empty packaging just could be placed in the own mailbox and there be picked up by the postman, they could imagine a such solution.

To get some extra insight regarding the re-use of a packaging, a question was asked concerning what the participants would like to re-use a packaging for, and what would be required of the packaging for them to want to save it. It showed, as earlier mentioned, that the need for being able to reuse a packaging, alongside with the need for an aesthetically pleasing packaging, was relatively low. At least in comparison with the other needs. However, several answers implied that most important for wanting to save and re-use a packaging were an appealing design. As suggestions on what a packaging could be re-used as, the most frequent answers were; to store other items in, as pottery, or to save for later shipment of other items.

On the question “what packaging attributes can make you feel a little extra satisfied with your purchase?” many meant that a well thought through packaging that has that little extra is what makes it feel special. Listed as important was also the design of the packaging, its shape and graphics should be adjusted to suit the product it holds. Visual storytelling was also mentioned as something that can have a positive impact. If the retailer company for example has a positive environmental profile, this should be expressed on the packaging. There were also several answers telling that a packaging that is easy to carry and easy to recycle would give rise to an extra positive feeling. The use of only one material was also mentioned as important, to not have to separate paper, tape and plastics when recycling.
Interviews were held with retailers to get insights regarding their view on e-commerce packaging and what they see as important features. Since these interviews were held during the summer months, I only got the opportunity to hold two interviews. What was seen as most important differed a bit between these two companies. One was more focused on easy handling and price, whilst the other found more value in consumer experience and to deliver something out of the ordinary. The conclusion can therefore be that what is seen as important in the means of packaging design differs amongst companies depending on their values, mission and what items they are selling. A low-cost packaging that is easy to handle is of course always to prefer, but for a company that for example are very caring about the environment or sell exclusive products, these attributes can be compromised with to create an experience that are more align with the company’s values. It can therefore be said that it is always best to tailor the packaging for the specific demands of the company’s preferences.

Personas

The following personas were created as a result of the needs ranked as most important in the survey. Each persona has been given a scenario to illustrate difficulties that can occur when items are ordered online.
Sven

24 years old. Just started studying Economics at Mid Sweden University in Sundsvall and has newly moved to town. He doesn't own a car and haven't had the time to buy a bicycle just yet. He has approximately one to two kilometers to walk to the nearest grocery store and hence the nearest pick-up point. But how far he needs to walk to pick up a package depends on what delivery company the e-store uses.

Unfortunately none of the nearest grocery stores is on his way home from the university. So when he has an errand there, like picking up a package, he seizes the opportunity to get some food shopping done as well. As the optimist he often is, he picks up a few more items than the absolute necessary, **this can be good to have in the freezer** he thinks, and besides it’s not that far to walk.

But when outside of the store he realizes his mistake, the bags are quite heavy, and the package is too big to hold in one hand. He tries to find a grip that works, **same mistake every time** he thinks to himself. On the way home he needs to stop several times to readjust the grip so he doesn’t drop everything on the ground. Eventually he arrives at the apartment door, sweaty and with cramps in both shoulder and hands.

**Finally!** He drops everything on the hallway floor and shakes his arms. **Why can’t they make the packages easier to carry?..**

Karin

43 years old. Mother of three children in the ages 3 to 8 who works fulltime in the IT-industry. She likes to have a lot going and her days seems to be in constant movement. She has a natural curly hair that has taken her many years to master. After way to many experimental products she finally found a shampoo that makes her hair behave the way she wants it to, this is now the number one product in her hygiene routine. She has noticed that the bottle in her bathroom is starting to get empty but luckily she remembered to order a new one a couple days ago.

On Friday afternoon on the way home from her office she drops by OKq8 to pick up her package. Back home she hurry to unpack the shampoo before she needs to start with the dinner, her best friend with family are coming by for a visit. **But how do you even open this package?** she wonders, it seems to be glued in all sides. She manage to get hold of a corner and rips the packaging open, and.. It’s the wrong shampoo. **Of course**, she sighs. She is fairly certain this one will not work on her hair so she will need to make a return.

She looks down on the packaging that no longer is in one piece. **Maybe some, or a lot, of tape will do the trick**, she thinks. She walks over to the kitchen drawer where she knows that the tape is, picks it up and realizes the roll is empty. **Why don’t they make packages that are easy to open and re-seal?..**
Stina

29 years old. Work in the field of diet and health and often spend her evenings in one of the cities yoga centers where she is an instructor. Environment and sustainability is something that lies close to her heart and under the sink in her two-room apartment she has an impressive system for sorting her waste. She does not own a car but last spring she invested in an electric bike, a brilliant device according to her. If she needs to go out of town she takes the train, which works just perfect and it also gives an opportunity to read a good book.

She hasn’t really had the time to go downtown lately so she ordered a new highlighter she’s been longing for. It will be perfect for the garden parties this summer. She picks the package up from a small store with a PostNord pickup point, which is conveniently located on her way home from the yoga practice.

When the cashier passes her the package over the counter, she feels the irritation growing within her. In this package you could easily fit a pair of shoes, and her product must be small enough to fit in one hand. What a waste, she thinks as she grabs the packaging. At home when she opens the package it is filled with a good deal of extra material to counteract the highlighter bouncing around. She finds both paper and plastic in there, and in no time her buckets under the sink fills up. She likes her new product but from this company she will never order again. Why can’t they just make packages that fit the products and are easy to recycle?..
IDEA GENERATION

Since the whole process regarding the idea generation for me has been very iterative, and each idea instantly has been tested, it is hard to estimate the amount of early ideas. Something that was discovered during this project is that when working with packaging design one idea often generates ten new. Each packaging shape can be twisted and turned in eternity to find different construction solutions. The standard constructions can also be combined and modified to find a packaging that suits your own preferences, something that is common in this industry. Due to the product developed during this project, function has been of greater importance and therefore it became natural to constantly test and evaluate the ideas as soon as they were sketched. Several quite unrealistic ideas in complex shapes has been generated during this project, but they have more worked as an inspiration for further ideas since they did not pass the folding test when creating the paper prototypes. The workshop held in the beginning of the project generated a few ideas of this kind, and thereby was a great platform for getting the creative mind going and create a base of ideas to continuously build on.

PROTOTYPES

The ideas obtained through creative methods were early tested with the help of quick paper prototypes. This to investigate different design solutions and to see if the ideas was realistic feasible. Many ideas were combined with others into new concepts and then drawn in ArtiosCAD to try the constructions out. After a natural selection where initial ideas were abandoned due to being contractually fragile, not utilizing the materials characteristics or already existing on the market, iterations followed and finally the six following concepts were at my hands.
CONCEPT #1
A quite simple construction with the main focus on easy handling. The open ends of this packaging’s long sides will be glued together in the manufacturing process and the packaging is then sent folded to the retailer. One of the short sides is here glued together by a tape-strip. The other short side now serves as the opening of the packaging. This side too is provided with a tape-strip for sealing, but it also has an opening-strip that is to be used by the consumer.

CONCEPT #2
This packaging has a similar shape as the previous but instead opens from the top. Only one tape-strip, that is placed on the flap overlapping one of the long sides, is needed to seal this packaging. The opening-strip, and an optional tape for re-sealing is also placed here. The short side flaps are folded over for self sealing.

CONCEPT #3
This construction differs a bit from the others and focus were here placed on finding a design for quick folding. The corner flaps are pushed into the middle which makes the packaging’s sides to rise. The whole construction are then locked together by the help of a tape-strip, and the top flaps holds the two sides in place. To in an easy manner be able to pack any items in this packing a jig will need to be used. The side-flaps that folds into the packaging can also function as filling material by help holding the items in place.
CONCEPT #4

This construction were based on one of Arcwise existing packages, but modifications were done regarding size and how the packaging is sealed and opened. This packaging is quite tricky to fold so the main goal for this one is creating a packaging experience out of the ordinary. The packaging has double side layers and are folded together and locked by placing the flaps and . The tape for sealing and the opening-strip are placed here .

CONCEPT #5

This construction was inspired by the e-commerce packages used for shipping books, and the goal was for it to work as a gift wrap. The short sides are hooked together , and the longer sides are wrapped around them and sealed with a tape-strip . The flaps on the shorter sides hold them in place.

CONCEPT #6

This packaging opens from the top, like a backpack or a mailbox. It has double short sides and a double bottom. The smaller sides are placed inside the bigger ones and the construction is then locked together by the help of the flaps . The top flaps also helps with holding the sides in place and the lid is closed by a tape-strip.
In order to further narrow the concepts different evaluation methods were used. A concept selection matrix was made, the packages were shipped and discussions were held, both with the Arcwise group and with school colleagues. The concept selections were then made as follows.

From the matrix concept #1 and #6 were the ones with the lowest score and thus these were the first two to concepts to go. The shape of these two packages also looked much like concept #2 and #3.

For further eliminations the pros and cons the four remaining packages were listed and a test was made were the packages was shipped to Luleå. Here it was decided that concept #3 should be deselected, this due to the risk of its sides to open during rough handling.

Concept #2 was then deselected, due to not showing the material properties as well as the remaining two concepts. Concept #4 and #5 were then taken to the next phase, Detail Design, for further development and improvement.
With both of these two concepts, constructions problems could be seen when it came to folding the packages and packing them with items, since this considered to be too time consuming. Therefore a step back was taken here and different alternatives regarding the constructions were tested. Finally, inspiration was found in earlier construction drawings as can be seen below.

Both concept #4 and #5 are now constructed in the same way, with the shape of the short sides as the only thing that tells them apart. To test these new constructions, cardboard prototypes were made and the adjustments here showed to have a positive outcome. The remaining step was now to choose the final concept. Since both concept #4 and #5 now are easy to fold and pack, and they both display the material properties in a great way, the selection was made due to how easy they were to handle during a transport. Here it could be seen that package #5 was both easier to carry and pile due to its outer shape, and was therefore chosen as this projects final concept.
Figure 21. Printing file for the flower pattern.
After this last selection was made, it was time to focus on the details. This was primarily done in the terms of developing graphics to show possible designs options. The illustrations were made in Illustrator, and the graphics were then applied on the 3D models by using the ArtiosCAD plug-in program. The graphics were adapted to fit the construction drawings and the cutting and printing files were put together. Four variants of graphics, one independent and three made as a series were then printed to create realistic models of the packaging.

The reason that different variants of graphics were created was to visualize possible design options. The first pattern that was made is based on flowers and are a bit more cluttered than the others. The reason for this is that most packaging that today are used for shipping items are carefully decorated and I wanted to show something out of the ordinary.

Inspiration for this pattern was found in the earlier created mood board, where the yellow colour, some stripes and flowers can be seen.

Figure 22. Rendering of the final packaging with the flower pattern.
Figure 23. Printing file for the pattern series.
To verify that the packaging construction was suitable for several size options three different models was created. For these a more discrete pattern series was developed. This to create something that can appeal to those who prefer a bit more discrete packaging. The decision to create different patterns and use different colours for each packaging size, were due to making it easier to find the right package during the packing of products.

Figure 24. Rendering of the final packaging in three different sizes.
Here the final product of this thesis project is presented. This is an out of the ordinary secondary packaging suitable for the e-commerce, that has been designed to stand out amongst other parcels with the aim to create a positive unboxing experience for the end consumer. The packaging distinguishes itself from others on the market by its rounded shapes, and it exhibits the bendability of Arcwise in a good way.

With the help of an opening strip and double-sided tape for sealing, the packaging is for the consumer easy to both open and re-seal, and the shape of the packaging makes it comfortable to hold and carry. In the development of the packaging construction, the folding and packing of items has been taken into consideration, and with the help of a jig, that can be seen on the next spread, the handling is made even smoother.

The jig used for testing the functionality of the final construction was created of a thicker corrugated board, but for implementation in a business packaging line it will have to be constructed in a more durable material, as for instance plexiglas.

More images of the packages can be seen in Appendix F.
Figure 25. The final packages with prints.
How the package is folded by the use of the jig is illustrated in the following picture series.

Figure 26. Step-by-step folding.
Below the opening and re-sealing of the packaging is shown.
DISCUSSION & CONCLUSION

Here can a discussion of the result be found together with recommendations for further work and conclusions regarding the thesis task. The research questions are here also answered.
THE RESULT

I must start by saying that I am satisfied with the result of this project, my goal is not to just create products that look appealing, but that also are easy to use and can contribute to making the users day a little bit better. I think that this is something I manage to do since the package that constitutes the result of this project is really quick and easy to fold if used together with the jig, which can help ease the workload in a packaging line. The package is also easy for the consumer to open up and re-seal. When the opening strip is removed, the lid of the package automatically flips open, and when re-sealing the package all that needs to be done is to expose the glue of the tape-strip and fold the lid back over. I would also say that the aesthetics of the packaging helps in creating a positive unboxing experience, since this is something out of the ordinary and you can see that thought has been put in both the shape and the graphics of the package.

If comparing the pattern-files and the renderings with the actual packaging it can be seen that the colours differ a bit. In real life they are a bit darker and more subtle. This is due to the printing method, which in this case was digital printing, and the choosing of the colour on the corrugated board. If a white cardboard had been used instead of a brown, the printing colours would have looked sharper. The reasons that I chose to use a brown corrugated board for the packages are that I wanted to give them a more natural feeling, but also since it hides dirt and wear from the transports better than white corrugated board.

In the beginning of this project the task was quite extensive with the aim to find a multi-functional packaging solution for the e-commerce. I found this a bit hard to grasp and therefore felt the need to further specify the task. The survey regarding online shopping habits was here sent out, and from this result my supervisor and me decided on the focus area beauty and health. The packaging solution is therefore developed to fit the products in this category. But, since this area consists of a large amount of products in different shapes and sizes, the packaging is not tailored to fit a specific product. This means that the packaging also can be suitable for other types of items, such as maybe clothes or books, if its dimensions are modified. The quantity of products in this chosen category has been one of the challenges in this project. This since I wanted to keep the material use to a minimum, which in some extent depends on the direction of the rounded shapes of the packaging and how the items are placed in the package. If the chosen product category instead had consisted of one specific type of products, such as shoes or maybe wine glasses, the shape of the packaging would have been easier to customize.

During this thesis, discussions has been held regarding if the packaging could have been designed in a way that let the retailers modify its size in order to fit different orders. One of the benefits with such packages is that they often are cheaper for the retailers, since the price is depended on the purchased quantity. It is for example cheaper to order 1000 packages in one size, than to order 1000 packages in 2 or 3 different sizes. But, such packages would also mean that the waste would increase, since material would have to be removed in order to make the packages smaller. To find a way for this excess material to work as filler, that sometimes is needed to prevent the items from bouncing around in the packages, could be a solution to this extra waste. However, to develop such a modifiable packaging was nothing I primarily focused on during this project due to time limitations, and the fact that I wanted to keep the material waste to a minimum.

If I am to discuss my own work performance during this thesis, I feel that the choice to carry out this project on my own to some extent
has strengthened my self-esteem. I have had moments when I doubted my own abilities and wished that I had decided to write my master thesis together with a course colleague. But now, afterwards, I am glad that I didn’t. I have learned a lot about my own weaknesses and strengths. Earlier in my education almost every project has consisted of group tasks, which is something that I prefer since I consider myself more of a team player, but to always work in teams makes it easy to take the same role as you always have and feel most comfortable in. I therefore think that to do this thesis alone was a necessary experience for me. The biggest struggle has for me been to write this report, I am more of a detail worker and maybe little bit of a perfectionist which has made the writing quite time consuming. As always it is easy to focus on the work you find more appealing and save those more challenging tasks for later, and this is also the main thing that I wished that I had done differently during this project. If I had put some extra hours of writing in the beginning of this thesis, it would have made my last couple of weeks a bit less stressful.

RECOMMENDATIONS

For continuous work I would recommend that further testing of the package is done. The new construction needs for example to be shipped to test its durability, and best is if this could be done while containing a real order. This should also be done for each packaging size that is intended to be used. Currently, test has only been done on the middle-sized packaging.

Adjustments may also have to be made in what material quality and thickness that should be used, since some problems regarding the paper qualities used for creating the prototypes were found. In one quality the glue between the inner liner and the fluting came loose when using a tape-strip for sealing. In another, thicker, quality this problem did not occur but it was instead a bit hard to open the package by the use of the opening-strip.

To meet all the needs that were found in this project, further work needs to be done concerning how to make the package easier to carry. For the sizes that the construction of the packaging has been tested in, this is not a problem, but for bigger packages some sort of handle may be to prefer. Maybe a handle in corrugated board can be integrated in the design?

Marketing actions also needs to take place to get the package out on the market; retailers need to be aware of that packaging with round shapes is an option. The sizes of the packages may also need to be adjusted according to product preferences or the demands of shipping-companies.
Except for exploring the market of the e-commerce to find out what makes an ideal packaging for this area, and according to this develop a packaging solution. My task for this thesis project was to look into the pros and cons of using Arcwise as a material for this type of packaging.

My conclusion according to this is that what is most beneficial with a bendable material is that it opens for endless possibilities. It makes it possible to create packages that really stands out of the crowd, and this type material also makes it easier to create customized packaging that fit the products perfectly. That Arcwise can contribute to a higher stacking strength, which makes an material reduce possible, is also a plus.

Disadvantages by using Arcwise for this type of outer packaging can on the other hand be seen in the high demands that are put on such packaging constructions. Packages used for this purpose is often subject of rough handling during the shipment processes, and they need to be able to guarantee protection of the products. When creating packaging with rounded shapes, small cavities can often be seen between the surfaces, which in a worst-case scenario can cause small items to fall out of the packaging. The solution I used to address this problem in my construction was to create small flaps to lock the surfaces together and keep the sides of the packaging in place. This can on the other hand lead to more complicated folding of the packaging. My suggestion is therefore to further investigate this phenomenon to find an optimal solution.
RESEARCH QUESTIONS

Below, the research questions that were formulated in the beginning of this project are answered.

1. What distinguishes a packaging made for the online retail?

What first and foremost differentiates an outer packaging that are to be used in the e-commerce, compared to a primary product packaging, is that it has to protect the product it carries. An e-commerce packaging goes through a significantly longer chain of transport with several handling stops on the way, and shipment companies are not known for handling the parcels with care. Therefore this type of packaging needs to be constructed in a way that can handle this. A packaging used for in-store sales acts on the other hand more as a means of marketing, and is primarily used to attract for sales.

2. How is value defined and created in this area?

In this product category the creation of value can be defined as a positive user experience. To create such, it is important to ensure that the packaging fulfill the needs that has been defined during this project. This mean that besides protecting the products, the secondary packaging should be easy to carry, open, re-seal and recycle. It should also be of the right size and contain as little material as possible, at the same time as it is produced in a sustainable way and looks appealing. If the packaging can be saved for other purposes this is also a plus. Best is of course if a packaging has as many of these attributes as possible, but in order to find out what was considered as most important by the consumers, questions was asked in the survey that was sent out. Here it could be seen that for the consumers to be satisfied with their purchase, most important were if the packaging was developed in an environmentally friendly way, if the filling material was kept to a minimum and if the packaging was easy to re-seal and carry. The questions and answers of the survey can be seen in appendix B.

3. What is needed to create a positive unboxing experience?

Through this work I have learned that to create a positive unboxing experience, care needs to be put in the packaging. This can for example be done by constructing the package in such way that the handling, such as the carrying, opening and re-sealing works smoothly. Other ways to achieve this is to put some extra thought in the design, to display well thought through graphics or to construct the packaging with focus on minimal environmental impact. An extra nice wrapping of the products, with paper, a bow and a thank you-card also generates a positive experience amongst the consumers.
REFERENCES

Here can all the references that has been used in the writing of this report be found.


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Appendices

A - Example of Arcwise construction catalogue 2 PAGES
B - Survey 6 PAGES
C - Interviews 2 PAGES
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Example of Arcwise construction catalogue
2 pages
Appendix B
Survey - the answers of 483 participants
6 pages

What age are you?

- 65.6% - 20 to 30 y/o
- 19.2% - 31 to 40 y/o
- 8.1% - 41 to 50 y/o
- 4.1% - 51 to 60 y/o
- 2.7% - under 20 y/o
- 0.2% - over 60 y/o

What gender do you identify yourself with?

- 95.5% - Female
- 3.7% - Male
- 0.6% - Other

How often do you shop online?

- 41.7% - 6 to 11 times a year
- 34.6% - 1 to 3 times a month
- 4.2% - 1 to 2 times a week
- 19.4% - 1 to 5 times a year
- 0.2% - More than two times a week
What items have you bought online during the last 12 months?

- Clothes and accessories: 86.5%
- Beauty products: 62%
- Books: 45.5%
- Supplements, vitamins and pharmacy items: 44.7%
- Sport and outdoor equipment: 37.4%
- Food: 28.7%
- Home electronics: 27.2%
- Hobby articles: 19.5%
- Furniture: 17.9%
- Consumables: 15%
- Baby items: 14.8%
- Kitchen-ware: 11.6%
- Household appliances: 10.4%
- Items for pets: 10%
- Major appliances: 3.3%
- Other: 0-0.6%
How important are the following packaging attributes on a scale from 1 to 6, were 1 is “not important” and 6 is “very important”?

- The packaging should protect the product.

- The packaging should be easy to carry.

- The packaging should be easy to open without the use of tools, such as scissors or knife.
• The packaging should be able to re-seal and used for returns.

• The packaging should be easy to flatten and recycle.

• The packaging should be as small as possible and not contain excess filling material.
• The packaging should be manufactured in a sustainable way.

• The packaging should be aesthetically pleasing and have well thought through shape and graphics.

• The packaging should be able to save for other purposes.
Except for protecting the product, which of the above attributes do you find most important for you to be satisfied with your purchase?

![Pie chart showing percentages]

- **23.1%** - Re-sealing and use for returns
- **6.9%** - Easy to recycle
- **20.1%** - No unnecessary filling material
- **16.6%** - Manufactured in a sustainable way
- **1.3%** - Astatically pleasing
- **9.1%** - Nothing is that important, just want my products
- **19%** - Easy to carry
- **3.9%** - Easy to open

If a packaging could be used several times for shipping different orders, would you then return your packaging to the retailer?

Answer on a scale from 1 to 6 were 1 is “no, I probably wouldn’t” and 6 is “yes, of course I would”

![Bar chart showing percentages]

- **12.1%** - 1
- **15.2%** - 2
- **12.7%** - 3
- **20.2%** - 4
- **16.6%** - 5
- **23.3%** - 6
My Muse

What is most important to you when it comes to choosing a packaging for your products?

For us price and quality is most important when choosing a packaging. But the packages also need to be quick and easy to pack and look good for the consumer. Here at MyMuse we have two packages, one primary and one secondary. For us most focus lies on the primary packaging. The demands we have on the secondary packaging is that it needs to be discreet and suit the primary packaging, and since this is not the primary focus for us, it needs to be quite cheap.

Why do you use two packages if the price is an important factor, wouldn't it be cheaper to just wrap the items in maybe tissue paper and then use a well designed secondary packaging?

Uhm, good question. We haven’t really thought about that. I will keep that in mind.

Are you satisfied with the packaging you use today?

The primary packaging is okay but sometimes the folding is a bit tricky and takes time. The secondary packaging does its job.

How does the handling of your packages look like, when it comes to housing, raising and packing?

The secondary packaging arrives pre-glued and flat so it is really quick and easy to fold. To close this packaging there is a tape strip. As I said earlier the primary packaging takes a bit more time and sometimes folding the edges are a bit tricky.

What are your costs per packaging?

Our packages costs us 5,94 nok and 6,47 nok, so that’s a total packaging cost on 12,41 nok per item.

Where do you order your packages from?

We order from bestemballage.no

What are your thoughts when it comes to environmental impact and sustainability?

This is not a focus for us, so we haven’t really thought about that.

What shipping company do you use when sending your products to the costumers?

We use Bring to send our products to our Norwegian costumers. But when we ship to Sweden Bring has an collaboration with Dhl.

LYKO

What is most important to you when it comes to choosing a packaging for your products?

The most important thing in my world is a package that is easy to work with. Of course it also needs to withstand a rough handling, but first and foremost the folding and packing needs to work smoothly and fast. An advantage is also if the packages arrive flat, so as many packages as possible can fit on a pallet. So you don’t have to fill up the stack at the packaging table all the time.

Are you satisfied with the packaging you use today?

Very satisfied, we have been experimented with different alternatives over the years, but have now found a solution that we are very pleased with.

Is there anything you would like to change with your packaging?

Right now we feel satisfied, but we are in the process of building a completely new automated warehouse. This
will change the packing conditions completely, so we will probably need to change our packages as well. But this is nothing we have started to look into yet, since our new warehouse won’t be finished until about two years from now.

**How does the handling of your packages look like, when it comes to housing, raising and packing?**

We are currently folding our packages by hand, but the idea is an automated solution later on. All but the two biggest packages have a tape strip for sealing, so it’s only the two biggest ones that need to be taped by hand. The packages also have an opening-strip the customer can use, but they do not have any tape-strips for re-sealing since returns for us are rare. In the future, we will probably have an automated line for single boxes, but a fully automated packing is difficult to achieve as our products require a lot of handling. For example, shampoo bottles must be taped so they don’t leak, and glass bottles must be wrapped in corrugated cardboard.

**What dimensions do your packages have?**

We have six different packaging sizes and one padded envelope, unfortunately I don’t remember the exact measurements right now. We have two smaller single boxes for individual products, I think the smallest is about 14x13 cm. We use this package to send individual items like nail polish or maybe a wax can. The other smaller package is a little longer and is used for shipping for example a spray or shampoo bottle. The medium size we have is the one that we use most, and a standard order for us consists of some bottles, maybe shampoo and conditioner, and a smaller item. Later with our new packing system, we will have the opportunity to measure our orders in order to optimize the choice of packaging.

**What are your costs per packaging?**

Our smallest package cost us approximately 1.2 sek per package, and then the price increases by about one Swedish crown per size. Our largest and most expensive package cost around 7.50 sek.

**Where do you order your packages from?**

We order our packages from Nöjd, www.nojd.com.

**Are your packages custom made or are they standard packages chosen from a website or catalogue?**

Our packages are custom made after our requirements.

**How common are returns of your products?**

Not common at all, I think returns are under one percent of our shipped orders. Items sent back are often electronic devices that don’t work as they should, like hair straighteners.

**What are your thoughts when it comes to environmental impact and sustainability?**

We try to think about this issue but it is very difficult. Of course you try to find a packaging that is easy to use and don’t cost too much, at the same time as it is good for the environment. But such packages can be a bit hard to find. The choice we have made is to only use paper in our whole shipment process, for example we use corrugated board instead of bubble wrap to protect fragile products.

**What shipping company do you use when sending your products to the customers?**

PostNord and Shenker are the two largest companies but we have several different alternatives so the shipment depends on the customers choosing and location. We have alternatives for home delivery but these alternatives only apply to customers living in larger cities.
Matrix one shows the scores for each need, telling how important it is compared to the others. These scores, telling the weight factor, were then used in matrix two.

<table>
<thead>
<tr>
<th>Easy to carry</th>
<th>Easy to open</th>
<th>Easy to re-seal &amp; return</th>
<th>Easy to flatten &amp; recycle</th>
<th>Easy to fold and pack</th>
<th>Aestatically pleasing</th>
<th>Can be re-used</th>
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</thead>
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</table>

Matrix one shows the scores for each need, telling how important it is compared to the others. These scores, telling the weight factor, were then used in matrix two.
Matrix two shows how well each concept fulfilled the needs on a scale from 1 to 5. These points were then multiplied with the weight factor and summarized for a final score.

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<th>Concept</th>
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<th>Koncept 3</th>
<th>Koncept 4</th>
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Appendix E
The four concepts after the shipping-test
2 pages
Appendix F
Images of the final design
4 pages