Master of Science Thesis

Supporting sustainable packaging decisions

A design proposal for increased sustainability focus in ICA Special's packaging development process

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Gothenburg, June 12th 2019

Daniel Berg and Oskar Samuelsson

ABSTRACT

Packaging fills an important role by protecting goods as they move through the supply chain. If designed correctly, the benefits outweigh the disadvantages from an environmental sustainability perspective. However, finding this balance is not easy, especially when this responsibility is assigned to someone who is not an expert in the field. This study aimed to investigate how design could be used to support sustainable decisions regarding packaging. The study was conducted in collaboration with Ica Special, the division that is responsible for the majority of non-food goods sold at the Swedish retail company Ica.

The study consisted of two phases, where the purpose of the first was to identify opportunities for increased environmental sustainability connected to decisions regarding packaging of non-food goods. To do this, interviews, workshops and field studies were conducted which formed the basis for the results of the first phase, a set of guidelines that should be regarded when implementing the design concept, in order to successfully support the development of sustainable packaging at Ica.

In phase two, the purpose was to design a concept that could facilitate the selection of sustainable packaging alternatives during the decision-making process. The guidelines for implementation was used during the ideation, where ideas were developed for how to improve the packaging development process from a sustainability perspective, as well as how to support product managers throughout this process. The phase resulted in a design concept consisting of two artefacts and a proposed working procedure. The first artefact is an informative packaging guide which aims to increase product managers' and suppliers' awareness and knowledge of sustainable packaging. The guide also contains a set of questions that can be used to identify packaging in the existing assortment that should be revised, and how these should be prioritised. The second artefact is an interactive checklist, which is to be used as a quick-assessment tool when choosing packaging for a new private label product. The proposed working procedure aims to standardize the packaging development process at Ica, and provides guidance for product managers on how to utilise the designed artifacts in an efficient way.

The designed concept is the result of an extensive study where multiple stakeholders that in some way affect or are affected by the packaging development process have been included on several occasions. It also encompasses the majority of aspects that affects the packaging sustainability. It can therefore be argued that it will aid in the development of sustainable packaging at Ica Special.

TERMINOLOGY

Artefact: This term refers to any man-made tangible or intangible object, for example a product or a service.

Ica Special: The division of Ica Gruppen responsible for the majority of non-food products in their assortment. They will further on in the report be referred to as Ica.

Private label: Products sold under the brand of a retailer but produced by another company.

Packaging development: In this report, this term refers to the optimisation of a package in the purchasing process between retailer and supplier.

Sustainability: If nothing else is stated, this term refers to environmental sustainability throughout the report.

CONTENTS

PHASE TWO

01. INTRODUCTION

This chapter outlines the background, aim, research questions and demarcations of the project, as well as an overview of the report disposition and the project process.

1.1 BACKGROUND

In modern economy, packaging plays a fundamental role as the majority of products we consume are bought and not produced by ourselves. Packaging is necessary in order to ensure protection when these products are being transported from producer to consumer. However, the fact that packaging generally is disposed of after use means that the environmental impacts are considerable. In 2016, the accumulated waste generated from packaging in the European Union was estimated to 86,689,000 tonnes (Eurostat, 2019).

Sustainable packaging is getting increased attention by consumers, partially due to implementation of new legislations from governments (Pawaskar, Raut & Gardas, 2018). According to a study conducted by Innventia, consumers prefer paper over plastic in packaging and tendencies to refrain a purchase due to an unsustainable packaging is not uncommon (Innventia, n.d.). In a survey from 2018 conducted in seven european countries, over 50 percent of the respondents had switched brands due to concern for the environmental impact of the packaging. Moreover, nine out of ten respondents wanted labelling demonstrating the environmental status of the packaging (Pro Carton, 2018).

Organisations are also starting to attend to the problem. In 2018, the Swedish Food Retailers Federation announced that all its members should have packaging that is either fossil-free or recycled by 2030 (Jönsson, 2018). Swedish FTI, Förpacknings- och Tidningsinsamlingen, who are responsible for collecting and managing disposed packaging, will in 2020 increase their fee for packaging materials not compatible with recycling systems. This will distinguish paper and plastics with good or bad recyclability as an incentive for companies to develop better packaging.

However, packaging is a complex matter as it serves different stakeholders many different purposes at different parts of its life-cycle. Producers want it to protect the product throughout the supply-chain, retailers demand marketing attributes and consumers want the packaging to be informative. This means that meeting, or exceeding, sustainability goals by making sustainable decisions regarding packaging can be hard.

Ica Special, the part of Ica Gruppen responsible for the majority of non-food products offered at Ica's retailing stores, initiated this project as the organisation is currently increasing its environmental sustainability focus. The scope for this project is to develop a concept that provides guidance on how to make sustainable packaging decisions for their employees involved in developing and purchasing products and packaging from suppliers. Although sustainability in a business context must account for environmental, economical and social aspects (Svanes et al., 2010), the focus of this thesis is to improve the environmental sustainability of packaging developed and purchased at Ica.

1.2 PURPOSE

The purpose of this project is to identify opportunities for increased environmental sustainability connected to decisions regarding packaging of non-food goods at Ica Special and to design a concept that facilitate the selection of sustainable packaging alternatives.

1.3 RESEARCH QUESTIONS

The following four research questions were posed and explored in order to achieve the defined project purpose:

- Which factors determine if one packaging alternative is more sustainable than another?
  The concept being designed has to encompass the different factors that affect the packaging sustainability.

- What factors, apart from environmental sustainability, affect packaging decisions at Ica Special?
  In order for the concept to be viable it must regard other demands than environmental sustainability as well.

- How are packaging decisions made at Ica Special today?
  By understanding how and by whom packaging decisions are made, one can derive where (and if) pitfalls and lack of knowledge exist that hinders the most sustainable option to be chosen.

- Can an artefact be designed that facilitates the selection of sustainable packaging?
  Ideation of concepts and following evaluation will be done to derive answers regarding if the insights gained can result in an artefact that aid and facilitate the product managers' decision making.

1.4 DEMARCATIONS

The project focuses on the packaging development of Ica's private label products, as Ica has greater control over the process from design to store on these goods compared to third-party label products.

The project does not focus on designing alternative or new packaging solutions.

1.5 PROJECT PROCESS

The project consisted of a research phase and a concept development phase, see figure 1.1. The research phase investigated how Ica conduct sustainable packaging development today. User and stakeholder needs and attitudes towards increased focus on sustainable packaging were also heavily emphasised. This phase resulted in a number of guidelines that should be met by a design concept in order for it to facilitate the development of sustainable packaging. The concept development phase consisted of ideation-, prototyping- and evaluation methods which aimed at producing an concept that regarded all aspects of sustainable packaging and met the defined guidelines. This phase resulted in a concept consisting of two artefacts and a proposed process for how to develop sustainable packaging.

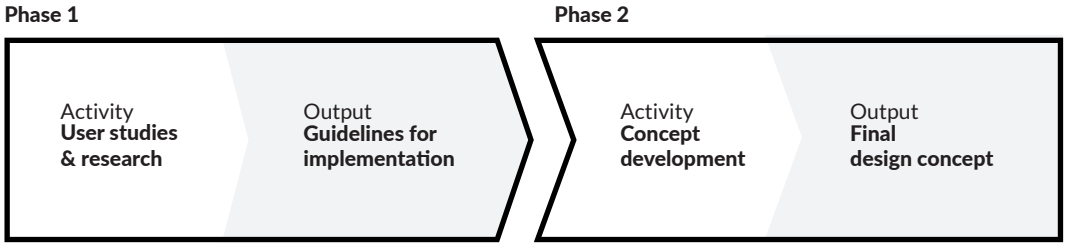


Figure 1.1

The project process

1.6 REPORT DISPOSITION

The report is structured as follows: First, relevant theory is presented. Secondly, the two phases are described one at a time, starting with the process undergone followed by the results of that phase. Lastly, the overall results and conclusions from the study are presented and discussed.

1.7 INTRODUCTION TO ICA SPECIAL

As mentioned, this project is conducted at Ica Special, the division of Ica Gruppen responsible for the majority of non-food products in their assortment. The product categories they maintain are; kitchen supplies, cleaning supplies, garden, lighting and light sources, candles, disposable products, consumer electronics, clothing, media and home office. Since Ica is a retailing company all products in their assortment, including their private label products, are produced by suppliers. The process from sourcing a new product to it being bought by a consumer involves many decisions and actions from several roles. The details and connections between these roles will be further explained later on in this report. However, below is an introduction to the essential roles involved in the decision making process regarding the products and their associated packaging.

Advertising: Makes all graphical design on the private label products, both decision on the general design templates and the fitting to each product in the assortment.

Category manager: Has the overall responsibility and is in charge for strategies in each of Ica's product categories.

Corporate responsible: Makes sure all products comply with current regulations. Also construct the internal goals and requirements on social, environmental and quality factors.

Logistics: Makes sure the transportation from supplier to the stores is safe and efficient. Has responsibility for both the actual transport and warehousing.

Merchandiser: A role at Ica Global Sourcing (IGS), situated in Asia, responsible for sourcing suppliers in that region.

Private label coordinator: Responsible for coordinating the development of products and their packaging sold under Ica's private labels.

Private label strategist: This function owns the strategic decisions for all products sold under the private label.

Product manager: The most extensive role, whose work tasks stretch from sourcing products and changing designs to meeing budget demands. The role is also responsible for packaging development.

Product manager assistant: Has the main responsibility in aiding the product managers in administrative tasks.

Space manager: Is responsible for layout and product placement in-store, as well as the number of products that should be displayed on shelves.

02. THEORY

This chapter presents the necessary theoretical frameworks regarding sustainability and packaging. The definition of a product-packaging system is explained, after which the general life-cycle of a package is described. The chapter concludes by presenting the factors that affect the sustainability of a product-packaging system.

2.1 PRODUCT-PACKAGING SYSTEM

In the eye of a consumer, the packaging of a product in most cases refers to an enclosing material around the actual product one aims to buy. This unit is in retailing defined as primary packaging. The purpose of the primary packaging is, apart from being sustainable, to protect and preserve its contents, present adequate information and facilitate display of the product. Before this can happen, several steps are required. First, products are transported from factory to stores or distribution centrals on pallets and in order to organise, conduct safe transport and distribute the appropriate number of products to each store, one or two additional levels of packaging are used. The level above primary packaging is defined as secondary packaging (ECR Sverige, 2018). The main tasks of secondary packaging are to hold several primary packages in order to stow them on a pallet and to allow for easier distribution of products to each store. Depending on the size of the secondary package, a tertiary package could be required in order to secure it on the pallet (ECR Sverige, 2018). Figure 2.1 illustrates the relation between the various levels of packaging used in distributing a consumer goods, from primary packaging to pallet.

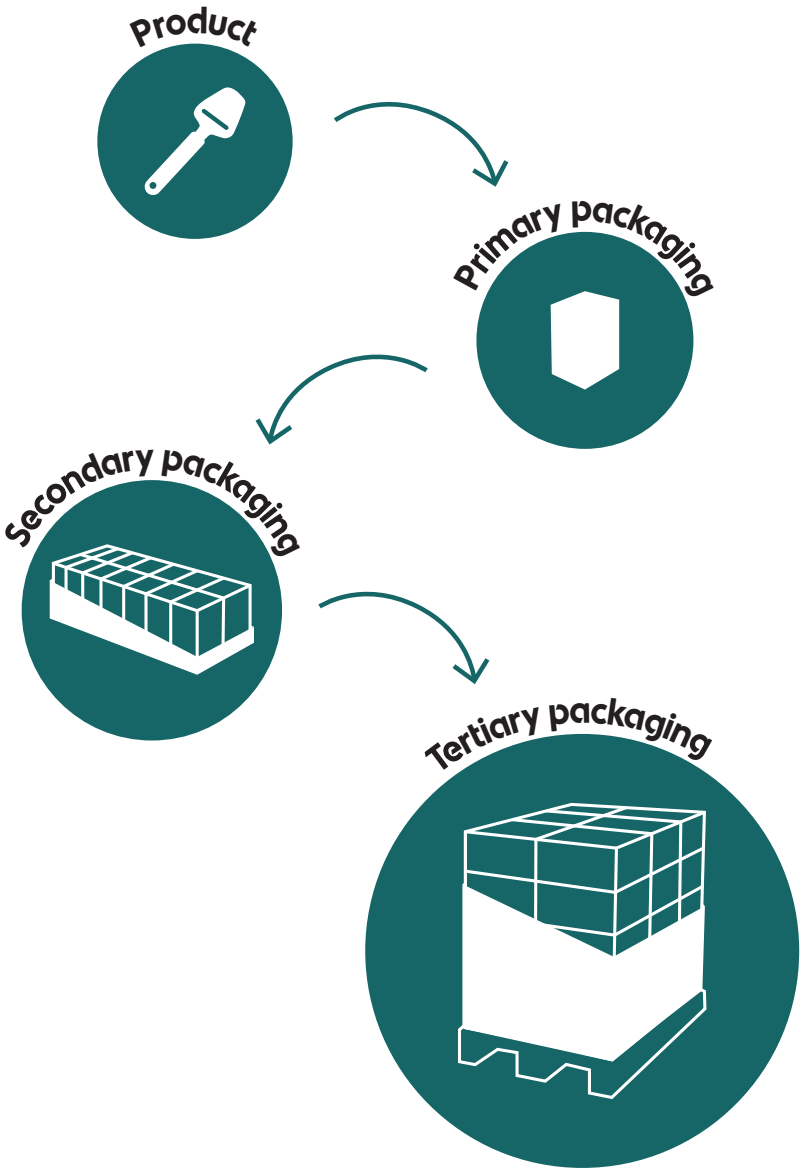


Figure 2.1

Packaging units and how they relate

2.2 LIFE CYCLE OF A PACKAGE

The life cycle of a package consists of the five stages illustrated in figure 2.2; sourcing, manufacturing, distribution, use and end-of-life (Sustainable Packaging Coalition, Green Blue Institute, 2006).

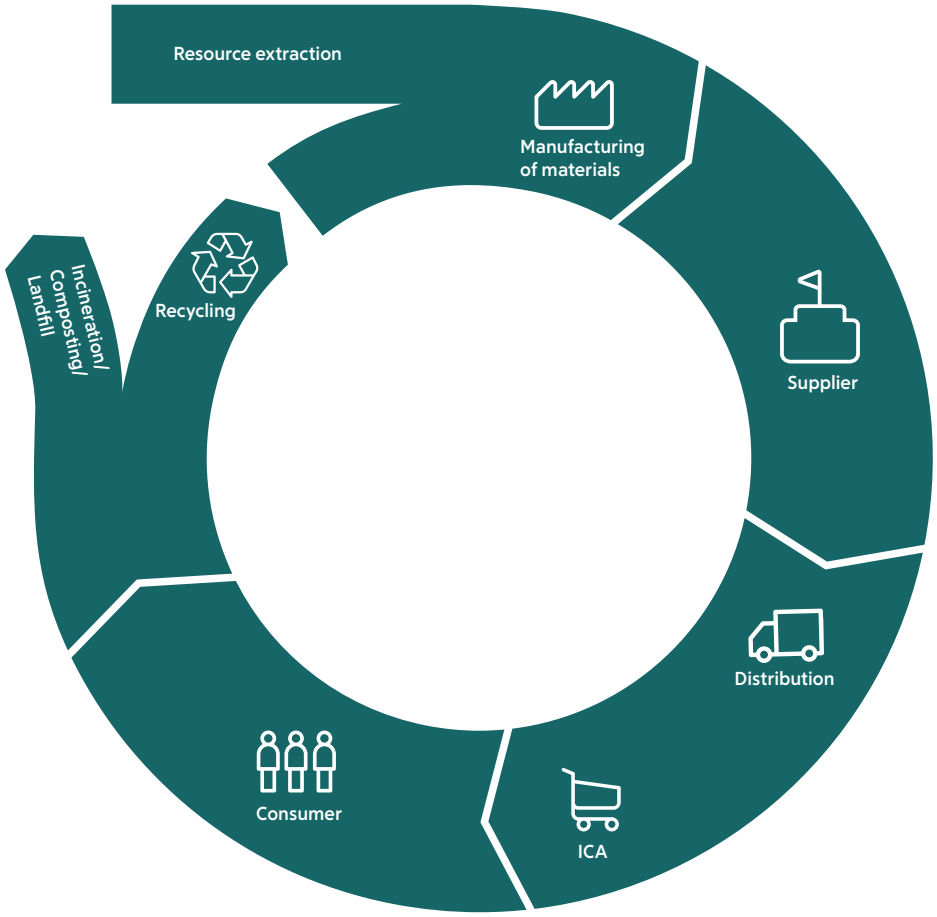


FIgure 2.2

The packaging life-cycle

Sourcing includes the extraction of raw materials, e.g. polymers and paper pulp, or utilizing recycled content as feedstock. In the manufacturing stage, materials are manufactured and then converted into packaging. The distribution stage includes transportation all the way from the manufacturing location to the end-customer, as well as intermediate warehousing and retailers. The use stage includes the use and disposal of the packaging by the end-customer. In the end-of-life stage, the packaging can take four different paths: landfill, incineration, composting or recycling. Reuse is also a possible path, where the packaging could return from the customer to the retailer, or from the retailer to the product manufacturer (Sustainable Packaging Coalition, Green Blue Institute, 2006).

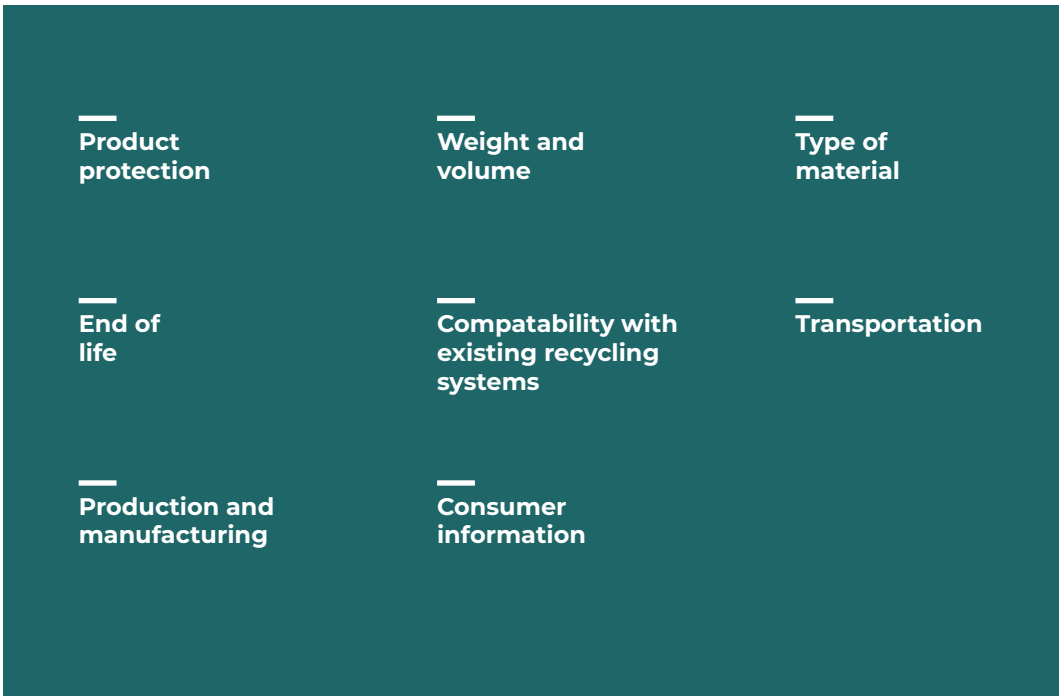
2.3 SUSTAINABLE PACKAGING

Svanes et al. (2010) stresses the importance of considering all three pillars of sustainability during development in order for innovation to be viable. This include environmental sustainability, economic viability and social equity. Economic- and social sustainability already have high priority at Ica. To gain an increased balance among them, this thesis focuses on improving the environmental sustainability of packaging at Ica, which is wht the presented definition of sustainable packaging regards the environmental aspects of sustainability.

There is a widespread consensus in the reviewed literature concerning the factors affecting the sustainability of a product. All factors are not mentioned unanimously but there is a common core. This section will present the eight different factors identified in the literature that should be considered in packaging development with respect to environmental performance. A solution for how to balance the different aspects of sustainability could not be found anywhere in the reviewed literature. Neither were any findings presented on how to balance sustainability demands with the economical viability of a product, when these two clash.

Figure 2.3

Aspects of sustainability



Product protection

One of the primary purposes of the package is to protect and preserve the quality of the product it is associated with (Azzi, Battini, Persona & Sgarbossa, 2012). If this fails the environmental impact of the entire product-packaging system will probably increase due to a discarded product that can not be sold. This is due to the product and not the packaging often being the biggest contributor to negative environmental impact (Lewis, Fitzpatrick, Verghese, Sonneveld & Jordon, 2007).

Factors that affect packaging sustainability:

- Degree of product protection

Weight and volume

Two intertwined and important factors are the weight of material used in a package and the volume of the package itself related to size and shape of the product. These factors refer to reducing unnecessary material in the package as well as making sure the volume is optimized for its purpose, since unnecessary material uses excessive resources. Lewis et al. (2007) describe this matter as efficiency in packaging volume and weight. Svanes et al. (2010) describe it in terms of material intensity and degree of filling. What both sources agree on is that these optimisations should never overrule the minimum requirement for protection of the product.

Factors that affect packaging sustainability:

- Packaging weight
- Packaging volume

Type of material

In the job of optimising a package for the best environmental performance, the choice of material is an important factor. However, deciding what aspects of material to consider and how to prioritise them is far more complex. In literature, four aspects that regard the sustainability of a package based on its material are mentioned. However, no source define how to prioritise among them.

According to Astrup, Fruergaard and Christensen (2009) the required energy and climate impact is generally always lower for recycled material compared to its virgin counterpart. Therefore, a material that is recyclable should be used in all cases possible, to as high fraction of the total package material as possible. Materials in Sweden relevant to this project are, according to FTI (2018a, b), paper, cardboard and variations of polypropylene and polyethylene.

Plastic has not historically been considered as a renewable material, that definition has only been denoted to fiber-based materials e.g. paper or cardboard. This has changed though and today plastic can be made from bio-based sources such as corn and and sugar canes (Spierling et al., (2018). The plastic made from these resources, defined as bio-plastic, can have the same mechanical properties and material structure as their fossil based counterparts, meaning no difference in practical applications according to FTI (2018b) and Sperling et al. (2018). Bio-plastics are mentioned by numerous sources to have great potential save carbon dioxide equivalents (CO_2 eq) compared to fossil counterparts (Spierling et al., (2018) and (Tsiropoulos et al., 2015). However, current calculation methodologies and production methods vary in their data to give a definite answer to this matter, meaning no unambiguous recommendations for all situations can be given.

The use of recycled material is always preferable from an environmental point of view. Sevigné-Itoiz, Gasol, Rieradevall and Gabarrell (2015) express that the exact environmental savings from using recycled plastic instead of virgin plastic depends on where the material is recycled, mainly due to the electric consumption of the recycling plant. However, all of their case studies still showed a net saving in using recycled content. This is also confirmed by Astrup, Fruergaard and Christensen (2009) and Mourad, Garcia, Vilela and von Zuben (2008). Clean fractions of plastic can be recycled infinite times (Wallman & Nilsson, 2011) meaning the potential saving of continuous recycling is significant. An active choice of using recycled material in

package development is therefore desirable when a plastic material must be used. Paper does not have the same difference in Global Warming Potential, GWP, as plastic in regards to virgin and recycled pulp. The production of paper pulp does not introduce as much CO_2 in the atmosphere as plastic from fossil sources does, though recycling is still preferable (Mourad, Garcia, Vilela & von Zuben, 2008). The quality of paper pulp decreases with each recycling stage, leading to loss in mechanical properties and ability to be used in packages where i.e. high quality print is desired (Mourad, Garcia, Vilela & von Zuben, 2008). With a maximum recycling of five times for an entity of paper pulp, virgin material can not be replaced completely. Nevertheless, using recycled pulp will decrease environmental impact.

The choice of material should also be based on the recovery value of a material. FTI (2018b) has in addition to what materials are recyclable declared the actual secondary market for the most common plastics. Because even if one material can be recycled, if the quality is too poor or the price too expensive for an actual implementation there is no real value in recycling. PP, HDPE and LDPE-film are all considered to have a good recovery value according to FTI (2018b). PP-film is possible to recycle but should be avoided since the market is not as extensive as for LDPE-film. PET bottles also have a good recovery value, but no other packaging of that material. Polystyrene (PS), expanded polystyrene (PS) and polyactic acid (PLA) are fairly common plastics that can be separated in the recycling facilities but there is currently lacking treatment methods for these plastics, which means that they should be avoided by all means possible (Förpacknings- & tidningsinsamlingen (2018b).

Factors that affect packaging sustainability:

- Amount of recyclable material
- Amount of renewable material
- Amount of recycled material
- Recovery value of material

End of life

How the packaging material is treated at its end of life greatly affects its environmental impact, as producing new resources are the biggest contributor to GWP (Astrup, Fruergaard & Christensen, 2009). There are three potential paths at this step; reuse, recycle and waste treatment (Sustainable Packaging Coalition, Green Blue Institute, 2006). According to the Ellen MacArthur Foundation (2012), reuse is preferable over recycling which in its turn is preferred over incineration or landfilling. In terms of emissions from the material itself, paper shows no benefit for recycling since the virgin material does not introduce any new carbon dioxide to the system. however, emissions from the production facility is higher for virgin pulp compared to recycled (Mourad, Garcia, Vilela & von Zuben, 2008). For fossil plastic materials, these savings are greatly present, as producing new material of that sort introduces additional carbon dioxide to the atmosphere (Astrup, Fruergaard & Christensen, 2009).

Factors that affect packaging sustainability:

- Whether the package is reused
- Whether the package is recycled
- Whether the package is incinerated or landfilled

Compatibility with existing recycling systems

There are a number of packaging design elements that affect packaging's compatibility with existing recycling systems. The material composition as well as adhesives, printing, colors and additives used in the packaging determine to what extent it can be recycled.

A fundamental action when designing recyclable packaging is to use mono-materials. Combined materials introduced to the recycling system will be harder to identify and to separat which could cause contamination of the recycled product, leading to worsened mechanical properties and visual abilities (Förpacknings- & tidningsinsamlingen (2018b).

If possible, glue and other adhesives should be avoided in the package. But if necessary, water-soluble adhesives are preferable since they cause less contamination during recycling (Förpacknings- & tidningsinsamlingen (2018b) The glue should be water-soluble below 60 degrees celsius, but up to 80 could also be compatible. In cases where hot melt adhesive is required, a heat-resistant version should be used with a melting point above 70 degrees celsius (Förpacknings- & tidningsinsamlingen (2018a).

As for coloring and printing there are two major rules to follow, minimize colored area on the package and don't use black and dark colors (Förpacknings- & tidningsinsamlingen (2018a, b). There is no loss in the mechanical properties of plastic due to printing but all colors can not be removed in the recycling process leading to discoloration of the recycled material and thereby less recovery value. Increasing transparent areas and the use of light colors will cause less damage (Förpacknings- & tidningsinsamlingen (2018b). The issue with coloring of paper often lies in the material being ingrained. This complicates the decolorization of the paper. Instead printing solely on the surface is preferable (Förpacknings- & tidningsinsamlingen (2018a). Mineral oils (MOH) is a common substance in printing ink that can cause health issues. This has led to producers not choosing recycled paper pulp since it can contain MOH. Therefore ink that does not contain this substance should be used to ensure recycled paper can be used in all applications (Förpacknings- & tidningsinsamlingen (2018a).

Paper sometimes needs to be treated in order to sustain wet. If needed a single sided plastic coating should be used. Other methods using additives for increased wet-resistence or grease repellent paper should be avoided since it will cause contamination in the recycling process (Förpacknings- & tidningsinsamlingen (2018a). Additives in plastics should be avoided if not absolutely necessary, e.g. if products are sensitive to moisture or oxygen. However, if needed the additives should not increase the density of the polymer, PP and PE, to exceed 1g/cm3 since it then will not be separable in the water bath at the recycling plant (Förpacknings- & tidningsinsamlingen (2018b). Barrier material is also to be avoided if possible, though if required EVOH is to be used and to a total fraction of less than 2% to ensure mechanical properties of the recycled polymer.

Factors that affect packaging sustainability:

- Use of mono-material
- Use of adhesives
- Printing and coloring
- Use of additives

Transportation

In transportation, there are a number of factors that affect the sustainability of the packaging. The fuel type, transport distances and mode of transport used throughout the distribution chain should all be taken into account as factors affecting the packaging sustainability (Jedlicka, 2009). Shipping by water as a mode of transportation is usually preferable compared to shipping overland (Okala, 2014).

Another transportation-related factor that affects the sustainability of a package is how efficiently the transportation space is utilised (Jedlicka, 2009). This is a factor that has to be taken into account since it affects the transportation-related climate effects per package. Lewis et al. (2007) defines this as cube utilisation, which regards how efficiently primary packaging can be packed onto a pallet.

Factors that affect packaging sustainability:

- Fuel type
- Transportation distances
- Mode of transportation
- Cube utilisation

Production and manufacturing

As mentioned above in this section, increased amount of recycled material in the package will reduce the energy consumption required in the producing a package. Where the energy comes from is also a crucial factor that has shown to have a huge impact. Astrup et al. (2009) studied the variations between using green energy or fossil based energy in recycling and sourcing virgin material. Although that process does not include the production of the finished package, their result of an variation in GHG emissions of up to four times higher environmental impact using fossil based energy for the same process, stresses the urgence of that factor.

Factors that affect packaging sustainability:

- Energy usage
- Emissions
- Water usage

Consumer information

Sustainable packaging solutions should also support sustainable consumption. According to Lewis et al. (2007), manufacturers can assist consumers in acting sustainably by providing information regarding the environmental attributes of a package and how to correctly dispose it. Packaging that allow consumers to make informed decisions and sort the packaging correctly most likely has a higher probability to assure that sustainability is profited and that the recycling is done properly. Therefore, a package that informs consumers on these two aspects can be regarded as more sustainable compared to a similar packaging that does not (Lewis et al, 2007). These aspects include information regarding the type of material used and how and where the packaging is produced, as well as sustainability labelling and information adapted to the applicable recycling systems (Lewis et al, 2007).

Factors that affect packaging sustainability:

- Encourage correct disposal
- Inform about environmental attributes of packaging

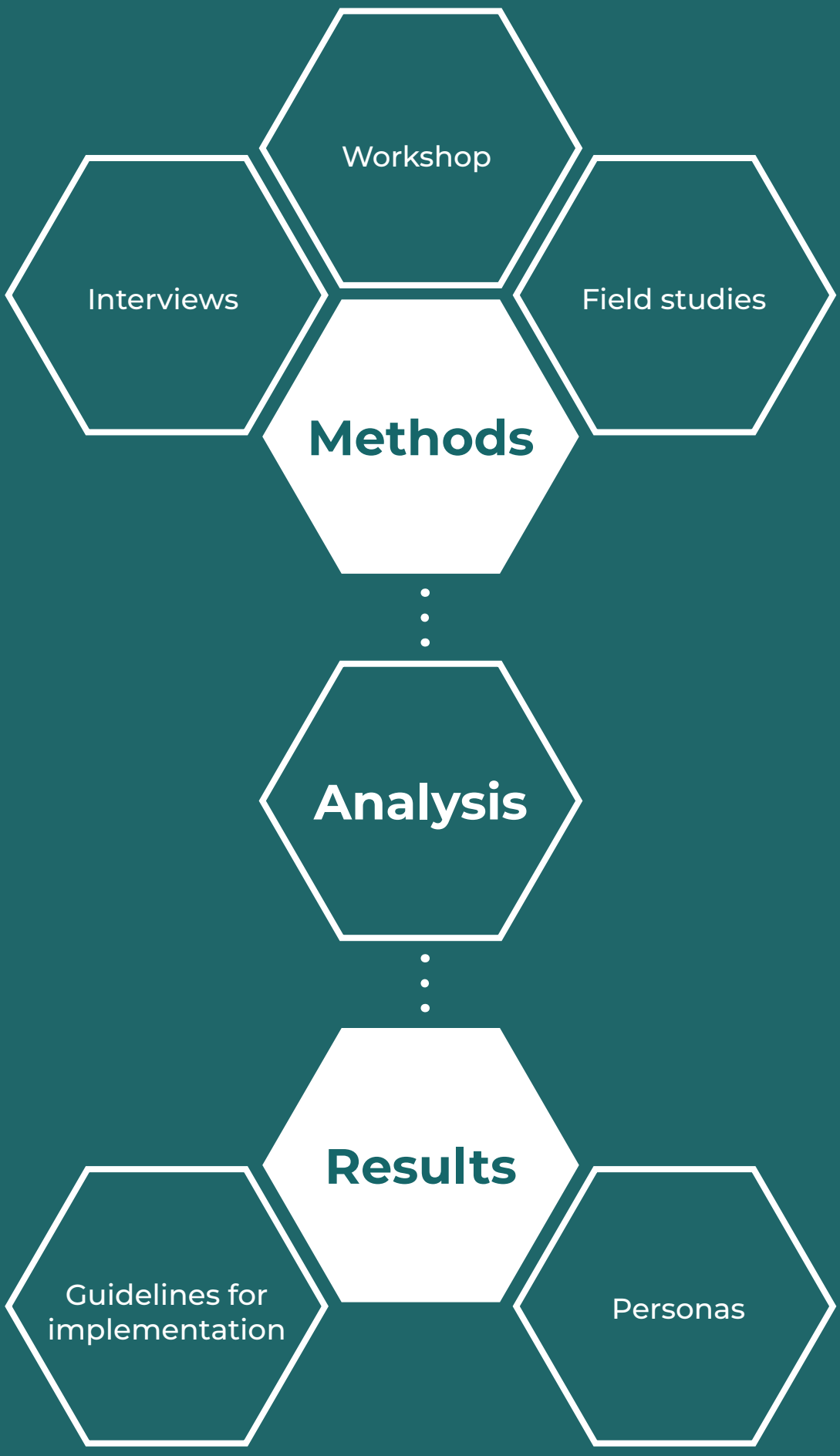
2.4 TAKEAWAYS

In order to achieve sustainable packaging, all components of the product-packaging system must be regarded and the entire packaging life-cycle should be considered. Moreover, all of the aforementioned factors that defines sustainable packaging, section 2.3, should be accounted for. This definition is used as a benchmark for the continuation for this study, in which Ica's current sustainability measures will be examined and compared against. The definition will function as a goal for what the result of the thesis should contribute to achieve.

PHASE ONE

User studies & Research

This phase of the study contains the user studies and research conducted in the project. The purpose of Phase one was to understand how packaging decisions are made at Ica and the factors that influence these decisions, as well as to identify missing prerequisites at Ica that hinders sustainable decisions regarding packaging to be made. First, the process undergone and the methods used for this phase are described. After that, the results are presented in the form of guidelines that should be regarded when implementing a concept that should support sustainable decision making, as well as personas that embody the various stakeholders involved in the packaging development process.


Workshop
Interviews
Field studies
Methods
Analysis
Results
Guidelines for implementation
Personas

03. PROCESS & METHOD

PHASE ONE

This chapter describes the process and methods applied in the user studies and research. The phase consisted of interviews, a workshop, field studies, analysis and the creation of personas.

3.1 INTERVIEWS

As product managers are responsible for packaging decisions made at Ica, they were emphasized during the interviews. However, since there are many stakeholders involved in the process, interviews were held with suppliers, merchandisers at Ica Global Sourcing (IGS) and with employees at Ica that are somewhat involved or affected by packaging, in order to gain a broader understanding of the current process. All interviews were documented by taking notes and recording audio. The notes were later complemented by a transcription of the audio.

3.1.1 PRODUCT MANAGERS

Exploratory interviews

Three initial interviews were held with product managers at Ica to gain an understanding of the current work situation and role of the product managers. The interviewees were responsible for the assortments lighting and light sources, underwear and cleaning products. The interviews were of a semi-structured character (Galletta, 2013) in order to allow for a fully explorative approach and utilised a question template (appendix A). The questions focused on how the current packaging development process works and how the interviewees approach sustainability in their daily work. Each interview lasted approximately one hour.

Table 3.1

Exploratory interviews

Interview no.	Roles	Assortment
1	Product manager	Electrical lighting
2	Product manager	Clothing
3	Product manager	Hygiene products

Probed interviews

A second set of interviews was conducted, this time with product managers, product manager-assistants and a product category manager. The purpose was to better understand the packaging development process undergone by product managers and product manager-assistants. Moreover, the interviews aimed to identify problematic aspects that entail that sustainable packaging decisions are not always made. Each interview lasted for approximately one hour and in total nine employees at Ica Special were interviewed over the course of five interview occasions, see table 3.2. The interviews commenced by asking the participants to map out the process of choosing packaging for a product in five to eight steps. Next, probing material in the form of basic design concepts (appendix B) were used to trigger the interviewees and elicit information regarding missing prerequisites for choosing sustainable packaging. A semi-structured interview template (appendix A) was used alongside the task and probing material.

Interview no.	Roles	Assortment
1	Product manager	Baby products
2	Product manager Product manager assistant	Disposable products Disposable products
3	Category manager Product manager assistant	N/A Electrical lighting
4	Product manager Product manager assistant	Candles & decorations Candles & decorations
5	Product manager Product manager assistant	Kitchen Utensils Kitchen Utensils

Table 3.2

Probed interviews

3.1.2 OTHER STAKEHOLDERS

Apart from the product managers and their assistants, there are several roles and divisions that are involved in the process of choosing product packaging. Therefore, a set of interviews were held in order to capture important insights and gain a more wide-ranging understanding of problem areas that are present during this process. As suppliers, merchandisers at IGS, space managers, corporate responsibility, logistics and the private label coordinator and strategist were deemed to be the most influential roles during the conducted workshop (see section 3.2), these were interviewed. In total nine semi-structured interviews were held, each lasting between 30 and 60 minutes. An interview template was used and adapted to the specific role, see appendix A. The questions focused on the interviewees' assignments, their involvement in the packaging development process and how they work with sustainability.

Interview no.	Roles	Assortment
1	Supplier	Kitchen utensils
2	Supplier	Hygiene products
3	Supplier	Hygiene products
4	Merchandiser at IGS	Kitchen utensils
5	Space manager	N/A
6	Private label strategist	N/A
7	Private label coordinator	N/A
8	Packaging logistics specialist	N/A
9	Corporate responsibility	N/A

Table 3.3

Interviews held with other stakeholders

3.2 WORKSHOP

A workshop was conducted with the purpose to understand factors affecting packaging decisions and how different roles within and outside the company affect the packaging development process. 17 employees from different divisions at Ica participated, see table 3.4 below, and were divided into four groups. Involving various roles would ensure multiple perspectives and feedback on the packaging development process. The workshop consisted of three activities in total, where the first activity was based on a sensitizing activity (Visser, Stappers, Van der Lugt, & Sanders, 2005). The tasks given to the participants can bee seen in appendix C.

Table 3.4

Workshop participants

Roles	No. of participant(s)
Communicator	1
Corporate responsibility	1
Graphic designer	3
Innovation manager	1
Logistics manager	1
Price strategist	1
Private label coordinator	1
Private label strategist	1
Product manager	3
Product manager-assistant	3
Project manager	1

A sensitizing activity was sent out via email prior to the workshop, in order to make participants more amenable and prepared for the session to fully utilise it. The activity encouraged the participants to bring one good and one bad packaging example to the workshop, along with brief motivations on why the examples had been chosen. In the first activity, the participants got to tell each other about the packaging examples they had chosen in their groups. Next, the groups were asked to list positive and negative aspects from three perspectives; ecological sustainability, customer acceptance and cost. The purpose of the activity was to identify the participants' definitions on appropriate packaging. In the second activity, the groups were handed a set of factors and tasked with ranking these factors depending on how much they influence the packaging decisions today. They could add any factors they saw fit. Thereafter, the groups were to define the actors that had responsibility or influence over these factors. The purpose of this activity was to elicit factors that influence packaging decisions and understand how these are prioritized as well as who is responsible for them. The purpose of the last activity was to understand to what extent different stakeholders are influencing the packaging decisions and how they are connected. The activity was largely based on the method *Mapping innovation ecosystems* (Kimbell, 2014). The last activity was concluded by the participants answering four questions regarding how the existing "ecosystem" could be altered to put more focus on sustainability in the process.

Insights were captured by encouraging the participants to write down notes and to use the provided material. Additional notes were taken by the facilitators and the discussions were recorded. The workshop lasted for two hours with a five minutes break in the middle. The result were then summarized and analysed to give an estimation of prioritization in packaging decisions, utmost responsible stakeholder for each factor affecting packaging and level of involvement for each stakeholder in the packaging process.

Figure 3.1

Participants discussing the third task of the workshop

3.3 FIELD STUDIES

Two different field studies were conducted at an Ica Maxi in order to gain knowledge about the current assortment in terms of current packaging designs, placement in stores and variations and similarities between the various brands categories and assortments. This was done by taking notes and pictures. The first observation was conducted early in the project and helped to gain an understanding of the assortment in general. During the second visit a more defined aim of mapping all current packaging solutions was applied. Doing so would not only enable listing all designs in use, but potentially give input to recommendations of designs in the output of this project.

3.4 ANALYSIS

The ultimate goal for phase one was to find the potential sustainability mismatches in Ica's current working procedures and to identify missing preconditions for a sustainable approach. Results and insights were summarised and analysed using methods such as affinity diagram, customer journey and matrix comparisons. The gathered data from each method, i.e. interviews and workshop, was first summarised individually and then merged and analysed together.

In order to understand and visualize the current procedure for packaging development, a variation of a customer journey was created (Wikberg Nilsson, Ericson & Törlind, 2015), which is presented in section 4.1. The components for this was de-

rived from the interviews in the user study. The various packaging types identified during the field study was structured in categories based on the amount material they generally would use for a specific product. Finding the mismatches in current sustainability knowledge was done through a comparing matrix with the actual knowledge within the organisation, measures taken by the product managers and the literature's definition of sustainable packaging. This resulted in a conclusion on why certain areas are addressed or not and the impact Ica's defined strategies have on achieving a sustainable approach. The summarized information from the interviews and the workshop was structured in an affinity diagram (Plain, 2007). Statements and information were written down on individual post-it notes and categorized into groups that represented the identified problem areas. The structured information in the affinity diagram was analysed by looking for correlations between the various problems elicited. Issues of similar nature were clustered together, resulting in nine areas for improvement, described in chapter 4.4.

All the findings from the analysis about missing preconditions and knowledge led to a set of guidelines for implementation of the upcoming design concept. These comprehend the requirements to solve the current improvement opportunities and to ensure that sustainable packaging development can take place.

Figure 3.2
KJ-analysis

3.5 PERSONAS

The insights gained from the analysis of the data collection phase was used to create five personas (Wikberg Nilsson et al., 2015). The purpose was to embody the diverse characteristics, attitudes, motivations and obstacles that people involved in the packaging-decision process have, in order to develop a design that would be feasible for all of them. Three different stakeholders were embodied in the five personas; three product managers, one supplier, and one packaging manager. The last mentioned does not represent a current role at Ica, but instead a role that was frequently requested during the data collection phase. The idea was that by including this persona, it would be easier to account for eventual problematic aspects that could arise, e.g. if a concept was heavily reliant on this packaging manager that would make the workload too heavy.

04. RESULTS & ANALYSIS

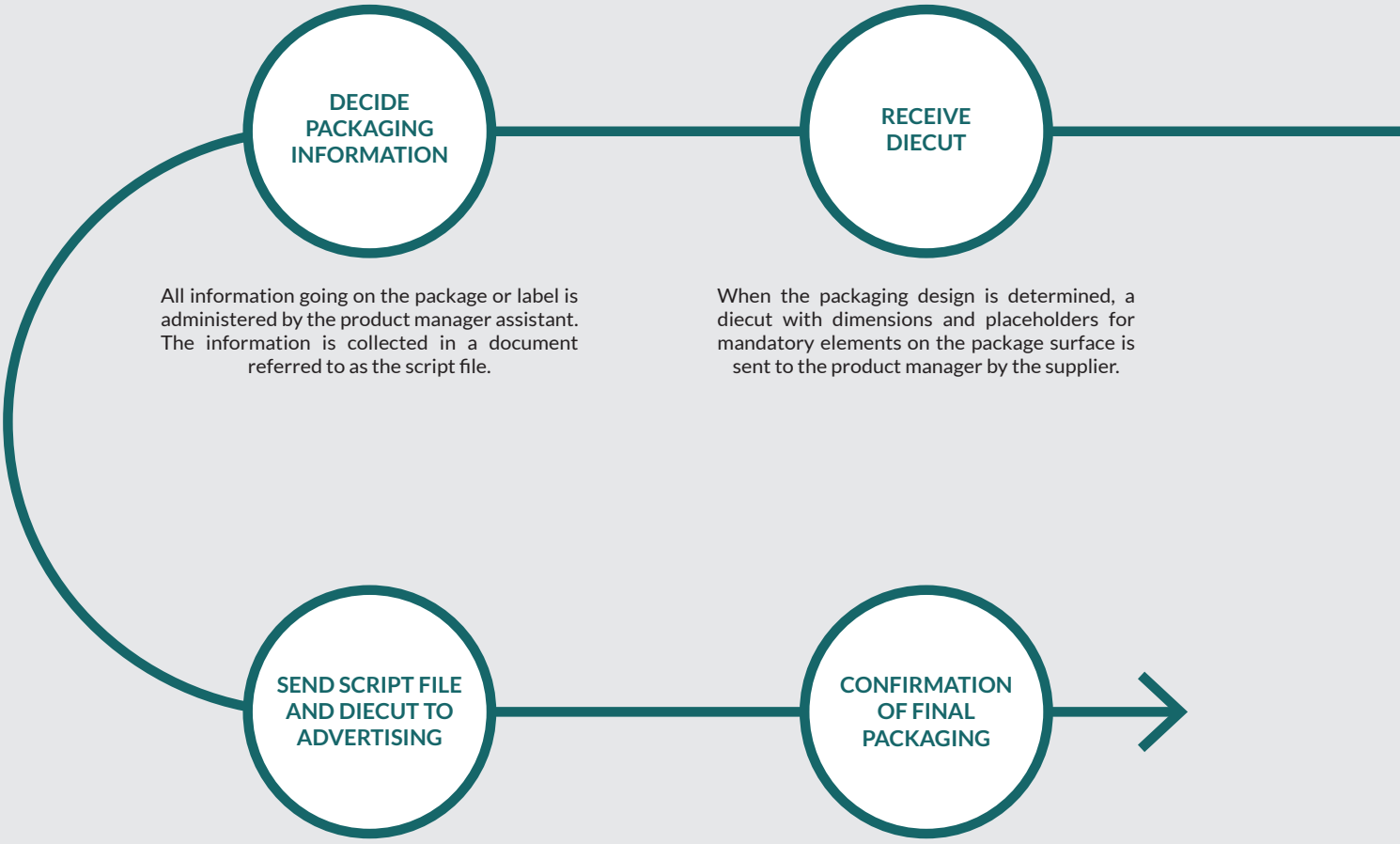
PHASE ONE

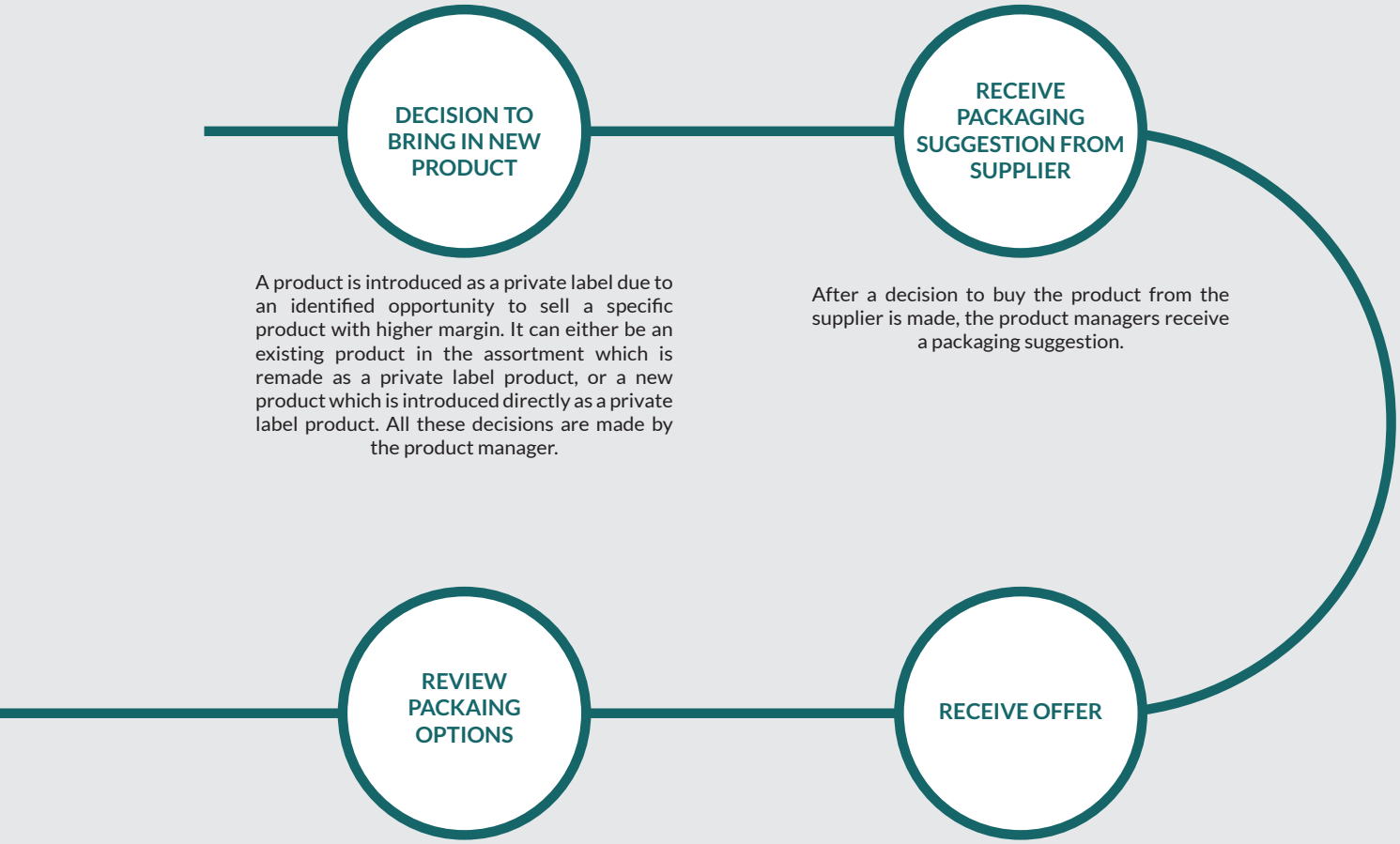
In this chapter the findings from the first phase of the project are presented. These include the current working process, package types used for private label products and nine improvement areas identified relating to these themes. The conclusion from this chapter is a set of guidelines that should be regarded when designing for increased sustainability in Ica's packaging development process. Moreover, five personas that embody the central stakeholders involved in the packaging development process are also presented.

4.1 PACKAGING PROCESS AT ICA

Maybe the most important insight from this part of the study is the absence of an explicitly expressed packaging process for product managers to follow. The presented packaging process for introducing a new private label product and packaging is based on the findings from the interviews with employees at Ica and suppliers. The flow chart is a description of the common steps involved and the order in which they most often are executed, but the depth and intensity of each step varied between each product manager.

The biggest issues and potentials for improvements from a sustainability perspective lies in the sometimes omitted Review packaging options-step. Greater focus on packages and an increased aid in how to conduct this step will most certainly have a positive impact. These issues and their consequences are further elaborated on in section 4.4.




DECISION TO BRING IN NEW PRODUCT
A product is introduced as a private label due to an identified opportunity to sell a specific product with higher margin. It can either be an existing product in the assortment which is remade as a private label product, or a new product which is introduced directly as a private label product. All these decisions are made by the product manager.
RECEIVE PACKAGING SUGGESTION FROM SUPPLIER
After a decision to buy the product from the supplier is made, the product managers receive a packaging suggestion.
REVIEW PACKAING OPTIONS
After the offer, the product manager has an opportunity to review the offer and propose changes to the packaging design. The thoroughness and degree to which this step was conducted varied between the product managers. It is in this step the potential consultation with other functions within Ica occasionally could happen. If desired changes have emerged, these are discussed with the supplier and if suitable, implemented.
RECEIVE OFFER
When a first agreement on the specifications of product and package is made the supplier send their official offer to the product manager.

4.2 PACKAGING CATEGORIES AT ICA

With the number of products in the private label assortment, approximately 4000, a variety of primary packaging alternatives is required. Despite the fact that a lot of varieties exist, a schematic structure of the packages can be made. Primary packaging alternatives at Ica can be divided into three categories, based on the general amount of material that is required to package a specific product, assuming that the same material type is being used. As long as product protection is not compromised, packaging from the first categories are generally better, since less material is required compared to the categories below. It is important to stress that this is not always the case, since the packaging types in the different categories can be customized to the specific product it is associated with. Moreover, different packaging types have different implications for sustainability apart from the amount of materials used, which is why this categorization cannot be regarded as an absolute indicator for the sustainability of a package.

The categories have been labeled *hangtags and labels*, *partial packaging* and *enclosed packaging*. Each of the packaging categories consist of a number of packaging types, which in their turn comes in a variety of alternations in design, attachment options and material options.

Category 1: Hangtags and labels

The first category includes the packaging types hangtags and labels. These are sometimes referred to as “no packaging” since they are small and do not enclose the product in any way. The characteristic features of primary packaging in this category is that they use a minimal amount of material, and thus offers no product protection and often only display brief product information.

Category 2: Partial packaging

The second category consists of backcards, headers and sleeves. These packaging types do not generally enclose the product, but are instead “open”. Many of the packaging types in this category are used for keeping several products or product components together. Headers and sleeves allow products to be displayed hanging, while sleeves are mostly used for products lying or standing on shelves. They use an average amount of material and the amount of protection they offer is limited, with a few exceptions.

Category 3: Enclosed packaging

The third category consists of boxes, bags and shrink-wraps. Packaging types of this category fully enclose the product and offer maximum protection. Exceptions are variations of boxes that have open windows or sections removed from them.

Figure 4.1

Category 1: Hangtag and labels

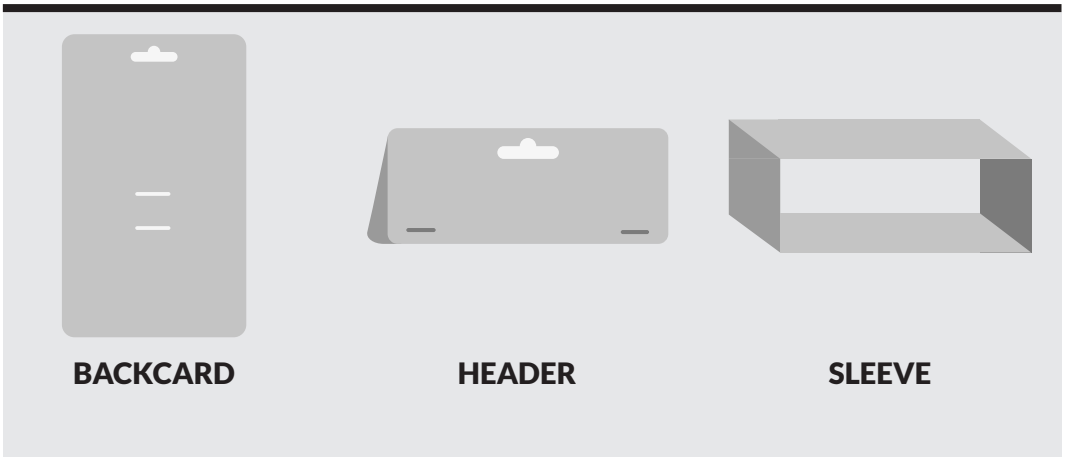


Figure 4.2

Category 2: Partial packaging

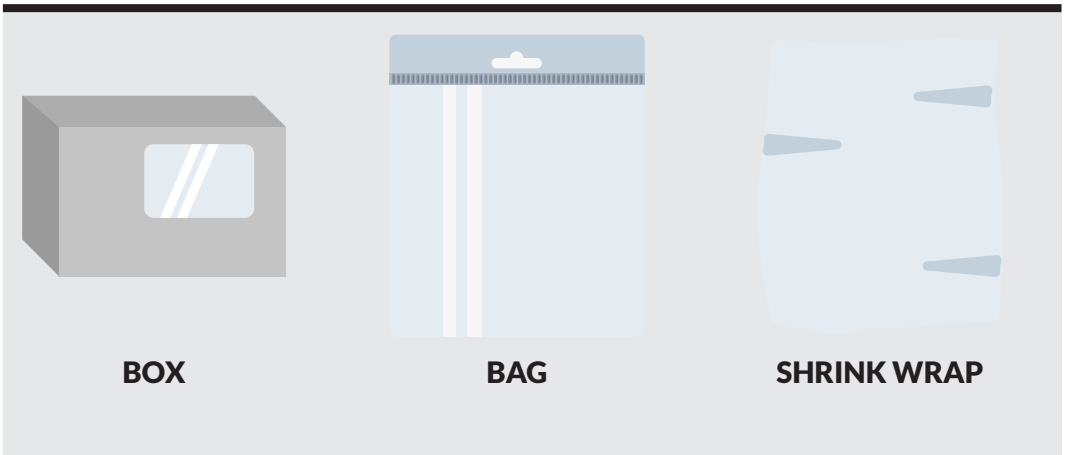


Figure 4.3

Category 3: Enclosed packaging

4.3 SUSTAINABILITY AT ICA

Ica's efforts towards sustainable packaging can be divided into three levels. Their overall strategies and goals, the guidelines communicated to product managers and the actual activities performed by the product managers in order to improve packaging from a sustainability perspective.

In their overall strategies and goals, Ica addresses a number of the aspects that affect the sustainability of packaging. Their most prominent and well-defined strategy regards plastics, which mention parts of the aspect *type of material*. The strategy states that all plastic consumer packaging is to be recyclable in 2022 and by 2030 all materials used in their plastic consumer packaging should be either fossil-free or recycled. In their brand criteria Ica define, amongst other aspects, *product protection*, *transportation* as well as *weight and volume* as important sustainability focus areas. The document states that transports and waste should be reduced by optimizing the size and weight of the packaging without compromising durability and functionality. In their sustainability appendix for products, production and manufacturing is addressed by stating that water and energy usage connected to production should be measured and that targets for reducing energy usage should be reviewed regularly. Apart from the aspects end-of-life and compatibility with existing recycling systems, all sustainability aspects, as identified in section 2.3, were covered to some extent in Ica's strategies and goals.

The guidelines communicated to product managers are generally more specific in terms of what actions that are to be done in order to achieve sustainable packaging, compared to the aforementioned strategies and goals. An example of this is when the aspect compatibility with existing recycling systems is addressed, where the guideline states that LDPE-film, PP and HDPE are the primary plastics that are to be used. However, some aspects are still communicated vaguely, e.g. weight and volume where the guideline, similarly to the overall strategies and goals, states that the consumer packaging should be adapted to the size of the product as efficiently as possible.

From the interviews and workshops conducted, information was elicited regarding the knowledge and actual efforts done by the product managers in order to improve packaging from a sustainability perspective. Minimizing packaging weight, removing plastics and requesting FSC-certified paper and cardboard were the three most recurring strategies for improving sustainability, which corresponds to the sustainability aspects weight and volume and type of material. Other aspects were only mentioned occasionally, and the extent to which those are actually cemented in practice is questionable.

Table 4.1 provides a comparison between the identified aspects affecting packaging sustainability with Ica's strategies and guidelines regarding sustainability as well as the actual measures they take. The numbers in each column represents how many factors of a sustainability aspect that is mentioned and somewhat regarded, but not to what extent.

No strategies regarding the end-of-life of a package are mentioned in the internal documents. Probably due to the ability to affect this ends at the point of sale. Introducing systems for reuse of packages could be a potential action but requires a massive change on logistic structure. Therefore this subject is not and should not currently be addressed by the product managers.

The reason for transportation and logistic guidance not being mentioned in the supportive documents for product managers is probably twofold. One aspect is considered to be that the responsible role for creating the document is lacking the sufficient knowledge to incorporate such guidance. The other side is that the responsibility lies mainly on the logistic department, and not the product manager.

Production and manufacturing are somewhat defined in the strategies but no guidance or action to secure sustainable use are taken. The explanation and reason for this is that current procedures does not involve sourcing supplier on these aspects and that knowledge and decisiveness to impact and change them are potentially not available.

Table 4.1

Comparision of Ica's knowledge and actions with sustainability aspects

Sustainability factors	Strategies & goals	Guidelines	Product manager
Product protection	**1/1**	**1/1**	**1/1**
Degree of product protection	●	●	●
Weight & volume	**2/2**	**2/2**	**2/2**
Packaging weight	●	●	●
Packaging weight	●	●	●
Type of material	**4/4**	**3/4**	**2/4**
Amount of recyclable material	●	●	○
Amount of renewable material	●	●	●
Amount of recycled material	●	●	●
Recovery value of material	●	○	○
Comp. with existing recycling systems	**0/4**	**3/4**	**0/4**
Use of mono-material	○	○	○
Use of adhesives	○	●	○
Printing and coloring	○	●	○
Use of additives	○	●	○
Transportation	**0/4**	**1/4**	**0/4**
Fuel type	●	○	○
Transportation distances	●	○	○
Mode of transportation	●	○	○
Cube utilisation	●	●	○
Consumer information	**2/2**	**2/2**	**2/2**
Encourage correct disposal	●	●	●
Inform avout environmental attributes	●	●	●
Production and manufacturing	**4/4**	**0/4**	**0/4**
Fuel type	●	○	○
Transportation distances	●	○	○
Mode of transportation	●	○	○
Cube utilisation	●	○	○
End-of-life	**1/3**	**1/3**	**1/3**
Whether the package is reused	○	○	○
Whether the package is recycled	●	●	●
Whether the package is incinerated/ landfilled	○	○	○

The most prominent conclusion from the comparison is that actions towards sustainable packaging do not happen if not mentioned in Ica's strategies and goals or guidelines to product managers. As shown in the table, all areas where action is taken are supported internally to some extent, whilst those areas with no support never or rarely are addressed in development. This highlight the importance of providing knowledge to the product managers, not only as strategies but how to turn them into action. The other conclusion extracted from the current working procedures is that even though a few of the areas are considered today, the actual execution and implementation could be improved.

4.4 IDENTIFIED AREAS FOR IMPROVEMENT

The interviews and the first workshop resulted in nine identified areas that hinder the development of optimal packaging solutions from a sustainability perspective. These areas and their implications are listed and elaborated on in this section.

Figure 4.4

Nine areas for improvement

Non-existent packaging process for new private label products

There is no explicit process for the product managers to follow in packaging development for a new private label product. There are a number of steps that have to be executed (see section 4.1) but except for those, the product managers are free to do as they please. Moreover, the extent to which certain steps are emphasised varies between product managers. Without a defined process for how to regard packaging, there is no guarantee that all necessary aspects of the packaging are elicited and therefore potential sustainability improvements in certain areas are not considered. Making packaging improvements before the packaging has become a part of Ica's assortment is crucial, since this means that the packaging is done right from the beginning and therefore will no have to be reviewed.

Existing packaging is seldom improved

The second problem area, unlike the first, regards packaging that is already part of Ica's assortment. The problem lies in that these packages scarcely are being evaluated or altered. There is no strategic approach to how existing packaging should be reviewed in order to maximize the sustainability effects. Instead, packaging is mostly reviewed due to new regulations or when a new brand design is to be implemented.

No routine for sharing packaging knowledge

Due to the differences between the product assortments, different packaging decisions will be made and different packaging solutions will emerge in the different assortments. Despite the product variations between assortments, the same type of packaging is in many cases used for widely different products. Today there is no knowledge exchange between the different assortments, which means that examples of "best practice" decisions or good packaging solutions are not shared or implemented beyond the assortment they emerged in.

Vague requirements and guidelines for product managers to relate to

Looking at table 4.1, it is evident that when Ica Special provide clear requirements and guidelines, it has an effect on the daily work that is carried out in the organisation. However, when interviewing the product managers, it became obvious that they have different perceptions on what is expected from them. For instance, some product managers believed that using FSC-certified paper was compulsory while others saw it merely as desirable. Moreover, as different versions of guidelines have been provided to product managers, they found it hard to know which of these they should strive to comply with.

Product managers do not have necessary knowledge regarding sustainability and packaging

Product manager is a wide role that implies several areas of responsibility. This entails that product managers do not have enough resources to become an expert within all these areas, including packaging and sustainability. Consequently, product managers at Ica are forced to make decisions regarding how packaging should be designed for optimum sustainability without having the necessary knowledge to make an informed decision. This is not an optimal working procedure, which today is being resolved by providing guidelines for product managers to use. As previously mentioned, these guidelines have an effect in that product managers become aware of the aspects being mentioned in them. The problem however, lies in that these guidelines are not covering all aspects of sustainability.

Product managers do not get sufficient input from other roles at Ica

Packaging affects several parts of Ica and therefore more roles than just the product manager. Today, information exchange between these roles and the product manager is not formalised, which results in information being exchanged too late, or not at all. The consequences of this is that packaging being developed does not become as sustainable as it would if information was exchanged, or that the process is slowed down and problems that could have been avoided arise.

More specifically, the functions that this concerns are corporate responsibility, space management and logistics. Corporate responsibility have knowledge regarding laws and regulations that packaging has to comply with for different products. If they are not consulted before the packaging is decided upon, there is a risk that it has to be altered, which makes the process laboursome. Space managers have knowledge regarding how the product should be displayed in store, as well as the maximum size and shape of the packaging. If information is not shared early in the process, this can

lead to costly modifications or unfavourable layout changes. Another consequence would be a package that is not as sustainable as it could have been, using more material or a packaging type adapted for one type of in-store display, when it in the end is being displayed in another way. The responsible person for packaging during transport would have important input regarding how primary, secondary and tertiary packaging should be designed in order to optimize the transportation of the product, whilst still complying with logistic regulations and demands.

Balancing sustainability with other aspects is difficult

Despite knowing what factors makes packaging sustainable, it can be hard to implement changes that improves the packaging since there are other demands on the packaging that are conflicting. From the conducted research, six demands that frequently obstruct sustainable packaging changes were derived.

Using certified renewable materials, e.g. FSC-certified paper or cardboard, is more costly compared to using materials that are not certified. This problem is especially prevalent when purchasing from suppliers in Asia. Certified materials are not as frequently requested in Asia as in Europe and therefore not a standard option, which results in increased costs.

Switching to a different packaging or changing materials might require suppliers to invest in new machines or production methods, which raises the cost of the product and packaging. If large quantities of the product are purchased, this is not a problem.

Some products have to be protected whilst still being visible to the consumer, which often results in fossil materials (non-renewable plastics) being used. An example of this would be decorations, whose visual appearance is important to communicate while they at the same time are fragile and therefore require an enclosed packaging.

Sometimes it is difficult for product managers to see the value in making alterations to the packaging that leads to increased sustainability. The first reason for this is that product managers do not see the actual impact of the improvement. The second reason is that a sustainable change to a package is not always evident to consumers and if product managers believe that the change affects other aspects negatively, e.g. marketing of the product, the change becomes harder to motivate.

Even if there is a possibility for the packaging to be right-sized to the product by minimising packaging weight and volume, the amount of consumer information which the product manager regards as necessary to include limits this possibility.

The number of products that can be packed in a secondary packaging is limited due to how Ica's logistics work. Ica's different retailing concepts (Nära, Kvantum, Supermarket and Maxi) have different capacities and therefore the secondary packaging must contain a number of products that is manageable for small retailers. Even though it would be theoretically feasible to package more products per secondary packaging, which would reduce the amount of packaging materials used, this would take up more storage space than small retailers could handle. Therefore, the secondary packaging is bound to contain a specific number of products.

Unbalanced dialogue between product manager and supplier

Many reasons for unoptimised packages are due to too much responsibility being given to the supplier and the design not being challenged enough by the product manager. Suppliers often have great knowledge in packaging design and their authority should not be neglected. But it is also easy to be satisfied with something that has worked for a long time and where development and changes requires financial sacrifices without knowing if it will pay off. If product managers were better at challenging suppliers and not having an exaggerated trust in them, sustainable packaging improvements could be done more frequently.

Insufficient requirements to suppliers and IGS

The final aspect that makes sustainable packaging harder to achieve is the insufficient packaging requirements being communicated to suppliers and IGS. Employees at Ica participating in the conducted workshop, the interviewed suppliers as well as the interviewed merchandiser at IGS all stressed the fact that they have to establish a closer collaboration and that Ica has to communicate their packaging requirements better. If Ica do not state what they want in terms of packaging, it becomes harder for suppliers to offer the correct production methods and materials. IGS also have to be aware of these packaging demands, as it is their role to prepare their suppliers or source new suppliers that can deliver this to Ica.

4.5 GUIDELINES FOR IMPLEMENTATION

From the identified areas for improvement a set of guidelines was derived. Their objective is to embody the requirements on the packaging development process and to make sure sustainability knowledge is mediated in an effective and efficient way to the product managers, through the design concept. The design guidelines are divided into three areas that together cover the overall process and knowledge necessary to ensure sustainability focus.

1. Provide standardized processes that support the development of sustainable packaging.

- There should be a defined process for how to develop packaging that is entering the private label assortment
- There should be a defined process for how to review and improve existing packages in the private label assortment
- There should be a way to share best-practice packaging between the different assortments
- When necessary, product managers should get input from supportive functions during the packaging process

2. Provide useful knowledge on how to develop sustainable packaging to product managers.

- Product managers should receive assisting knowledge in improving the sustainability of the packages introduced in their assortment
- Product managers should receive assisting knowledge in balancing sustainability with other demands that packaging solutions has to meet
- Expectations on product managers in terms of sustainability must be well-defined
- Product managers should be assisted in becoming more active and knowledgeable in the dialogue with suppliers
- The design concept must be applicable on all product categories within Ica Special
- The design concept should be applicable on packaging regardless it's current level of sustainability
- The design concept should be useful regardless of the user's knowledge of sustainability

3. Provide all suppliers with knowledge regarding Ica's requirements for sustainable packaging

- The design concept should aid suppliers in achieving and meeting Ica's sustainability requirements

4.6 PERSONAS

This section of the results from phase one presents the developed personas which were used as inspiration in the concept development phase. They were also used when evaluating proposed ideas and concepts.

Jenny, 46
Product manager

Jennie has worked many years as product manager at Ica, but was recently assigned a new assortment. She enjoys her new role and feels confident from her prior experiences, yet stimulated by the new challenges that are specific to this assortment. The biggest difference compared to her previous role is that there is a broader range of product types in her new assignment.

Right now Jennie is in the process of purchasing a new colander and have had short discussions with the supplier about how it should be packaged. The supplier has suggested an option which Jennie believe is too large, and she would also like to remove the plastic if possible. By doing so the sustainability of the packaging could improve, which is important to her. It should be possible as long as the cost stays relatively the same, but if the supplier needs help with investments in new machines it will not work, as they are not buying large enough quantities to cover for it.

Jennie feels that she does her best to regard sustainability, but is unsure whether she does enough according to Ica, as she feels that the organisation's guides and requirements are rather fuzzy. She would also want to know how become even better in this matter.

Abilities

- Open-minded to new working procedures and ideas for improvement
- Has an understanding attitude towards demands from suppliers and other roles within Ica
- Always approach problems with an analytical mindset

Motivations

- Driven by measurable performance
- Seeks continuous professional development
- Wants to place Ica at the industry frontier in sustainability issues

Obstacles

- Don't know how to obtain sustainability knowledge
- Never question current transportation solutions from suppliers
- Dont know if other assortments have developed packaging solutions that could be applicable to her assortment

Jacob, 28
Product manager

Jacob has worked as a product manager at Ica since last year. Although he is responsible for a narrow assortment with few product types, he feels that he has more than enough to manage. He has never had a role that is this versatile, and being new makes it hard to understand all of the different aspects that goes into this job. He enjoys some parts of it, especially sourcing new products for the upcoming seasons and making sure that Ica's customers have everything they could expect from his assortment. Jacob likes that Ica has started focusing more on sustainability, and he does his best to do his part. He has received some material from the private label coordinator to use as a guide when choosing packaging, but it is hard to integrate these guides since many recommendations clash with reality.

Recently, he removed the plastics from one product line, but for the most part his products have paper packaging. Replacing ordinary paper with FSC-certified is costly, so even though it is sustainable it is hard to implement. Jacob thinks that he needs to get more knowledge regarding sustainability, but above all he feels that he does not have the time needed to make sustainable decisions. Right now he is in the middle of another project, where he wants to make his packaging more uniform over his assortment so that it looks better in the stores. Today the products have differently sized packages although the products are roughly the same size, so he might have to increase the size of the smaller ones.

Abilities

- Is positive, outgoing and continuously looking for social connections
- Enjoys being creative in finding new solutions to problems
- Can be persuasive and get his will through

Motivations

- Creating an exceptional assortment for Icas' customers
- Loves trend forecasting
- Develop the mid segment and beat IKEA as the no.1 sponge retailer

Obstacles

- Has trouble allocating time to manage more than his mandatory tasks
- Finds it difficult to make packaging sustainable without compromising other aspects
- Always have trouble fitting all products on the shelf

Lisa, 52
Product manager

As an experienced employee within Ica, Lisa has been responsible for many products over the years. Maximizing profit and creating a visually attractive assortment are two things that motivates Lisa.

Since the time of year for planning the christmas assortment is approaching, Lisa is in the process of sourcing and deciding the design and patterns on these products. Because the design and kind of products in the segment are roughly the same, regardless of season, the main dialog with the supplier concerns variations on product design and making sure the correct graphical profile she have gotten from the design department is delivered and implemented on the package accordingly. Though most of these administrative and document related tasks are handled by her assistant. Other than design, packages are not really discussed, since Lisa does not really have any knowledge on how to improve or change them. She feels that the supplier should provide the best solution, because they are the expert after all.

During the project where Lisa was planning the summer offers, she actually changed three packages on her products. The amount of material on those packages looked well over necessary and when approaching the supplier it was no trouble fixing these. This action saved a few öre with no extra cost, meaning better profit on the products. The environmental impact improved simultaneously which she knew should be appreciated as well.

Abilities

- No special relationship to sustainability, but sort and recycle garbage at home
- Great at coordinating work and delegating tasks
- Creative when it comes to adjusting products to fit in the assortment

Motivations

- Driven by maximizing the commercial success of the assortment
- Wants to be responsible for all aspects of a product
- Loves creating great in store marketing with the products

Obstacles

- Don’t possess enough sustainability knowledge related to packaging.
- Believes the supplier always knows best
- Needs motivation to increase packaging focus

Camilla, 31
Packaging manager

After only a year as both new Ica employee and head of packaging, Camilla is overwhelmed by the achievements the company have done lately but also by the amount of possibilities still untouched. All product managers have been very cooperative, even though the role is very demanding. The huge amount of different products sold by Ica requires constant meetings with product managers, where the discussions varies from switching packaging solution entirely to just removing some unnecessary material.

The current time of year is a very hectic period since all categories must develop their spring offerings for the upcoming year. For Camilla this means meetings that fill up every day, leaving no time for other tasks. She feels that these meetings many times could have been avoided if the product managers just had a little more knowledge about packages. Camilla thinks that if the product manager can deliver better requirements to the supplier in an early stage, she does not have to spend as much time on each product to improve.

An issue Camilla have noticed so far is that her proposed changes often has to be comrpomised due to aspects such as cost, weird sales argument or unclear internal strategies at Ica. Camilla understand some of these arguments but some seem invalid and she in general lacks knowledge in many of these areas in order to give proper recommendations on the packaging. All meetings and new products continuously launched limits and almost completely remove any available time to overlook existing products and conduct improvement projects on that part of the assortment.

Abilities

- Communicate knowledge in dialogue very well
- Persuasive and good at convincing sustainable options and changes
- Stays up to date with best practice packaging solutions

Motivations

- Establish Ica as the most sustainable retailer in Sweden
- Save money whilst saving the environment
- Remove plastic from the surface of the earth

Obstacles

- Heavy workload to aid all categories
- Feels it is difficult to balance other demands with sustainability
- Don’t know how to find time to review the existing assortment

Anders, 43
Supplier

Anders works as a sales person at a swedish mid-sized company producing kitchen tools, and has done so for the past 15 years. He enjoys his job because it is both social and challenging. The thing that really gives Anders positive feelings is when he is able to meet internal demands as well as demands from customers. Ica is one of their larger customers, and they have a good collaboration. Especially Anders and the product manager at Ica he is in contact with, since they have both been at their respective position for many years. They have a mutual understanding for each other's interests and goals when they negotiate products.

Anders is happy that sustainability is becoming a more prioritised topic in his company. Two years ago it was barely discussed so it is good that they are finally catching up. Removing plastics from their packaging solutions is something that customers started requesting frequently last year, and it's become easier to meet those requests now since Anders's company have developed several collaborations with packaging suppliers who can deliver other types of materials, since they saw that this was not a one-time specific request.

But there is still cases when the customer's demands are hard to meet. Ica recently wanted to replace a plastic packaging with paper, but since that implied that the product would have to be attached manually instead of automatically, the price was too high for Ica. At least they replaced the label of the packaging to a paper label instead of a plastic one, after Anders suggested it.

Abilities

- Have great knowledge regarding production and manufacturing
- Open-minded to changes
- Can make use of input from different customers to improve their entire line of products

Motivations

- Increase sales to Ica
- Strengthen sustainability profile to increase company's attractiveness
- Conduct more extensive collaborations with their best customers

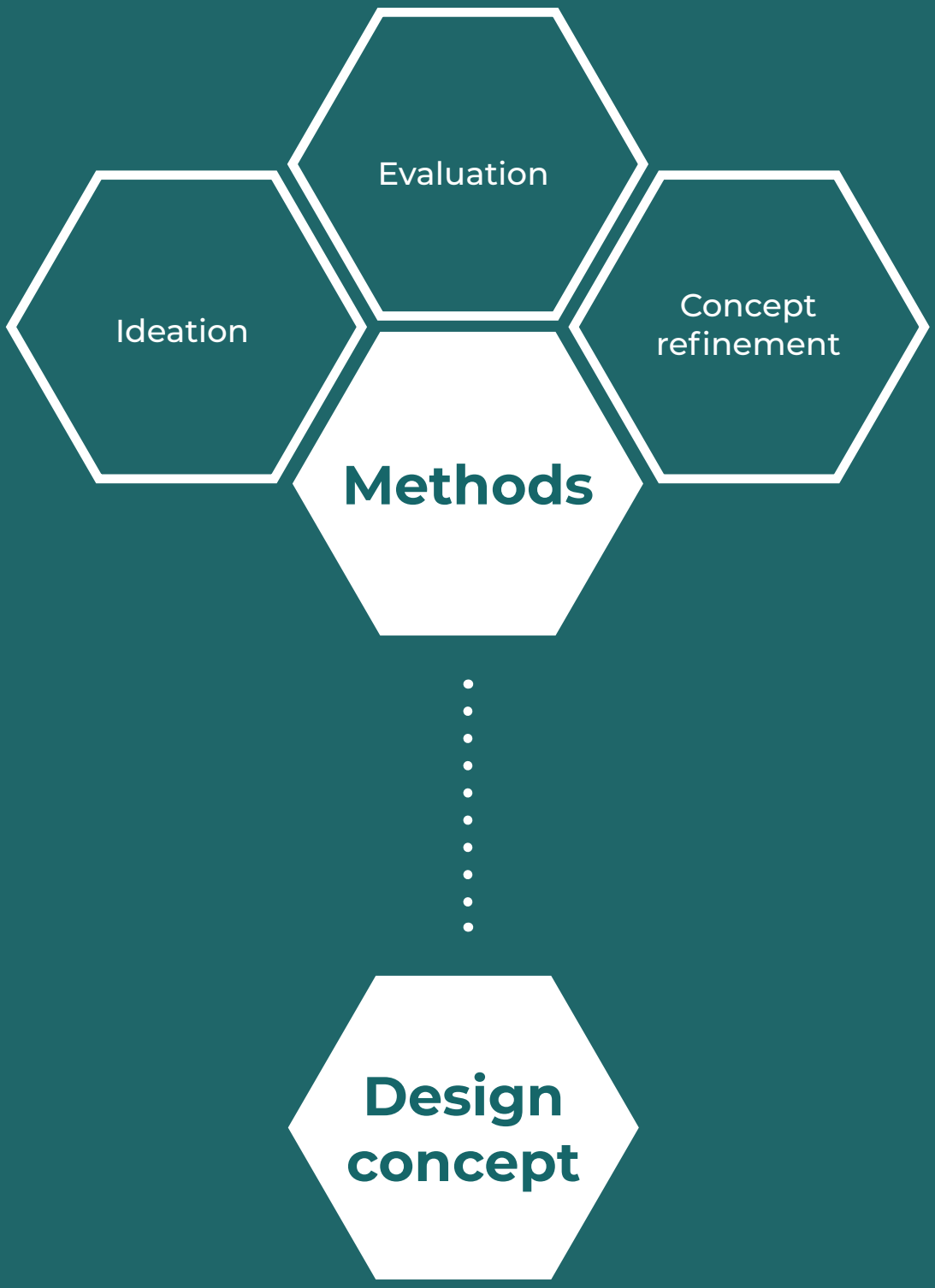
Obstacles

- Different demands from different customers
- Limited sustainability knowledge
- Only conduct large changes on legal or customer demands

PHASE 2

Concept Development

The second phase of this study aimed at developing a design concept that could assist in the selection of sustainable packaging. First, the process undergone and the methods used for ideation, concept development and evaluation are described. After that, the developed design concepts and the results of the evaluation of them are presented before the final design concept is described.


Evaluation
Ideation
Concept refinement
Methods
Design concept

05. PROCESS & METHOD

PHASE TWO

This chapter describe the process and methods used during the concept development phase. The phase consisted of ideation methods, co-creating workshops, evaluative methods and concept refinements.

5.1 IDEATION

The purpose of the ideation was to formulate ideas that could meet the defined guidelines for implementation and encompass the relevant aspects affecting the packaging sustainability. The main focus during the ideation was on how to increase knowledge of packaging sustainability and how to make it useful for product managers in the process of purchasing new products, i.e. the area *Provide useful knowledge on how to develop sustainable packaging to product managers* defined in section 4.5. Ideas and concepts were developed using various brainstorming and concept creating techniques such as speedstorming, morphological matrix and user journeys.

First, the technique speedstorming was used to generate a broad set of ideas (Wikberg Nilsson et al., 2015). Specific ideas were generated for the different guidelines individually. The most viable and interesting ideas were ideated on further in order to develop and concretise them.

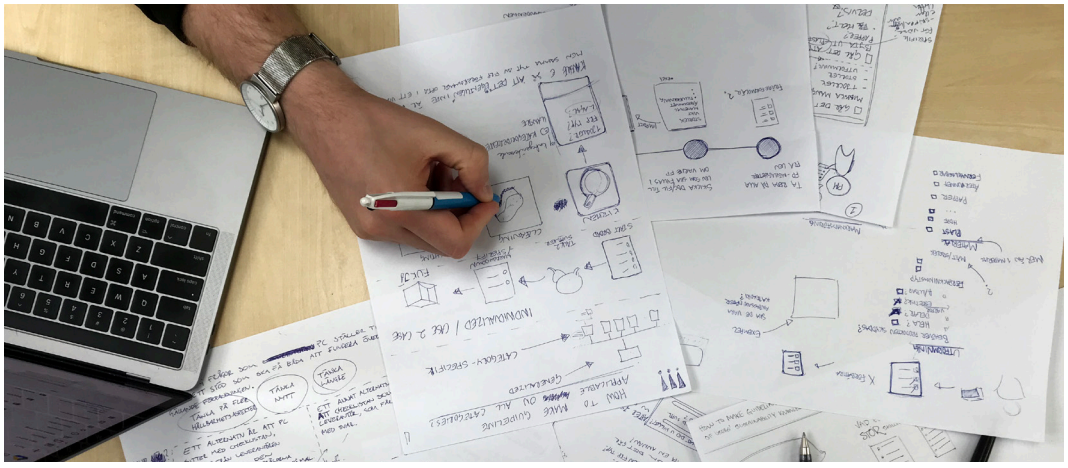


Figure 5.1
Speedstorming

In order to broaden the set of solutions, two ideation workshops were held (Design Kit, n.d.). One with six other masters' students not involved in the project, to get input and ideas from individuals not affiliated and affected by the project. Another ideation workshop was held with eight participants from Ica; one product manager, one innovation manager, two private label coordinators, one space manager, one corporate responsible and one logistic packaging manager. The purpose was to generate ideas with people that have deeper knowledge of the work situation and the organisation in which the design is to be implemented. Both sessions were conducted as speedstorming ideation. Six statements were defined from the identified areas for improvement, which formed the base for ideation and the following discussion, see Appendix D. The workshop with the students was lasted for one hour whilst the time spent on the second workshop with Ica employees was two hours.

Ideas generated from the workshops and other creative sessions during this phase were combined using a morphological matrix into five concepts (Wikberg Nilsson et al., 2015). Each concept was defined in terms of a process map as well as conceptual images describing an artefact. The main ideas in those areas was further developed in order to assure they covered the second area in the guidelines for implementation. Visualisations of the artefact and the process were done using Figma, a graphical design tool. The remaining guidelines not incorporated in the first concept development were further ideated on to the final concept, after the evaluation of the five main concepts.

Roles	No. of participant(s)
Product manager	1
Innovation manager	1
Private label strategist	1
Private label coordinator	1
Space manager	1
Corporate responsibility	1
Logistic packaging manager	1

Table 5.1

Co-creation participants from Ica

5.2 EVALUATION

To decide which of the five concepts that was going to be developed, they were evaluated heuristically against a set of criteria, and a second evaluation was done together with employees at ICA.

For the first evaluation, a list of six criteria was set up which the concepts were evaluated against. The criteria were selected in a way so that they encompassed the intended purpose of the concepts, as described in section 4.5, but the selection was also based on requests from ICA. Each concept was given a score ranging from 1 to 5 for each criteria, where a higher number was desired. Each concept was evaluated against the personas individually, after which a mean for each concept could be calculated and inserted in the overall matrix. Since the criteria were not regarded as equally important, they were weighted by doing a pair-wise comparison.

An evaluation of the concepts was also done together with employees at Ica. The concepts were presented and discussed. Among other topics, the probability of realising the concepts, how different aspects from them could be integrated into one concept as well as how to modify the proposed processes were covered during the discussion. The evaluation concluded with a recommendation of what concept the employees believed was the most feasible. Based on the outcome of the two evaluations, a final concept was chosen and developed further.

5.3 CONCEPT REFINEMENT

After the evaluation, a final concept was developed by combining aspects of the two concepts that were regarded as the as the most promising. The guidelines not fully addressed in the first concept phase were further ideated on and implemented as components in the final concept. This mainly regarded a process and support for improving existing primary packaging in the assortment and support in communicating packaging demands and sustainability to suppliers. Functionality was specified in detail as the concept was evolving, whilst regarding the evaluation results in order to improve on the concepts weaknesses and to assure that the strengths were not compromised. To be able to communicate the concept, prototypes were developed using Adobe InDesign. Fonts, tonality and layout was determined by using Icas corporate graphic charter.

06. RESULTS

PHASE TWO

This chapter describes the five concepts that were developed during the second phase of the project. Each concept is a combination of an artefact and a packaging development process. The chapter concludes by presenting the results of the concept evaluation, the chosen concepts to be further developed and the refinements done in order to arrive at the final design concept.

6.1 CONCEPTS

The five concepts presented in this section address the second area in the guidelines for implementation, Provide useful knowledge on how to develop sustainable packaging to product managers, with different approaches. Each of the concepts, except Packaging expert, are presented as an artefact to be used in packaging development and a corresponding process of how it should be used in order to be efficient.

6.1.1 THE CHECKLIST

Artefact

The concept Checklist consists of a set of questions for the product manager to pose to the supplier when discussing possible packaging changes. By using the Checklist, the product manager will explore all possibilities for sustainability improvements of a specific packaging. It will be accessible through Ica's intranet and can be filled in similarly to a questionnaire. The Checklist will be divided into a number of sections, each covering one of the aspects that affects the packaging sustainability, described in section 2.3. Each question will be designed to elicit an answer regarding if a sustainable change is possible to do or not. If the answer is no, follow-up questions will be provided to determine the reason why a change is not possible, to ascertain that it is the case. In order to further empower and inspire the product manager to investigate possible sustainability changes of a package, illustrative examples that demonstrate possible changes will be provided along with the questions.

Process

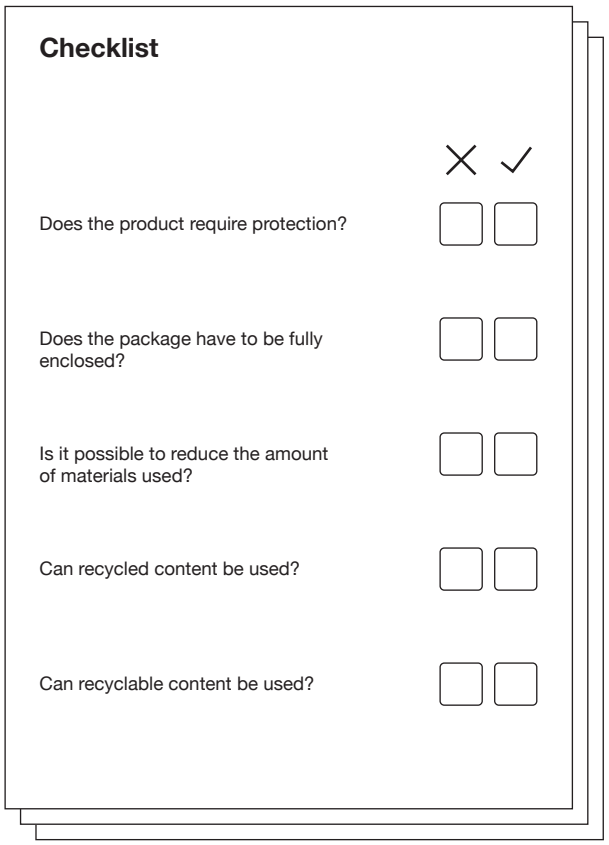
When having decided that a product is to be introduced as a private label product at Ica, the product manager contacts the supplier and requests an offer. After receiving a packaging suggestion from the supplier, the next step is having a discussion with the supplier, where the proposed packaging is reviewed. Here the Checklist will be used for guidance. After that the product manager consults the packaging responsible at Ica, to ask for advice if there are uncertainties, or to confirm the decisions made with the supplier regarding the packaging.

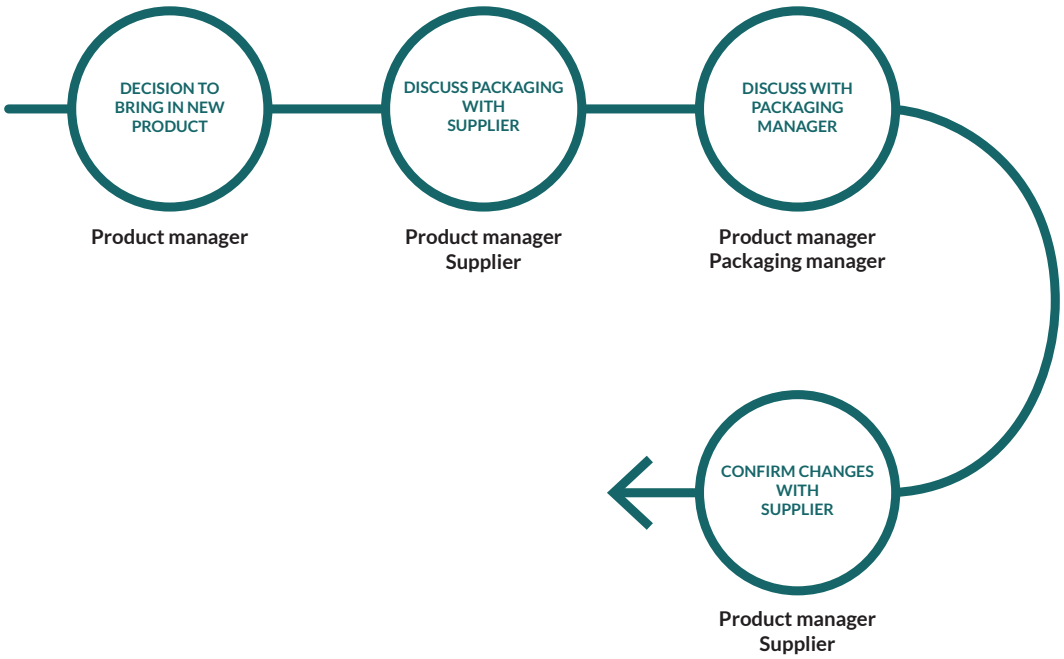
Advantages

- Easy, quick and cost-effective to implement.
- Allows the product manager to challenge supplier suggestions.
- Allows for a somewhat standardized process across the assortments, since the questions will not be derived by the product managers themselves.
- Facilitate a discussion focusing on realistic options rather than solely proposing a fictional ultimate packaging.

Challenges

- Can be laboursome and tedious having to go through the same questions every time with a supplier.
- Does not provide the ability to determine the most sustainable option.
- Provide information that is perceived as helpful and valuable and not only as an increased workload.


Checklist
Does the product require protection?
Does the package have to be fully enclosed?
Is it possible to reduce the amount of materials used?
Can recycled content be used?
Can recyclable content be used?


DECISION TO BRING IN NEW PRODUCT
Product manager
DISCUSS PACKAGING WITH SUPPLIER
Product manager
Supplier
DISCUSS WITH PACKAGING MANAGER
Product manager
Packaging manager
CONFIRM CHANGES WITH SUPPLIER
Product manager
Supplier

6.1.2 PACKAGING SUGGESTIONS

Artefact

An issue commonly mentioned during the interviews was a lack of knowledge in potential improvements during packaging development with the supplier. This Packaging suggestion concept provides a support in the dialog by suggesting viable packages for each product. The artefact is an interactive software with a set of questions and predefined answers, covering both sustainability and marketing aspects of the packaging. Aspects to be determined internally at Ica as well as with the supplier are provided. Each answer is linked to a library of packages. The answers functions as a filter for available packages. When all questions have been answered, the software will have provided a set of packaging solutions feasible for each situation.

Process

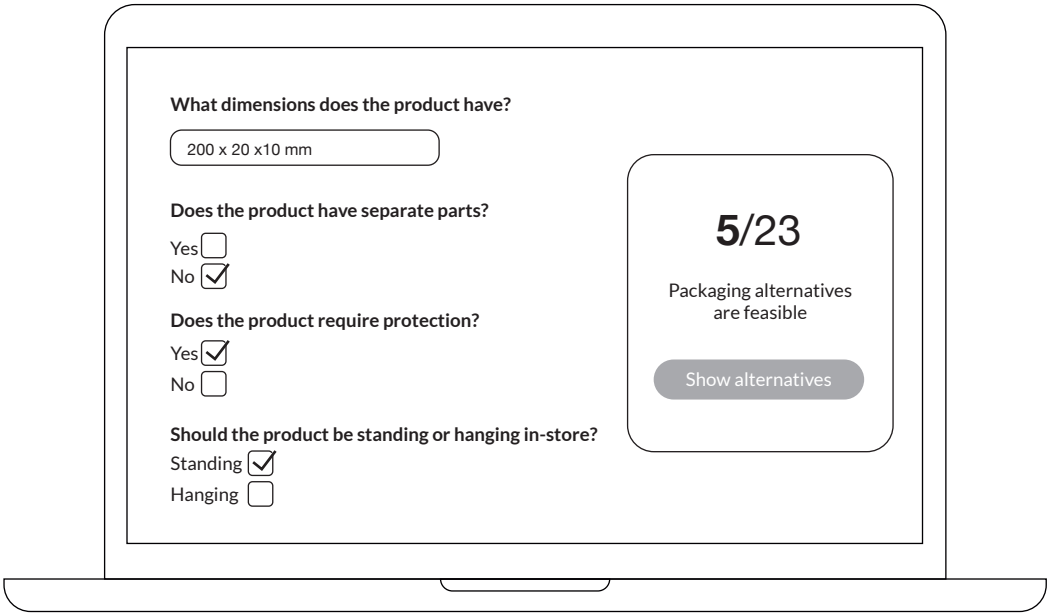
When having decided that a product is to be introduced as a private label product at Ica, the product manager contacts the supplier and requests an offer. The product manager first answer the questions he or she have or can manage based on internal demands. After that, a dialog with the supplier is held to investigate the other aspects. A final packaging solution is chosen from the derived suggestions. Finally, the product manager consults the packaging responsible at Ica, to ask for advice if there are uncertainties, or to confirm the decisions made with the supplier regarding the packaging.

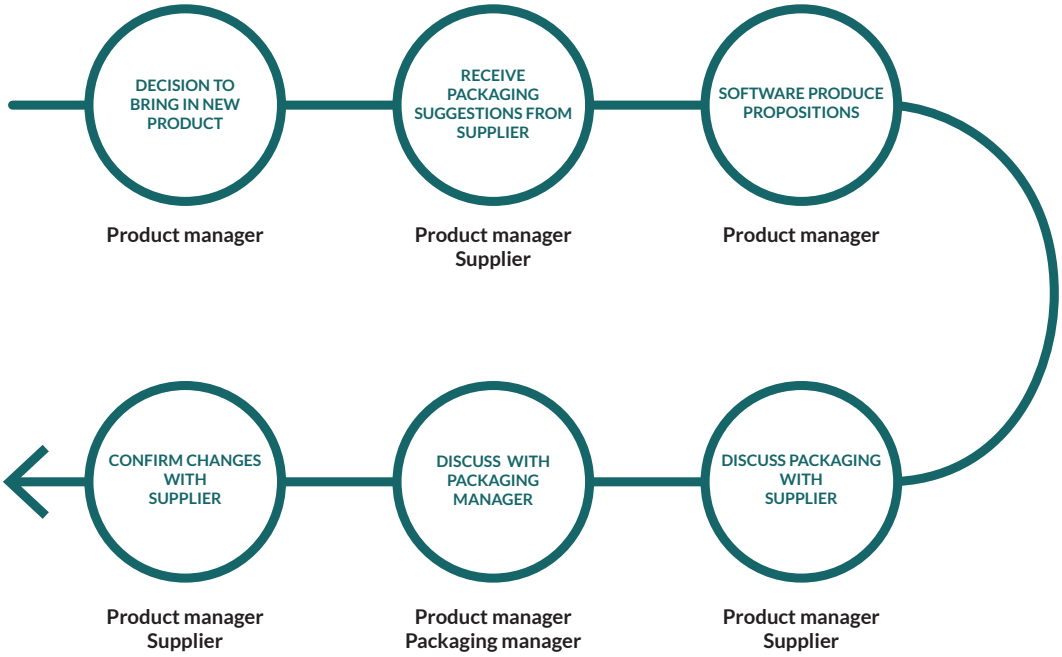
Advantages

- Allows the product manager to challenge supplier suggestions, without being an expert in the field
- Allows for a somewhat standardized process across the assortments, since the questions posed to the supplier will not be derived by the product managers themselves.
- Facilitate a discussion focusing on realistic options rather than solely proposing a fictional ultimate packaging

Challenges

- Can be laboursome and tedious having to go through the same questions every time.
- For products where the general suggestion is not the best option this concept can limit rather than support creativity.


What dimensions does the product have?
200 x 20 x10 mm
Does the product have separate parts?
Yes
No
Does the product require protection?
Yes
No
Should the product be standing or hanging in-store?
Standing
Hanging
5/23
Packaging alternatives are feasible
Show alternatives


DECISION TO BRING IN NEW PRODUCT
Product manager
RECEIVE PACKAGING SUGGESTIONS FROM SUPPLIER
Product manager
Supplier
SOFTWARE PRODUCE PROPOSITIONS
Product manager
DISCUSS PACKAGING WITH SUPPLIER
Product manager
Supplier
DISCUSS WITH PACKAGING MANAGER
Product manager
Packaging manager
CONFIRM CHANGES WITH SUPPLIER
Product manager
Supplier

6.1.3 THE PACKAGING GUIDE

Artefact

The packaging guide is a web page at Ica's intranet that provide extensive information regarding sustainable packaging. By gathering information at one single accessible place, product managers can easier assimilate new knowledge regarding sustainable packaging. This will help them in posing relevant questions to the supplier and making more informed decisions. The packaging guide will be divided into a number of sections, each covering one of the aspects that affect the sustainability of a packaging. Examples illustrating how different principles can be realised, e.g. minimizing material of a packaging, will be provided alongside the informative text as inspiration for the product managers.

Process

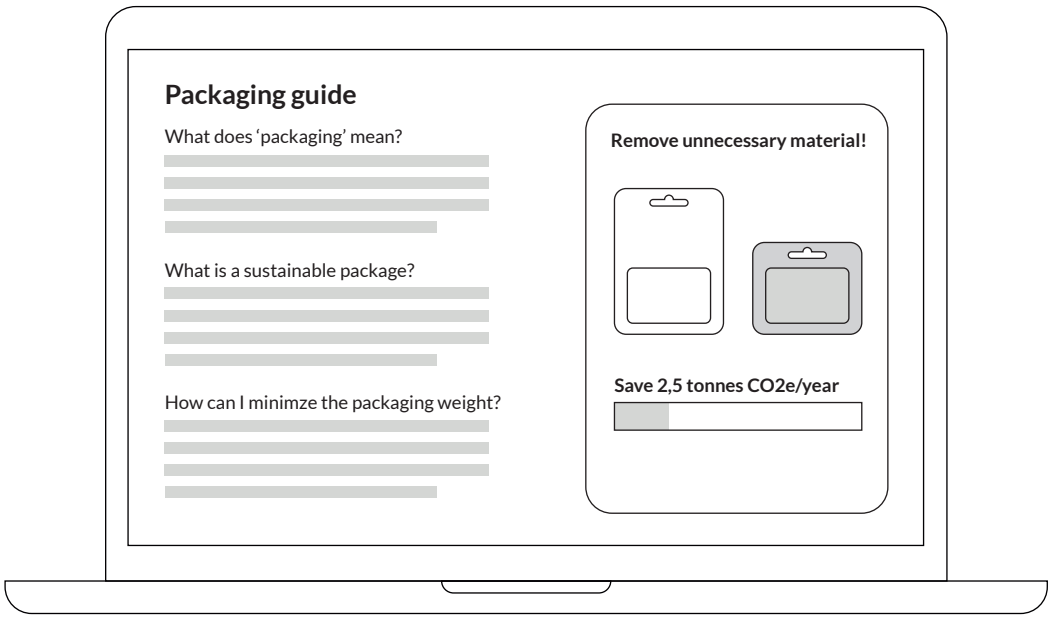
When having decided that a product is to be introduced as a private label product at Ica, the product manager contacts the supplier and requests an offer. The next step is receiving the suggested packaging description from the supplier and, by using the packaging guide, identifying possible improvements that can be made. After that, the product manager is having a discussion with the supplier about possible changes to make . Finally, the product manager consults the packaging manager at Ica, to ask for advice if there are uncertainties, or to confirm the decisions made with the supplier regarding the packaging.

Advantages

- Easy to implement as no major organizational changes or advanced systems are required.
- Provides the product manager with deeper knowledge regarding sustainability. Gives direction and makes it easier where to start in packaging development.

Challenges

- Providing information that is perceived as helpful and valuable in order to increase the user acceptance, and not only be perceived as increased workload.
- Relies on the product manager's ability and interest in assimilating the knowledge and using it to improve packaging.


Packaging guide
What does 'packaging' mean?
What is a sustainable package?
How can I minimze the packaging weight?
Remove unnecessary material!
Save 2,5 tonnes CO2e/year


DECISION TO BRING IN NEW PRODUCT
Product manager
RECEIVE PACKAGING SUGGESTIONS FROM SUPPLIER
Product manager
Supplier
EVALUATE PACKAGING SUGGESTIONS
Product manager
DISCUSS PACKAGING WITH SUPPLIER
Product manager
Supplier
DISCUSS WITH PACKAGING MANAGER
Product manager
Packaging manager
CONFIRM CHANGES WITH SUPPLIER
Product manager
Supplier

6.1.4 LCA-TOOL

Artefact

The LCA-tool concept is to be used by product managers during the packaging decision process, to derive the most sustainable packaging option. The idea is that by examining data on the environmental impact of a package, product managers will be able to see what changes that would be most beneficial from a sustainability perspective. Moreover, showing the actual effect of altering a product in terms of environmental impact could motivate product managers to make changes. In order to use the LCA-software effectively, a form where comprehensive information regarding the supplier's possibilities in terms of packaging options has to be provided by the supplier.

Process

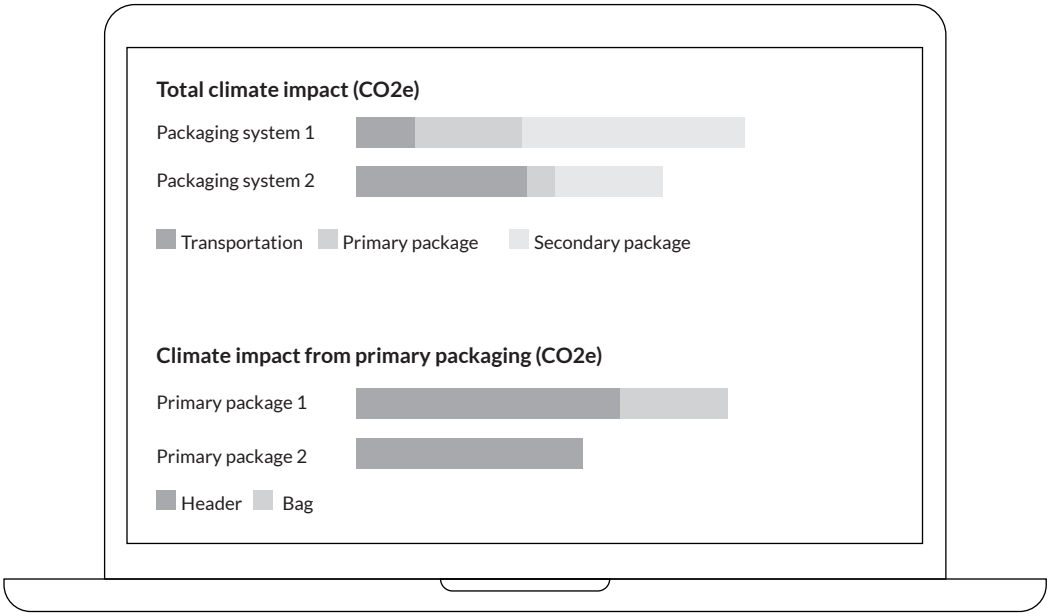
When having decided that a product is to be introduced as a private label product at Ica, the product manager contacts the supplier and requests an offer. The first step is sending a form to the supplier to be filled in for each packaging suggestion, e.g. weight and material specifications. The supplier sends the form back to the product manager, who inputs the parameters into the LCA-software and evaluates them. The product manager can then use the software to find alternative ways to improve the packaging further. After that, the product manager is having a discussion with the supplier about possible changes to make . Finally, the product manager consults the packaging manager at Ica, to ask for advice if there are uncertainties, or to confirm the decisions made with the supplier regarding the packaging.

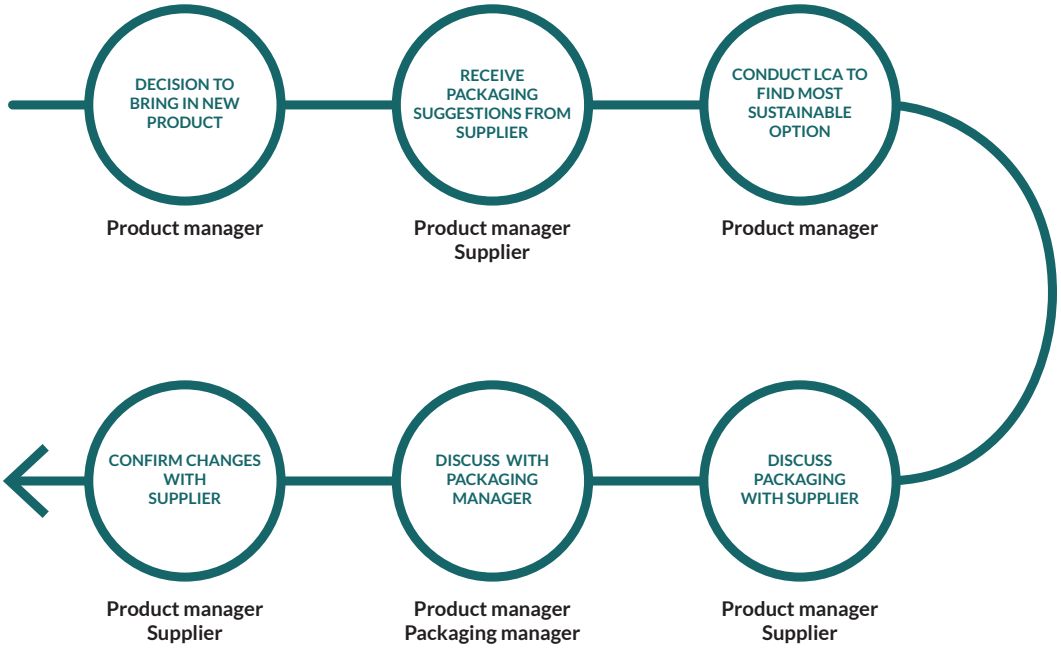
Advantages

- Can provide the product manager with an accurate measurement of the environmental impact of a packaging.
- Minimizes the risk on making wrongful decisions that will actually reduce the sustainability of a packaging.

Challenges

- Does not support in exploring all aspects that affect sustainability of a packaging.
- Provide the tool as something helpful and valuable not only be perceived as increased workload.
- Is expensive to develop or purchase.


Total climate impact (CO2e)
Packaging system 1
Packaging system 2
Transportation
Primary package
Secondary package
Climate impact from primary packaging (CO2e)
Primary package 1
Primary package 2
Header
Bag


DECISION TO BRING IN NEW PRODUCT
Product manager
RECEIVE PACKAGING SUGGESTIONS FROM SUPPLIER
Product manager
Supplier
CONDUCT LCA TO FIND MOST SUSTAINABLE OPTION
Product manager
DISCUSS PACKAGING WITH SUPPLIER
Product manager
Supplier
DISCUSS WITH PACKAGING MANAGER
Product manager
Packaging manager
CONFIRM CHANGES WITH SUPPLIER
Product manager
Supplier

6.1.5 PACKAGING EXPERTS

The idea of the concept is based upon the fact that product managers are not packaging experts and do not have the necessary knowledge to make informed decisions regarding packaging. A way to solve this is by relieving the product manager from the responsibility of deciding about the packaging, and instead introducing a packaging specialist to take over the responsibility. Moreover, other functions at ICA (i.e. space managers, corporate responsibility and logistics) that have specialist knowledge in their respective area are involved in the process to assure that sustainable changes conform with other demands on the packaging. The main idea is to have meetings where possible changes are discussed when the product manager has received packaging suggestions from the supplier, but before meeting with the supplier. The packaging specialist also accompanies the product manager during the following meeting with the supplier, and takes responsibility for the packaging discussion.

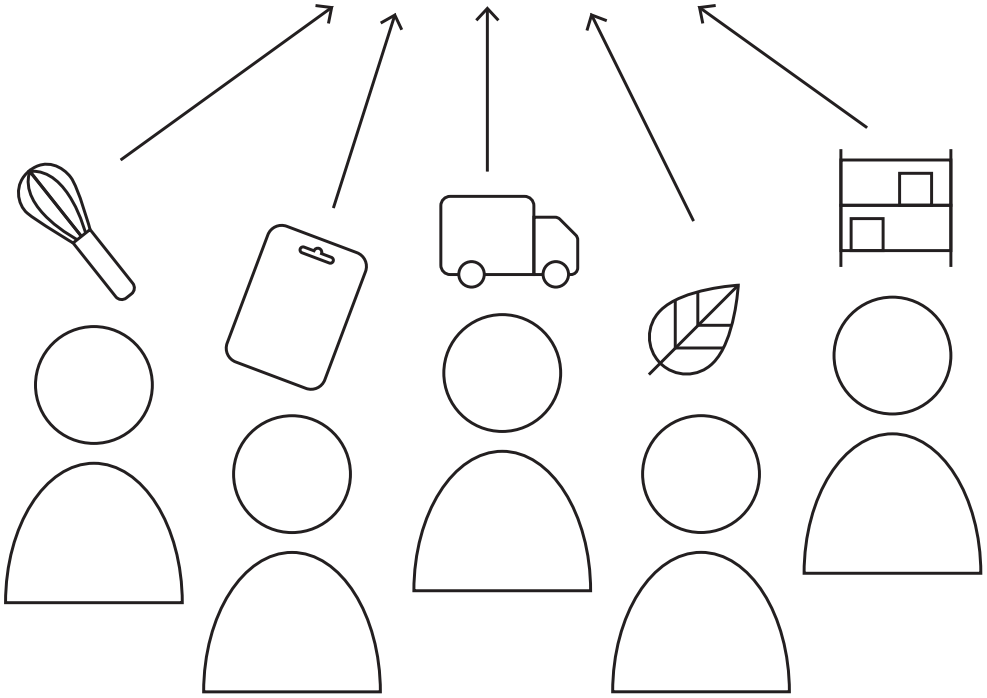
Advantages

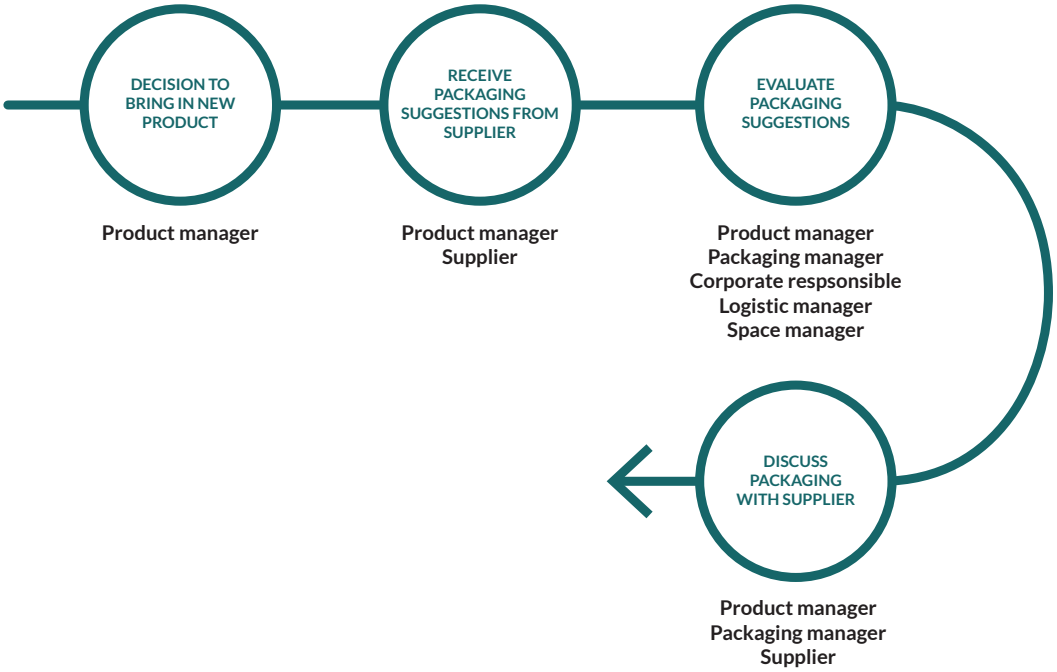
- A packaging expert who possess more knowledge compared to a PM (even with a supportive tool), is more likely to achieve a packaging that is as sustainable as possible under the circumstances.
- By integrating other specialists into the process, the outcome will be realisable and instead of assuming that something is not possible, it can be evaluated and possibly implemented.
- The concept can be adaptable to different types of packaging, as people and not static guides constitute the concept.

Challenges

- Costly and resource-intensive, since many people will have to be hired and many employees will have to allocate time to attend meetings.
- Implementation may take long time as roles has to be redefined and introduced

Sustainable packaging





6.2 EVALUATION

This section presents the evaluation of the concepts, first in regards to the formal evaluation done with the evaluative criteria and finally the conclusions from the one performed with employees at Ica. The full definition of the list of six criteria used in the evaluation is showed in appendix E. The results of the first evaluation with the six defined criteria are shown in table 6.1, and is discussed further on in this chapter. The full evaluation matrix for the last criterion, persona feasibility is shown in appendix F.

Table 6.1

Evaluation of concepts

	Checklist	Packaging suggestions	Packaging guide	LCA-tool	Packaging experts
Implementation	5	4	5	2	3
Time perspective	4	3	4	3	1
Cost	4	3	4	2	1
Ability to increase sustainability	3	4	3	3	5
Efficiency	4	4	4	1	3
Persona feasibility	3.4	3.2	3	2.4	4.6
Score	**23.4**	**21.2**	**23**	**13.4**	**17.6**
Weighted score	**3.9**	**3.7**	**3.8**	**2.2**	**3.5**

The concept *Checklist* received the highest total score as the artefact is simple to implement, require limited financial investments and can be done in near future. Its feature of eliciting packaging discussions in a simple way should lead to a lean process and at least an increase in sustainability compared to today.

The concept *Packaging suggestions* received a high score and could have higher potential in increasing sustainability than the checklist, since it is based on suggesting packaging solutions for each specific case. This idea of aiding creativity and potentially questioning existing solutions was considered positive. Being fairly similar to the checklist on some aspects the slightly lower total score was due to a bit more effort and time required for implementing this concept.

The *Packaging guide* did also receive a high score, were the difference compared to the *Checklist* lies in it being slightly less feasible with the personas. This concept demands more discipline from the user to actually review the information in the guide and to formulate the necessary questions to the supplier from the knowledge gained. That aspect was not as compatible with the personas as receiving direct guidance in the communication.

Using concept *LCA-tool* as the artefact did receive a low score in the evaluation. Not only because such a tool would introduce new costs but mainly the projected low efficiency and compliance with the personas. In addition, even if a LCA-tool can calculate the exact impact of each packaging option, it does not aid in the creative development of improvements like the other concepts can do.

The last concept where a *Packaging expert* would take all responsibility for the packaging of each product did score good as well and was considered to potentially have the largest potential for increased sustainability. However, the concept requires big changes in current working procedures and hire of many new employees with dedicated packaging knowledge. This problematic implementation is the main reason for the total score not being higher.

In the evaluation with employees at Ica the concepts got almost the same feedback as in the evaluation done through the matrix. The *Packaging experts* was considered a possible solution as well but something that lied a bit more into the future due to the organisational changes required and costs involved. A combination of the Checklist and the Packaging guide was desired since both of them was considered quick and easy to implement and at a low cost.

Based on the results in the evaluation matrix and the feedback from Ica the final concept will be developed with the combination of ideas from concept one and three. All of them scored high points and prosper in slightly different areas of the design guidelines. Increasing sustainability knowledge and sufficient support in the dialog with a supplier were both requested by product managers and can be done if the concepts are combined.

6.3 CONCEPT REFINEMENTS

The final concept was concluded to consist of three parts; a packaging guide, a checklist and a set of evaluative questions for improving the existing assortment at Ica. Throughout the ideation and evaluation this division of components was considered to best fulfill all guidelines defined in section 4.5.

Implementation

Different ways to implement the concept were discussed. The main concern was whether to implement the Checklist as an interactive online system on Icas intranet or as an interactive pdf. An online system would allow for more sophisticated functionality and interactions, where filled in data could automatically be stored in data sets that easily could be retrievable and useful for a variety of applications. After discussing the matter with Ica, it was determined that this would be too costly and time-consuming to implement. Instead, it was decided to build the concepts as interactive pdf-documents which also would be accessible through the intranet.

Guide for reviewing existing packages

In order to meet the guideline on a process of how to review and improve existing packages in the assortment, a section for this task was added in the packaging guide. A number of criteria to be used as checklist for evaluating packages was constructed. Each of the criterion focus on an sustainability aspect directly connected to the primary packaging and formulated in a way that could be answered through a brief evaluation. The purpose of this guide is to identify packages with opportunities for improvement, while the actual changes will be aided by the Packaging guide or the Checklist.

Packaging guide

Since the concept was to be realised in the form of pdf-documents, it was decided that the packaging guide should encompass all information except the checklist in order to avoid an excessive amount of documents. Therefore the questions for evaluating the existing assortment were added in the end of the packaging guide. Moreover, a description of the proposed packaging development process and information regarding how and when to use the different artefacts was added. As the packaging guide was deemed to be beneficial to the suppliers as well, it was decided that it should be sent to them as well. A summary was added in the beginning of the guide, to allow suppliers and product managers to quickly understand how to meet Ica's packaging demands.

Checklist

Textboxes for alternative answers and comments were added to the concept, as the provided answers might not be applicable in every case. It was decided that the product manager always should be the one filling out the checklist and not the supplier. Because leaving the decisive power, i.e. choosing the predefined answers, to the supplier will create the same issue of an unbalanced dialog between supplier and product manager as discussed in section 4.4. This means that when having mail contact with suppliers, the relevant questions will have to be written in an email, rather than sending the form for the supplier to fill out. Moreover, the need of documenting packaging attributes and decisions was acknowledged by Ica and therefore functionality for doing this was included as well. The examples and tips on how to improve the packaging sustainability in the packaging guide was added to the checklist as well, since they would be beneficial here too.

07. FINAL CONCEPT

PHASE TWO

The final concept consists of three tools; the Packaging guide, the Checklist and the Review questions. The final concept also consists of a proposed packaging process which combined with the tools will improve the development of sustainable packaging at Ica.

7.1 OVERVIEW OF THE FINAL CONCEPT

The final concept intends to provide a solution which can be implemented quickly and then later be adopted to future changes. It has been designed to fit current working procedures at Ica, and is not reliant on large organisational changes or the introduction of digital systems that are not already available at Ica today. The purpose of the concept is therefore to make the current working procedure as good as possible from a sustainability perspective. It consist of three tools, the Checklist , the Packaging guide, and a set of review questions, which combined will improve the procedure of increasing the environmental sustainability of Ica's private label packaging. All levels in the product-packaging system are addressed in the Checklist and the Packaging guide, although primary packaging is emphasized. This is due to it being easier to affect, and secondary and tertiary packaging are also revised by the logistic division at Ica.

Figure 7.1

The three tools that constitute the design concept

Structure of concept

The three different tools are designed as interactive pdf:s in order to be compatible with the current systems used at Ica. As Table 7.1 demonstrates, the three tools are structured in two pdfs (the Packaging guide-pdf encompass both the Packaging guide and the Review quesitons). The three tools can be used individually but are meant to complement each other. The Checklist is supposed to be used as a communicative aid with suppliers and to facilitate documentation of packaging decisions and changes. The Packaging guide is more comprehensive and is focused on informing product managers and suppliers on how to work towards sustainable packaging. The Review questions are designed to be used for improving existing packaging in the assortment.

Table 7.1

The artefacts (pdf:s) and the tools in each of them

Artefact	Tool(s)
Packaging guide	Packaging guide Review questions
Checklist	Checklist

Sustainability aspects encompassed by the concept

The different tools are intended to be used at different stages of the packaging development process. During these different stages, different aspects that affects the packaging sustainability are more or less relevant. Table 7.2 provides an overview of the aspects that are addressed by the different tools.

None of the tools address the sustainability aspects *production and manufacturing*, *end-of-life* or three of the factors in transportation; *transportation distances*, *fuel type* or *mode of transportation*. Because these aspects, as mentioned in section 4.3, is be-

yond what the product manager can affect at this stage. The Packaging guide address the remaining aspects of sustainable packaging, whilst the Checklist does not regard consumer information. The reason for this is that the supplier is not involved in decisions regarding what information that is to be provided on the packaging, because that information is decided upon later in the process. The Review questions have been designed to be used as a quick evaluation tool of an existing packaging, and it should be possible to review packaging simply by looking at it. The aspects that are not addressed in this tool are aspects that could not be determined without investigating the packaging on a deeper level.

Table 7.2

Addressed sustainability aspects in the final concept

Sustainability aspect	Packaging guide	Checklist	Review quesitons
Product protection	2/2	2/2	1/2
Weight & volume	2/2	2/2	2/2
Type of material	5/5	5/5	1/5
Comp. with recycling systems	4/4	4/4	1/4
Transportation	2/4	2/4	0/4
Production & manufacturing	0/3	0/3	0/3
Consumer information	2/2	0/2	1/2
End-of-life	0/3	0/3	0/3

Continuous updates

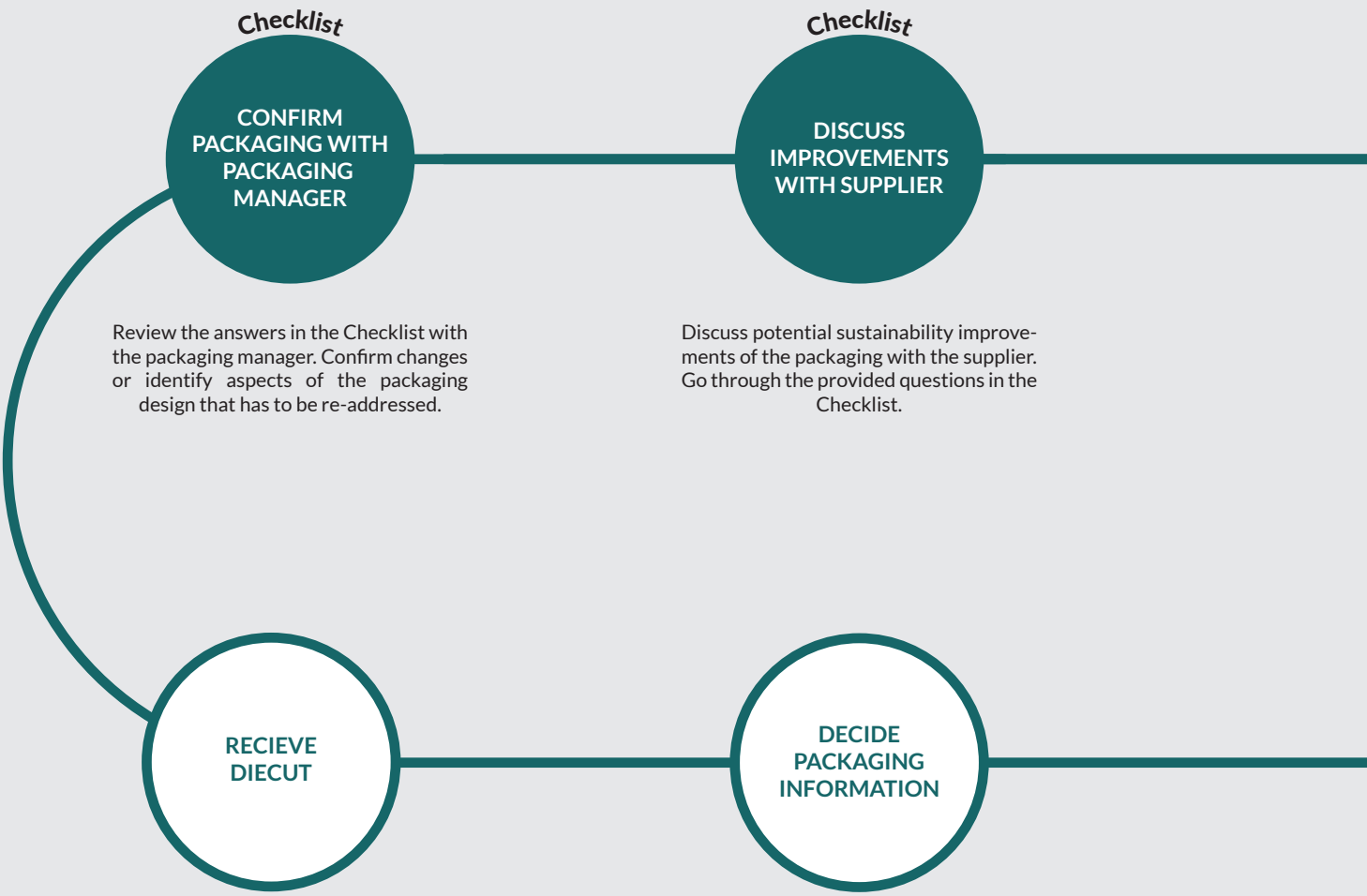
An important basis for this concept to be valid on a long term scale is it being continuously updated. Both the Checklist and the Packaging guide does provide current up to date information, but the validity of certain information will probably change over time. Additional information about packaging, not directly linked to sustainability should also be included further on to keep all information in one document. The responsibility of updating the documents is envisioned to be put on the role responsible for packaging, in this concept referred to as packaging manager. This role does not exist at Ica today, but the private label coordinator currently has similar responsibility to that of an packaging manager and will therefore take on this assignment initially.

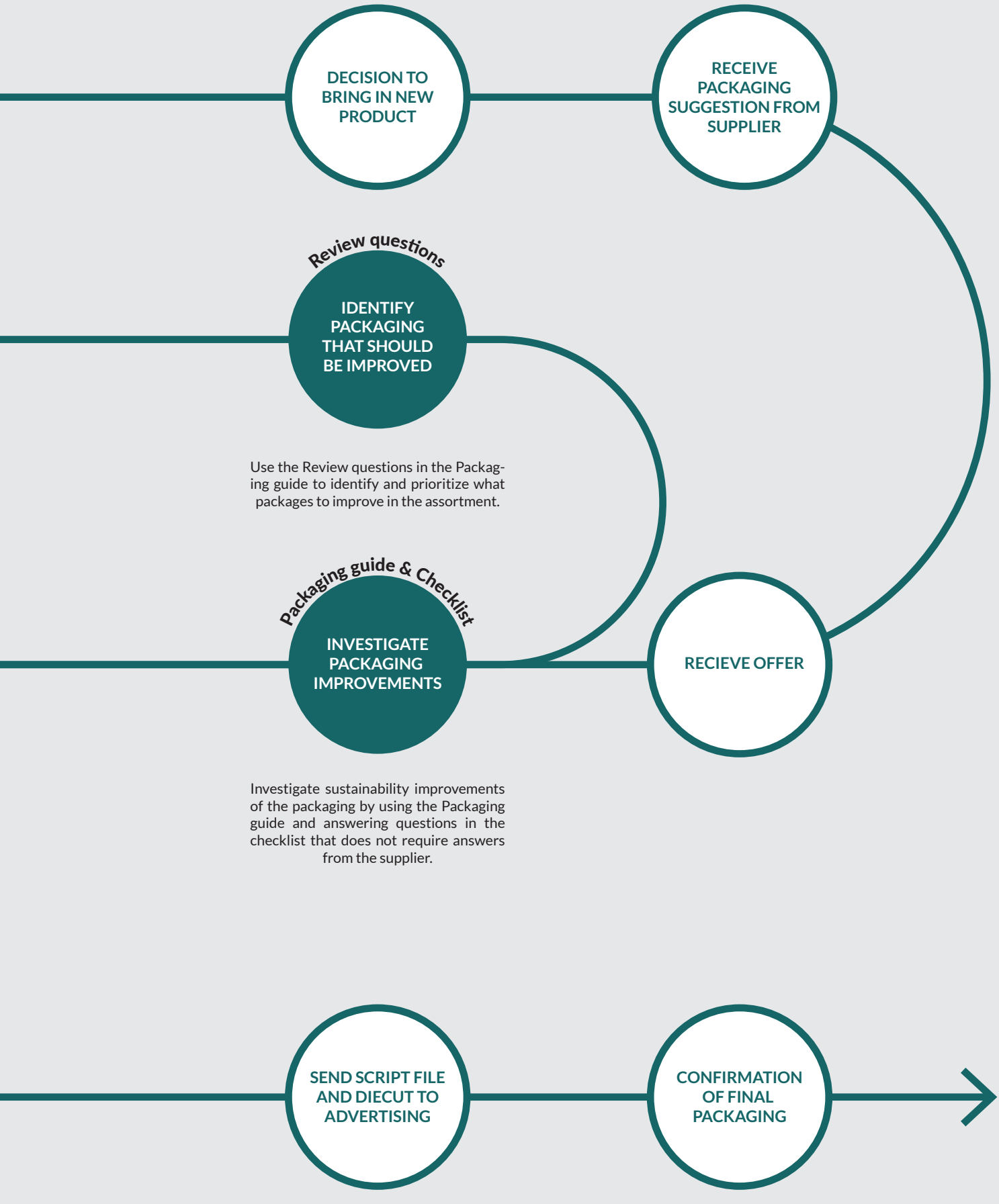
Figure 7.2

Desired process

New product entering assortment

Existing product in assortment




DECISION TO BRING IN NEW PRODUCT
RECEIVE PACKAGING SUGGESTION FROM SUPPLIER
Review questions
IDENTIFY PACKAGING THAT SHOULD BE IMPROVED
Use the Review questions in the Packaging guide to identify and prioritize what packages to improve in the assortment.
Packaging guide & Checklist
INVESTIGATE PACKAGING IMPROVEMENTS
RECIEVE OFFER
Investigate sustainability improvements of the packaging by using the Packaging guide and answering questions in the checklist that does not require answers from the supplier.
SEND SCRIPT FILE AND DIECUT TO ADVERTISING
CONFIRMATION OF FINAL PACKAGING

7.2 PROPOSED WORKING PROCEDURE

One of the insights from the user study was the variation in sustainability knowledge and accuracy about the internal goals and requirements on the environmental approach. Reading the Packaging guide should therefore be a mandatory task for all product managers and their assistants, so that all have the same preconditions and source for future decisions to be based on.

In figure 7.2 the proposed packaging development process is shown. The initial step in the process can either be the introduction of a new product or the revision of a primary packaging in the existing assortment. When introducing a new product in the assortment, the supplier should have received the packaging guide beforehand, and should propose a package that is believed to be feasible in Ica's private label assortment. Alternatively, if an existing packaging is being reviewed, the first step is to identify packaging that should be improved by utilizing the Review questions in the Packaging guide. More details on how this review is done is described in section 7.4.

Once these steps have been performed, the actual improvement focus on the packaging begins. The product manager use the Checklist and Packaging guide to reflect on how the packaging should be designed according to Ica's preferences and the defined aspects of sustainability. After that, potential packaging improvements are discussed with the supplier, using the Checklist as guidance. Once this discussion has been held, the concluded packaging design must be approved by the packaging manager. This is to ensure no unfavourable designs are put in production and then become irreversible. The rest of the process, regarding the printing and consumer information proceeds as usual.

7.3 PACKAGING GUIDE

The purpose of the Packaging guide is to support product managers at Ica in improving the sustainability of the packaging in their assortment, by providing knowledge as well as strategies and tips for how to make sustainable improvements. Moreover, since the Packaging guide is accessible to suppliers, it aids in communicating Ica's ambitions regarding sustainable packaging which will support suppliers in meeting Ica's requests. The complete guide is displayed in appendix G.

Description of the packaging guide

The packaging guide consists of four parts: an explanation of the three tools, an introduction, a part describing strategies for achieving sustainable packaging and finally the review questions for improving existing packaging within Ica's assortment.

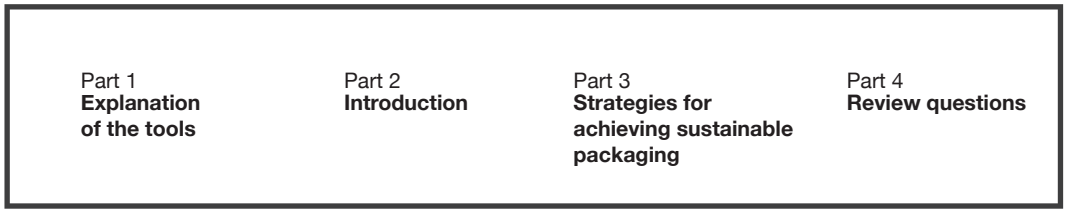


Figure 7.3
Structure of Packaging guide

The first part of the packaging guide describes the three different tools available for the product manager and when and how to use them. This is done by presenting a preferred working process in text and with an illustration.

När och hur används de tre hjälpmedlen?

Förpackningsguiden, *Checklistan* och *Utvärderingsfrågorna* tar upp liknande aspekter, men är anpassade för att användas vid olika tillfällen och på olika sätt.

1 *Förpackningsguiden* samlar nödvändig kunskap om hur förpackningar bör utformas för att bli så hållbara som möjligt. Läs igenom den och använd den sedan för att gå tillbaka till när du ska besluta om förpackningsförbättringar.

2 Eftersom *Förpackningsguiden* sammanfattar ICAs riktlinjer för EMV-förpackningar bör den även skickas ut till dina EMV-leverantörer, så att de får koll på hur deras förpackningar bör utformas. En leverantörsanpassad version av *Förpackningsguiden* finns att ladda ner på Sharepoint.

3 För att underlätta framtagandet av hållbara förpackningar har *Checklistan* tagits fram. När du fått ett förpackningsförslag av din leverantör kan du börja med att själv besvara de frågor i Checklistan som du kan. Använd även i *Förpackningsguiden* i den mån du hinner och behöver.

4 Kontakta sedan leverantören och gå igenom Checklistan tillsammans, fyll i svaren direkt i det interaktiva pdf-dokumentet.

5 Efter att frågorna fyllts i laddar du upp dokumentet på Sharepoint för godkännande från förpackningsansvarig. Efter att förpackningsansvarig godkänt förpackningen är det bara att implementera!

X För att kunna förbättra existerande förpackningar i ditt sortiment används *Utvärderingsfrågorna*. Genom att använda dessa kommer du snabbt och enkelt kunna identifiera vilka förpackningar som har förbättringspotential. När du gjort detta kan checklistan och förpackningsguiden användas i själva förbättringsarbetet.

Figure 7.4

One of the introductory pages

The introduction begins by presenting a summary of the guidelines and demands that are described in the packaging guide. The reason for this is that product managers that already are familiar with the contents of the packaging guide should be able to quickly get an overview of the contents, as a reminder of what Ica expects from them. Moreover, suppliers should be able to to quickly get an overview of what they are expected to deliver in order to meet Ica's demands. In the next part of the introduction, the concept of packaging and product-packaging systems are explained and put into relation to the various packaging components that are used by Ica. This part stresses the fact of considering all components of the product-packaging system, and it also presents a categorization of primary packaging that is based on the amount of material a packaging type generally uses. This part aims to inspire product managers and suppliers to consider all packaging types, especially those that use less material. The introduction concludes by explaining sustainable packaging, emphasising the packaging life cycle and highlighting the aspects that affect the sustainability of packaging.

The next part of the Packaging guide, *Strategies for achieving sustainable packaging*, is divided into five chapters, each dedicated to one of the relevant aspects that affect the packaging sustainability. *End of life* and *production and manufacturing* are not included, as explained in 7.1. The aspect *product protection* is not addressed in one dedicated chapter, but rather as a prerequisite that should always be regarded. Each chapter describes why the sustainability aspect is important to consider and also provide a number of strategies to employ in order to improve the packaging in this regard. Table 7.3 shows the different chapters and the corresponding strategies provided.

Table 7.3

Content of each chapter in the packaging guide

Chapter	Strategies
Minimize weight & volume	Change packaging type to one that uses less material
	Package several products in the same packaging
	Reduce the size of the product
	Remove unnecessary material
Use the right materials	Use paper instead of plastics
	Use recyclable materials
	Use recycled content
	Use renewable materials when using virgin material
Allow for recycling	Use the same material in the entire packaging
	Make it easy to separate different materials
	Use feasible adhesive materials
	Use feasible printing
Optimize transportation	Avoid handling units
	Avoid transporting air
	Minimize packaging material per pallet
Provide relevant information	Communicate the environmental attributes
	Inform consumers on how to dispose the packaging
	Remove redundant information that entails increased packaging size

The chapter continues by explaining each of the strategies. Each strategy is accompanied with examples that illustrates the intended goal along with a text describing the benefits for that specific occasion. The informative paragraph explains how to achieve the strategy and why it is important. When applicable, examples of the strategy implications are included. These either illustrate one example of the strategy in practice or a comparison between one poor packaging solution compared with a good packaging from the particular perspective.

Minimera vikt & volym

Förpackningsvikt och -volym påverkar hållbarheten ur flera avseenden. Dels innebär en ökad förpackningsvikt och -volym att en större mängd material och resurser har förbrukats vid framställningen av förpackningen, vilket i sig innebär en större klimatpåverkan. Dessutom har förpackningens volym implikationer för hur effektivt produkter kan transporteras. Mindre volym per förpackning betyder att fler produkter kan transporteras tillsammans.

Att minimera förpackningsvikt och -volym är inte bara fördelaktigt ur ett ekologiskt hållbarhetsperspektiv, det innefattar även minskade kostnader kopplat till förpackningsmaterial samt minskade transportkostnader. Det kan också ge ett ökad kundvärde i mindre förpackningar som behöver bäras från butik och ta upp plats i avfallssorteringen.

Viktigt att tänka på är också att inte ta bort eller minska tjocklek på material på sådant sätt att förpackningen i sig går sönder under transport eller i hanteringen av butikspersonal och kunder. Ett exempel på detta är förpackningar i papper där utstansningar för att kunna se produkten eller för upphängning bildar en för smal remsa av materialet leder till brott när en drar eller lyfter i förpackningen.

Det finns fyra för att minska vikt och volym på en förpackning. Dessa är sammanfattade i rutan till höger, och resten av detta avsnitt beskriver var och en av dessa mer ingående.

Notera igen att förpackningens huvudsyfte är att skydda produkten vilket innebär att förändringar fortfarande måste ske inom ramen för detta, om produkten behöver skyddas.

Strategier

- **Byt till en förpackningstyp som använder mindre material**
- **Eliminera onödigt material**
- **Packa flera produkter i samma förpackning**
- **Minska produktens storlek**

Innehåll

Figure 7.5

Overview of a strategy area

Byt till en förpackningstyp som använder mindre material

Som tidigare nämnt i avsnittet Konsumentförpackningar på ICA Special finns det förpackningar som generellt sett använder mindre förpackningsmaterial än andra, givet en viss produkt. Genom att byta till en förpackningstyp som använder mindre material kan produkt-förpackningssystemets klimatpåverkan minska betydligt.

Det är lätt att tänka att en viss produkt måste förpackas som den gjorts tidigare eller som det vanligtvis görs. I många fall kan det vara så, men långt ifrån alltid. Därför bör möjligheten till att byta förpackningstyp alltid undersökas.

Vissa produkter har inte behov av en konsumentförpackning som skydd. I dessa fall behövs bara en etikett eller en hangtag som informationsbärare.

Om en produkt behöver skyddas, fundera på var i värdekedjan detta är. Om produkten bara behöver skyddas under transport kan det vara effektivare att undvika konsumentförpackning och skydda produkten med enbart distributionsförpackning.

Distributionsförpackningar återfinns också i olika utföranden, till exempel lådor, banderoller och påsar, och även här bör den typ som i fallet använder minst material väljas.

Tips!

Många produkter behöver inte skyddas och kan enbart ha en hangtag eller etikett som informationsbärare. Fiberdukarna till ICA Basic-sortimentet använder betydligt mindre material jämfört med fiberdukarna från ICA Skona.

Stekpannan från ICAs EMV förpackas med en infälld sleeve istället för en låda som Fiskars. Detta kräver betydligt mindre material och medför även att stekpannorna kan staplas, vilket sparar plats både under transport och i butik.

Innehåll

DEL 1
SAMMANFATTNING
VAD RÄKNAS SOM FÖRPACKNING?
VAD ÄR EN HÅLLBAR FÖRPACKNING?

DEL 2
MINIMERA VIKT & -VOLYM
VÄLJ RÄTT MATERIAL
UNDERLÄTTA FÖR ÅTERVINNING
OPTIMERA TRANSPORT
GE RELEVANT INFORMATION

DEL 3
UTVÄRDERINGSFRÅGOR

Figure 7.6

Structure of a strategy and its informative examples

The last part of the packaging guide provides the review questions, which is described in section 7.4.

7.4 REVIEW QUESTIONS

The review questions are designed to support product managers in identifying potential sustainability improvements of the existing consumer packaging within their assortment. It is also used to prioritize which of these packaging that should be improved. The review questions consists of the following six questions:

- Is the degree of product protection offered by the packaging either over- or under-proportionate?
- Are there volumes of the packaging that is not filled up by the product?
- Are there unnecessarily large areas on the packaging that neither are in contact with the product, nor contain any information?
- Does the packaging contain plastic materials?
- Does the packaging contain different materials?

The questions have been selected with the purpose of covering the five aspects of the packaging guide, whilst still being reasonable to be answered by the product manager alone, by simply examining the consumer packaging.

The questions should be answered with either “yes” or “no”, and are designed in such a way that a “yes”-answer implies that the packaging could be improved from a certain perspective. The number of “yes”-answers correspond to how inadequate a consumer packaging is from a sustainability perspective. This means means that packaging that receives many “yes”-answers should be prioritized over one that receives few.

Description of the review questions

When reviewing existing packaging, the product manager starts by reviewing consumer packaging with the highest sales rates, since improvements of these packages will have greater effect compared to improvements made on packages with lower sales rates. After selecting a number of consumer packaging with the highest sales rates, the product manager uses the review questions for each of these. The ones scoring the worst here should be attempted to be improved first. In order to actually improve the packaging, the Packaging guide and the Checklist are used.

7.5 CHECKLIST

One of the major reasons why packages are not optimised for sustainability, or even cost in some cases, is due to the standard packaging solution provided by the supplier not being reviewed and questioned. But the developed Checklist will ensure the required prerequisites exists to conduct the necessary discussion in order to ensure all relevant aspects affecting the sustainability are considered. The Checklist consist of two sections, where the first one provides the communicative guidance in terms of questions and informative guidance of probes and packaging examples. The second section summarise the discussion by allowing the product manager to document the chosen packaging solution and the properties of included materials. In the first section, the questions are divided into five areas highlighting different aspects affecting the sustainability of a packaging; *Change type of packaging*, *Volume and weight*, *Choose correct material*, *Compatible with recycling* and *Transport*.

Process of using the Checklist

Figure 7.7
Process of using the Checklist

The intended process for using the Checklist are designed to both be efficient and supportive during packaging development. A flow of the interactions is illustrated in figure 7.7. With every new purchase of a product or improvement of either product or packaging, a new project folder including the Checklist file should be created on SharePoint in the *Ongoing projects folder*. Before the communication with the supplier, the product manager should reflect on the questions and fill in those answers he or she can answer beforehand. After this has been done, a dialog about the packaging must be held with the supplier to confirm the product manager's decisions and discuss the remaining aspects. This can be done in three ways; by mail, by phone or as a live meeting. When all questions are answered and the temporary packaging specifications are decided, the product manager schedule a meeting with the packaging manager to ensure the design is optimized for the product and meet the sustainability goals. If there are some aspects the packaging manager regard not sufficient, those changes are communicated to the supplier by the product manager to evaluate if possible to apply. Once this is signed off, the project folder is moved to the *Archive folder* where all finished and updated packaging projects are stored.

Naming document

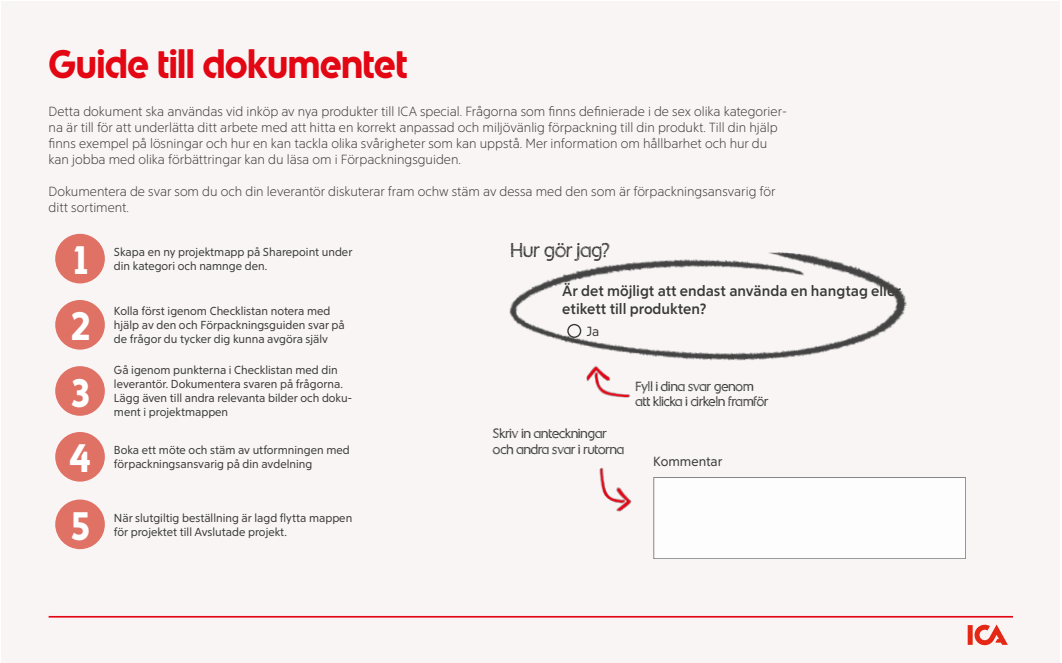
Since this document will be used for every new and redesigned products in the assortment, proper organisation is crucial. Not only for documentation per say but in order to make use of the actually documented decisions. On the first page, information about each product is entered to know when and by whom the development project was undertaken.

How to use it

A guiding page on how to use the Checklist, both the document itself and in the development process, is included and presented as an introduction in the document. The process described for the product managers on this page is presented in figure 7.7. By including the necessary steps in the Checklist, a reminder of each step in the process is always directly available and therefore more likely to be acknowledged by the user compared to being presented solely in a separate document. There are also illustrations describing how to enter the derived answers in the file, as interacting with a pdf is not considered common knowledge. Answers to each question can be documented through the clickable checkboxes and in the text fields dedicated to each question.

Figure 7.8

Instructions on how to use the checklist



Components for each question

Each of the five aspects affecting sustainability consist of one or several “groups” of components. These components are; a question, answering options, tips and text fields for alternate answers and comments. The questions are formulated to directly address and impose a desired design or approach to packaging sustainability. One of the issues elicited during the user study was the product managers experienced lack of knowledge and guidance on how to approach this issue. By providing actual questions to approach suppliers with, the Checklist removes the initial uncertainty of how to initiate the discussion concerning these aspects. A continued dialog can then be held with the aid of information from the Packaging guide if necessary.

The predefined answers to each question serve multiple purposes. Defining the most common and potential answers can prepare the product managers on how to respond in the communication with a supplier and potentially give suggestions on alternate solutions to meet sustainability demands. The alternative answers are not defined as radio buttons, but rather multiple choice boxes to not exclude several reasons for a desired solution to be neglected. These answering options can also be used as probing questions if a weak or no reason for an unmet demand is given by the supplier. Understanding the reason for a negative response can be a valuable experience to draw from in further projects or valuable information in the

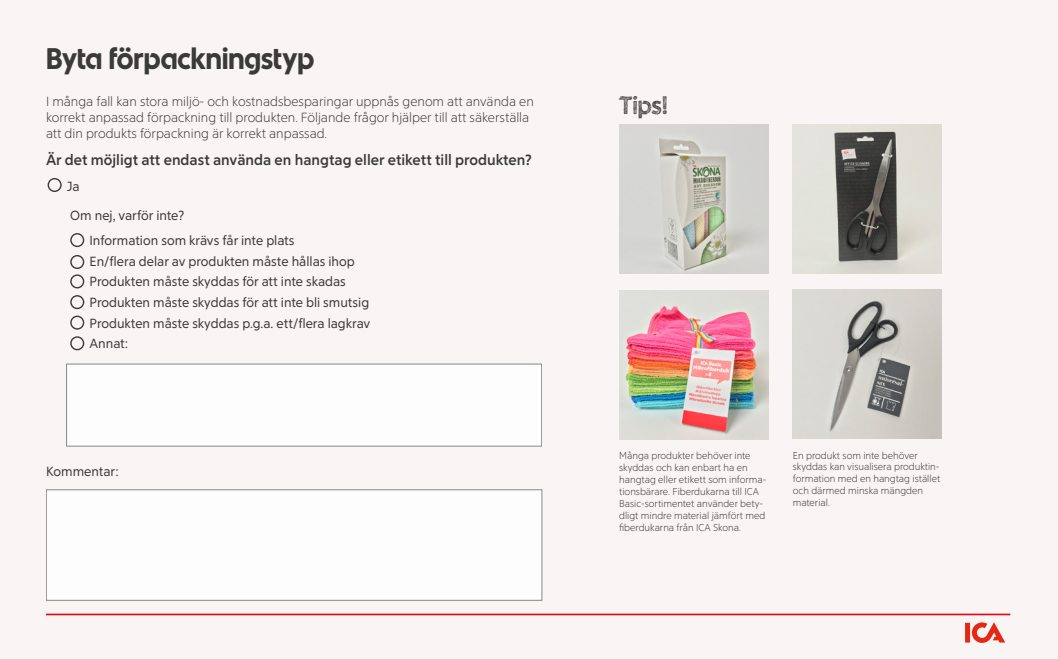


Figure 7.9

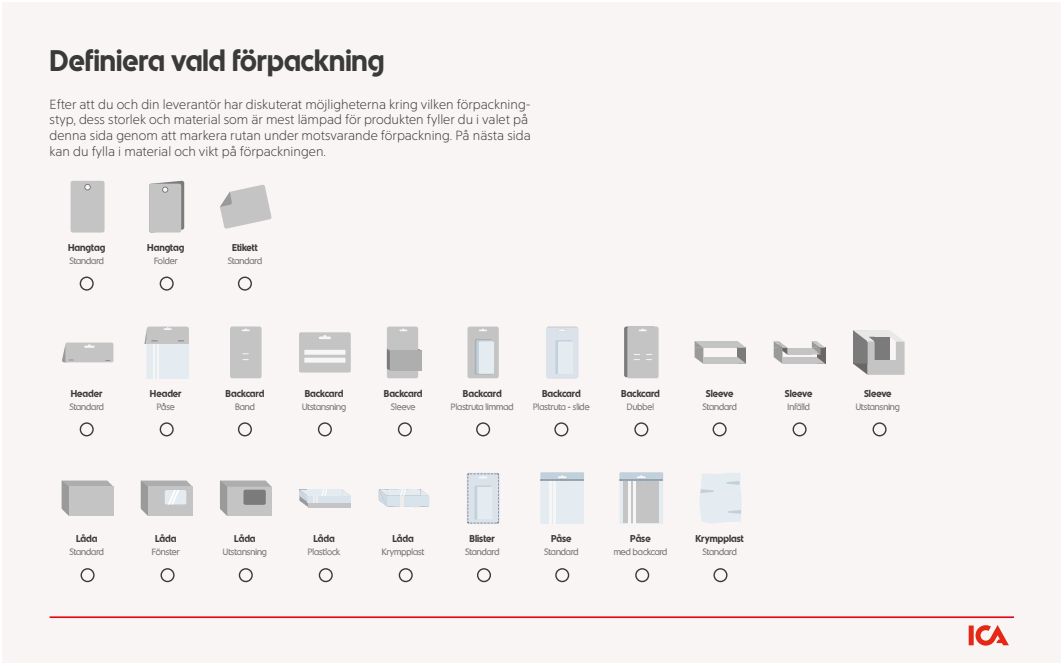
Layout for each question in the Checklist

reconciliation with the packaging manager in order for them to provide adequate suggestions for improvement. Additionally, predefined answers to tick in is quicker than typing every response and thereby reducing potential experience workload of using the Checklist. For those situations where reason for a unmet demand is not one of the defined options, the text field below those options can be used. Other additional information or notes on the matter can be documented by the same principle in the comment box.

To guide the product managers and increase creative solutions, each question in the Checklist has one or more tips showing examples on how to use the specific principle. The included tips are not the only way to improve a packaging solution, but it illustrates one potential approach. This further probes the product managers with potential solutions and questions to ask suppliers, encouraging more active involvement in the packaging development. But even the creativity, or at least desire to be creative increase, solely discussing the principles in the tips with the supplier can improve many packaging solutions in the assortment.

Figure 7.10

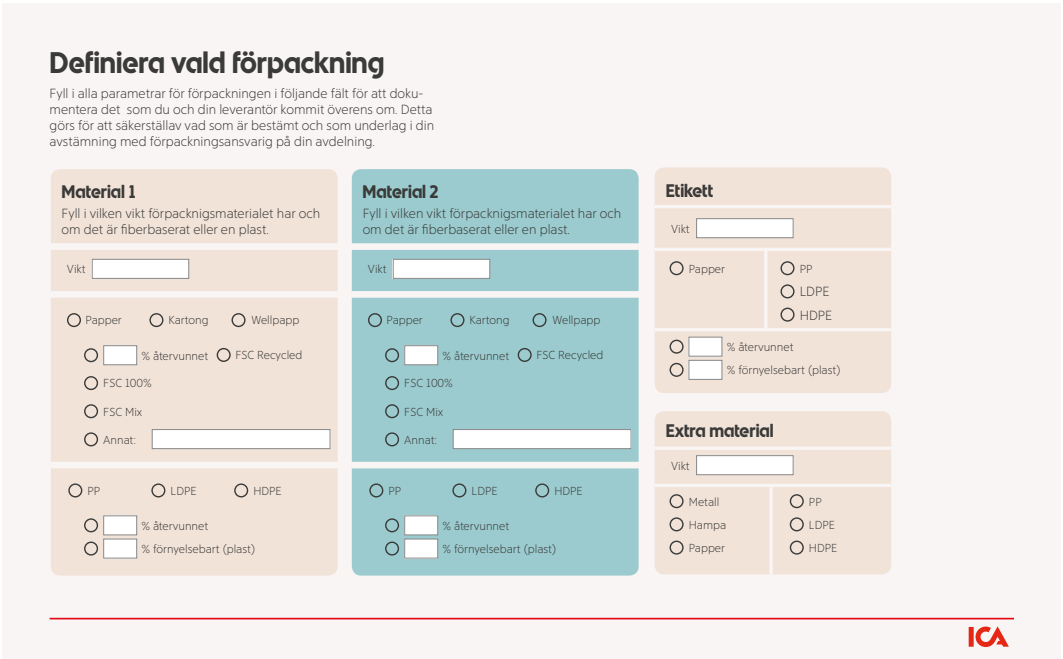
Documentation of the chosen packaging type



The second section in the Checklist is not meant to derive new information in about the packaging, but rather summarise the discussion and visualise the decision. On the penultimate page, all packaging types at Ica are listed and he chosen package are noted by ticking the corresponding box. Chosen materials are filled in on the final page. For each of the main materials and label used, all relevant specifications can be documented; weight, type of material, recycled fraction and renewable fraction. Additional materials, often staples of some sort, are often a very low fraction of the total packaging weight but still crucial to document for knowledge and further improvements in weight and number of materials used. Apart from the actual documentation, the fields for recycling and renewable fractions acts as complementing reminders for the importance of these details.

Figure 7.11

Documentation of materials used for the package



Reason for documentation

Designing the Checklist as a fillable document rather than solely written statements has multiple advantages. It will ensure that the product manager finish a packaging discussion process with documented material of what is actually decided. The packaging manager will receive a more secure basis for their final check of the proposed solution. Finally, knowing the details why certain decisions were made and storing the physical information of the packaging allow for an improved and perhaps more supported processed in the future. Although no digital system for storing, analysing or making use of packaging data is currently in use, when such a system is introduced, the advantage of already possessing the raw data means the timeline to actually get value from such system will be shorter. Collecting packaging information will, based on the result from this study, only be done when a new product is added to the assortment or through limited improvement projects. Therefore, documenting all packages in the assortment will probably take years and that process should be initiated as soon as possible. Another advantage is potential cost savings. Knowing the exact materials and weight of all packages ensures that the correct FTI-fee (see section 1.1) is paid. In the future additional charges for unsustainable material properties may be added and by knowing the details of their packages, Ica will be prepared for such changes. The entire tool can ne viewed in appendix H.

DISCUSSION

Result

In order to successfully reach positive sustainability effects, the product and packaging have to be regarded as an integrated system. Moreover, considering the entire packaging life-cycle allows for aspects that are not as evident as packaging size or materials to be dealt with. The factors that affect packaging sustainability can be summarized in eight factors; product protection, treatment at end of life, packaging weight and volume, materials used, compatibility with existing recycling systems, production and manufacturing, transportation and consumer information. The purpose of the packaging as protection and providing adequate information is superior to the remaining factors.

Apart from environmental sustainability, there are a number of factors that affect packaging decisions at Ica. These include price, marketing of the product in-store, material availability, available production techniques and tools, the quality of recycled material, perceived customer value and regulations. Instead of regarding these as factors that obstruct environmental sustainability, they are deemed to be important factors that fall under the broader definition of sustainability that includes economic and social factors. Nevertheless, there are instances where these need to be balanced with the aforementioned factors that affect sustainability, e.g. profit margin that can be sacrificed for the sake of better packaging materials or finding alternative ways to market a product in store in order to remove fossil-based material from the packaging.

At Ica, product managers are responsible for considering all these aspects and making sustainable packaging decisions. There is no standardized process for how this is to be done, which results in different approaches being employed by different product managers. Some invest more time while others invest less, and since many product managers lack a sufficient amount of knowledge regarding sustainable packaging, they rely heavily on recommendations from suppliers. Moreover, packaging is generally discussed in the later stages of the buying process, which results in a shortage of time for making packaging improvements from a sustainability perspective. Amongst the sustainability factors, it is mainly two that are being addressed: packaging weight and volume, and materials used. In terms of weight and volume, the main strategy being employed is removing unnecessary material, and for materials it is mostly about replacing plastic packaging with paper and using FSC-certified paper when possible.

The study identified nine areas that could be improved in order to facilitate the selection of sustainable packaging at Ica. These areas concern undefined or non-existing processes, knowledge deficiencies and insufficient communication of requirements and ambitions. Defining processes for how to select packaging to new private label products, how to improve existing packaging in the assortment and how to share packaging knowledge between the assortments would allow for increased packaging sustainability. By allowing product managers to gain increased knowledge regarding packaging sustainability and how to balance sustainability with other packaging demands would also allow for increased sustainability, as product managers

could become more active during discussions with suppliers. Additionally, allowing for input from other roles at Ica to be shared at the correct instant would have positive implications for packaging sustainability. Lastly, communicating requirements and guidelines internally and externally would also be beneficial from a sustainability perspective.

The design concept that this study resulted in addresses all but two of these improvement areas (sharing packaging knowledge and getting input from other roles are not encompassed). Moreover, six of the eight factors that affect packaging sustainability are addressed. This suggests that introducing artefacts can facilitate the selection of sustainable packaging. However, findings also suggest that some aspects of packaging sustainability are hard to address fully without making organisational or procedural changes. More specifically, transportation, production and manufacturing, and end-of-life are aspects that cannot be fully addressed with the current organisational structure and processes at Ica today. To fully address transportation and to address production and manufacturing, suppliers would have to be selected based on the sustainability of their product-packaging systems, including transportation modes and distances as well as their production and manufacturing processes. End-of-life could be addressed by introducing a system for reusability, which also would require dramatic changes in the current logistic structure.

The strategies provided in the packaging guide are open to interpretation since they must fit all product categories at Ica. This implies that the end results could vary if two different product managers would be given the same packaging to improve. However, now that strategies actually exist, the gap and variations between the assortments should decrease.

The design concept has to a great extent been shaped by a willingness to quickly implement a tool that supports the development of sustainable packaging for Ica's private label assortment. The concept has been adapted to the current working process at Ica, and has been implemented without being reliant on the introduction of digital systems that are not readily available today. Therefore, the realisability of the concept is deemed to be high. However, these constraints are reflected in the functionality and usability of the design concept. Storing packaging data using pdfs makes it harder to retrieve and also harder to utilise. If the time-frame for implementation was not as narrow, a system that stored packaging data in the same place could have been designed, allowing for that data to be searched, sorted and presented in a more sophisticated way. As the design concept relies on users to save and structure the information themselves, potential negative effects such as bad structuring of data, use errors (e.g. forgetting to save a filled in Checklist), as well as reduced user acceptance due to a more demanding working procedure, could have been accounted for if the system had been designed in the form of a digital system.

Nevertheless, viewing the concept from a wider perspective, as a first of several more steps to come towards increased packaging sustainability at Ica, still motivates the decisions to design a concept that can be implemented quickly. Ica has just started taking action to achieve their recently defined strategies regarding sustainability, and according to Kotter's eight-stage process of creating major change, the next step that should follow is empowering broad-based action (Kotter, 1995). In these stages, Kotter (1995) states that getting rid of obstacles and changing structures and systems that undermine the change are key activities that should be undertaken, which the designed concept does by providing knowledge and defining a packaging development process.

A final notion of the strategies provided in the packaging guide is that product managers are recommended to use natural fiber materials instead of plastic. This recommendation is not unambiguously supported by the reviewed literature. However, as Ica already has a cemented strategy for reducing plastic packaging which in its turn is supported by strategies defined by the European Union, it was considered relevant to include in the designed concept. This entails that for some packages designed with the concept as support, the environmental impact can be greater since plastic packaging sometimes will have a lower impact compared to e.g. cardboard packaging.

Method

In total, product managers from eight of the 15 product categories participated in the conducted user study. The reason for not including product managers from all categories was that all of them could not allocate time to participate. It can be discussed to what extent this has affected the study and consequently the design concept. Some product managers might have different working procedures or products that adds dimensions of complexity when it comes to balancing sustainability with other packaging demands.

Three suppliers were interviewed, of which two deliver cleaning products and one kitchen utensils. Moreover, all of them were Swedish. The results of the study might have been different if international suppliers and suppliers delivering other products were interviewed as well. The interviewed product managers mentioned that attitudes towards sustainability differ from supplier to supplier, and that Swedish suppliers are generally positive and active when it comes to making changes that imply increased sustainability. Interviewing other suppliers could therefore have elicited new challenges for facilitating sustainable packaging choices.

The study took a broad approach, in the sense that many of the conducted methods during the user studies and research phase focused on acquiring insights regarding both organisational preconditions and challenges as well as insights more closely related to the artefacts being designed and their main user's (product manager) needs. This approach helped in distinguishing between what improvement areas the artefacts should address and what areas that instead should be addressed by organisational changes. Many important insights that shaped the purpose of the concept could have gone unnoticed if a narrower approach were taken and the risk of sub-optimisation, by solely designing artefacts and not processes, would have increased.

Nevertheless, taking a narrower approach more focused on developing an artefact might have entailed a validated end result, as time could have been allocating to testing and evaluating it in a real context with users. This was not done, and therefore the actual feasibility of the concept can not be fully ascertained. User acceptance as well as the concept's effectiveness when it comes to making sustainable packaging alterations are two areas that should be tested, and the concept should be altered accordingly. However, as the study included stakeholders and users during creative and evaluative sessions, the concept is likely to be aligned to fit the working procedure and the users' needs to an extent that makes it useful.

FURTHER RECOMMENDATIONS

The proposed concept in this report is considered the first stage towards a more sustainable working process regarding packaging at Ica. Continued change is necessary as not all identified areas for improvement could be solved right away by the concept. Some due to the requirement of quick implementation and others due to organisational working procedures on a greater scale would be required.

Product managers should be relieved from the responsibility of meeting sustainable packaging requirements. Sustainable packaging is a subject that spans over many functions at Ica and requires specialist knowledge in different fields in order to be adequately addressed. The way the product manager role is defined today makes in unrealistic that they should become experts in this field. Instead this responsibility should be allocated to a specific role, i.e. a packaging manager. There will probably have to be several roles of this kind, in order to handle the workload that the size of the Ica assortment implies. These roles should be responsible for packaging-related issues with the supplier, whilst the product manager focuses on the product. This way, the workload would decrease and sustainable packaging could be addressed more effectively.

The selection of suppliers should be based on the sustainability of the product and packaging that can be delivered. By doing this, sustainability aspects which are not included in the final concept, such as energy usage in manufacturing, production and transportation as well as transportation distances can be accounted for. Again, viewing the product and packaging as a joint product-packaging system is of importance in order to make decisions that improve sustainability.

The climate impact should be determined for the product-packaging systems that are being considered to be introduced in Ica's private label assortment. This allow for more informed decision making. Having this data documented is necessary in order to work strategically towards sustainable packaging, e.g. since it allows for setting KPIs that truly reflect the sustainability of a product-packaging system. Moreover, this data can be used for marketing purposes and is valuable to consumers and who wants to make informed decisions. Climate impact of the product-packaging systems could either be assessed by Ica or provided by the suppliers themselves. One alternative would be to introduce a quick life cycle assessment tool, such as PIQET (Verghese, Horne & Carre, 2010) or COMPASS (GreenBlue, 2019). These tools can be used to assess the climate impact of a product-packaging system in roughly 30 minutes.

Finally, the FTI-fee should be integrated into the cost estimates for product and packaging, in order to reflect the actual cost of it. Today, using an unsustainable material (as defined by FTI) does not change the cost estimate, although the actual cost of the product-packaging system increases.

CONCLUSION

This study has shown that there is potential for Ica to improve their work towards sustainable packaging by addressing more of the factors that influence packaging sustainability. The study also identified a number of improvement areas at Ica that should be addressed in order to facilitate the selection of sustainable packaging, e.g. having defined working procedures, providing clear requirements and guidelines, providing useful knowledge regarding sustainable packaging and communicating requirements and guidelines externally to suppliers. In order to address as many of these improvement areas as possible, the design concept that this study resulted in consists of both artefacts and a a redefined packaging development process. Three tools were designed in the form of interactive pdf-documents (a packaging guide, a checklist and a set of review questions) which allows for the concept to be implemented, used and tested straightaway. As the result is based on an extensive study where multiple stakeholders that either affect or are affected by the packaging development process have been included on several occasions, it is our belief and hope that it will aid in the development of sustainable packaging at Ica.

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APPENDIX

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