

# URBANEARS MODULAR

AN ADAPTABLE HEADPHONE SYSTEM TO EXTEND LIFETIME

Master of Science Thesis in the Master Degree Program - Industrial Design Engineering  
Department of Product- and Production Development - Division of Design & Human Factors



**PHILIPSON NILS • WALLNER ANTON**

Chalmers University of Technology - Gothenburg Sweden 2017



MASTER OF SCIENCE THESIS

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Master of Science Thesis PPUX05

## **URBANEARS MODULAR**

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# Acknowledgement and Preface

This master thesis project is a product development project performed at the Industrial Design Engineering master program during spring 2017. It is a cooperation between Chalmers University of Technology and the sound device company Zound Industries. The project covers 30 credits and was performed under the division of Design and Human Factors at the department of Product and Production Development.

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Gothenburg may 26th 2017

Nils Philipson and Anton Wallner

## Abstract

Consumer electronic products are today an environmental problem because of resource demanding production and fast consumption rate. Circular economy and modularity are models which in theory can solve this problem. Modularity is about dividing the products in different parts which makes the product adaptable and not dependent on the part with shortest lifetime. However, there are few companies today which uses these models because they are hard to adapt to today's market.

This study is done in cooperation with the sound device manufacturer Zound Industries and its brand Urbanears. The study is divided into two phases. In phase one it aims to find opportunities of modularity for the stakeholders business, environment and users and also to conclude a strategy of modularity. In phase two the study aims to extend the headphones lifetime on the most valuable parts through developing a business model and a product concept.

Interviews and meetings with Zound Industries, users, recycling companies and environmental consultants were conducted to find opportunities for modularity. Additionally a user questionnaire about use, consumption and disposal was performed. Branding techniques and meetings were done to develop a business model and a product development work was performed to design the final product concept.

Phase one shows that the ultimate goal for sound devices is to extend product lifetime as all environmental impact is made in the production phase. There are possibilities to extend lifetime of valuable components and still create a good business model and create a better user experience. It is possible and there are many opportunities to create modular headphones which can be implemented today. The key to success is to put demands from business, environment and users equal in order to make a successful modular product.

Phase two presents Urbanears Modular which consists of a business model and a product concept. The business model focus on the possibility to adapt functionality of the headphones to different user needs. The product concept creates a modular system that both offer adaption for the user and is possible to maintain over time. Urbanears Modular can work as a transition towards a more sustainable consumption of headphones in the future.

### **Keywords:**

Modularity, Sound Devices, Headphones, Circular Economy, Urbanears, Zound Industries, Modular Headphones, Environment, Product Experience, Electronic waste, Recycling.

## Abbreviations

**ABS:** Acrylonitrile butadiene styrene. A common type of plastic which is durable and used in most electronics.

**ANC:** Active Noise Cancelling. A technique used to reduce background noise from the surroundings.

**BOM-List:** Bill of Materials list. A document used by manufacturers to keep record of product details such as materials, subcontractors and prices.

**I2C:** Inter Integrated Circuit. A signal compression technique used to manage communication between circuits.

**NFC:** Near Field Communication. A wireless communication technique between electronics within a close distance.

**ODM:** Original Design Manufacturer. A manufacturer which is in charge for the production and assembly of products.

**PCB:** Printed Circuit Board. A board with all electronic components soldered together to make an electric system for the product.

**PP:** Polypropylene A common type of plastic which is cheap and mostly used in packages.

**PS:** Polystyrene. A common type of plastic which can be made see-through.

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# 01

## INTRODUCTION



## 1.1 Background

The production of electronic consumer products is demanding for the environment due to the extensive use of energy and materials from limited sources. Additionally the consumption rate of electronic consumer products is today high due to short use time and fast evolution of technology (Babu, Parande and Basha, 2007). Governments are starting to attend the problem and have begun to set pressure on production companies by investigating implementation of harder environmental regulations (SOU 2017:22). The need for a sustainable model of production, purchase, use and disposal is hence emerging.

Circular economy is a model which approaches the problem but do not direct solve any specific product problems. Circular economy is gaining more attention and can be seen as a future environmental solution. Lately, the Swedish government confirmed this as they issued a research in the topic (SOU 2017:22). Circular economy includes modularity as a principle to work with regarding consumer products. The main idea of modularity is to create a more adaptable product by dividing it into parts. This extends the life length of the product as a whole as it is not limited to the most short-lasting part. However, the concept of circular economy and modularity only works as guidelines and is not practically applicable to the market's demands today. Because of this most of today's companies have not implemented any products which adapts to the model of circular economy.

This project aims to create a modular product which can be implemented today and be a transition towards a circular model. The project is going to investigate sound devices. Sound devices represent the consumer electronics well as they are fast moving consumer products. Headphones and active speakers are manufactured in a resource demanding way and are being consumed quickly due to a low price and a fast technology evolution. To make the study relevant, it is done in cooperation with Zound Industries which is a manufacturer of sound devices. This shall be done by finding and working with demands from the business, environment and users. In this way, the study strive to find a modular sound device adapted to today's and futures premises.

## 1.2 Aim

The study is divided into two phases where phase two builds upon the result from phase one. The aim is hence divided into two part aims, one for each phase of the project.

### 1.2.1 Phase 1

Aims to find opportunities to change the environmental impact of sound devices in a beneficial way for business, environment and users.

### 1.2.2 Phase 2

Aims to extend the lifetime of the most environmental and economical demanding parts of headphones in a way which benefit business, environment and users.

## 1.3 Objective

The listed objectives are divided into the two phases of the project.

### 1.3.1 Phase 1

Conclude opportunities of modularity which can work as a foundation for a strategy that:

- a. Benefits the environment.
- b. Improves user experience.
- c. Got economical potential for the business

### 1.3.2 Phase 2

The objective is to develop:

- a. A concept of modular headphones which:
  - i. Extends the lifetime on environmental demanding parts
  - ii. Creates a good user experience
  - iii. Communicates the Urbanears brand
  
- b. A business model for modular headphones which:
  - i. Focus to make profit in a less environmental demanding way
  - ii. Is attractive for customers
  - iii. Fits the Urbanears brands and is profitable from a business perspective

## 1.4 Scope

The scope of the project is different between phase one and two and the scope for each phase is hence described below.

### 1.4.1 Phase 1

The study is limited to active speakers and all kinds of headphones.

### 1.4.2 Phase 2

- The study is limited to wireless on/over-ear headphones.
- The project in phase two is limited to work with the Urbanears brand specifically.
- Solutions as construction and material choices are chosen in order to be feasible solutions but are not developed in detail.

## 1.5 Project Process

This study is divided in two phases which each consist of a process and a result (figure 01). Some events overlapped the phases and the work was iterated throughout the process.

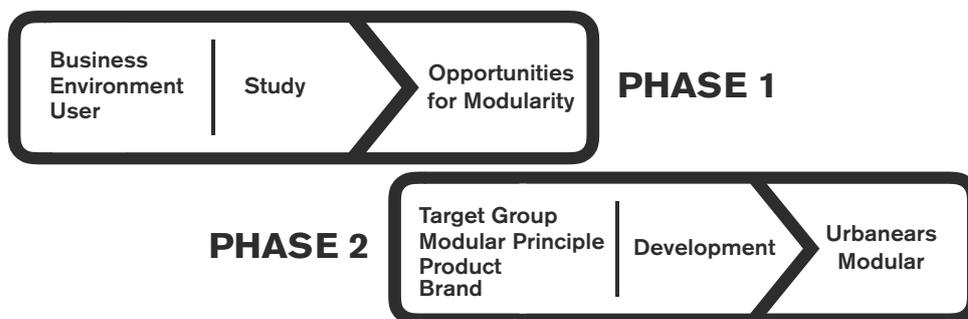
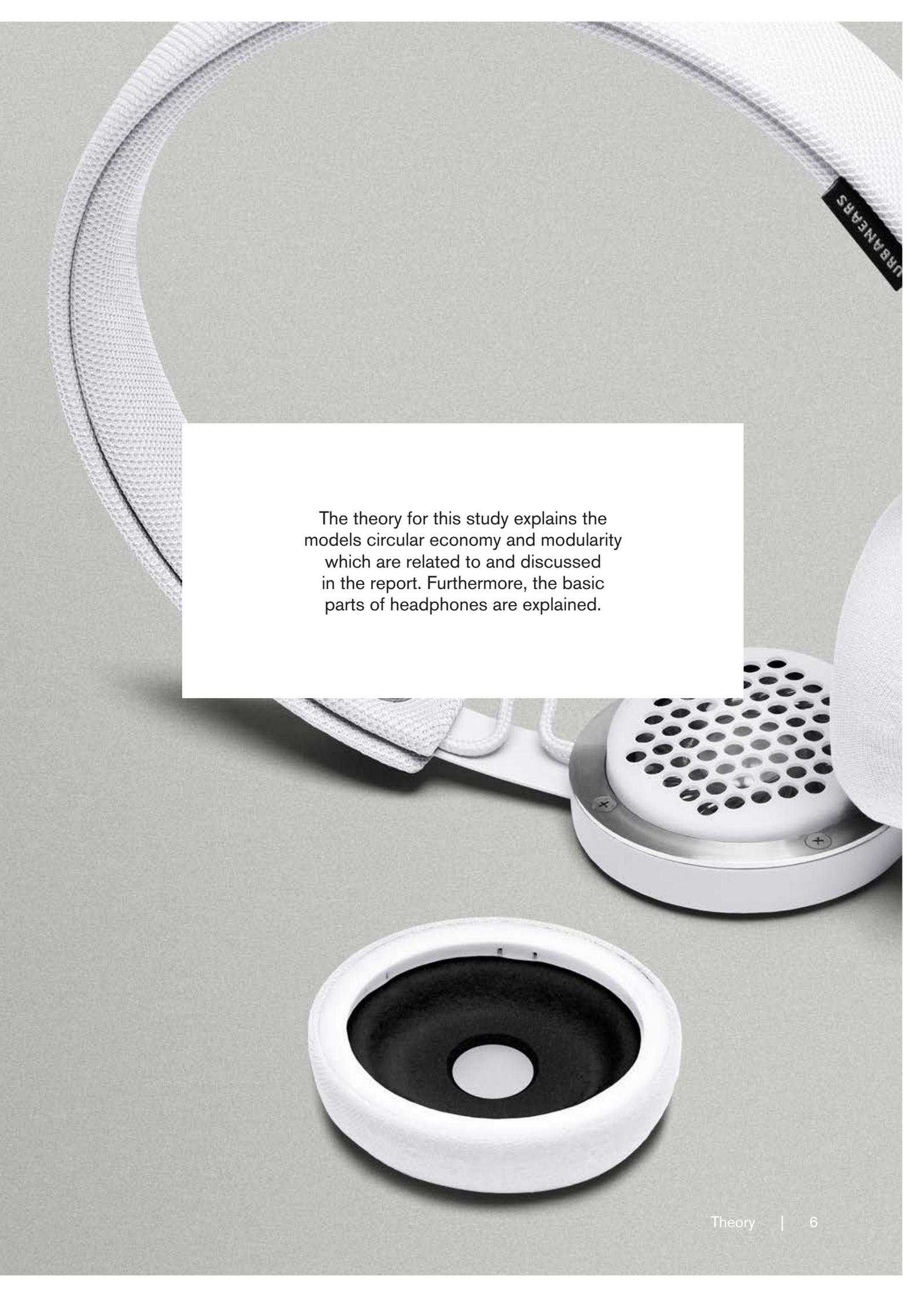


Figure 01

Project process

# 02

## THEORY



The theory for this study explains the models circular economy and modularity which are related to and discussed in the report. Furthermore, the basic parts of headphones are explained.

## 2.1 Circular Economy

Circular economy is an alternative approach to today's model of 'take, make, dispose' (Ellen Macarthur Foundation, 2017). It includes both strategies for business and product development. Its main idea is to keep products and materials at their highest possible value at all times. The development process is considered to be a cycle that preserves and enhances its natural capital. It aims to optimise the exchange of resources by circulation of products and materials in both technical and biological cycles.

Approaches included in circular economy are:

- Design to decrease waste by using renewable materials in the biological cycle or keeping materials in the technical loop by managing the recycle or disposal processes.
- Use renewable energy sources only.
- Working with diversity in order to make better use of resources. This can be achieved by working with versatile products which can adapt to fit different contexts.

## 2.2 Modularity

The term modularity refers to the use of individually functional units that works together in a system (Gershenson and Prasad, 1997). In the context of product development, the effect of modularity includes that the life of the main product is not limited to the life of the shortest living component. By making components into modules, possibilities for repair and replacement increases which gives the total product a longer lifetime.

## 2.3 Headphones

Traditional headphones consist of two speakers, a cord to the sound source and a structure to hold the speakers. The structure is generally made by a headband connected to a housing for the speakers and cushions allowing for support against the head or ears.

### 2.3.1 Wireless Headphones

Wireless headphones consist of the same setup as traditional headphones but have additional components to support the wireless connection to the sound source (figure 02). The added components are generally a circuit board, a battery and a user interface. The circuit board contains components to process the wireless signal, amplify the sound and control the user interface. This can among other solutions consists of buttons, a jog or a touch interface.

### 2.3.2 Active Noise Cancelling Technique

Active Noise Cancelling (ANC) is a technique which controls the surrounding sound by either muting or amplifying it depending on the need. This functionality adds more components to the headphones. A way to achieve this is to add microphones that collect noise, which then is processed in different ways. The processed sound is then played in the headphones to either mute or amplify the true noise.



This requires a feedback mic in front of each speaker and a feed forward mic on the outside of each ear cup. The signal from these microphones demands extra processing power and can in some cases require an added separate processor.

## 2.4 Active Speaker

Active speakers generally consist of one or more speakers connected to a built-in amplifier. They are either connected to a power outlet or powered by a battery. The source of media is either connected by cable or through wireless communication. Bluetooth has long been the standard of wireless technique however Wi-Fi is today becoming more common.

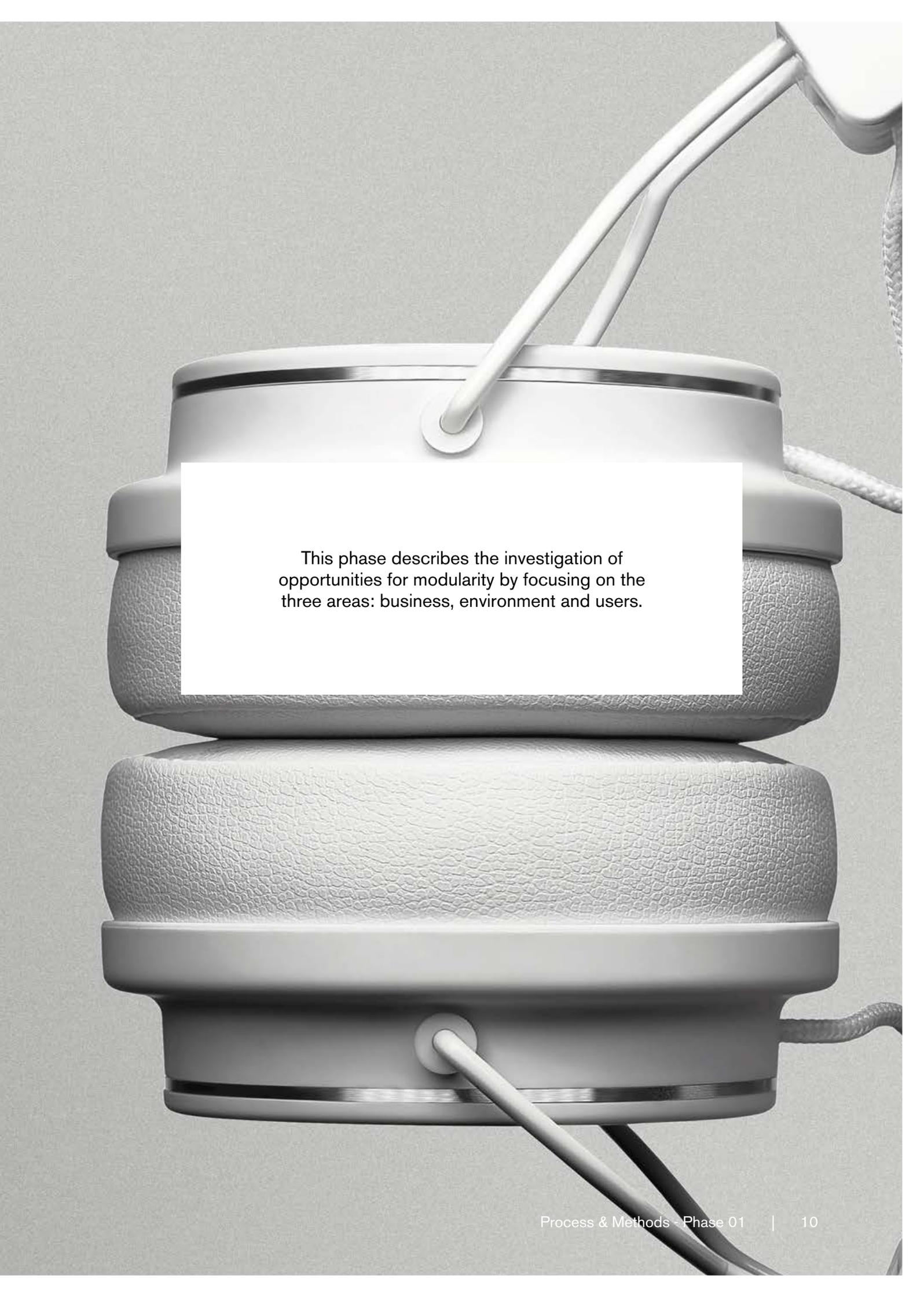
**Figure 02**

General setup of components in wireless headphones

# 03

## PROCESS & METHODS

PHASE 01:  
OPPORTUNITIES FOR  
MODULARITY



This phase describes the investigation of opportunities for modularity by focusing on the three areas: business, environment and users.

## 3.1 Business Study

The structure of the company's processes and the opportunities for modularity were discovered through interviews and analysis of internal material.

### 3.1.1 Interviews

Semi-structured interviews were conducted at 12 departments of Zound Industries (figure 03) in order to gather input of how the company is run and to detect problem areas. Each semi-structured interview was approximately an hour long and followed a question template (Appendix A). The interviews were recorded in order to be able to track information. An understanding of the company's work methods was sought. This was done to grasp what premises the project had and to discover possible problem areas that may be solved with a modular product and new business model.

Individuals from the following departments were interviewed:

**Figure 03**

Interviewed departments

Department	Date
Sourcing	13/2/17
Brand	14/2/17
Sales	14/2/17
After Sales	14/2/17
Compliance	15/2/17
Design	15/2/17
Acoustics	15/2/17
Logistics	15/2/17
Project Management	15/2/17
Packaging	15/2/17
Retail	17/2/17
E-Commerce	17/2/17
Labs	27/2/17

### 3.1.2 Analysing Internal Material

Internal material and the Zound Industries intranet were searched through in order to further understand the company structure and the costs of the components in the products. Bill of material (BOM) lists were analysed and charts were made of the most expensive components in the reference products Plattan ADV Wireless headphones and Baggen speaker. Additionally, a pair of Plattan ADV Wireless headphones were disassembled. This was done in order to understand the structure of the parts and their fixation to each other. Brand material, project briefs and further core business material were also located. Focus was to find out which components or processes in the products that involves costs and inefficiencies. Furthermore, to understand how the company works and where effort is spent.

## 3.2 Environment Study

The environmental footprint of headphones and the existing recycling processes for electronic waste were investigated by study visit, interviews and internal material. This in order to understand what modularity can imply for the environment and how to adapt it to fit today's needs.

### 3.2.1 Visit at Recycling Company Renova

A study visit was made at the recycling company Renova in order to understand the process of electronic waste recycling in Sweden. At Renova the different processes for electronic waste pre-treatment and battery separation were observed. The purpose was to understand how headphones or an active speaker is recycled and how to design for recycling.

### 3.2.2 Interviews

Interviews were made with different stakeholders (figure 04) in order to map the recycling process of today. Each step from user disposal to material or energy recovery was investigated. Different actors were approached in order to gain understanding of the recycling process worldwide today. The interviews were held in a semi-structured form. The purpose was to extend the insight from the visit at Renova in order to build a complete picture of the electronic waste recycling processes.

Person/Company	Type
Miljögiraff	Consultant firm
Isabel Ordonez Pizarro	PHD Student
El-Kretsen	Trade organisation
Swerec	Recycling Company
Sims Recycling Solutions	Recycling Company
Renova	Recycling Company
Stena Recycling	Recycling Company

**Figure 04**

Interviewed recycling stakeholders

An internal life-cycle analysis (LCA) investigation was analysed in order to gain insights of the environmental footprint. The LCA was the result of an earlier consultant work made by Miljögiraff. The LCA were made on a pair of Major 2 Marshall headphones but was together with Miljögiraff estimated to represent and be a general result for wireless headphones.

## 3.3 User Study

User consumption, use and disposal of sound devices were investigated in order to gain insight for opportunities of modularity for users.

### 3.3.1 Survey

A survey was done to get an understanding of the consumption, use and disposal of headphones and active speakers (Appendix B). The survey was composed of one part

with general questions about how sound devices are bought, used and disposed. The second part was directed towards the use of headphones from the brand Urbanears. The purpose of the survey was to get comparable data from the use of sound devices in general as well as the use of Urbanears headphones specifically.

The survey was distributed via social media and personal connections but also shared via targeted people which reached people in the less represented age spans. The survey got 232 answers which were gathered from people of different ages (figure 05).

**Figure 05**

Age span frequency of respondents for the survey

Age span	Percentage of answers
16-20	3%
21-25	35%
26-30	25%
31-40	20%
41-50	13%
50 and over	4%

### 3.3.2 Interviews

Interviews with selected subjects were conducted to get users reasoning regarding consumption, use and disposal of headphones and active speakers. Four interview subjects were chosen with ages 17, 25, 26 respectively 44 years old who all had different needs and demands regarding sound devices. This was done in order to get additional input to different ways of sound device use. A questionnaire was used and the interviews were conducted in a semi-structured way where probing was used to gain better understanding of specific areas. Interviews gave the opportunity to get deeper insights into specific questions compared to the survey.

### 3.3.3 Study of Electronics Stores

Visits to electronics stores were done to understand how returns of sound devices are handled and to investigate the actual conditions of the returned products. Open interviews with personnel were done and returned goods were studied to find common reasons for malfunction. Three different stores were visited (figure 06).

**Figure 06**

Visited electronics stores

Store	Location
Kjell & Company	Kungsgatan, Göteborg
Kjell & Company	Nordstan, Göteborg, Sweden
Elgiganten	Nordstan, Göteborg, Sweden

## **3.4 Taking a Project Direction**

Results from phase 1 were discussed and developed in order to make a decision of which project direction to take for phase 2.

### **3.4.1 Meeting with Discussion of Potential Product Areas**

A presentation of the results of phase 1 and a discussion of potential product areas were held with representatives of Zound Industries in order to move the project to the next phase. In the presentation all key results of the three areas: business, users and environment were presented. With the representatives updated on the results, potential product areas and incentives for modularity were discussed. The purpose of the activity was to decide which direction to take in the project. Both the company's and the project group's interests were kept in mind when performing this activity.

### **3.4.2 Potential Product Direction Ideation**

An ideation session was held with the main incentives for modularity as a starting point. The main incentives were business, environmental and usage related benefits. All key opportunities were mapped out for the project and every choice of path was identified in order to prepare for the final choice of project direction. The purpose was to narrow down the project in order to be able to focus the effort on the parts of modularity which shows the largest potential.

An initial decision of project scope was made based on the results from the ideation, inputs and discussions. The decisions were made to direct the project towards areas with greatest potential for improvements. The end result of the project was kept in mind to make sure the work would result in a product suitable for the project group's competences. The decisions made were brought to the next meeting for approval and discussion with the company.

### **3.4.3 Meeting for Further Project Direction**

A meeting was held in order to further discuss and capture the project direction. The key choices of paths were presented and discussed for the three focus areas: user, business and environment. During the meeting choices were made of where to focus the project and what outcome to aim for.

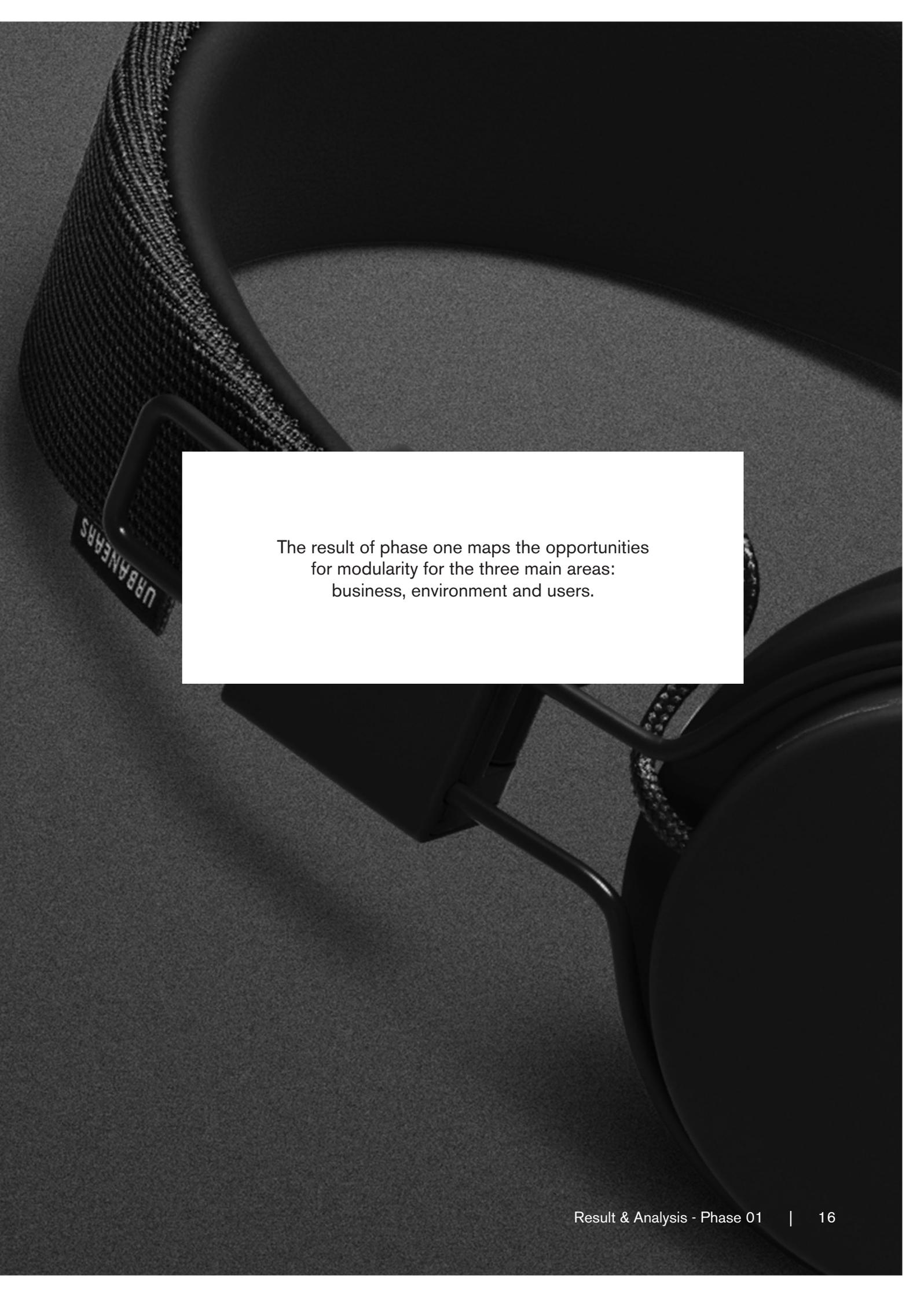
## **3.5 Creation of Function List**

To achieve a clear project direction a function list was made to concretise the research into functions to work with (Appendix C). The list was made with the subcategories business, environment and users as these were the study's main research areas. Additionally, the subcategories product experience and branding were used to make sure that the final concept would be worked through in these areas. The technique Elements of Value was used to find functions related to branding (Leidenkrantz, 2016).

# 04

## RESULT & ANALYSIS

PHASE 01:  
OPORTUNITIES FOR  
MODULARITY



The result of phase one maps the opportunities  
for modularity for the three main areas:  
business, environment and users.

## 4.1 Business

This section describes the company employees' perspectives on the topics modularity and sustainability. This is presented together with the views of environmental consultants who worked for Zound Industries.

### 4.1.1 Organisation

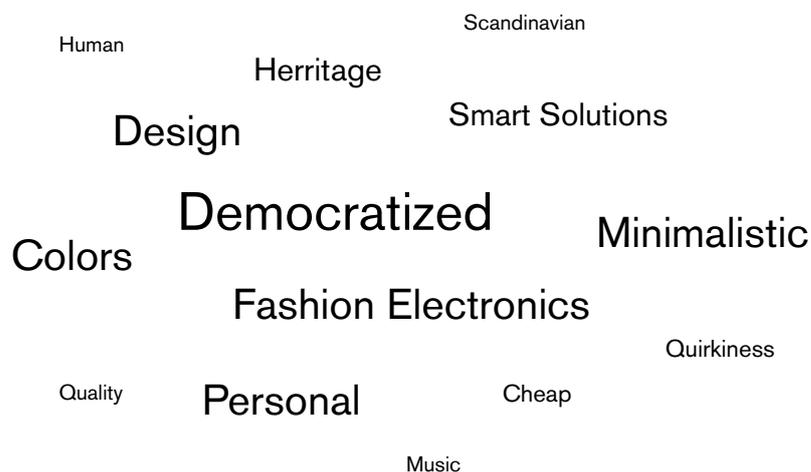
Organisational results are aspects tied to the company's structure and the brand of Urbanears.

#### Internal Brand Image

The internal brand image of Urbanears is quite coherent where aspects as democratised and fashion related properties are most common. This result shows that employees mainly got a united picture of the Urbanears brand. All aspects mentioned is shown below (figure 07) where the size of the words stand for how frequent they were expressed.

**Figure 07**

Illustration of the most frequently mentioned aspects regarding internal brand image



The view on which users Urbanears got is a bit scattered between employee representatives of the different departments of the company. The most common descriptions of Urbanears users are that they are younger and prioritise lifestyle products. Following is the result (figure 08) where the frequency of the mentioned aspects is displayed in the same way as for the brand image.

“

**Customers are not tolerant, they vote with their feet quickly**

”

- Compliance spokesperson

#### View on Sustainability

There is an intention within the company to work towards more sustainable solutions according to several interviews. Partly because there is a view within the company that sustainability be a competitive advantage. It is however considered as an area where not much effort is made today. A general view is that the company could do things better to be more sustainable and that Urbanears should be in front of competitors in the area.



**Figure 08**

Illustration of the most frequently mentioned aspects regarding the internal view of Urbanears users

### Opportunities

Working towards sustainability is expressed as a way for the company to discover new opportunities. These include business opportunities and the chance to achieve better market value. Additionally, sustainability work is considered to elevate their employer value since the demand for sustainable employers is regarded as increasing among attractive jobseekers.

### Strategies

The company has an ambition to work more with sustainability. Many of the interviewed employees express that the company should have a clear vision regarding sustainability. Some interviewees also express that a responsible person should be assigned to work with the sustainability area in order to build an organization with sustainability focus.

There are to some extent different prioritisations in which strategy for sustainability that is most important. Some interviewed persons stress better transport solutions as a strategy while others mention the importance of more sustainable materials in the products. Moreover, some express that sustainability often is seen as a cost and could be prioritised higher.

### View on Future

The future seems to imply a need of conversion of the products for the Urbanears brand according to the spokesperson from the department Labs. The company has already today started the process of transforming from a fashion company to a tech company. In general, products within the segment are moving towards smarter technology and being more independent of the phone as a source. Sound devices will be smarter and include more electronics which demand new types of competences and expertise in the company. According to the interview with Labs it is also important be prepared and work proactively with upcoming technologies.

Zound Industries has to go its own way and not compete with the largest companies according to a Labs spokesperson. There are plenty of other large sound device companies which have much more resources than Zound Industries. Hence, it is stated that it is hard for the company to succeed if they just follow the larger companies and try to do the same thing. It is also stated that to succeed Zound Industries must do as

“  
**Urbanears should be best in class**  
”

- Brand spokesperson

“  
**Zound should not compete with the giants, we should start our own competition**  
”

- Labs spokesperson

they have done before, be original and create their own competition and make sure to be a key player in that area.

### **Compliance**

The company does today fulfill environmental legislation but is not working to go in front for sustainable products according to the Compliance spokesperson. Zound Industries is working with compliance management to make sure rules are followed on all the markets where the company is acting. These rules include economic and environmental legislations. The company acts today on an essential level when handling environmental compliance. The toughest legislation decides the effort to put into the environmental areas and not much more effort is spent to be better than the minimum requirements. However, several employees state that the future will bring tougher legislation on environmental impact. Hence, there is a desire to start working with environmental goals before the law demands it.

### **4.1.2 Brand**

From a branding perspective sustainability is considered to be closely related to Urbanears. The brand is considered to be easily presumed to be sustainable according to the brand spokesperson. The association with sustainability is thought to be derived from the brand's Scandinavian profile and design. This could in turn lead to presumptions based on user's experiences from similar brands with stronger environmental branding.

“  
**Sustainability  
is in the DNA of  
Urbanears**  
”  
- Brand spokesperson

Urbanears has from the start been branded as a fashion brand. It is important to the brand department to maintain this close connection to the fashion industry according to the brand spokesperson. The fashion profile of Urbanears should hence be so strong that it would be naturally accepted by the market if Urbanears sold garments as well.

### **4.1.3 Design**

The interviews with the different departments show that there is a great potential for modularity and more sustainable material choices.

### **Modularity**

Modularity can imply larger production volumes which result in better price and quality according to the sourcing spokesperson. If modules would be used in several models of sound devices and sold in large quantities it would lead to larger volumes being manufactured. With the manufacturing of large volumes comes advantages of a lower price per unit and a better control over quality. Moreover, the production of modules can be streamlined as a result of high production volumes. A streamlined workflow decreases costs and saves time. Modules can be made to be easily disassembled as well. This opens up possibilities of better sorting and handling of components when the product is disposed.

Modularity can imply that it is hard to communicate the benefits of the product and give more expensive production according to some departments. The argument is that it is easier to buy a single and complete product than a system of separate parts. Therefore, it is important for a modular product to be sold in a way where it communicates its assembled functionality. The manufacturing of modular parts can be assumed to be more expensive than an integrated product according to the interviews. This because all modular parts demand extra enclosures and interfaces between each other. These increased costs have however the possibility to be settled with the production of higher

volumes. On the contrary can larger volumes of modules also result in increased costs related to stock-keeping and transport.

The fast-moving technical development can imply a difficulty for a modular sound device with a long life length according to some interviews. Today, components in electrical products quickly gets outdated as new technology arrives. This is a potential problem as demands for newer technology appears. Modularity must hence enable the possibility to update technology.

Modularity can be hard to implement on sound devices with too small physical size according to some interviews. Small in-ear headphones is hence an example of product where modularity would be hard to implement.

### **Material**

Below are some guidelines for material choice presented which derive from input from interviews and from sustainability consultants.

Sound devices should use less types of materials in order to make the production and recycling process better according to the environmental consultants. To use fewer materials in the products also makes it easier to gain control over the manufacturing process from a sourcing perspective. Furthermore, few materials which are easy to disassemble will make the recycling process easier and more effective.

Sound devices shall use more sustainable materials with better quality according to several departments. To use recycled materials instead of virgin materials can be a method to reach a more sustainable product. Furthermore, use of tougher materials can have the potential to make products last longer. It is also important to choose materials with the future availability and demands taken into account. This is important in order to secure the time span the product can be produced without putting pressure on the environment or running out of resources.

New types of textiles should be used in the future which are better for the environment (Miljögiraff, 2017). Cotton is a resource which will be harder to obtain in the future. The production of cotton is not sustainable today and harder legislation for use of textiles is expected. Additionally, textiles on sound devices are today not recycled. Hence, alternatives of today's used textiles shall be considered in future sound devices.

Batteries have established recycling processes today and are possible to recycle in an effective way (Miljögiraff, 2017). However, batteries are often hard to get out of sound device products today. This implies a possibility to improve the way batteries are connected to sound device products in order to make batteries easier to separate in the recycling process.

#### **4.1.4 Packaging**

Packages used for Urbanears today are to some extent sustainable due to the use of mainly paper based materials (Miljögiraff, 2017). However, the focus on unboxing experiences has resulted in complex packages with room for improvements. Some packaging solutions used today are time consuming to assemble. There is hence a potential to cut costs by design the packaging to reduce the assembly time. There are also demands on the packages to be durable in different conditions. These demands

makes the design of the packaging to contain a lot of material in order to make them shock absorbing.

There is a potential to work with more environmental friendly packaging and at the same time get an good unbox experience. An approach towards this is to work with less amount of material, to use only one type of material and to use sustainable packaging materials.

#### 4.1.5 Production

The production of Urbanears sound devices is today located in China and is done with different providers of electronic production. The products consist of many different parts which are assembled together to make the final product. The production today has some difficulties and potential for improvements which are described below.

##### Headphone Assembly

An Urbanears Plattan ADV Wireless is assembled by many different parts of plastics, metals, textiles and electronics (figure 09) which often requires an effort to separate. Many of the parts are glued together, however most of them are still possible to break apart. All the main coloured plastics parts are made out of ABS plastic but rest of the plastic parts are of unspecified type. The cushions consist of textile and different types of plastics glued together, making it hard to separate. The speaker elements consist of plastic, metal, magnet, circuit board, and textiles all glued together and hard to take apart. All the cables are fastened with soldering which make them vulnerable of breaking apart. This also apply to the battery, which also demands unscrewing four screws in order to reach it. The same thing applies to the circuit board.

##### Problems

Subcontractors are hard to gain control over as it is most often the original design manufacturer (ODM) which choses and operates with them according to a sourcing spokesperson. This makes it hard to know material sources, work conditions and other aspects which can affect sustainability or costs. Furthermore, the ODMs have high mark-up costs which also often are hidden in other subcontractor costs. This makes it hard to gain control over costs (figure 10).

The arrival of new technologies can be demanding for the company as they pose a challenge to implement them into new products according to the Labs spokesperson. Large computer and phone companies steer and set the standards for new technology solutions. This force manufacturers of accessories to reach a certain level of compatibility and to follow the large companies' development. If the company wants their accessories to work with the most used phones and computers, they have hence no choice but to adapt to the new technologies.

It is hard to have multiple manufacturers for the same product as it is hard to match different components together in a good way according to the interviewed person from sourcing. It can for example be difficult to get the colours right and acoustics can be perceived differently depending on how components work together. Since Urbanears uses many different colours for their products they need manufacturers which can be flexible enough to allow for good colour matching.

The physical connections of electrical components are today not done with a standardised interface which brings the use of unique electric circuits in each product. Most electronic components are integrated on the PCB and soldered together. This

“  
*I would like to  
have a sourcing  
department of 100  
people*  
”

- Sourcing spokesperson

PROBLEMS:

# TEXTILES MIXED MATERIALS

ASSEMBLIES

WOOD - TIME



creates expensive solutions with multiple manufacturers according to the sourcing spokesperson.

The amount of produced spare parts needs to be decided before product launch and hence before the need for spare parts is known according to an after sales spokesperson. The production of spare parts is ordered together with the main product today. Because of this, it is difficult for the company to supply more spare parts if there would be an increased demand for them afterwards.

## Opportunities

The main potentials for production of sound devices are to extend valuable components' lifetime, use smarter assemblies and standardise components. Standard components can imply less certifications, larger production volumes and standard electronic solutions.

Many of the inner parts in sound devices are environmentally and economically demanding to produce but also have potential of a longer lifetime according to a sourcing spokesperson. These parts are typically the electronic parts PCB and drivers which not are exposed to wear and tear. These component have hence a potential to have

**Figure 09**

Problems of disassembly for Urbanears Plattan ADV Wireless

a longer lifetime or implementation of a take-back system according to some departments. The take-back procedure demands collecting, transporting and testing used products. This is a process which involves high costs. However, take-back of valuable components have the potential to be more profitable than the production of new ones.

Smart design of modules creates a possibility of more effective assembly processes according to the sourcing spokesperson. Many parts in sound devices today are integrated and requires assembly which involves gluing, soldering or screwing. This creates an opportunity to make the assembly of sound devices easier with less moments which will shorten the production lead times. Screws and glue are possible to replace with snap fasteners and soldering can in some cases be replaced with interface connections.

Modularity can standardise and minimise the number of PCB variants in the product portfolio. This decreases the number of needed certification processes according to the sourcing spokesperson. Every part of a circuit board assembly needs to be certified today which results in an extra cost per component. If the assembly instead is built as a single modular component a single certification cost could replace the collection of certification costs there are today. Moreover, if the module can be shared between products, the total certification cost for the product portfolio will decrease further.

Larger production volumes can decrease the cost per sound device unit according to the sourcing spokesperson. When dealing with the ODM and the manufacturers, higher volumes usually leads to a lower price per unit. If the same modules were used in different sound devices, larger volumes could be ordered. In this way the unit price could be lowered.

There is a potential to separate components into modules in order to standardise the electronic circuits in the sound devices according to a sourcing spokesperson. This can imply that it is possible to upgrade parts when new technology arrives.

#### 4.1.6 Logistics

The goal today is always to ship sound devices with only boat and lorry, but because of time pressure flights are still frequently used according to a logistics representative. Shipping by boat and lorry is cheaper and better for the environment but demands longer time and planning ahead. To use flights is both expensive and bad for the environment, but demands less time which make the company use it anyway. Hence, there are possibilities of improvements regarding the transportation organisation and planning of shipping.

Modularity from a logistic standpoint can imply some difficulties regarding stock-keeping according to the logistics spokesperson. The concept of modularity probably mean that more spare parts will be produced which may challenge the stock-keeping due to larger volumes.

#### 4.1.7 Retail

The Urbanears headphones are already today to some extent modular as they use the exchangeable spare parts ear cushions, headband and cable. However, the spare parts are not sold in stores and not all of them are accessible in the web shop.

To brand products as modular can be an opportunity to be unique on the market if performed in the right way, according to some interviewed company representatives. To sell a system of modular parts can however imply some obstacles in order to achieve a good user experience. The exposure in stores can be difficult if more parts are to

be exposed. Creating the feeling of an integrated and simple product can hence be challenging and the system might be interpreted as confusing. It is therefore important for the company to keep the product portfolio unified and easily understood.

#### 4.1.8 Returns

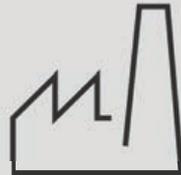
The portion of headphones which are exchanged due to guarantee claims is rather small according to an after sales spokesperson. However most of them are exchanged with a brand-new product even though most of the parts still work. This also applies to headphones which have spare parts. The reference headphones Plattan ADV Wireless got for example the possibility to easily exchange headband, cushions and cable. The hinge is also possible to exchange manually but not as easy. Despite exchangeable parts, very few spare parts have been offered up to date and instead have customers been provided with completely new headphones. This is negative both for the company's economy and the environment.

The setup for returns make it hard for Zound Industries to get correct failure data and number of incorrect claims seem significant. All returns come with a description of the reason of the return. However, the level of detail is very different which makes it hard to abstract good data from it. This makes all failure data very general and hard to work further with in an effective way. There is a significant number of incorrect returns according to performed shop visits and experience from the after sales department. The shop visits shows that most of returned headphones with a guarantee claim only have a small defect or none faults at all. After sales also experienced that many returns actually are functioning products. Several of this type of returns could be prevented if stores were provided with better troubleshooting competence and spare parts for the headphones. An example is failure of Bluetooth in wireless headphones. These failures are often not tied to the headphones and can often be solved with troubleshooting. However, many products are today exchanged due to this reason.

# RESULT OF BUSINESS RESEARCH

Figure 10

Illustration of  
business research  
result



PROBLEMS WITH HEADPHONE

## PRODUCTION



COLOR MATCHING

CERTIFICATIONS    



PRODUCTION LEAD TIME

SUB CONTRACTORS 

 5.0  4.0   3.0 TECHNOLOGY COMPATIBILITY

## ELECTRONICS PRODUCTION

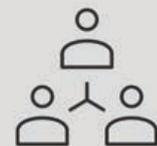
**COST** STANDS FOR  
**75%** OF THE TOTAL  
PRODUCTION COST

HEADPHONES MUST BE

# FUTURE PROOF

IMPORTANT TO CREATE A

# CONNECTION TO USERS



FUTURE  
WILL BE **SMARTER**  
**MORE**  
TECHNOLOGY & REGULATION  
**LIMITED RESOURCES**

## 4.2 Environment

The main environmental impact of headphones and active speakers today is due to short product lifetime and inadequate recycle and repair processes (figure 13). The majority of the environmental footprint today for headphones and active speakers is made in the production of new products (Miljögiraff, 2017). Additionally, not many sound devices are today repaired, generally due to lack of economical and user motivation. The processes for electronic waste recycling is also inadequate for many components and materials (Benson, 2017).

### 4.2.1 Environmental Footprint for Headphones

The ultimate goal for headphones and active speakers is to design for extended lifetime of the products in order to decrease environmental footprint (Miljögiraff, 2017). Almost all environmental footprint for headphones and active speakers is connected to manufacturing and logistics of products. This shows the main effort must be put to create a modularisation and business case which together in the best way extend the lifetime for the product.

Electronic components are the most environmental demanding and economical valuable parts. This mean special effort must be made to extend lifetime on these (Weibo, 2017), (Miljögiraff, 2017). These components are also the cause of the products main environmental footprint. This is shown in the LCA made for Zound Industries (figure 11). The electronic components which include PCB, battery, drivers and mic cable stand for 78 percentage of the footprint for the product. Furthermore, these components stand for a majority of the production costs. The PCB is by far the component with highest environmental footprint. This is mainly because of the alloyed doped metals which are used in it, the manufacturing processes and materials for the circuit board itself.

### 4.2.2 Repairs

Reparations of headphones and active speakers made by Zound Industries are today handled differently depending on which product it concerns. Decisions are made mainly based on economical profit. The logistics of broken products implies transport costs but also demands administrative work for the transport and customs. This often results in that less valuable products are not repaired. Moreover, there are few spare parts which the customers can repair the products with by themselves. Some headphones have exchangeable headbands, cushions and cables which in theory easily could be exchangeable. However, it has taken time to set up a system for sending out spare parts which has lead to few products being fixed this way. Hence repair requests for less valuable products today mostly results in a replaced product. The customers are then asked to destroy the product and take a picture to send in. In many of these cases, several parts of these products are still well functioning.

There is a great potential to extend the general product lifetime by a product and system design which supports repairs in a better way. Customers today show a greater will to repair their products to a larger extent. This is confirmed by Zound Industries which has acknowledged a growing demand for spare parts from customers. This has resulted in that actions lately have been taken to offer more spare parts in the web shop. Additionally, many of the complaints today are concerning parts which have a shorter lifetime. This includes common wearing parts on the headphones or batteries in the portable active speakers. These should therefore be made easy to replace in order to extend the product lifetime further.

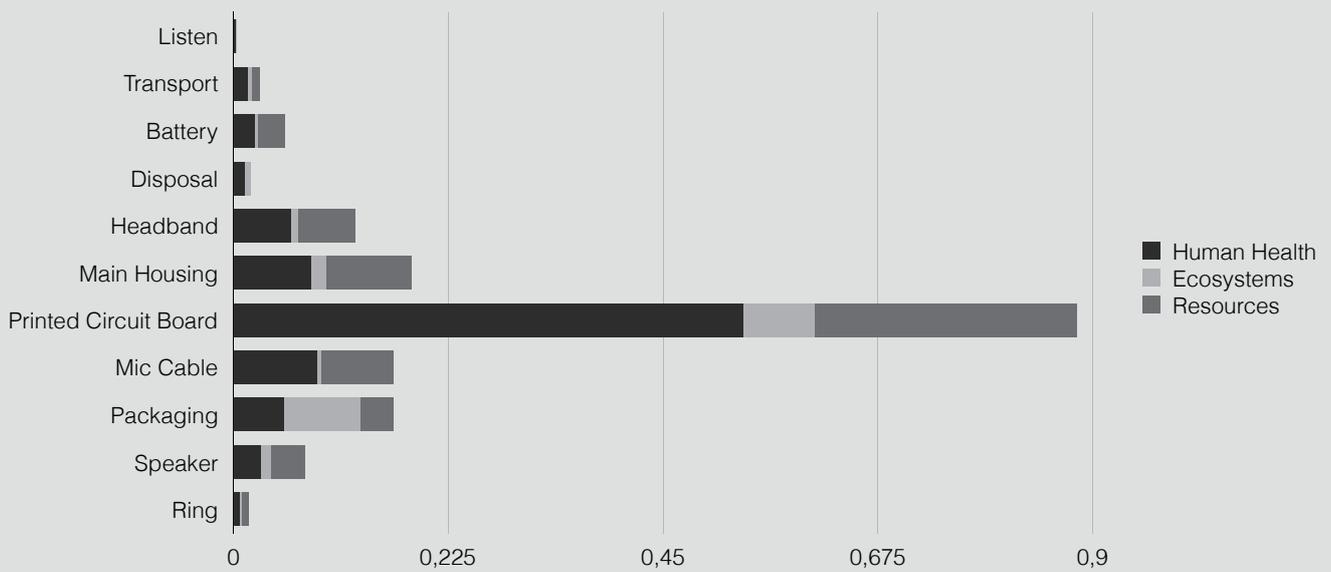
Figure 11

Lifecycle  
Assessment for two  
of Zound Industries  
headphone models

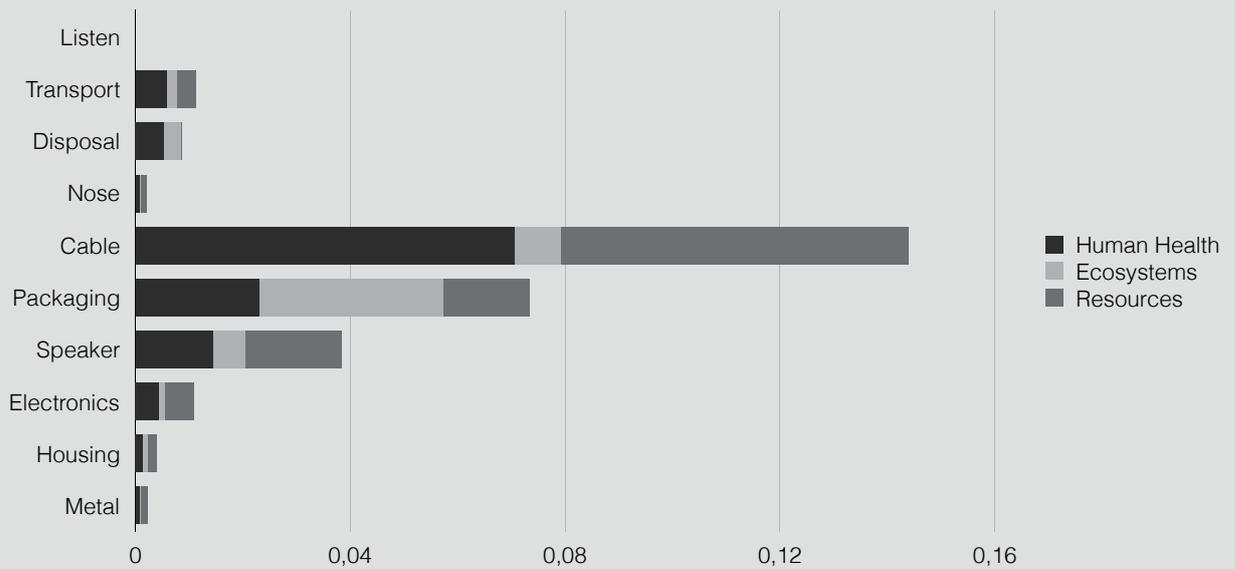
# LIFE CYCLE ASSESSMENT

## BY MILJÖGIRAFF

### LCA FOR MARSHALL MAJOR II



### LCA FOR URBANEARS SUMPAN



### 4.2.3 Recycling

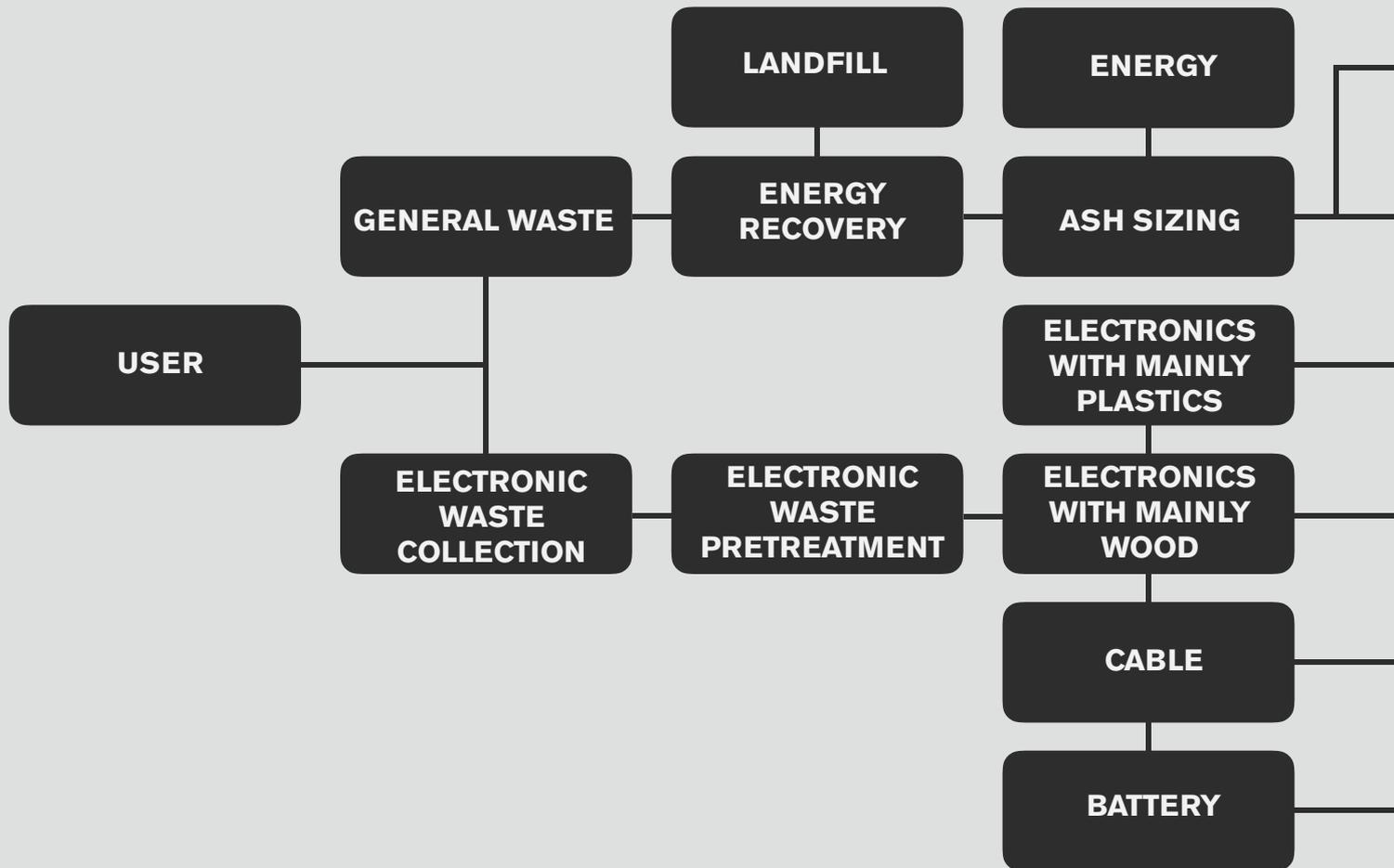
The electronic waste recycling process is a complex business and consist of a lot of different players which each of them have their own core business and its own processes (Benson, 2017). The business always focuses on to make as much value on each waste fraction as possible. If the particular recycling company cannot sort out more value from a fraction, the fraction is sold to another company which can make more out of it. Because of this, it is hard to map exactly how products are recycled as there are so many different processes. Moreover, all these processes differ much between different geographical areas within countries but varies even more between different countries.

There are some general approaches that tie the electronic waste treatment business together which can explain how it generally works. Generally, the main focus of electronic waste recycling is to extract the metals as they are easy to get and have the highest value (Weibo, 2017). In the industrialised countries, focus is also to gather hazardous materials in order to protect the civilization from them making harm (Blom, 2017). Also, the most common plastics are gathered to be recycled. Remaining is a waste material which consist of materials not possible to recover (Weibo, 2017). The portion of waste material of the whole original product depends on which geographical area the product is recycled in (Flink, 2017). The waste material is generally energy recovered in northern Europe, Japan and some states in the United State of America. In other areas, it is usually put as landfill.

The electronic waste recycling processes' grade of automatisisation globally varies a lot (Flink, 2017). This usually depends on the grade of industrialisation of the country but also the economic cost of human power. Most of the recycling businesses with a higher degree of manual labour is situated in development countries and often use hazardous processes. This may for example imply burning of plastics from metals which is unhealthy for the workers and pollutes the environment. Most industrialised countries use automated processes which most often leads to more extracted materials and cleaner processes.

The electronic waste recycling process for sound devices in Sweden is described in the following infographic (figure 12) in order to further describe the processes in detail. It illustrates all possible recycling stages for headphones and active speakers. These processes should also represent the general processes for industrialised countries (Flink, 2017). However, energy recovery is generally limited to northern Europe, Japan and some areas in the United States of America. The process' starting point depends on the users and where they chose to dispose the sound device. Because of this, both the waste's way through general waste and electronic waste is explained in the following section.

# WASTE TREATMENT SYSTEM OF ELECTRONICS DEVICES



## Electronic Waste Collection

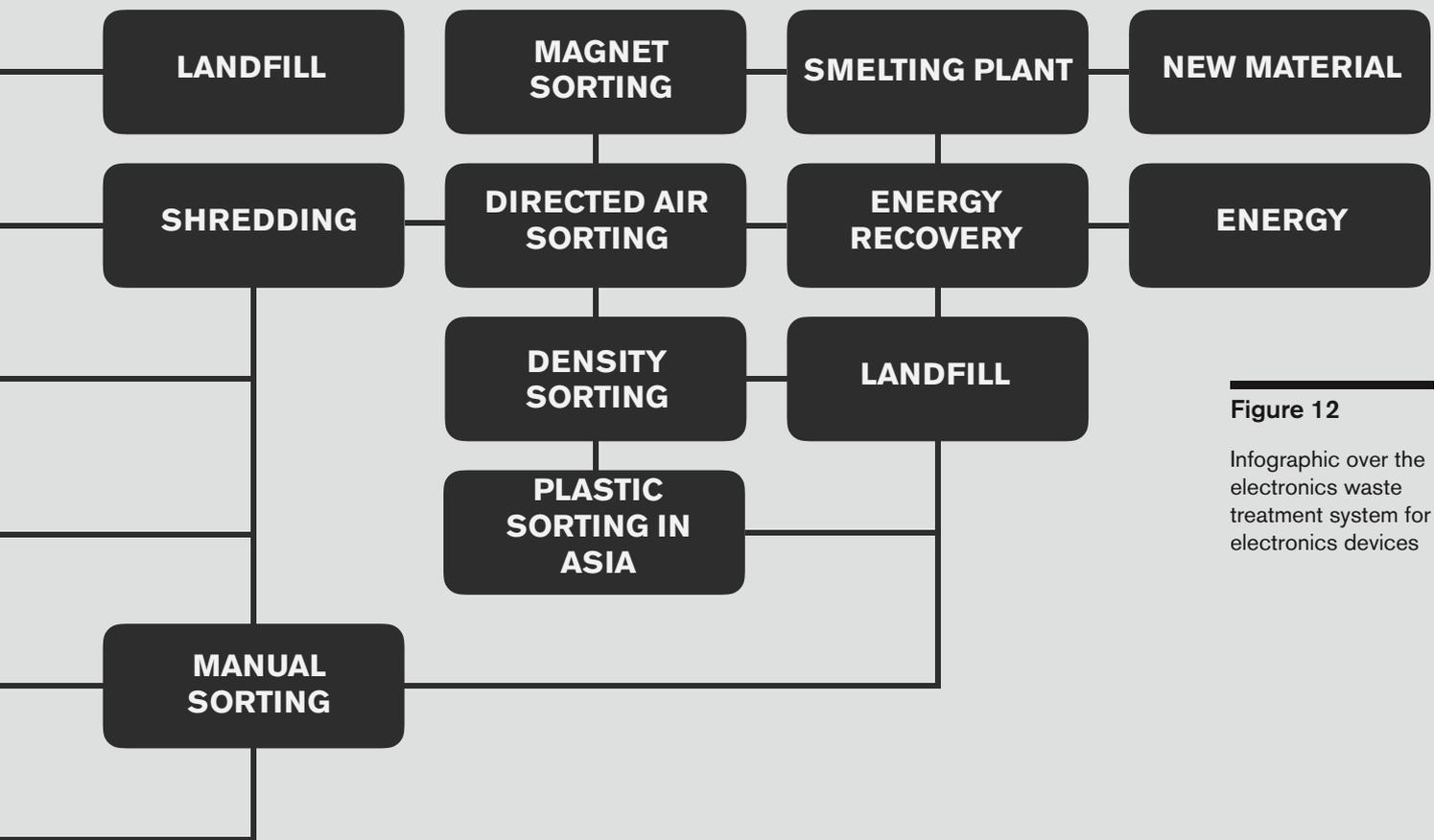
The sound devices are gathered in special bins for electronic waste at the waste dumps, refuse chambers or at stores that sells electronic equipment (Blom, 2017). These bins are then transported to electronic waste pre-treatment.

## Electronic Waste Pretreatment

At this stage, all hazardous material is removed from the waste and a first manual sorting is made (Blom, 2017). The cable will be removed from the headphones and the rest will be sorted as electronics with mainly plastic (Benson, 2017). If the headphones are wireless some companies will remove the battery. Other companies will regard the whole headphones as a battery and sell it to a battery recycler. The active speaker's cable will be removed and the rest will be sorted as electronics with mainly wood (Weibo, 2017).

## Electronics with Mainly Wood

The majority of Zound Industries active speakers are made out of MDF-board and will due to this require either manual labor to access internal components or a special shredding process for wood products (Weibo, 2017). This is because wood cannot



**Figure 12**

Infographic over the electronics waste treatment system for electronics devices

be mixed with plastics in the processes as they got approximately the same density and are hence hard to sort.

### **Cable and Battery**

Cables and different fractions of batteries are sold to companies which specialises in recycling them (Blom, 2017). Most of the metals can be material recycled and some of the plastics around the cables and the internal substances in the battery (Benson, 2017). The rest of the material is energy recovered.

### **Electronics with Mainly Plastic**

All headphones will be sorted to this fraction and will be sold to companies specialises in further sorting of this fraction (Benson, 2017).

### **Shredding**

The headphones will go through a shredding process where they are crushed into small parts and most of the materials are separated (Flink, 2017). However, there are problems with small components with different materials as it is hard to separate the materials from them.

### **Magnet, Density and Directed Air Sorting**

After the shredding, the pieces of the headphones will go through a sorting process where different metals and the most common plastics are sorted out (Benson, 2017). The metals are sorted out with magnets, electromagnets and density baths. Some plastic types are sorted out through density baths and some through directed air on those plastic types which can be identified through infrared cameras (Flink, 2017). Sometimes these processes are done by a separate company. The rest material is energy recovered.

### **Plastic Sorting in Asia**

The plastic fractions are today seldom completely pure. It seems to be common to sell them to countries in Asia for further manual sorting (Weibo, 2017).

### **Smelting Plant**

The material fractions of metals and the most common plastics are melted down and processed into new materials in different smelting plants (Benson, 2017). Stuck plastic parts in the metal fractions works as fuel for the smelting process and are in this way energy recovered.

### **General Waste**

The sound devices thrown in the general waste are gathered by the local waste company and sent for energy recovery (Blom, 2017).

### **Energy Recovery**

The sound devices will be burned and energy will be recovered in the process (Blom, 2017). Left is an ash composing some metals and other rest materials. Metals which can be recovered from the ash are copper, stainless steel and ferro metals larger than a standard screw (Flink, 2017). Therefore, copper cables and circuit boards will end up being energy recovered. The ash is often transported to another plant for further sorting (Dahlek, 2017).

### **Ash Sizing**

The ash from the energy recovery is sifted to sort the ash in different sizes (Dahlek, 2017). These sizes are then seen as different fractions and goes into magnet and density sorting processes similar as described before.

### **Recycling of Metals**

A very high degree of all metals in electronic waste is in general material recycled today (Benson, 2017). It is the metals which stand for the economic value and much refinement work in the recycling business is done to achieve a more effective metal recycling (Weibo, 2017). This especially applies to high quality PCBs as they consist of several valuable metals.

### **Recycling of Plastics**

Plastics are generally material recycled less often than metals as the value of the material is lower (Weibo, 2017). Furthermore, it is because there are several different types of plastics and additives which make the recycling process more difficult (Benson, 2017). Generally, the only sorts of plastics that are recycled today are: ABS, PP and PS (Flink, 2017). Moreover, the plastics only are recycled if they are pure enough and not contain too much additives. A problem is also that few production companies want to use recycled plastics as the purity never can be guaranteed today (Benson, 2017).

### **Problems with Electronic Waste Recycling Today**

Difficulties to separate materials, unwanted materials which mix with others and time are the largest problems with electronic waste recycling today. Different types of plastics that are glued or fixed to each other, often sort into wrong fractions (Flink, 2017). This finally makes them end up as energy recovered instead as material recycled. This also apply to some metal combinations that are fixed together and hard to separate with today's recycling techniques. Plastics with too much additives are contaminated and can therefore not be material recycled (Weibo, 2017). Wood also cause problems in the process as it has approximately the same density as plastics. This make wood contaminate the plastic fractions and therefore it always has to be manually sorted out before the shredding process. Textiles and especially foams cause problems as they can tangle with other materials as for example copper wire and put them into energy recovery (Flink, 2017). Finally, time is a problem as it is equal to money earned (Weibo, 2017). Recyclers therefore always have to balance between prices for raw materials towards time spent in recycling.

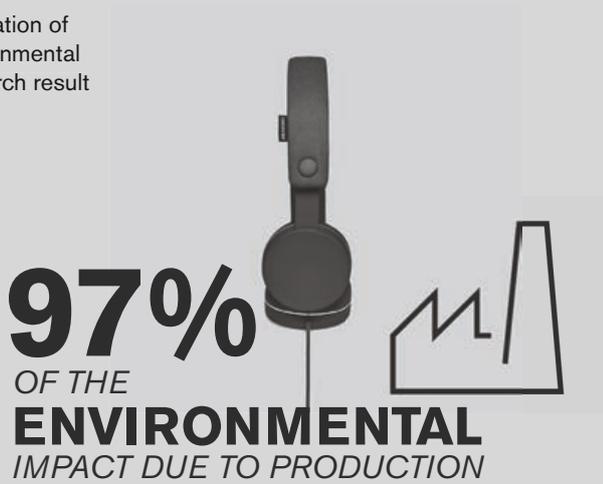
### **Opportunities with Electronic Waste Recycling**

A smarter design and better use of right materials will imply a better grade of material recycling and less required effort. This will also lead to an economical benefit. A recyclable product must use clean materials with focus on common metals and the plastics of the types ABS, PP or PS with minimally used additives (Flink, 2017), (Benson, 2017). Also, it is beneficial to use recycled materials in order to raise the value for it and not always consume new resources (Benson, 2017). Sound devices' battery and circuit board should be easy to detach in order to enable an easier and quicker recycling process. Lastly, it would further simplify the sorting process if the product can motivate and enable the users to do some presorting of the materials.

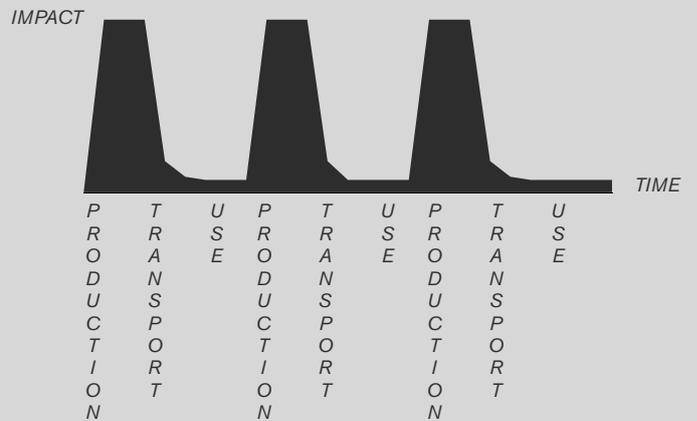
# RESULT OF ENVIRONMENT RESEARCH

Figure 13

Illustration of environmental research result



## LARGE ENVIRONMENTAL IMPACT EVERY TIME HEADPHONES ARE CONSUMED



## ELECTRONIC PARTS HAVE GREATEST IMPACT



# MOST VALUABLE COMPONENTS



CIRCUIT BOARD



SPEAKERS



BATTERY

## AMOUNT OF RECYCLED MATERIALS

WHEN THROWN IN:

### GENERAL WASTE



ENERGY RECOVERED/LANDFILLED



RECYCLED

### ELECTRONICS RECYCLING



ENERGY RECOVERED/LANDFILLED



RECYCLED

## 4.3 User

Below is the result from users' consumption, use and disposal of sound devices. The result is from a questionnaire about the use of sound devices, user interviews and store visits. The questionnaire got 232 answers and the age of the participants were distributed over the ages (figure 14) but had an emphasis of younger persons. The living premises of the participants were varied (appendix D).

“

*I probably have four old headphones lying in a box...*

”

- User 44 years old

### 4.3.1 Ownership

Most users own two or more headphones (appendix D) and none or one active speaker (appendix D). However, the interviews showed a misunderstanding as all respondents in general own more headphones than first answered. This because the formulation of the question made the most of the respondents only count the headphones they actually use.

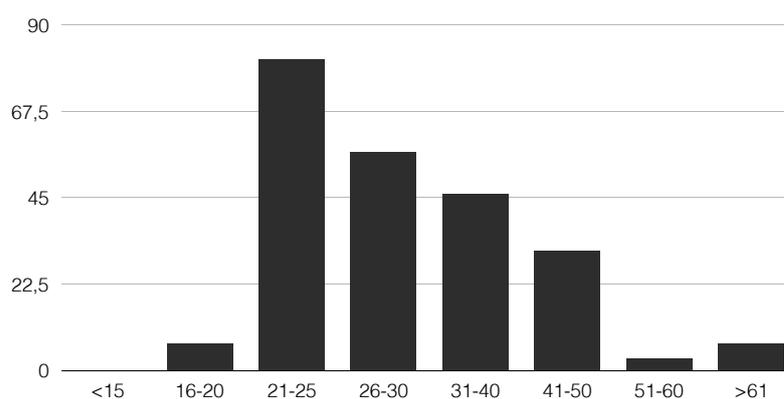
The majority of users own headphones with wire (appendix D) which could imply that the product group wireless headphones have potential to grow. Tech company Apple's decision to remove the 3.5 mm headphone output from iPhones further strengthen this assumption. Moreover, 72 percent of the users do not own headphones dedicated to sport. This could imply that there is a potential market to explore. The majority of users also own portable active speakers with battery (appendix D).

**Figure 14**

Age distribution of questionnaire respondents

**232**  
RESPONDENTS

**DISTRIBUTION OF AGES FOR RESPONDENTS**



### 4.3.2 Consumption

The consumption rate of sound devices is much larger on headphones than active speakers. 65 percent of the users buy new headphones more than every second year while only 9 percent buy active speaker every second year. However, different types of headphones imply different kind of use and expectations according to the interviews. In-ears headphones are looked upon as a consumer goods with short life time while on/over-ear headphones and active speakers are expected to have a longer lifetime.

The reason for purchase of headphones is mainly that previous headphones are somehow broken or that the user got an aspiration of better headphones (figure 15). The most common reasons for headphones purchase are associated with the sound, either that previous headphones had a fault affecting the sound or that the user got an aspiration of better sound. The third most common reason for a purchase is that the user lost the previous headphones. Other common reasons for purchase are aspiration for a new functionality, better fit or a new technology. In the interviews, some users however expressed that sound quality is less important than the fit in the end. Instead, it is about having a perceived sound quality which is good enough.

The reason for purchase of active speakers is mainly to get better sound, a different type of speaker or a new technology (appendix D). However, most of the answering persons expressed that they did not have any active speaker before previous purchase. New technology is more important for active speakers compared to headphones according to the interviews. The appearance of active speakers seems to be more important for young users as they often are used in a social context. This create a desire for the users to appear to have good taste in choice of products. This also sometimes applies to headphones according to interviews. However, many users do not want their headphones to be a fashion statement and hence chose to buy headphones with a neutral design.

The ranked most important aspects with a purchase of headphones are the sound experience, fit and quality (figure 15). For active speakers sound experience and quality are also the most important, but technology is higher ranked than for headphones (appendix D).

Which store users buy sound devices in depend on need to test the products and how fast the user need the new sound device. It seems as headphones often tend to be bought in physical stores because of the immediate need of new headphones. Users seem to want to test active speakers in the store to a higher degree than headphones.

### 4.3.3 Disposal

Many users own sound devices which they never use but still have not disposed and instead keep them at home. 74 percent of the users got headphones at home they never use and 26 percent got active speakers they never use. The majority of the users do not even know where to dispose their headphones (figure 15). Some more users know where to dispose an active speaker (appendix D).

Many users dispose their headphones in a wrong way. A quarter of the users have previously disposed headphones in the general waste (appendix D). In an interview, a user expressed a bad feeling of disposing headphones in the general waste even if it was the only known alternative. Moreover, only very few users have disposed sound devices at the electronics stores. Most of the users have not ever disposed an active speaker (appendix D). Some users also expressed a bad feeling of disposing partly functioning sound devices.

“  
***I mostly buy headphones in physical stores because I need them immediately.***  
”

- User 17 years old

“  
***It feels crazy that a whole garbage bag of packages is generated after purchasing electronics.***  
”

- User 26 years old

#### 4.3.4 Urbanears Use

A third of the answering users own or have owned a pair of Urbanears headphones (appendix D). The reasons of purchase for the Urbanears headphones are mainly fashion, the price and the brand (appendix D). The aspects sound, quality and fit are not as common reasons of purchase for Urbanears headphones. This despite that users mentioned them as most important for purchase of general headphones. This shows that users previously bought Urbanears headphones of other reasons than general headphones. Also, almost a third of the users got Urbanears headphones as a gift. None of the users have bought Urbanears because they were perceived as sustainable.

Urbanears users are in general satisfied with their last bought Urbanears headphones (appendix D). Fashion, sound and price are the aspects Urbanears users are most content with (appendix D). For all these aspects, the Urbanears headphones in general seem to meet the expectations users got before the purchase. However, users in general expect a bit more of the fit of the headphones than Urbanears headphones deliver. Furthermore, Urbanears users are not that satisfied with the aspects technology and extra technicalities. However, these aspects are not that prioritised at a general purchase of new headphones.

The sound is the most common aspect to dispose Urbanears headphones and the lifetime is rather short. 93 percent of the users only used their last bought Urbanears headphones for less than two years (figure 15). Over half of the users stopped using their Urbanears headphones because of broken sound (appendix D). Also, almost a third of the users stopped using their Urbanears headphones because they wanted headphones with better sound. Furthermore, many users stop using their Urbanears headphones despite that the headphones themselves are not necessarily broken. The most common reasons for this are a need for headphones with a new function, experience of worn out headphones or a need for a better fit.



# RESULT OF USER RESEARCH

USERS OWN

**MULTIPLE HEADPHONES** **3.2** PCS IN AVERAGE

Figure 15

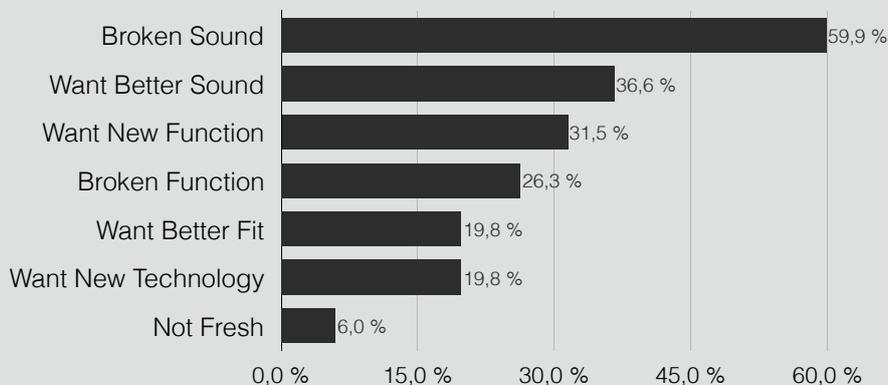
Illustration of user  
research result



WITH

**MULTIPLE  
FUNCTIONALITY**

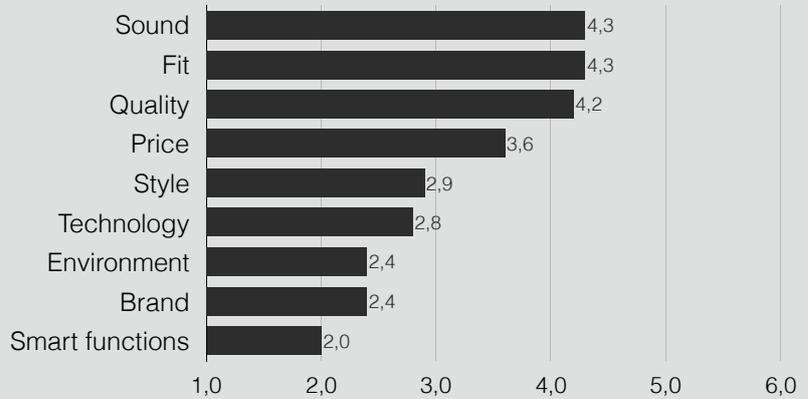
## REASONS FOR PURCHASE



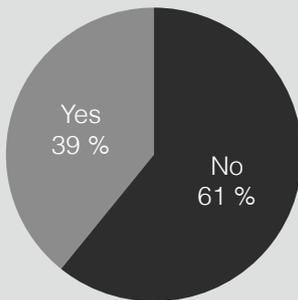
**65%**  
**CONSUME**  
NEW HEADPHONES  
More Than Every Other Year

**SOUND**  
*FIT QUALITY*  
 PRICE

**MOST IMPORTANT ASPECTS AT PURCHASE OF HEADPHONES**

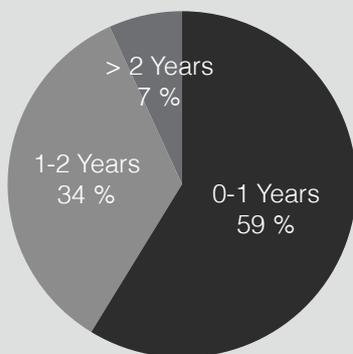


*KNOW WHERE TO*  
**DISPOSE**  
*OLD HEADPHONES*



**”FEEL BAD”**  
*TO THROW ALMOST*  
 FUNCTIONING HEADPHONES

**USAGE TIME**  
*OF LAST OWNED URBANEARS*



**74%**  
*HAVE KEPT*  
**BROKEN HEADPHONES**

## 4.4 OPPORTUNITIES FOR MODULARITY

There are many opportunities for modularity which show potential for the business, advantages for the environment and possibility to increase user experience (figure 16). Below are the most promising opportunities concluded which can work as material for a strategy or guidelines for development of a modular sound device.

### 4.4.1 BUSINESS

- Potential of a disruptive business model and a system that keep customers
- Possibility of new business models which can transform the sound device market
- Increased module volumes which give a better price and quality
- Decreased amount of development work of new products and shorter lead times
- Possibilities to gain better control over subcontractors as modules can be universal for different products
- Lower certification costs as modules can be shared between products
- To have an adaptive product system prepared for future technology, demands and business models

### 4.4.2 ENVIRONMENT

- Extend product lifetime
- Improved recycling process with less material to separate
- Less use of environmental demanding resources
- Use of better standard quality materials
- Reuse still functioning components
- Steer the users to recycle components in right way

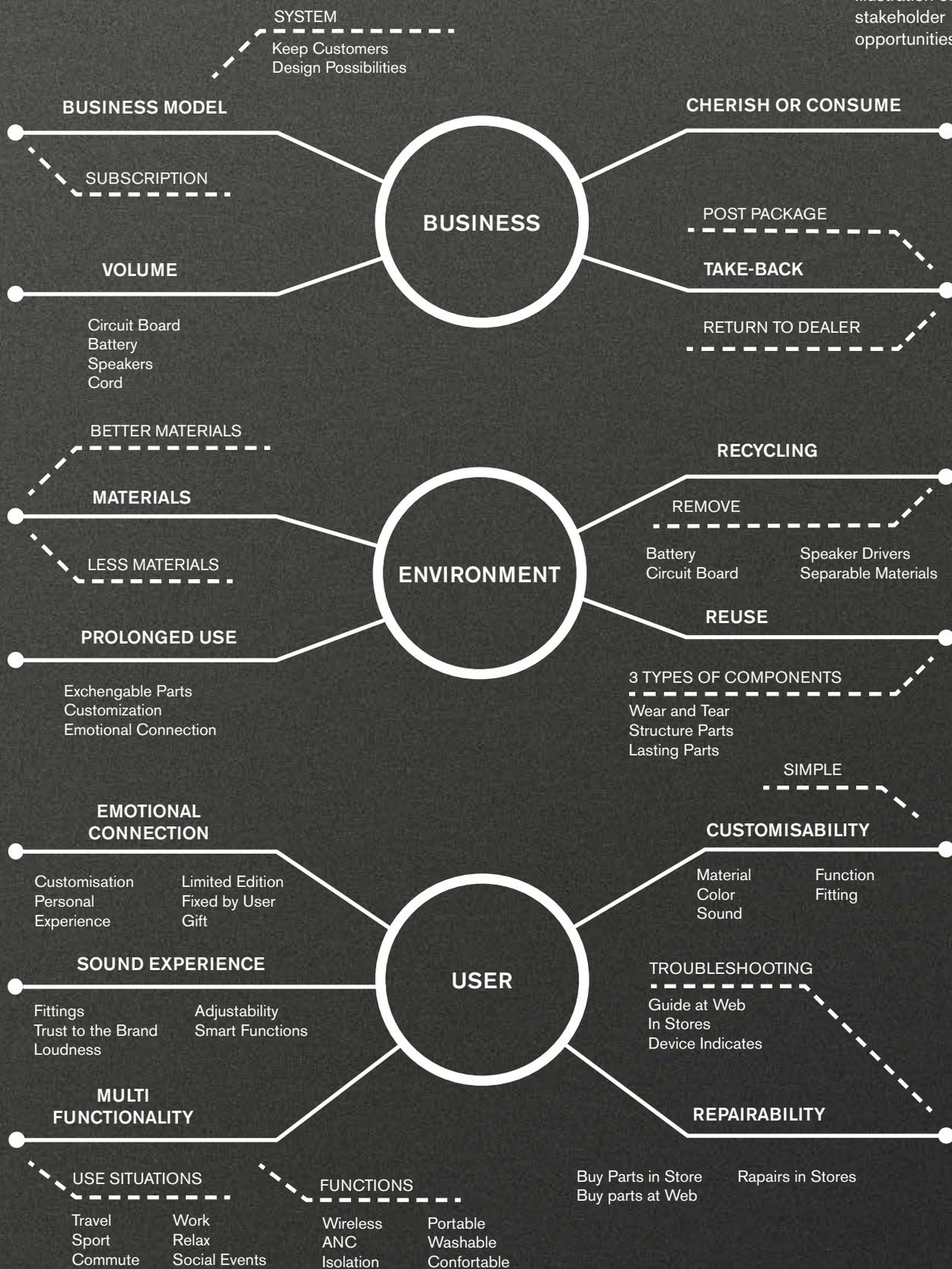
### 4.4.3 USER

- Adaptable functionality, appearance and fit
- Better sound experience
- Easy to maintain the product
- The possibility to update the sound device
- The possibility to personalise the sound device
- To create an emotional attachment to long lasting modules

# STAKEHOLDER OPPORTUNITIES

Figure 16

Illustration of stakeholder opportunities



## 4.5 Directions for Modularity Project

Below is the project direction for phase two presented which is based on the result of phase one, the project group's opinion and Zound Industries' opinion.

### 4.5.1 Type of Sound Device

The project shall focus on the product group on/over-ear headphones in phase two because of its strong potential for modularity. On-ear headphones were once the starting point and core business for Urbanears and Zound Industries. Therefore, Zound Industries thinks it is natural to take on/over-ear headphones as product group in order to make the most impact. Furthermore, this product area shows greatest potential for modularity as the lifetime today is short despite considerable material use and environmental impact.

### 4.5.2 Project Outcome

The master thesis project outcome shall consist of a business model and a product concept. This in order to make good use of results from phase one and the project group's competence. Below is each part further described.

#### **Business Model**

A business model for Urbanears modular headphones shall be the first part of the project outcome. This is about creating a concept of the modularity possibilities that fits the Urbanears users. The business model concept shall aim to create as much value as possible for the users, business and environment. Furthermore, the business model shall motivate the modularity for every company departments and areas. Finally, the concept shall be prepared for a rental model but no development of such will be undertaken as it is out of the project scope.

#### **Product Concept**

A concept of on/over-ear headphones which showcase an Urbanears modularity that fits the brand shall be the second part of the project outcome. Focus shall be on the user interaction and experience with the product in order to gain all advantages of modularity for the user. Furthermore, the concept shall determine which parts to divide into which modules and how they all sit together. This is mainly in order to find the right degree of modularity for Urbanears products and users. Finally, the concept shall be visualised in order to show the intended expression and the material choices shall be made.

### 4.5.3 Keys to Success

Below are three areas described which the project shall look into further in order to create trustworthy concepts of a business model and a product.

#### **Business Benefits of Modularity**

This area is about finding a new model for the business which creates profit from a modular system. It is about to find which target group to aim for and to understand their needs. The model shall make it easy to buy Urbanears headphones and users shall not have to invest too much effort in the purchase. Furthermore, it is important to create a good user experience and make users buy into the system and brand. To make the perfect environmental or production effective modular breakdown is therefore secondary. Decisions must be made of where in the modular system the company shall make

profit. This means to investigate where to put margins and to design the consumption pace for the different modular parts.

### **Environmental Benefits of Modularity**

The main environmental profit is to extend the product lifetime. This area is about finding the best, most efficient way for users and business to achieve a longer product lifetime. Moreover, this is about to create a modularity which withstand different types of reasons for disposal. Reasons of disposal today are typically: hygienic, breakage of mechanic structure, failed electronics, desire of new headphones or outdated technology. The goal is hence to work with these reasons and find solutions which help the users to keep the headphones a longer time. This shall lead to a definition and motivation of the grade of modularity, choice of materials, way of repairing and possibilities of a take-back system.

### **User Benefits of Modularity**

This area is about to find the most beneficial aspects of modularity for the Urbanears users. It deals with the development of a strategy regarding which aspects to focus on and which purposes modular headphones should have. It is about finding the most important values to the user, to build trust and create a good product experience. The modular headphones shall imply such an experience to the users which makes it worth investing in. The goal is to find a way to accomplish these aspects for the user in the best possible way in order to make a strong modular concept which is made for users.

# 05

## PROCESS & METHODS

PHASE 02:  
THE MODULAR  
HEADPHONES





The process and methods in phase two were about finding a solution for a business model and a product concept which together extend the lifetime of valuable components.

## 5.1 Defining a Target Group

The definition of a target group stretched over the two phases of the study as several actions contributed to the definition. The company's internal branding guidelines, internal interviews and meetings contributed to the definition of a target group. The methodology of ecotypes (Persson and Hemberg, 2010) and the technique Elements of Value (Leidenkrantz, 2016) were also used. This in order to understand which users that could be suitable to aim the concept towards. Finally, a brand meeting at Forsman & Bodenfors was performed in order to elaborate on the customer values. The meeting resulted in a valuable discussion of the topic which contributed to the target group definition.

## 5.2 Formulation of Modularity Principle

Two approaches of modularity were developed and defined based on the input from the research in phase one. This in order to create an easy offer but at the same time offer the possibility to maintain the headphones. In the process, the aspiration was always to keep the number of modules as low as possible. This in order to lower costs and create a simple offer but at the same time extend the headphones lifetime. To further lower the environmental impact, different materials and adoption to electronics recycling were investigated. Finally, different electrical and physical interfaces were ideated, discussed and elaborated on in order to create a simple and intuitive interface.

## 5.3 Idea Generation of Part Functions

An idea generation process was done by ideating from part functions of the headphones (figure 17). This in order to get several ideas in every focused area. The function list made in phase one was used as a starting point to ideate around solutions to functions. Sketching together with brainstorming were used as ideating methods. The desired functions were gone through one by one and multiple sketches were done individually within the group in a rapid way. Further ideation was done collectively by discussing sketches and adding to them. The ideas were then gone through and decisions were taken to either keep an idea or discard it.

Interaction and battery charging solutions were also discussed with the design team. This in order to find solutions which fit the Urbanears brand and which are realisable in an easy way today.

Part solutions of assembly principle of modules, battery charging, personalisation and media interaction were presented and discussed at a short workshop with members of the design team at the company. The given feedback was used to further develop the concepts.

## 5.4 Electronics Investigation

An electronics investigation was made in order to find the best way to divide and handle the electronic components in order to extend lifetime on the most valuable components. First, an understanding of the electronic parts in headphones was established by input from the company. This in order to investigate if modularity could be implemented to the assembly of the circuit board. Then, elaboration on how to divide



the electronic components was done. This in order to investigate if the electronic parts with potential to a longer life could be separated from components with shorter life length. Finally, ideation of implementation of diagnostics was conducted in order to create the possibility to monitor the functionality of the headphones.

The plausibility of the division and the diagnostics of the electronic components were gained from the company and through researcher Lars Svensson. The company's team leader of acoustics Marcus Mimer was consulted to give input and a company perspective. The matter was also discussed with Staffan Linde, the company's sourcing manager. To gather information regarding the technical details that were needed to make a decision, Senior Lecturer in the Department of Computer Science and Engineering at Chalmers University of Technology Lars Svensson was consulted.

## 5.5 Materials Investigation

A hypothesis was formed from the results of the research from phase one regarding materials. Materials with low environmental impact was sought after and focus were put into finding materials made from renewable resources.

**Figur 17**

Process image of idea generation session

### 5.5.1 Plastics

Research was performed in order to find plastics made from bio-based sources. To get input to the area Antal Boldizar, professor in Industrial and Materials Science at Chalmers University of Technology, was consulted. This resulted in recommendations of suitable plastics to use and where to find more information about them. The topic was further discussed with sourcing manager Staffan Linde at the company. The availability of plastics was then investigated by contacting trade organisation IKEM and sales personal at the producer Sabic.

### 5.5.2 Textiles

An alternative to the textiles used in Urbanears' products today was sought with the idea to limit the use of fossil based materials. An interview was held with Anders Persson, Senior Lecturer at the Swedish School of Textiles, Department of Textile Technology. The aim of the interview was to find suitable textiles for the ear cushions and headband. The result in phase one showed that textile parts of headphones often end up in energy recovery where they are burned. Therefore, non-fossil based textiles were searched in order to lower the environmental impact. This would make sure that the carbon emissions from the burning of textiles would be equalled by the carbon absorbed when producing them. Persson was hence asked to suggest a textile with properties suitable to the point of use regarding the environmental question and also functionality, cost, durability and comfort.

### 5.5.3 Metals

Different metals were investigated with the aspects of environmental impact, aesthetics and construction taken in consideration. In interviews with the design department different metals were discussed. The current metals used in products were presented and their advantages respectively their disadvantages were stated.

The final choices were based partly on recommendations and partly on the investigation of metals' environmental impact. This information was collected from both interviews and the iOS application Idemat.

## 5.6 Maintenance Investigation

Development of a maintenance design was made through concept ideation with support from the department interviews, Markus Mimer and Lars Svensson. Different approaches were discussed regarding how maintenance of the headphones could be done by users in order to extend product lifetime. The level of how detailed maintenance the user should perform was considered in order to make the maintenance interaction easier for the users. Simplicity for the user was always in focus as simplifying complex technology is one of the company's brand values.

## 5.7 Disposal Investigation

The end of life of headphones was studied further in phase two to validate that the discussed ideas were beneficial from an environmental standpoint. Ideas of modularity was discussed with environmental consultant firm Miljögiraff together with material choices to get input on the ideas' effect on end of life processes. Stena Recycling was also contacted to discuss the treatment of electronic waste with the idea of dividing parts into modules.

## 5.8 Creation of Brand Profile

A branding profile was developed in order to provide a clear communication to the users. This due to the potential of a relatively high complexity of the final concept. This was done through having a workshop with employees from the marketing firm Forsman & Bodenfors, by working with branding techniques and by working with Zound Industries' internal branding guidelines.

At Forsman & Bodenfors a workshop was held with six employees. The project was presented and input was given to further develop ideas about how a stronger connection with consumers could be obtained. Approaches to achieve this were discussed including the choice of main marketing touchpoints, tips about how to work with secondary touchpoints and how inspiration could be obtained from other brands.

The company's internal branding guidelines were studied and an interview was held with co-founder and creative director Oscar Axhede. This gave insights to how the final concept could be made to communicate the values of Urbanears.

### 5.8.1 Branding Techniques

Work was done with different branding techniques to consolidate and develop the branding ideas.

Techniques which were used were:

- Brand Promise as described by the Circular Design Guide (Ellen Macarthur Foundation, 2016 a)
- Elements of value (Leidenkrantz, 2016), (Appendix E)
- Core, offerings, society, market (Hestad, 2016), (Appendix F)
- Theories of Brand Archetypes (Mark and Pearson, 2001), (Appendix G)
- Business model canvas (value proposition, customer relationship, channels) (Ellen Macarthur Foundation, 2016 b)
- Layers of meaning (Hestad, 2013)

## 5.9 Concept Formulation

Concepts were put together with the earlier produced part solutions and were then evaluated. During this phase, headphones were looked upon as a combination of parts related to function respectively parts related to appearance. Moreover, two main issues made up the base of forming concepts; lifetime and functionality.

The lifetime issue was connected to appearance and was about if to design headphones to be kept over time or to minimise the environmental impact when disposed. A long lifetime would demand to create exclusive long-lasting headphones which users keep over time. A short lifetime would keep today's consumption rate and therefore a design flexibility but would demand to minimise the environmental impact when disposed.

The issue of functionality was about if the modularity should be used to alter the appearance of the headphones solely or the functionality as well. To only alter the appearance would imply a larger focus on fashion and style and therefore equal one type of today's headphones. To also include functionality would imply to focus more on

lifestyle and to serve different user needs and would therefore equal a new headphone platform system.

In addition to the posed issues the concepts were formed with part solutions. Solutions were paired with the concept with which they were thought to fit best.

## 5.10 Concept Choice

The developed concepts were presented to members of the design team at the company. Discussion was held around the concepts and the issues of lifetime and functionality were handled in particular. A recommendation was given by the company of which ideas that were suitable to continue to develop.

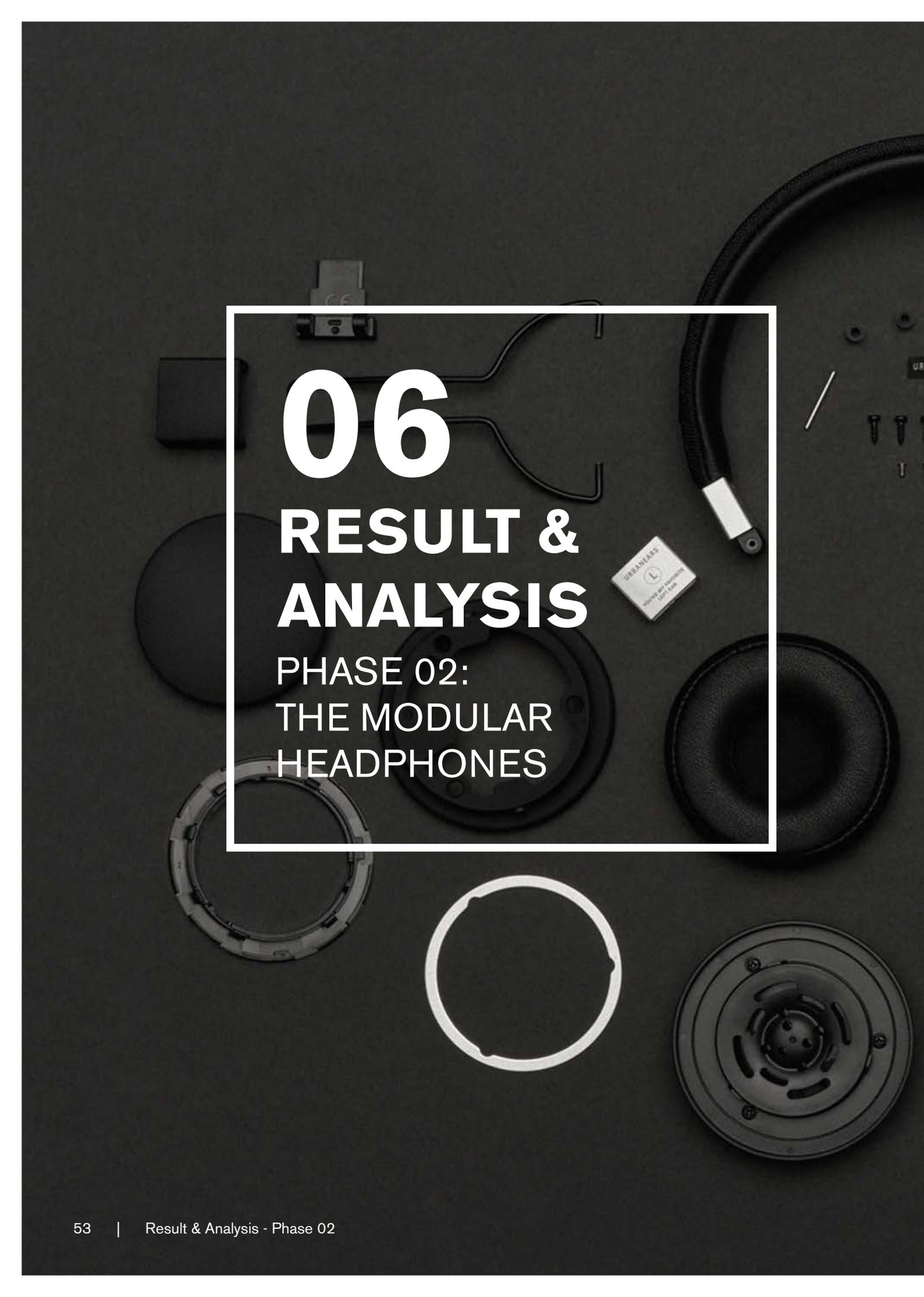
In addition, the concepts were discussed with consultants and the tutor. The environmental consultant firm Miljögiraff gave feedback regarding the ideas potential environmental effect. The projects' tutor Oskar Rexfelt gave feedback on the ideas and a discussion was held regarding their potential use in a closed loop consumption model. The input from the earlier workshop with Forsman & Bodenfors did also affect the choice of concept. The mentioned feedback together with input from consultants regarding electronics and materials were used to make choices of concepts and part solutions to take further to the final concept.

## 5.11 Final Concept Development

The final concept development included construction of models, testing, search of existing solutions, CAD and visualisations with the goal to find solutions which both express Urbanears and are natural to use. A visit to a camera store gave inspiration for interface interaction and surface quality. A lot of time was then spent to build models, test and find the ultimate interface for the modules. Particular work was spent on how to make it easy to switch the electronic cores between the editions, but still keep the appearance of the brand. Discussions were also held with the company which guided the work. The objective was to find a way to express that the headphones are modular and how to interact with them simultaneously as they clearly show that they are an Urbanears product. Moreover, work was spent on differentiating the editions' expression from the electronic cores'. The editions were aimed to be more about style and function compared to the electronic cores', which were aimed to express quality and long lifetime.

Further work to determine the final appearance was done through cad and dimension modelling but also through inspiration from Urbanears' brand and products. The software Fusion from Autodesk was made to model and iterate the design of the headphones. During this work, dimension checks were constantly done to make sure the design would result in a great user interaction and express Urbanears. Vred by Autodesk was used to render the headphones and test different materials. Inspiration from the existing Urbanears products was used to find material combinations, transitions and the right colouring. The Urbanears' website was used as inspiration to find a way to communicate the brand. This altogether resulted in the design for Urbanears Modular.

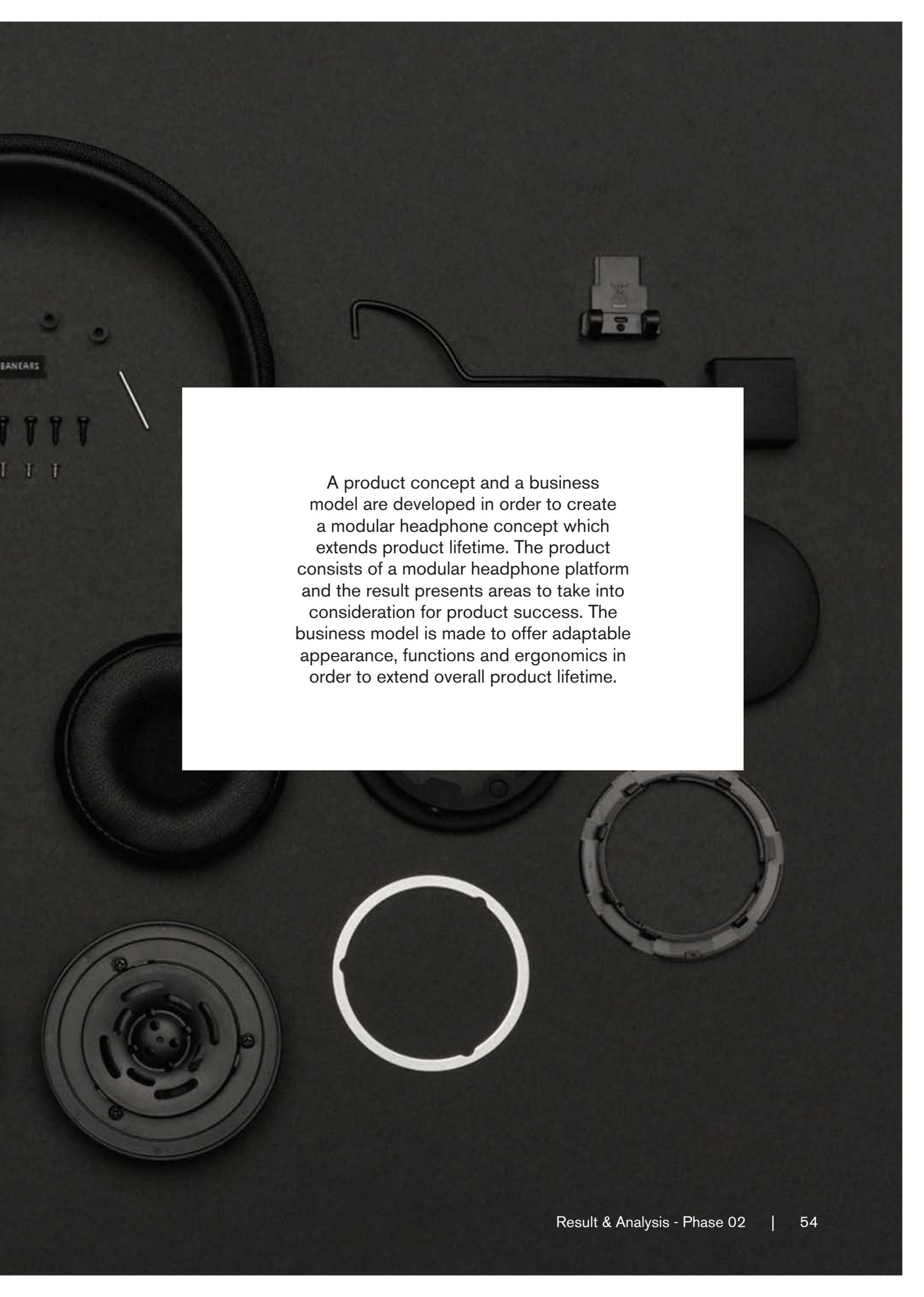




**06**

**RESULT &  
ANALYSIS**

PHASE 02:  
THE MODULAR  
HEADPHONES



A product concept and a business model are developed in order to create a modular headphone concept which extends product lifetime. The product consists of a modular headphone platform and the result presents areas to take into consideration for product success. The business model is made to offer adaptable appearance, functions and ergonomics in order to extend overall product lifetime.

## 6.1 Target Group

The illustrations show the target group and the most important aspects for them when buying products. The first illustration shows how the target group live their life and what they value in style (figure 18). The second illustration shows the most important aspects of a product at purchase and how to communicate sustainability in a way that attract the target group (figure 19).

## 6.2 Product

The product uses modularity and includes properties to extend the product lifetime. The design of the product prioritises valuable parts and materials in order to create attractive sustainable headphones.

### 6.2.1 Modularity

Use and maintain modularity are two different types of modularity which serves different causes but together shall extend valuable modules' lifetime.

#### **Use Modularity**

The use modularity consists of editions and electronic cores (figure 20). It is created with the user in focus with the purpose to be simple and beneficial. The main idea is to separate the electronics from the headphones' function, ergonomics and appearance in the simplest way.

The electronic parts create two modules called the electronic cores. The reason to separate the electronic parts are that they today stand for almost 80 percent of the environmental impact and at least 70 percentage of the costs. This makes the electronics most valuable and the incentive to extend the lifetime of these important. Because of the need of one driver for each ear, the smallest number of electronic modules are two. These modules create the electronic cores.

The electronic cores are supposed to have a long lifetime with possibilities to repair and upgrade the technology. This gives a future proof system where the product can adapt to new technologies and demands. Therefore, the electronic cores must be consistent and secure a modular trustworthy system for a long future. The design of the electronic cores shall therefore communicate value and long lifetime. They shall exist in only one variant at the same time and therefore no design, function or other differentiating functionality shall be included in them. They may be resembled to a Sodastream CO2 bottle which run the product but always are the same even though it supports a range of different products and functionalities. The electronic core modules may therefore be seen as a start kit users need to get in order to be part of the headphones system. They shall also manifest they are part of a system and build a brand status.

The editions are what users today experience as the headphones, everything except the inner electronics. The editions consist of all outer material as plastics, metal and fabric which shape the appearance, functionality and ergonomics of the headphones. These are the parts that visually and ergonomically differentiates a pair of headphones from another. This creates an opportunity for the users to have different editions adapted to different use and style but still use the same electronics in them. The edition has neither considerably high environmental nor economic impact. This creates possibil-

ities of adaptable function, appearance and ergonomics for the users with lowered economical investment and environmental footprint.

The edition shall be experience as everything which today is associated to headphones while the electronic cores shall be experience as a long-lasting unit that powers them. By giving the electronic cores long lifetime, the quality of the components in them can be higher. This secures the future and builds possibilities to a more premium product experience. Moreover, all experience parameters as sound, fit, functions and appearance can be controlled and unlocked with new editions. Different cushions, inner volumes and acoustic air holes can create different sound experiences despite the use of the same set of drivers. The same applies to the other experience parameters which all must be independent from the electronic cores. By creating a platform design, production of especially the electronic cores can be rationalised. This means higher production volumes, lower lead times, rationalised legislation work, streamlined product development and larger control over subcontractors.

### **Maintain Modularity**

The maintain modularity further divides the edition and the electronic cores into sub modules which are necessary in order to offer reparability (figure 21). Each module gathers parts which have common prerequisites and will have a common reason to be exchanged. These reasons are that parts may be unhygienic or worn out, go out of fashion, have outdated technology, have deteriorated functionality or simply brake. The maintain modularity takes this in mind and divides the parts into a minimal number of modules in order to simplify for the user and extend product lifetime.

The main idea of maintain modularity is to keep the product alive by giving the user the opportunity to replace outdated modules. It is not about offering customisation possibilities as this will complicate purchase and product experience. The main idea is to keep it simple for the user and therefore this modularity is all about providing the same module as the outdated one to replace it with. This means that users will know exactly what they need and how it works as they already got one before. This opens up for possibilities to offer these modules only online in order to separate it from the use modularity.

The Maintain modularity of the edition consist of headband, cushions and structure frame. This modularity is basically the same as many of the Urbanears headphones use today which simplify user acceptance. The idea is to separate headband and cushions which over time will get unhygienic or worn out. These modules may be washed or exchanged to new ones which will extend the lifetime on the edition. The structure frame holds all other modules and makes up most of the appearance, functionality and ergonomics of the headphones. This module will be exchanged if it breaks or goes out of fashion.

Figure 18

Illustration of target group

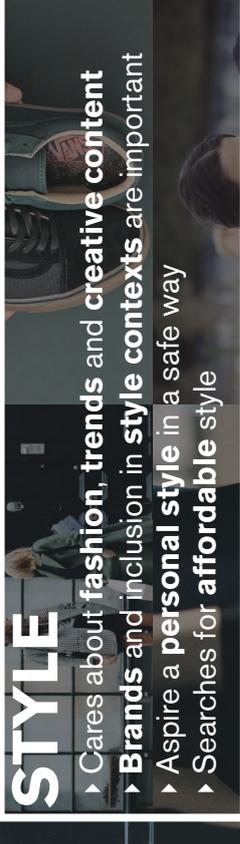


ACTIVE URBAN  
STYLE CONSCIOUS



- ▶ Has an **active** life with a lot of things going on
- ▶ Lives in an **urban environment**
- ▶ Has different needs of **functionality** for headphones
- ▶ Listens often to **various media** depending on purpose
- ▶ Is constantly busy and **lacks time**

## LIFE



## STYLE

- ▶ Cares about **fashion, trends** and **creative content**
- ▶ **Brands** and inclusion in **style contexts** are important
- ▶ Aspire a **personal style** in a safe way
- ▶ Searches for **affordable** style

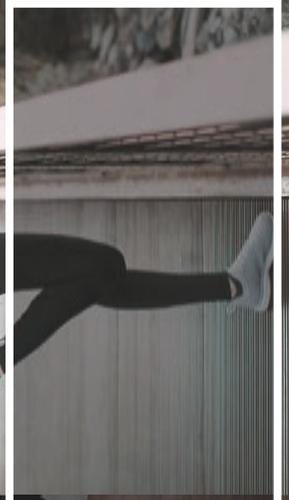


Figure 19

Illustration for product communication towards target group

# E CO BRANDING & CONSUMPTION



EASY TRUSTWORTHY EXPERIENCES OPPORTUNITIES

## Ecotype

The target group consist primary of the pioneer and the spontaneous person. It is about to be fashionable and take part of new trends. Experience is always first and well known brands can be an easy way to gain them as well as badge values. Sustainability gives new opportunities and must express such in order for the target group to buy into it. New experiences must be gained instantly and also show in society.

## POINT OF DECISION

- ▶ Products **easy to buy** into
- ▶ **Trustworthy** product system
- ▶ **Product experience** before specifications
- ▶ **Possibilities gained** with the new product
- ▶ Brand that gains **badge value**
- ▶ **Assortment** to choose from
- ▶ Clear **advantages** of purchase



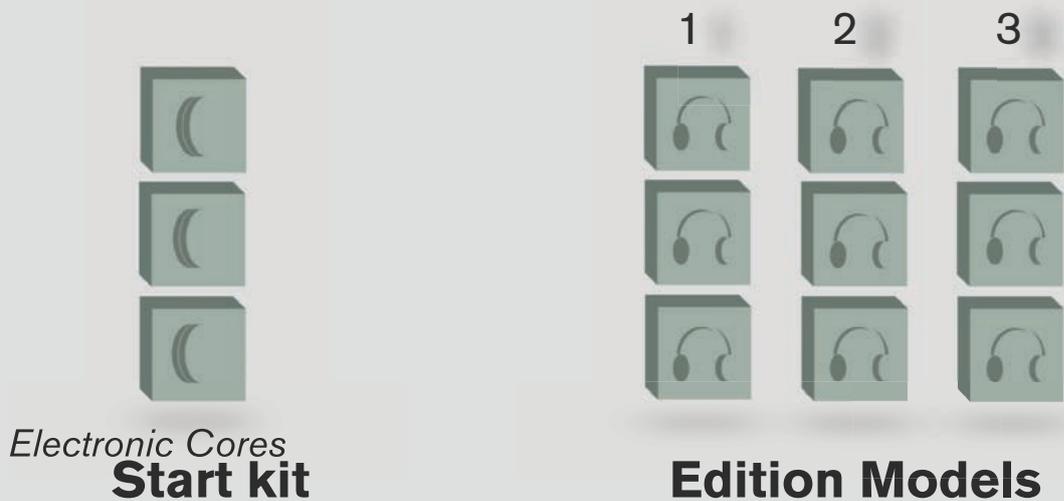
# USE MODULARITY

Figure 20

Illustration of Use Modularity



## RETAIL PLANOGRAM



# MAINTAIN MODULARITY

Figure 21

Illustration of  
Maintain Modularity

**WASH  
REPAIR**  
NEW STYLE



Editions



Headband

Structure  
Frame

Cushions

**REPAIR  
UPGRADE**



Electronic  
Cores



Battery



Speaker



Circuit  
Board



Speaker

The maintain modularity of the electronic cores consists of a set of drivers, a battery and a PCB module. The drivers have the possibility of a long lifetime as they basically are passive speakers. Drivers shall be produced in good quality and have great sound which can secure future sound experience needs. Furthermore, it is an advantage for the control of the sound to have a fixed module enclosure of the driver. This makes it easier to create a correct soundstage despite all other electronics which today affect the sound.

The battery is separated from rest of the electronics as it has a strictly restricted lifetime depending on the number of charges. This makes it necessary to exchange the battery periodically in order to extend product lifetime. Additionally, it gives the user the possibility to have a spare battery in case of power loss.

The PCB module consists of all technology and is separated in order to offer the possibility to update the technology. In this way Urbanears can release updates as versions in a periodic way. This gives the users the advantage to stay updated with the headphones technology.

## 6.2.2 Sub Functions for Modular Headphones

Following are the main sub function solutions presented which shall be used in the modular headphones.

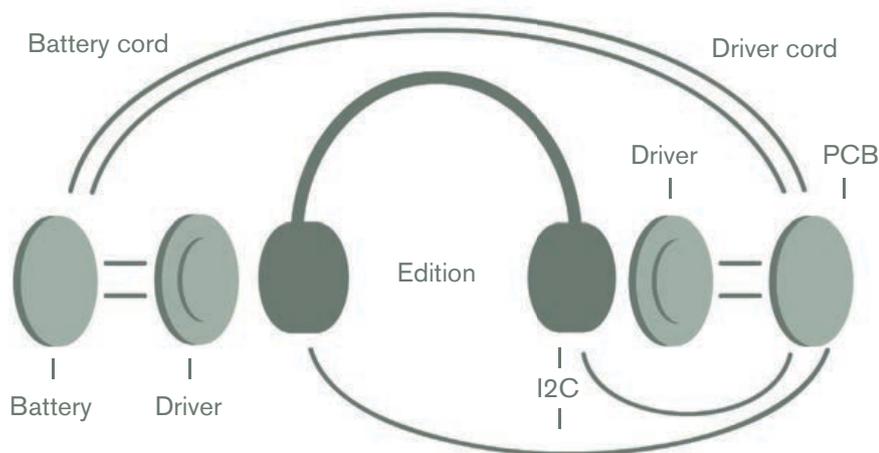
### **Module Assembly**

A bayonet socket shall be used to assemble the electronic cores and the cushions to the structure frame. Same assembly principle shall be used to assemble all modules of the electronic cores to each other. A bayonet socket solution is simple and commonly used, which makes it easy for the users to understand how it works (Svensson, 2017). It is also easy and cheap to produce and need no extra material than the enclosure material itself. Moreover, this solution works for both plastics and metal parts. The mounting is secure and holds parts together in a good way even if the product is exposed for stress. In addition, an extra secure button may be added which snaps and locks the bayonet socket that holds the parts together. The bayonet socket is already today successfully used in Urbanears products in order to secure the cushions to the headphones.

### **Electronic Communication**

The electronic communications between modules shall use ordinary cables for the modules and be prepared for additionally technology by use of the I2C standard (Svensson, 2017). The illustration shows the electronic setup in the product concept (figure 22). The I2C is a standard which compress multiple signals into two wires. This is a cheap standard solution which have already existed a long time. This allows editions to use the I2C standard and enable connection of additional technology into the PCB. An example of need for the I2C standard is an edition with ANC. The ANC technology demands four extra microphones and a user switch for the sound control. These can be connected to the PCB by use of the I2C standard in each ear cup of the edition.

The electronic communication between modules shall use self-cleaning contacts in order to extend lifetime (Svensson, 2017). The structure frame shall hold a cable similar to the one used today. The cable will connect both ear cups to each other via self-cleaning contacts between the structure frame and the electronic core. This is a reasonable and fairly simple solution to connect both sides to each other due to fairly few needed contact plates. However, it is important to design especially the contact



**Figure 22**

The electronic communication in the modular headphones

plates on the electronic cores to hold for many repeated connections. This also applies to the dimension of the cable threads and the soldering. The contacts between the modules in the electronic cores shall also use the same principle of self-cleaning contacts. However, these contacts only have to hold two to three contact plates, which makes it easier for production.

### Electronic Assembly

The main electronics shall be placed in one module in order to keep it simple for the users and due to the lack of environmental benefit to divide the electronic components into several modules. Today's used components are in a large extent integrated to each other. This means that components with a potential long-life time are fixed together with components with short lifetime. Hence, are there few components with potential long life which are possible to separate into a new module. A division of components imply a need of an interface between the modules. A division of the electronic components would hence not be beneficial for neither the environment nor the business today. Moreover, a division of the electronic components would create a more complex product for the users. This together motivated to put all electronic components in a single module.

### Battery

The battery shall be charged by cable in order to keep a standard solution which is easily adapted by users. Most of today's battery headphones are charged by cable which therefore can be seen as a standard. Charging with cable is also the easiest and most inexpensive solution. Moreover, user acceptance and understanding is largest for cable charging today as it in addition to headphones is used in smartphones, computers and other electronics. This makes cable charging to a solution which does not build any obstacles for the users.

The charging port is kept in the PCB as it is in current Urbanears models in order to provide upgradability and in order to keep the charging secure for the future. This implies that it is possible to change cable standards and method for charging the battery.

Induction charging is a promising technique to charge batteries with in the future assuming it will be commonly used. Induction charging is a technique which might get

hold of the market in a soon future and would fit well with the modular solution. This because there are no charging cables which implies no port outlet through the PCB module is needed. This would make the PCB module more future secure as it does not have to consider cable standards. However, induction charging has not really broken through yet, which means that general users do not commonly own induction chargers today. This force an induction charging solution of headphones to provide a charging surface. This is both bad for the environmental and economic impact. Therefore, the battery shall not be charged by the induction technique to begin with but will by modularity be prepared to make use of it by the time it might break through.

The headphones shall have precise battery diagnostics in order to provide information for the user to plan the charging of the battery. Battery diagnostics are a big issue of today's headphones which often leaves the user with run out battery. This sets the user in position to have less trust of the battery in the headphones. This means today that users need to either bring spare headphones, a charging cable or a 3.5-millimetre cable in order to secure media listening. The problem is mainly the complexity of the diagnostics techniques which need calculation methods of battery usage instead of only measuring the voltage over the battery. However, this is done in all more complex electronic products and therefore it can be done for headphones as well. Development of diagnostics techniques for headphones would be required in order to provide diagnostics. This would ensure a better user experience and make it clearer at what time to charge the headphones.

A spare battery module can replace the 3.5-millimetre headphone jack in order to provide backup play time. The 3.5-millimetre headphone jack technique is on its way to get outdated because of the expansion of wireless techniques. Already today, Apple have removed their 3.5-millimetre standard and it can be assumed that others will follow. This removes the possibility to use this type of outlet as backup connection if battery runs out. However, the existence of a battery module provides the possibility for the user to get a spare battery in order to have a backup if power runs out or to extend the headphones' use time. This will work as for camera batteries today where the user brings an extra battery in case of power loss. This has the potential to replace the use of the 3.5-millimetre headphone jack as backup in case of power loss.

### **Media Interaction**

The media interaction shall be made by a joystick in order to stick to a standard solution and make use of existing techniques of the company portfolio. The joystick is a control device that enables access to several functions but still entails a good physical feedback. However, the joystick must have a clear user interface in order to secure a good product experience. This makes it important to have clear joystick directions in order to provide user guidance of the functionality. Furthermore, it means that the knob shall be designed so the directions can be understood just by haptic feedback. The joystick shall also be placed on the right ear cup in order to have a logical direction of skip forward and backward. Moreover, it shall be placed so it can be used with the thumb as this allows for easy access and control. Before final decision of design, usability tests must be performed in order to assure a good user experience of the joystick solution.

The media interaction is prepared for the future as it can adapt to new technology and user needs. The media interaction device shall be situated on the PCB module

which means it can be changed every time the technique is. This makes it possible to constantly develop the headphone interaction to adapt to new user needs.

The Urbanears products shall strive to use a uniform media interaction principle in order to build a clear product portfolio belonging. The channel programmer button on the Urbanears Wi-Fi speakers is a control which has the potential to fit well with headphones as well. This control gives the users possibilities to save any media into a programmable channel. This makes it easier and faster to change media while on the move with no need of using the phone. However, this control and software solution do not exist today and must be further investigated.

### **Personalisation**

Modules which shall have long lifetime can make use of personalisation in order to build emotional linkage to the users. This can form a stronger connection between product and user and make the product more valuable for the users. Moreover, this creates an incentive for the user to keep and repair the product because of its personal value. If the consumption pace gets lower in the future, emotional linkage shall be a goal to achieve for the editions. This can imply working with materials, possibility to collect memories or colours in order to make the editions more personal.

### **Media Sharing**

The new Bluetooth standard can replace the 3.5-millimetre headphone jack for sharing possibilities for media (Mimer, 2017). The sharing function between 3.5-millimetre outlet is already on its way to be outdated. This because of the transfer to wireless headphones which imply the need of the users to bring a spare 3.5-millimetre cable in order to share music. This makes the function outdated and not as convenient as before. However, the new Bluetooth standard provides possibilities to provide sharing possibilities wireless instead. This is a possibility to update the iconic Urbanears sharing function to wireless and make it convenient for the users again. However, it is important to make it easy to connect multiple headphones to the same source in order to make the function relevant for the users. To use the NFC technique in order to quickly connect headphones together can be a solution for that.

## **6.2.3 Materials**

Common standard materials shall be used in all parts possible to material recover while bio-based materials shall be used in parts not possible to material recover. The ultimate goal is to keep materials in the loop and to always strive to material recover as much parts as possible. These parts will consist of standard materials which have a well-functioning material recovery system today. However, some materials do not have possibilities for material recovery today. Therefore, the environmental impact shall be minimised for these materials by choosing non-fossil materials.

### **Plastic**

The best choice of plastic is bio-based ABS in order to keep the existing good material abilities and the compatibility with today's recycling system (Miljögiraff, 2017). ABS plastic gives nice surfaces, is a durable material and have further abilities that suits headphones (Boldizar, 2017). It is a cheap material to buy and produce with and is also the most common plastic to use in electronic products. ABS only demands a low mold inner pressure when producing parts. This makes it possible to use cheaper molds of lower quality but still get a good result of high complexity parts. Moreover, ABS allows fast production and is an existing material which makes it easier to quick

get good results from production. This is because it takes up to ten years and a lot of experience to get a new material to work in production and give good results.

The ABS plastic should consist of bio-based components in order to be as sustainable as possible (Miljögiraff, 2017). The ABS is made out of the three components: Acrylonitrile, Butadiene and Styrene (Boldizar, 2017). Each of them has the possibility to be made from bio-based materials. Today however, it is often more expensive to produce these components from bio-based materials which makes bio-based ABS unconventional. Despite this, styrene seems to be the component which has started to be produced conventional in bio-based variants. This creates possibilities for 40 to 60 percent bio-based ABS (Plastguiden, 2017). Bio is however not equal to sustainable as it depends on which type of biomass that is used. Even if bio-based ABS not is chosen from the start, the company shall strive to find and work for implementing it in the future.

Recycled ABS plastic can be a good alternative to start out with if bio-based plastic is hard to obtain. (Boldizar, 2017), (Benson, 2017). In this way, old plastic is reused and given a second life. However, long-term sustainability is not achieved as the material still is based on fossil sources. Despite this, use of recycled plastic can have the benefit of increasing the value of recycling electronic waste. This can lead to more effort being put into the plastic recycling process. However, if using recycled plastic it must be made sure stabilisers have been added in order to extend the plastic's lifetime.

The ABS shall be kept as pure as possible with a minimum amount of additives such as flame retardants or softeners in order to make it more recyclable (Flink, 2017). However, aspects as ageing from UV-light or wearing must also be considered (Boldizar, 2017). Furthermore, plastic ages even though the part is enclosed which makes it important to specify the expected lifetime.

## **Metal**

The best choice of metals is durable standard metals with no lacquers that can be worn out by time. The metals must be kept pure in order to make them possible to material recycle (Flink, 2017). Furthermore, they must be dimensioned in a way which make them stand hard use in order to last over time.

In all bendable parts the best choice of metal is steel, which also is used today. This is a standard material which is consistent over time. However, it is important to dimension it in such a way that it holds for a long time of use. It is also important to keep it pure in order to make it possible to material recycle it (Flink, 2017).

Non-movable metal parts shall consist of durable standard metals. Good choices of metals possible to colour is anodized aluminium or PVD coated stainless steel (Linde, 2017). These metals and ways to colour are durable and are not as sensitive to be worn as lacquers. The aluminium is however a soft metal which is sensitive to unwary usage and easily gets damaged if it is under dimensioned. PVD coated stainless steel is more durable but only comes in a limited number of colours. Good choices of non-coloured metals are zinc, aluminium or stainless steel. Aluminium is a light metal (Ädelmetaller, 2017) which is commonly used in electronic products (Idemat, 2015). Zinc is heavier but can be made durable with less use of material and is less environmental demanding. Stainless steel is a bit heavier than zinc and aluminium (Aksteel, 2017) but has less environmental impact than aluminium and has good mechanical strength (Idemat, 2015).

## **Textile**

The best choice of textiles today is bio-based textiles made out cellulose in order to use non-fossil materials (Persson, 2017), (Miljögiraff, 2017). Artificial fibres from cellulose can be produced without fossil based materials and have properties which could suit the application of Urbanears' products. Lyocell and Tencell are examples of suitable textile materials as they are durable, washable and have the possibility to be inked.

To make the textile more durable, polyamide may be blended into the textile (Persson, 2017). The polyamide should in that case be made from mechanically recycled sources in order to keep the textile sustainable. It would however be more difficult to ink the fabric since the polyamide and the cellulose based textile would need to be inked separately before being blended.

### **6.2.4 Maintenance**

The headphones shall be easy to maintain in order to extend lifetime and keep user experience and satisfaction. This is about offering possibilities for the wearing parts cushions and headband to keep them fresh. Furthermore, to offer reparability in an easy and obvious way for the user.

The wearing parts cushions and headband shall be possible to wash easily in order to keep them fresh. It is important to guide the users in an obvious way that it is possible to wash them. The wash tag solution today is good but could be more visible in order to catch attention of the users. Moreover, the user interface and way to disassemble the headband and cushions must be obvious for the users. The way the headphones are taken apart must hence be clearly communicated to the users. This can be done by designing for affordance with hints through for example colours, shapes or symbols.

All modular parts must be easy to replace in order to decrease the effort for the users to repair or update the headphones. This is about directing the users to buy a new module instead of complete new headphones. In this way users are kept in the product system and the product lifetime is extended. As users already are familiar and clearly know what to expect of a replacing module, the purchase of a new modular part can be made easily with no need to explore it in a physical store. The goal is therefore to differentiate the purchase of a module from an ordinary headphone purchase. This in a way that demands less mental processing and gives an easier point of decision. Focus shall be put on directing the users to find the part that replaces their old one. Sales shall preferably be kept online where information flows and guidance to users can be better controlled.

The headphones shall detect by diagnostics if any of the modular parts in the core breaks or needs to be replaced. This can be done by sensors and calculations which detects if any of the circuits are broken (Svensson, 2017). Different techniques shall be used on different modules in order to check functionality. Broken drivers can be detected by measuring impedance over the circuit. The battery and the PCB can be checked by measuring the voltage over the circuits.

The user shall be informed if some modular part needs to be replaced through the unit the headphones are connected to. This could be done through an extension in the existing Urbanears speaker application. The prompt shall include information about which modular part that needs to be replaced. Moreover, it shall offer to order a new part which replaces the old one and instruct in how to replace it. Also, there shall be information to the user about how to dispose the old modular part in best way. In this

way, the user is noticed about the problem and gets an offered solution to it at the same time.

### 6.2.5 Disposal

The modularisation of the headphones implies that modules will have different end of life processes in order to recover most of the used materials. The different modules consist of different combinations of materials which requires different channels of disposal. The main idea is hence to always have a module sent to end of life instead of the whole product. As a module is replaced with a new one, instructions can be provided to the user in how to dispose the old module in best way. This creates the possibility to direct the disposal process for each module in order to get as much material as possible recovered. Furthermore, the disposal process will be kept flexible for the future as recycling processes will change. In this way instructions for disposal of modules to the user can be accurate, up to date and in the leading edge of the disposal processes.

The structure frame and drivers shall be kept in the existing disposal channel of electronics recycling. These modules therefore need to consist of standard metals and plastics which today are sorted out in the process and material recovered. The amount of different materials used must be kept to a minimum in order to increase the amount of materials recovered. By designing the modules for shredding most of the materials can be separated in an effective way (Flink, 2017). This implies to use snap buckles and design the enclosure material to crack in certain ways in order to separate it from the inner material parts. In this way, most of the materials used can be material recovered.

The PCB module shall also initially be kept in the disposal channel of electronics recycling but future technology implies possibilities of a take back system. Today, the economic value of materials and components in the headphones' PCBs are relative low (Flink, 2017). However, the future may bring a need of smarter technology and consequently also more advanced PCBs. This creates possibilities for economic benefits of a take back system for the PCB module. Moreover, there is a possibility to reuse old still functioning PCB modules in other markets. In this way, they can be sold to a lower price but still offer a good functionality.

The battery module shall be disposed as a battery which will send it directly to the right procedure of recycling. This implies that most of the material used will be material recovered or treated in the best possible existing way (Benson, 2017). Furthermore, the separation of the battery from the rest of the materials will take away today's need of manual disassembly of the product. This will streamline the recycling process and send a higher degree of the materials in the product to the correct disposal channel. The battery module must also be labelled in a clear way by which type of battery it is as the sorting of batteries often is manual.

The cushions and headband shall be separated from the rest of the modules and disposed in the general waste disposal channel which in Sweden mean energy recovery. These modules consist of textiles which today do not have any well-functioning recycling system (Flink, 2017). Moreover, textiles obstruct the material recovery in other disposal channels as the material tend to get stuck in other materials and send them to the wrong fraction. Therefore, these modules shall initially be sent to energy recovery but may in the future be sent to a textile recycling fraction.

## 6.2.6 Packaging

The packaging shall be made out of wood pulp based materials, be compressed and use little material. Wood pulp based material is today the most sustainable commercialised packaging material (Miljögiraff, 2017). Moreover, it enhances the sustainable experience and has possibilities to be branded in many different ways. It is also important to make the whole packaging in the same material in order to make it easier for the user to recycle it. The packaging shall aim to be maximum compressed in order to minimise transport footprint and use of materials.

## 6.3 Business Model

To make attractive modular headphones and extend overall product lifetime, the modules shall have different lifetime and offer different functionality. The editions shall be possible to update more often in order to satisfy user needs. Moreover, they shall offer different functionality in order to accommodate different type of usage. The electronic cores shall have long lifetime and create a platform standard.

### 6.3.1 Life length of Modules

The modules shall have different life length in order to prioritise and extend life of the most valuable modules and to create a compelling product for the user. The electronic cores shall have long life length as they both have the largest environmental and economic impact. They must be experienced to be timeless with no appearance tied to trends. Updates and repairs will occur, however these are kept to a minimum just in order to keep the electronic cores functioning and modern. Moreover, they must be prepared for the future in order to be secured for new user demands and headphone technologies.

The edition shall have a life length similar to today's headphones in order to create possibilities for the user to follow trends and get new functionality. This gives the editions the ability to be adaptable to the market and the users. Furthermore, Urbanears can keep and rationalise the strive to develop a better headphone experience with the user in centre. This makes it possible for the user to have adaptable headphones in a more sustainable way than before. The threshold to buy an edition rather than competing headphones will be lower as the editions will be a part of the already familiar modular system. With a faster consumption rate compared to the electronic cores, the editions shall make use of materials and be designed to be recycled in a good way.

Long life time on editions would extend material life length but restrict the possibility to adapt the headphones to the user needs. An edition with long lifetime could be made out of premium materials which gain patina over time and ties emotional linkage to the user. However, such edition has to be expensive and will not change appearance or functionality over time. The user is in focus for the Urbanears brand and to restrict it from updating appearance or function is not in the brand's interest. Also, a long lifetime of the edition will probably not extend the total lifetime of the product. Instead, it is a risk that the edition will be outdated and disposed prematurely. Because of this, a long lifetime of editions is ruled out as a way to accomplish a general long lifetime of the system and the most valuable materials.

### 6.3.2 User Benefit of Modularity

Adaptable headphones to the user's needs shall be the main user benefit. This is about giving the users a possibility to choose an edition with functionality that fit their needs.

The user can always keep the same set of quality electronic cores but change edition when adaption is needed. In this way, the user can always adapt the headphones to their life and new user situations. Finding an edition that fits a specific user's needs shall be made easy. A clear distinction between editions makes it obvious what situation they are meant for. This makes the choice of a new edition easy and straightforward when a new user situation appears.

The editions shall adapt to trends and come in different styles in order for the users to be able to personalise their style. This makes it easier and safer for the users to take part in a style context and express themselves. Moreover, the modular system and the possession of the electronic cores create a safety to try out new editions. This because the system shall communicate a consistent level of quality and create trust with the users. Furthermore, this creates possibilities to over time change and adapt style to life. This because the threshold of purchase is lowered for trustable editions compared to buying complete new non modular headphones.

The editions shall be a competitive product to existing non-modular headphones today but give a better user experience for less money. The editions include all functionality, appearance and ergonomics and shall therefore be experienced as comparable to existing headphones today. This implies that the users can get a better product experience for less money because of the separated electronics. The electronic cores will be more expensive to purchase. However, they are only bought once and will also ensure a good product experience for the user over a long period of time. The separated electronics also removes cost from the editions which therefore can be much cheaper. This is because the editions stand for a much lower production cost. This makes it possible for the user to get much better quality which assures a trustable product with a great product experience for an affordable price.

The modularisation implies possibilities for the users to easily maintain the headphones in a good condition. By including maintenance in the system, the threshold to look after, repair or update the headphones will get lowered for the users. This shall result in a continuous easily performed maintenance which ensures a much higher condition standard of the headphones. This shall give more satisfied users as the headphones always will work and be in good shape. This will also strengthen the Urbanears brand as it creates many touchpoints with the users and builds a customer trust. Moreover, this puts the users into a system which creates a lot of new service opportunities today and for the future.

# URBANEARS<sup>TM</sup>MODULAR

## **6.4 Final Concept**

Following section describes the final concept as it is supposed to be presented to potential customers. Name, slogan, arguments of user benefits together with description of functions are stated.

# UPDATABLE HEADPHONES

*MADE TO LAST*



# *MADE FOR YOU* **A PLATFORM SYSTEM**

A headphone platform, adaptable to your needs. With high-quality Electronic Cores and interchangeable Editions these headphones are made to last. Change Edition when you feel for a change and keep the Electronic Cores like that classic old vinyl. Something broken? Need to update? No worries, all parts are exchangeable.

# 1

**ELECTRONIC  
CORES**



# 2

**EDITION**



# ADAPTS WITH YOUR LIFE

## *FITS DIFFERENT SITUATIONS*

Different Editions for different situations. Sweat at the gym with Active or relax while traveling with Control. This way you can find the perfect Edition which fits your everyday life.





## LIFETIME

Made to last, these headphones are made for wear and tear. Keep the cores over time and update Editions when needed.



## UPDATABLE

Keep up with technology changes with the possibility to update electronics with a simple twist and pull.



## STYLE

Find a style to match your life or follow the latest headphone trends, but keep your familiar quality sound.



## MAINTAIN

Got stuck in the subway doors? Biked over your headphones? No problem, all parts are replaceable without the need of any tool.



## SOUND

High-quality Electronic Cores ensure a state of the art sound quality which lasts over time.



## HANDLING

Change Editions in seconds or fix your broken headphones easily, these headphones are made for you.



# URBAN

## THE CLASSIC EDITION

The timeless headphone Edition that goes with every outfit. A companion on your daily commute. Featuring a minimalistic design and a comfortable fit you want to bring wherever you go.

# PICK YOUR EDITION

## ACTIVE

### THE FEATHER-LIGHT EDITION

Light, washable and faster than ever - Active is made to endure the hardest workout. Easily remove and wash the cushions and headband after every workout and make this Edition good as new.

## CONTROL

### THE SOUNDPROOF EDITION

A comfortable fit and sound isolating experience makes Control the ideal choice for work and travel when feeling for some privacy.

# PARTNER IN CRIME

## *BUILT WITH QUALITY*

The Electronic Cores are created to last. Made out of durable and lightweight aluminium and with high quality electronics and speakers, they ensure a long lifetime. Each core is dividable into two modules with a speaker found on each side. On the right side sits the Amp which contains all the needed electronics for sound processing and wireless communication. On the left side sits the battery module.



# LIKE SWITCHING A *CAMERA LENS*

To open the headphones your hands are the only tool needed. All modules sit together with bayonet sockets, the same principle as used on a camera lens. Simply twist the ear cushion to access the Electronic Core. The same motion is used to detach the speaker from the Amp or the battery.



# KEEP UP WITH THE TECHNOLOGY

Technology evolves fast. Urbanears Modular makes it easy to keep up as it is possible to replace the Amp when new technology arrives. Just twist the Amp to take it out and replace it with a new in order to upgrade the technology with no need to buy complete new headphones.



*TWIST*  
**UPGRADE  
PLAY**

# MAINTAIN *YOUR EXPERIENCE*

Headphones are often brought everyday and everywhere and are really put to the test. When something eventually breaks, they often go in the trash. Urbanears modular are instead made for wear and tear. Parts of the headphones are exchangeable to make maintenance easy. Just detach the part which is broken and replace it with a new one or wash headband or cushions to make it feel like new.

REPAIR  
**CHANGE**  
**UPDATE**  
WASH



# FIND YOUR STYLE

Everybody feel for a change once in awhile. Editions makes it easy to change the appearance of Urbanears modular. When an Edition eventually is worn out or when the need comes for a new look, it is simple to switch to a new one and find a personal style. By keeping the Electronic Cores there is no need to buy additional electronics when updating your style.



# *PERFORMANCE* **SOUND**

Urbanears Modular's well defined high-quality speakers ensures a sound which lasts over time. An aluminium casing protects the speaker membrane and makes sure it stays intact. With the uncompromising sound, every Edition gives a great sound experience to the users.



# *UNCOMPROMISING* **QUALITY**



*FROM A*  
**BUSINESS MODEL  
PERSPECTIVE**



# LITTLE EFFORT TO **CHANGE**

All the Editions are developed to keep the environmental impact to a minimum. Materials are responsibly chosen to save resources and integrated electronics are kept to a minimum in order to improve recycling. This also lowers costs and makes it possible to offer the Editions at a lower price compared to complete new headphones. When the Electronic Cores are not used in an Edition, the cushions can be mounted directly on the structure frame for easy storage.



DETACHED FROM  
**ELECTRONICS**



## PREPARED FOR **FUTURE**

The Electronic Cores are designed for the future as the Amp will come in new versions in order to keep up with the technology change.

## **ONE SINGLE MODEL**

The Electronic Cores are developed to be produced in large scales in one single model to make production and the use of resources effective. This means that certification costs, subcontractors and lead times can be kept to a minimum.



# ENGINEERED FOR **CONTROL**

A high-quality sound driver is found inside the speaker module used in every Edition. The precise construction of the casing is designed with control of acoustics in mind, making the Urbanears Modular sound great. The Editions also affect the sound experience. Different amount of isolation and acoustic space modifies the sound in order to provide a great experience adapted for the activity. The same type of speaker sits on each side making sure only one model needs to be manufactured.





# NOTIFIES WHAT'S BROKEN

Urbanears modular application notifies and encourages users to take care of their headphones. The Electronic Cores detect if any problems occur and communicate it via the application.

# OFFERS INSTANT SOLUTION

The application directly gives a solution to the problem as it offers the possibility to order a new spare part, quick and easy. Since the part already is familiar, you know what you are getting. This lowers the threshold to maintain the headphones.



# DESIGNED FOR TODAY'S DISPOSAL SYSTEM

The modules of Urbanears Modular are each designed to fit today's waste treatment system in the best possible way. The different modules are sorted as different waste types in order to increase the amount of recovered materials. Each part consists of as pure materials as possible and is adopted for the individual waste type.



## ELECTRONICS RECYCLING

The structure frame, speaker and Amp consist of aluminium and ABS plastic which can be fully recycled in the electronics recycling.



## BATTERY RECYCLING

The battery is adopted to be recycled in the battery recycling.



## GENERAL WASTE

The headband and cushions are made out of bio-based textiles and ABS plastic in order to lower the environmental impact when thrown in the general waste.

# WE SHOW THE WAY

The Urbanears Modular application also informs users how to recycle the broken module at the same moment that a user buys a replacement module. This helps and guides users to sort each module in the correct waste type. This means that more of the headphone modules will end up in the right waste sorting.





### 6.4.1 Business

Urbanears Modular is meant to be sold both in stores and online. The editions shall be sold as separate packages which are interpreted as everything today's headphones offer. The electronic cores are meant to be sold as a start kit which users only buy once. This allows flexibility in the purchasing situation as one or more editions can be added to the electronic cores.

Spare parts are meant to be sold online only. This to limit the selection in stores and make the choices simple for the buyers as the application offers the needed spare part directly.

The Urbanears Modular business model includes several positive advantages for the company. By transforming the traditional model of sales into the platform system, a linkage to the users is developed. This mean that a user who already owns a pair of electronic cores, can be assumed to be more likely to buy a new edition when the need for new headphones appears.

The editions can be produced for a lower price compared to today's complete headphones and sold with a higher margin. This because the research shows that the largest part of the costs for headphones are the electronic parts and these are not included in the editions. The assumed low manufacturing cost on the editions opens up possibilities to have large markups on the editions while maintaining a reasonable sales price.

The electronic cores are produced in one variant which fits all different editions. However, they still fill the purpose of all the electronics used in different traditional headphones models today. Traditional electronics all have individual certification costs today (Linde, 2017). By only making one variant of electronic cores which fits all editions, only one single certification cost is needed. This will save both money and time for the company in development of new editions. Standardised modules would also imply a greater overview of all subcontractors as the same model will be produced in a much larger volume.

### 6.4.2 Environment

The main advantage of Urbanears Modular is an overall extended lifetime on the most environmental demanding parts. By facilitating for users to especially keep the electronics longer and use them in multiple editions, the impact over time will be lowered. Urbanears Modular allows users to maintain the headphones or change only the broken or outdated module instead of buying totally new headphones. This applies to the replacement of a broken part, the washing of a dirty wearing part or the upgrade to a new technology standard or function. This gives the users the possibility to keep the other still functioning modules. This also saves money for the users but especially mean that less resources are used which is beneficial for the environment.

Material choices are made to be both durable and have low environmental impact. The main idea is to use few clean materials which are recyclable in as large extent as possible. For all parts which can not be recycled, bio-based materials are chosen in order to limit the use of fossil resources. The bio-based textile Tencel(R) is chosen because it is efficient and has a circular production (Persson, 2017). It also has suitable properties

for cushions and headband. The plastics are made out of bio-based ABS in order to lower the impact on the environment but still stick to a good standard plastic.

Urbanears Modular's modules are designed to fit today's waste treatment system which makes all modules sort and recycle in best possible way. Moreover, the users are guided via the application to recycle the old module in right way. This creates an effective recycle process with no need for tools to disassemble the product. In this way as much material as possible is recycled and all hazardous substances are controlled with less effort than today.

The modularity of Urbanears Modular also gives the possibility to implement a takeback system in the future. This might be beneficial for especially more valuable electronic components regarding both environment and economics. In this way modules could be reused or better recycled in the future.

### 6.4.3 User

Urbanears Modular gives the user headphones which adapts to their life and are flexible compared to traditional headphones. The most prominent advantage is the possibility and flexibility to cover the functions of different headphones in one product system. In this way the users can find their perfect fit and type of edition which suits their active life.

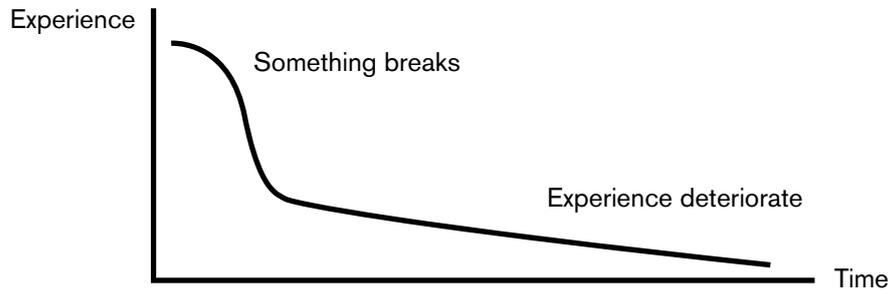
The prolonged length of life makes the headphones a valuable investment. The electronic cores are built to last longer than today's electronics usually do. This will make users keep their electronics longer which both save money and gives the users better quality headphones.

If something would break in Urbanears Modular, all modules are replaceable without the need of a tool. This makes it easy for users to individually take care of and maintain their headphones for continued use. Moreover, Urbanears Modular's wearing parts can be washed which mean the users always can keep their headphones fresh as new.

Urbanears modular allow users to upgrade the headphones when new technology arrives by replacing the amp. In this way the users can enjoy new technology for less money and also still keep their old favorite editions. By giving users this opportunity, use experience can increase over time (figure 23).

The electronic cores are made to last and therefore provides a great sound quality in every edition. This will make the users feel confident they get the same good listening experience no matter what edition they use in what context. This also mean users can buy a new edition which gives a great new experience for much less money than corresponding today's headphones would cost.

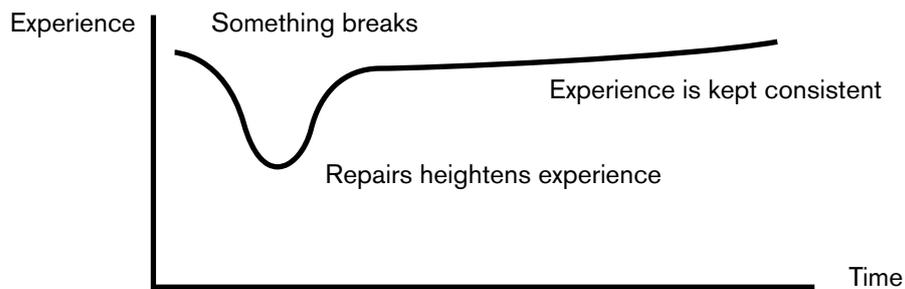
### Traditional headphone use



**Figure 23**

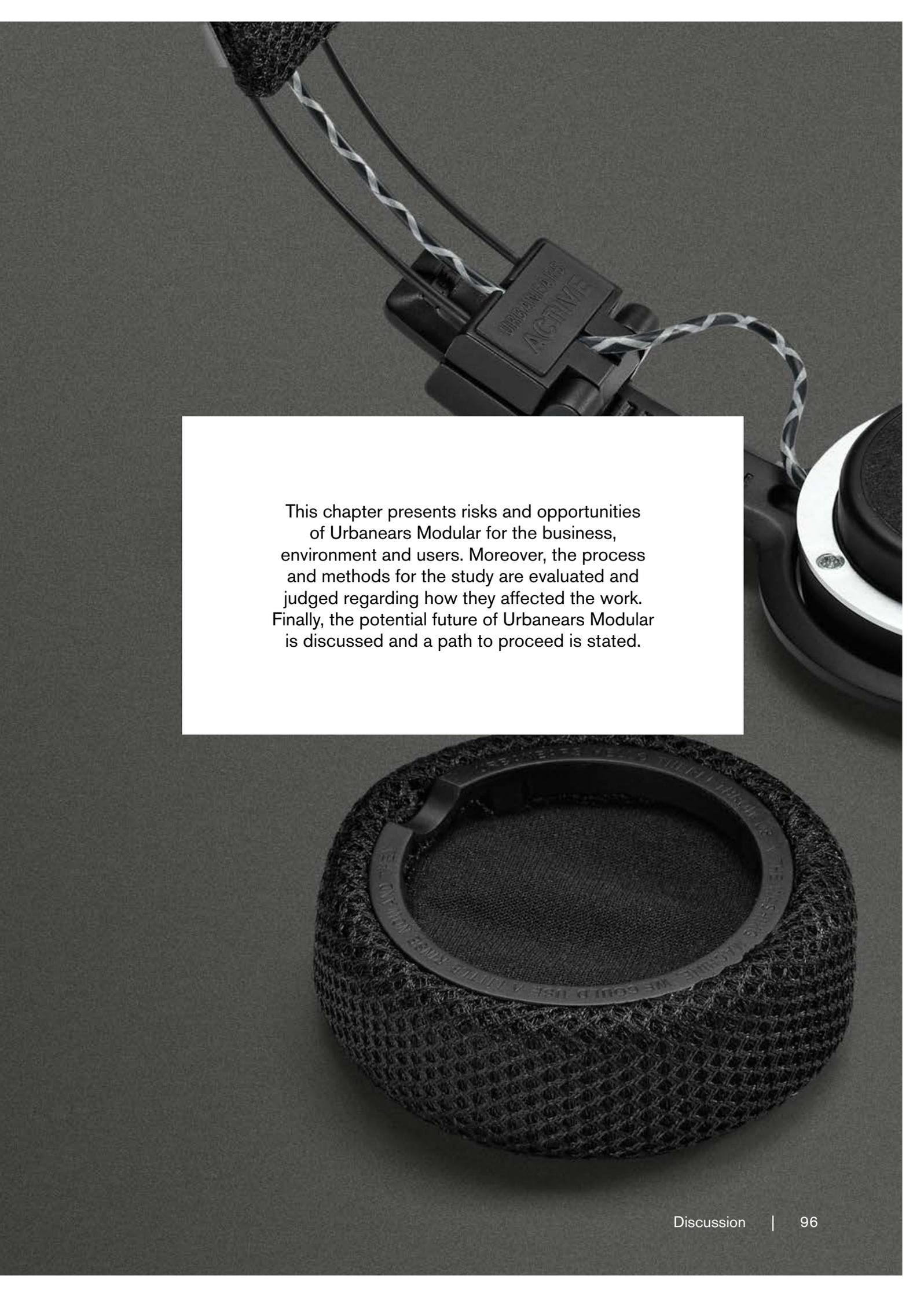
Experience curve of traditional headphone use compared to Urbanears Modular use

### Urbanears Modular use



# 07

## DISCUSSION



This chapter presents risks and opportunities of Urbanears Modular for the business, environment and users. Moreover, the process and methods for the study are evaluated and judged regarding how they affected the work. Finally, the potential future of Urbanears Modular is discussed and a path to proceed is stated.

## 7.1 Business

The modular system implies large initial costs for the company but has the potential of pay-back over time. The development and introduction of a modular system will mean large cost and the product's functionality will replace much of current product setup. The main costs will be related to the number of modular parts and the need of certification of each of them. Therefore, the number of parts has been kept at a minimum and must be kept so in order to keep cost lowest possible initially.

The system could set a standard for Urbanears headphones and work as a product platform. This implies only editions will have the same development pace as today's headphones. This will shorten development- and lead times and remove the need of many certification processes. Moreover, the editions will be much less complicated which implies a shorter and less resource-demanding development process. The electronic cores will also be produced in much higher volumes which gives possibility to push prices and gain control over subcontractors. This gives cheaper electronic parts and higher product performance. The vehicle industry is an example of companies working with platform based products. This should hence be a natural step to take for the headphone industry as well. Already today, there are some electronic parts which are shared between the products which vouch for success.

The step for a customer to buy into the system should be kept as low as possible in order to attract customers. It is a risk that Urbanears modular gets too expensive and excludes many potential customers. Because of this, the electronic cores shall have a lower margin as they are the most expensive parts to produce. However, the editions can have a higher margin as they are cheaper to produce but still are perceived as the actual headphones. In this way, the initially set price can be kept fairly low in order to attract customers into the system. A package deal with an edition plus electronic cores might be a way to do that. When the customer is in need of new headphones, the Urbanears Modular system is hence already familiar. The editions will then be perceived as a low-price alternative to new headphones. This will make the company earn more money through the higher margin on the second purchase of edition but will also keep customers to the system.

The modules which serve the repair modularity shall also have low margins as they are to be looked upon as a service which keep the users in the system. It is dangerous if users experience that the threshold to repair their headphones is larger than to buy new ones. Therefore, the threshold to repair must be kept low in order to keep user satisfaction and to strengthen the Urbanears brand.

There is a risk customers will not buy into the modular system if it is experienced uncertain how long it will exist. Therefore, it is important to communicate its resistance to new technology and trends as it can adapt to it. Moreover, to introduce the modular system and the electronics core in a serious way. The design of the electrical cores shall for example be timeless and minimalistic in order to survive trends. In this way trust can be gained by potential users.

In 10 years ahead the user demands of portable sound devices may look completely different. This parameter is unknown and hard to predict and deal with. This means the Urbanears Modular system must be prepared for the future. However, the size is limited to on/over-ear headphones and consequently some techniques may not be compatible. Furthermore, the modularisation is designed from today's, and upcoming, headphone techniques. It is hence a risk the modularisation of Urbanears Modular

will not be able to adapt to the future. However, the human ear is consistent which will keep the size of on/over-ear headphones consistent over time. Moreover, a driver need a certain space for the acoustics. Battery and PCB are already today possible to compress and will get smaller in the future. Because of all this, the Urbanears Modular platform should be fairly future proof as long as the future sound devices are going to sit on or over the ear.

The result consists of many parameters which can be implemented separately in an incremental process. This is a strength of the result as it can be used in many different ways to make headphones more sustainable. This because many of the areas are not dependent of each other. This makes it possible to implement the most relevant results first and then incrementally implement the rest.

## 7.2 Environment

The result of the project is an aspiration to create the most feasible sustainable headphone concept of present time. This has resulted in many compromises which have made the result less sustainable. However, the goal during the whole project was to actually develop headphones that could be produced today. This because many previous too ambitious and future oriented sustainable projects have failed. These failed mainly due to lack of compromises and the choice to always prioritize environment before business and users. Compromises taken in this project make hence both the weakness and strength of the result. The weakness is that the headphones will still have a considerable environmental impact. However, the strength is that the result is actually feasible today. The result shows it is possible to implement modular headphones today which will take a huge step in the sustainable direction. Moreover, the modularity prepares for rental models and take back systems. This makes the results stronger as it is a transition towards a more sustainable consumption model.

The approach towards modularisation and lifetime is optimised for the symbiosis of business, environment and users together but not for the environment in particular. This has implied a lot of compromises which not makes the result perfectly sustainable. The ultimate goal was always to extend lifetime on the most valuable components. This resulted for example in the decision to design the editions to have a similar lifetime as today's headphones. To extend the editions' lifetime would though be better for the environment. However, this could lead to that users will tire and stop using them because of the outdated appearance, functionality or ergonomics. Designing the editions for a shorter lifetime was consequently found to be the most sustainable choice. Another compromise was to design Urbanears Modular for the existing disposal system instead of a take-back system. This will be less sustainable and not guarantee recycling of materials. However, the market value of materials in headphones is today low and the investment to set up a sustainable take-back system is large and complex. Because of this, there are too few incitements to design for a take-back system of headphones today. Urbanears Modular is hence prepared but not designed for take-back.

The modularisation of Urbanears Modular implies increased logistics and need of packaging material due to a larger amount of products. This will demand larger supplies and initially more transported products. However, will logistics of repair modules replace today's logistics of totally new headphones. This because the users can replace only the broken module instead of the whole headphones. This decrease the volume and size of transported goods and use of packaging material. Moreover, a standard supply

can be kept for all parts in the electronic cores which can decrease the lead times in the logistics.

The material choice of bio-based plastics and textile can be questioned. This because the knowledge about it in the production industry and if it is commercialised have not been discovered fully. However, the ambition shall still be to use bio-based materials in the long run. If necessary, partly bio-based or recycled materials can however be chosen initially. In this way costs can be kept low meanwhile a pressure is created on material producers to develop bio-based materials. Moreover, the source of the bio-based material must be taken into account. A bio-based material is not sustainable just because it is made from biomass. It is about finding a sustainable production of the biomass in order to make it sustainable.

The materials and production of electronic components in the modules will be hard to make sustainable as they will be sourced from subcontractors. However, a continuous work must be established to always strive to put pressure on subcontractors to deliver more sustainable components. This is about putting effort in the sourcing work and establish clear environmental policies and demands which the subcontractors must follow. In this way focus can be put in sustainability which can drive the industry towards more sustainable material choices and productions methods.

The disposal of the Urbanears Modular modules will not be fully sustainable but will recover the most valuable materials. The modularisation and choice of materials have been optimised for the existing disposal processes. However, it is complex to design for all materials in the product to be material recovered. Therefore, a prioritisation was done to focus on the metals and the main plastic parts to be fully material recovered. This means that some plastics parts and all textile parts will end up in the general waste fraction. Bio-based materials was hence chosen in order to at least not use fossil sources. Finally, further development must focus to construct the product to break apart in the shredding process in a way which separates the materials. In this way a more efficient material recovery can be achieved.

## 7.3 User

There is a risk users will not make use of multiple editions with different functionality and use the same electronic cores to them. According to the user questionnaire, most people own two to three headphones. This was partly why three areas of functionality for editions were chosen. However, for some users all possessed headphones served the same user need. In these user cases are different edition functionality probably not wanted.

The procedure to switch the electronic cores between the editions is a potential frustration for the users. The risk is that users would not bother to switch edition, even though the usage would benefit. This is partly the reason to why there only are three clearly different types of editions in order to motivate the users to switch. However, the modularity also allows the users to construct their usage in different ways. A situation could be when a user would switch editions while preparing other equipments for an activity. This could be while preparing for sports or while packing bags for going traveling. In user situations when time is more limited as for example when commuting to work, the will to switch editions might be lower. Therefore, some users might be in

need of two set of electronic cores. However, would the main goal to extend lifetime of the products still be fulfilled for either cases.

It is important to make the repair modularity system really simple and fair with no hassle in order to get the users to replace modules. The price of modules must be accurately considered in order for the users to experience it as worth to invest in. If it is too expensive, the risk is that users leave the modular system and buy other headphones. Therefore, margins shall be kept lower than for the editions and the repair modularity shall be more looked upon as a service. In this way Urbanears can keep the users within the system and raise user satisfaction. Moreover, the repair procedure must be really easy and obvious with clear directive to the users. In this way the repair procedure will be a part of the product experience and probably will increase user satisfaction.

Urbanears Modular must be sold in a way which make users easily buy into the system. Therefore, it must probably have a distinguish display at retail shops in order to explain its unique selling point for the users. It is important to gain control over retail and work with clear planograms in order to explain the system. It is a risk users do not see the advantages of modularity. However, is Urbanears an established brand which has the capacity and power to work with special designed retail installations which can explain the system further. Moreover, the risk is that the product offer gets to cluttered with too many choices. It is therefore important to keep the offer really clear and make it most about the editions and the power of adaption in the system. The editions must be experienced as the actual headphones with all functionality, appearance and ergonomics. The electronic cores is something users buy ones which power the editions, therefore these must be experienced as something universal.

## 7.4 Process and Methods

The questionnaire was distributed through Facebook which can imply the answers are not credible. On Facebook, it was shared through the project group's accounts and through some targeted friends' accounts whom's friends are within the searched target group. The questionnaire got 232 answers which is good and the the age distribution and accommodation situation were overall good represented. However, people under 20 years old were not sufficiently covered. Despite that, the age representation cover the target group which suggests credibility.

The main study is done through interviews which may have given a geographical specific result. Only a limited amount of literature studies has been performed. This together, can imply that the result is mostly relevant to the Swedish market. However, the result can be considered to be trustworthy as it is a result from interviews with actors working in the industry. Moreover, many of these actors are global which makes the result more trustable. Zound industries acts on a global market and therefore should the information from them cover all markets. Moreover, the disposal processes have been researched from a global perspective and risks have been evaluated. This all together should make the result credible.

The result of phase one shows possibilities of modularity and can be used in many different ways and on other product categories. In phase two the result is about the best way to use the result of phase one for Urbanears. However, this is mainly a concept

in how to approach the result from phase one. Therefore, there are other ways to use same opportunities for Urbanears and especially other companies.

The process and all decisions during the whole project have been about keeping the project possible to implement today. This was a conscious decision in order to differentiate from many other sustainable projects which failed due to that they were not relevant at the present time. This is also what makes this result strong as it should be possible to use today. However, this approach has also lead to many compromises for the business, environment and users. Therefore, the result is not the optimal modular headphones in every aspect. However has the strive been to meet these needs in a realistic way in regard of today's premises.

The product concept is not optimal constructed but is a representation to illustrate how the product system may look like. The focus in the project has been much about the business case in order to create a modularisation which is attractive to the users. This is mainly due to that many previous modular development projects by other companies have been cancelled. Most of these were about modular phones and were instead really extensive and too complicated. Therefore, much focus has been spent to make Urbanears Modular clear and simple. This because it is about affecting the view users got on headphones. This has done that less effort has been put on the construction solutions of the headphones. Therefore, the level of detail in the product is low but good enough to represents the idea and illustrate the business case.

## **7.5 Future work**

To implement the Urbanears Modular, a product development work must be performed. The result of this study is a concept of a business case and modular headphones. However, it must be seen as material for development with guidelines and principles to follow. Therefore, a whole new product development process must basically be performed with different user tests to assure success.



# 08

## CONCLUSION



There are many opportunities for modularity for business, environment and users. Modularity gives business opportunities to standardize components, rationalize production and offer a broader product range with less product development work. Environmental impact can be lowered as a result of a decreased need of resources, better material use, rationalized disposal and repaired products. Users can get more value for their money with a better experience and a possibility to maintain and update the product.

The study shows the ultimate goal is to extend product lifetime in order to make headphones sustainable. This can be achieved through a business model and a product concept.

The business model is about adaptable functionality and sets the user first. It expresses the Urbanears brand and makes it possible for the user to update appearance, functionality and fit over time. Moreover, its purpose is to extend lifetime by offer maintenance and exchangeable parts.

The product concept Urbanears Modular is a platform for headphones which separates the main electronics from the headphones. This create the new modules called the electronic cores. In this way approximately 75 percent of both the environmental impact and the product cost is separated from the parts that are more exposed to wear and tear. The electronic cores fit into the headphone shells called editions, which contains the parts for appearance and fit. The electronic cores and the edition consist each of some modules that make it possible to maintain the headphones. This extends the total product lifetime, makes the concept adaptable to new demands and hence creates a concept that is prepared for the future.

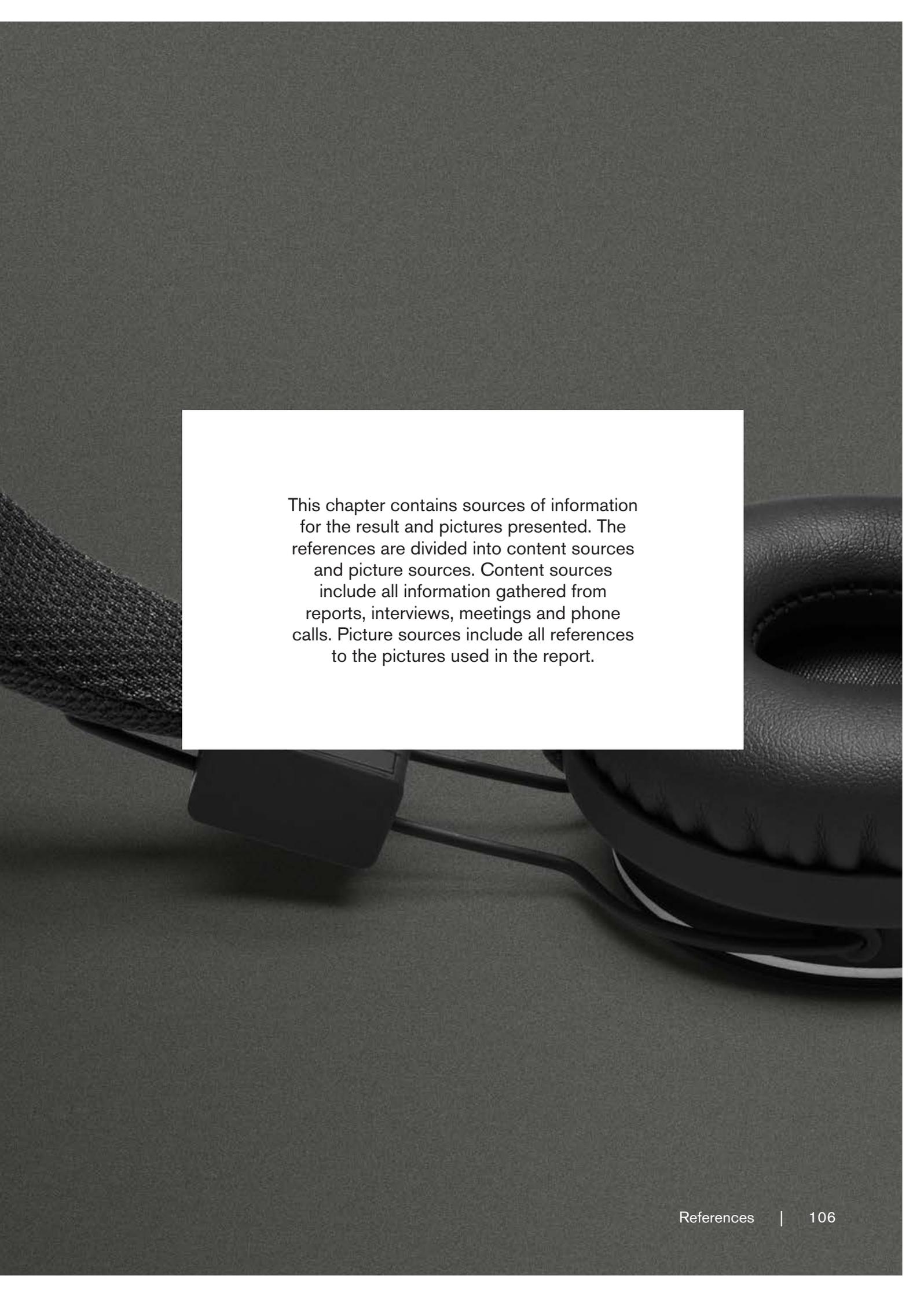
The results are made to work as a product development brief for further product development. Hence, the level of detail in the developed product concept is not high enough for product production. Further product development and user testing is needed to set the final product design. The concept is a new platform which demand a large investment from the company. However, the whole platform must not be released once and the products can be implemented gradually.

The business model and the product concept together show it is possible to implement modular headphones today. These headphones are not perfectly sustainable, but are a transition towards sustainable headphones. The result also includes guidelines and areas which not are exclusive to modularity and can be adapted to other consumer electronics.



# 09

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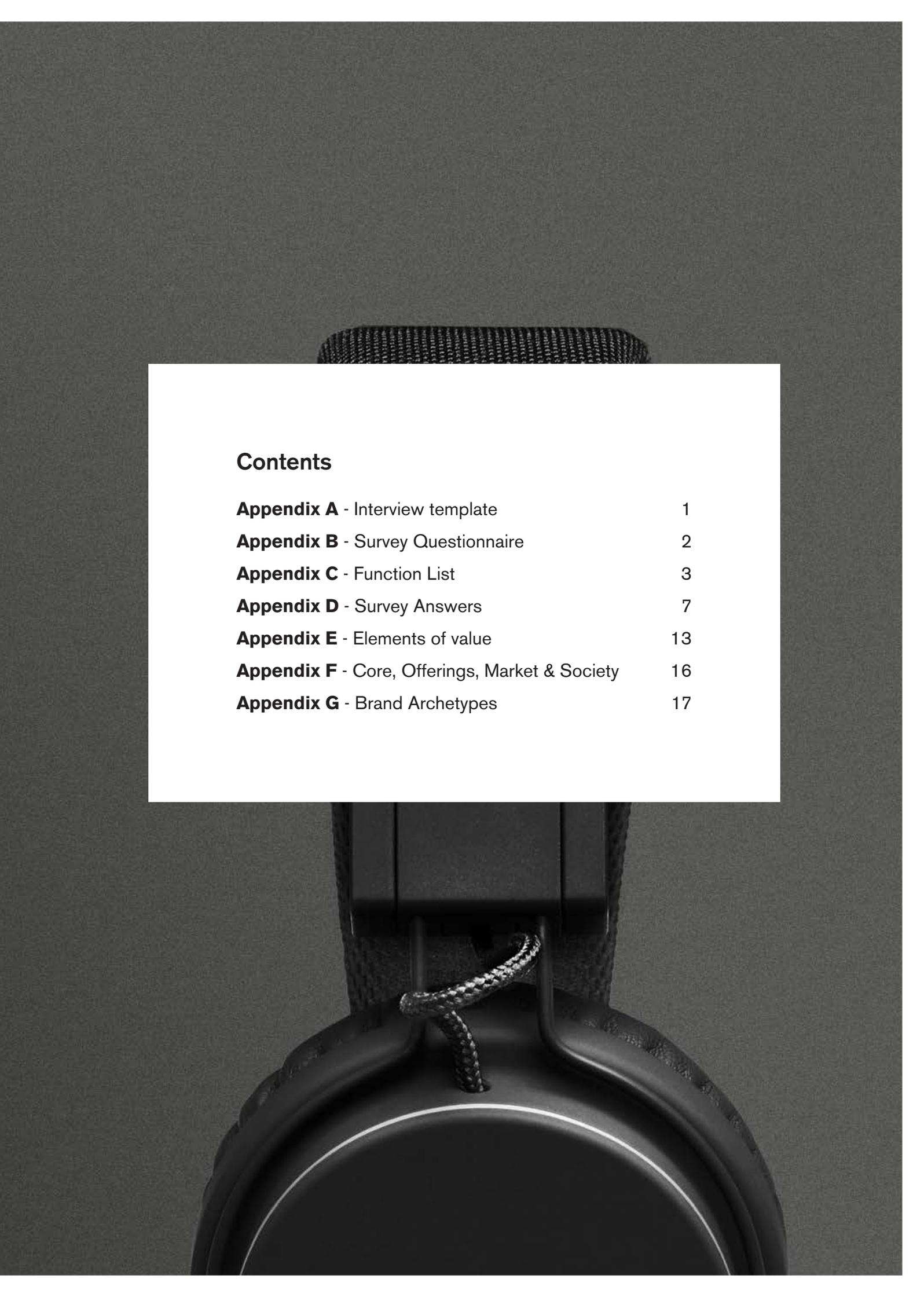
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# 10 APPENDIX



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## Appendix A - Interview template

The interview template consists of questions which were asked in the interviews with the employees at Zound Industries. The general questions were asked together with specific questions for every department. Presented below is an example of the questions asked to the retail department. A similar amount of questions at a similar depth were asked to every interviewed department.

### General Questions

- What is this department's area of responsibility?
- What values does Urbanears communicate according to you?
- Which people buy Urbanears?
- What is the company's general idea regarding sustainability?
- How could this department contribute to a more sustainable Zound Industries?

### Example questions asked to the retail department

- What product does the Retail department deliver?
- Do you send Planograms to vendors?
- Which stores get these?
- What is most important when it comes to Retail?
- What are the greatest challenges?
- Which demands do you put on vendors?
- How much can you control about where in the store the products are placed?
- How often are you out and collaborating with stores?
- Is there a limited space to use in a store?
- When is the full assortment of products shown and when not?
- How much do you work with customer psychology?
- How do you think retail can influence customers to do a sustainable choice?

## Appendix B - Survey Questionnaire

This appendix presents the questions used in the performed online survey which were used in the user study. The Urbanears specific questions were only asked for the respondents who owned or had owned headphones from the Urbanears brand.

- Age
- Housing arrangements
- How many headphones do you have?
- How many headphones of these have you purchased individually, ie not included in a package such as with your mobile subscription?
- What types of headphones do you have?
- Do you have headphones intended for sports?
- How often do you buy new headphones?
- What reasons have you previously had to buy new headphones?
- Where did you buy your latest headphones?
- What is important when you buy a new pair of headphones? [Mode / Style] [Audio] [Quality] [Price] [Fit] [Additional Features (eg washable parts, music sharing, etc.)] [Trademark] [Technology (eg Bluetooth, ANC, etc.)]
- How many headphones do you have at home which you never use?
- Do you know where to dispose your old headphones?
- In what places have you previously disposed your old headphones?
- Have you, have you had or would you like to buy an active speaker?
- How many active speakers do you have?
- What types of active speakers do you have?
- How often do you buy a new active speaker?
- What reasons have you previously had to buy a new active speaker?
- Where did you previously buy an active speaker?
- What is important when you buy a new active speaker? [Mode/Style] [Sound] [Quality] [Price] [Environment] [Additional Features (eg waterproof etc.)] [Trademark] [Technology (eg Bluetooth, etc.)]
- How many active speakers do you got at home which you never use?
- Do you know where to dispose old active speakers?
- In what places have you previously disposed your old active speakers?
- Have you owned or do you own any Urbanears headphones?
- Which were the main reasons of purchase for the Urbanears headphones?
- What is the latest Urbanears model you have purchased?
- Do you use these Urbanears headphones today?
- For what reasons did you stop using your recently purchased Urbanears headphones?
- For how long time did you use your previously purchased Urbanears headphones?
- Have you ever disassembled ear cushions and/or headband from your previously purchased Urbanears headphones in order to wash them?
- How useful do you think the function of washable ear cushions and/or headband is?
- How satisfied are you with your previously purchased Urbanears headphones?
- How satisfied are you with your previously purchased Urbanears headphones' features? [Mode/Style] [Audio] [Quality] [Price] [Fit] [Additional Features (eg washable parts, music sharing, etc.)]

## Appendix C - Function List

Below are the product- and branding goals presented. Product goals are categorised by the stakeholders: Business, Environment and Users. Desired product experience is also presented. Branding goals are divided into 'What We Want' and 'How to Achieve It'.

### Product Goals

#### Business

##### **Easy Assemble**

In production, the modules should be easy to assemble with minimum effort.

##### **Create High Volumes Modules**

Modules should be produced in large volumes to rationalise production, legislation and take control over subcontractors.

##### **Compatible with Standards**

The product should be possible to use with all main standards.

##### **Reduce Distributors**

Get closer to the customer via reducing number of distributors

##### **Prepare for Legislations**

The modules should be prepared for future environmental legislation.

##### **Prepare for Rental System**

The modules should be constructed so they will work in a future rental system.

##### **Prepare for Future Technology**

The product system should be made updatable in order to easily implement new technology.

##### **Update Users**

The system should update user on new products, news etc.

#### Environment

##### **Prepare for Limited Material Assets**

Use recycled materials or materials which not are limited.

##### **Limit Number of Materials**

Use few materials in each module in order to make each module as material pure as possible.

##### **Extend Lifetime of Valuable Components**

Design for long lifetime for components with high economical and environmental value which not is affected as much of the technical drive. These components are especially: drivers, mic, parts of PCB, and cable.

**Use Recyclable and Safe Materials**

Use materials which are recyclable and safe to use. Make sure to use as much recycled material as possible and construct the product so it holds for lower quality materials.

**Close Material Loop**

Use materials which support a circular loop of materials and create a system to achieve it.

**Easy to Recycle**

Design the product for disassembly and effective recycling in today's premises.

**Guide to Recycle**

Guide users in how to recycle the different types of modules.

**Easy to Repair**

Make it simple for users to acknowledge broken part and repair it. Make a logistic clever repair system which provide as good experience as possible with transport impact in mind.

**Easy to Keep Fresh**

Design the product to make it easy for the users to clean, wash and keep it fresh.

**Prepared for Take-Back System**

Design the modules and sort functionality after material and component value in order to prepare for a successive structuring of a take-back system.

**Create a Feedback System**

Design the system to handle and give users a good experience of claims, guarantee, fault reports etc.

**User****Enable Personalisation**

The product should enable personalisation in function or appearance in order to create emotional linkage between user and product.

**Enable Multifunctionality**

The product function should be adaptable in order to make it possible to use the product in different user situations.

**Self-Explaining Modules**

The module functions should be easy to understand and use.

**Human-Technology Interaction**

The interaction should be easy, obvious and adapted to users not interested in technology.

**Design Equal to Brand**

The product design should follow the brand image.

### **Updatable**

The product or modules should be possible to update.

### **Easy Function Transformation**

It should be easy to transform the product between different functions.

### **Easy Module Assemble**

The modules should be easy to assemble into a working product.

### **Meet Urbanears Product Requirements**

The product should meet requirements of sound quality, fit etc. used in previous Urbanears products.

### **Urbanears Packaging**

The packing should be self-explaining, straight forward and environmental friendly.

### Product experience

The product shall give the experience to have:

- Sound quality
- Comfortable fit with appropriate size and weight
- Quality construction
- Responsible disposal
- Easy access to media

The product shall give the experience to give:

- Confident of investment
- Emotional linkage to the product
- Inspiration
- Proudness

## **Branding Goals**

### What we want

#### **Stockholm Heritage**

Be true to the origin of Scandinavian/Stockholm, this has formed Urbanears.

#### **Urbanear Sustainable**

Communicate sustainability in a way which is coherent with the brand

#### **Create Trend**

Color 2.0, take the next step and do something like the colors but better.

#### **Easy to Buy Into**

The product system should be easy to understand and benefits with the system should be graspable.

#### **Loyal Users**

The product system should make users to desire to stay with the brand

**Urban People**

The headphones should be adopted for urban people and use

**Collaborations/Editions**

Modules should make it simpler to collaborate with different brands

How we can achieve it

Style

**Stay Fashion**

Maintain the fashion profile of Urbanears brand, the new fashion headphones

**Personalised**

Turn the headphones to your own

**Lifestyle**

A new headphone experience which fit different urban lifestyles

**Experience Music**

Make the brand associated with music, the whole artist playground etc.

Function

**Human Technology Interaction**

Makes technology regardless standards simpler and adjusted to the user with focus on the experience.

**Smart Functions**

Functionality built for the users and their need of the products.

**Adaptable**

Transforms to fit different user situations in the best way and therefore offer multifunctionality

Lifetime

**Long Lifetime**

The headphones should be kept alive, modules are changed but the soul keeps living

**Looks Better Over Time**

The product gather patina and history over time which makes it better looking, functionality is updated to be up to date.

**Stays Fresh and Functioning**

The headphones are able to be maintained and repaired in order to keep them up to date and fresh.

**Quality**

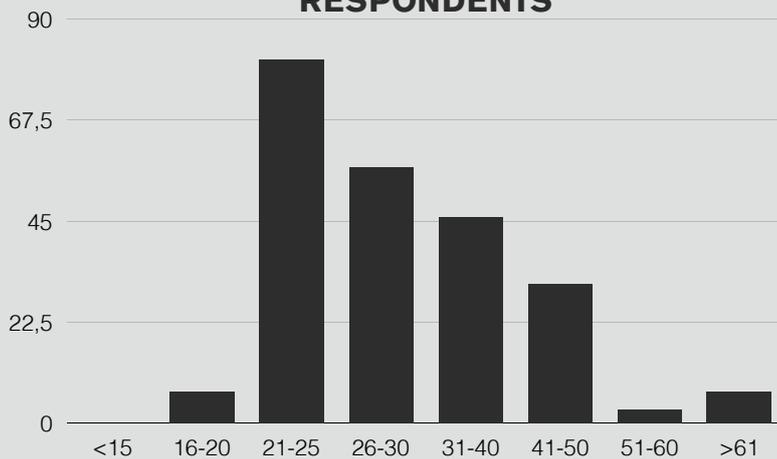
The quality and performance of the headphones is good.

# APPENDIX D

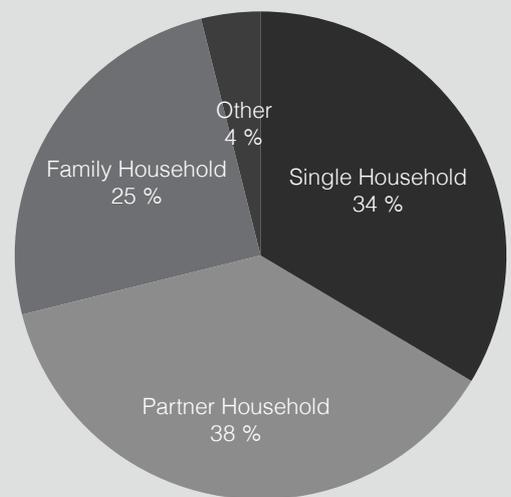
## SURVEY ANSWERS

**232**  
RESPONDENTS

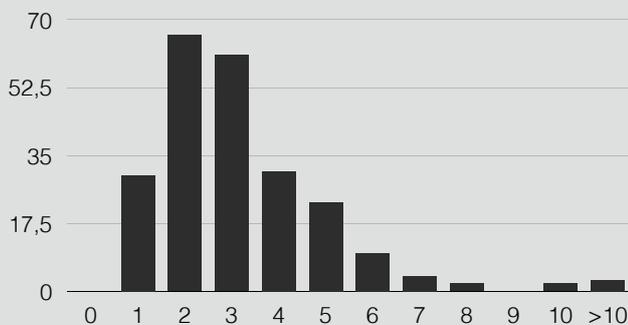
**DISTRIBUTION OF AGES FOR RESPONDENTS**



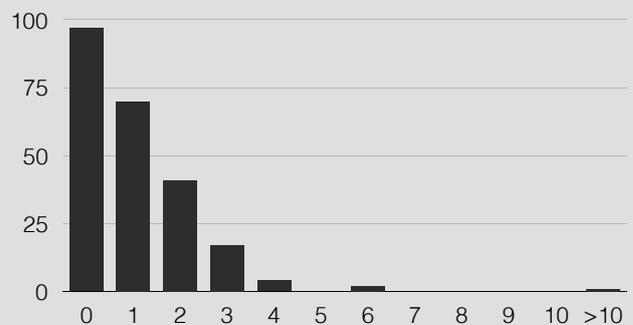
**LIVING SITUATION**



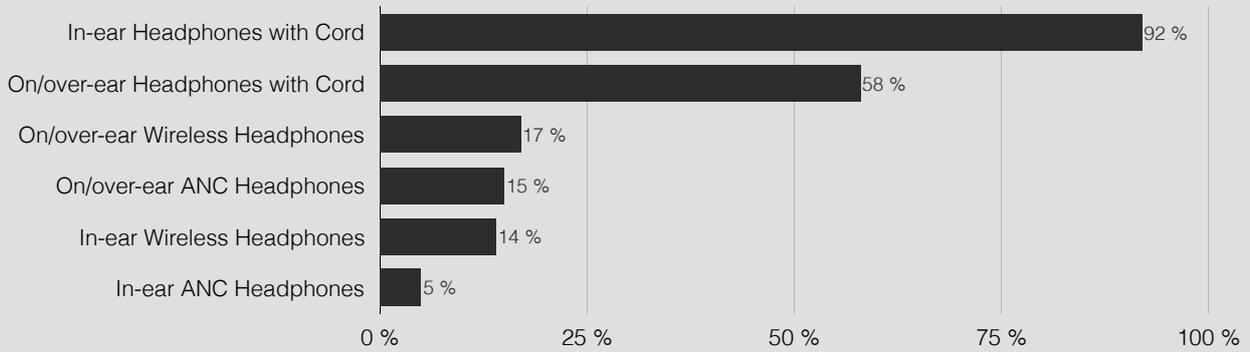
**NUMBER OWN HEADPHONES**



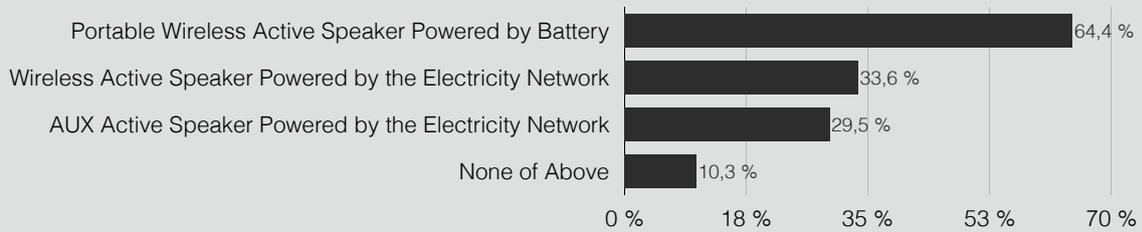
**NUMBER OWN ACTIVE SPEAKERS**



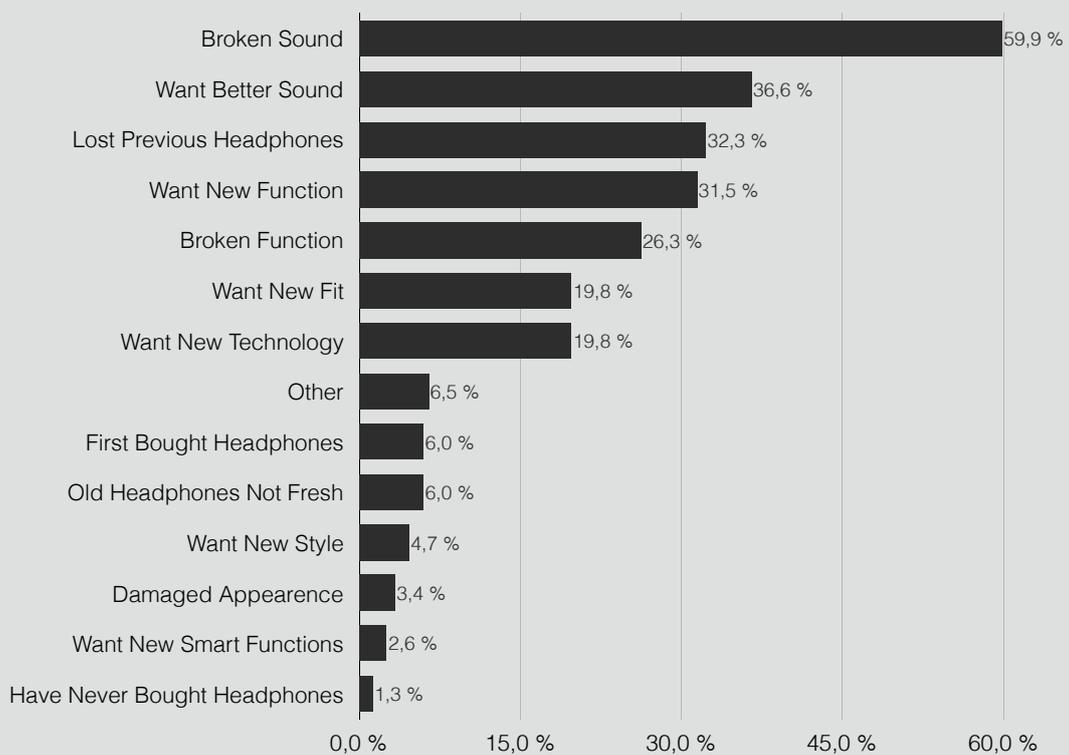
## SHARE OF USERS FOR DIFFERENT HEADPHONE TYPES



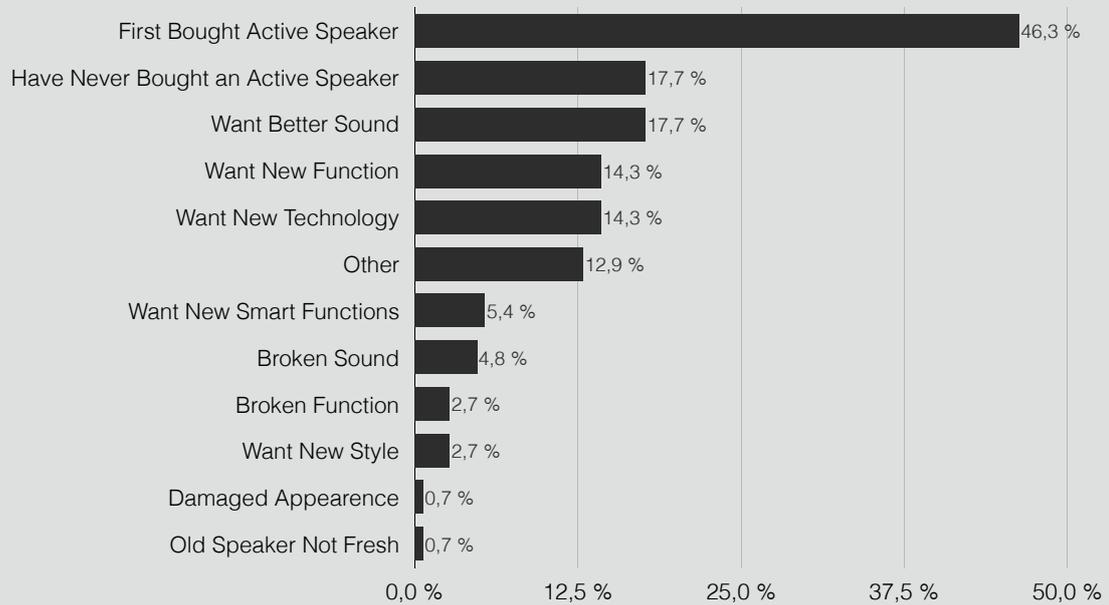
## SHARE OF USERS FOR DIFFERENT ACTIVE SPEAKER TYPES



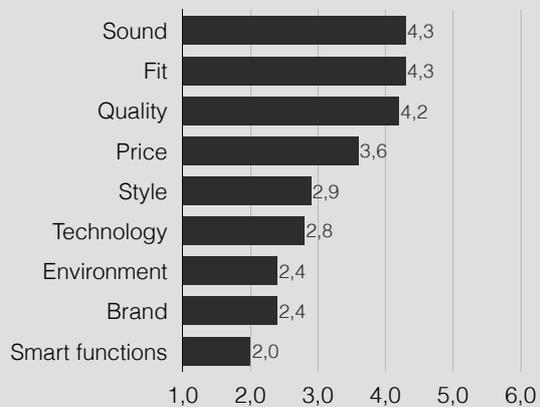
## REASON OF PURCHASE FOR HEADPHONES



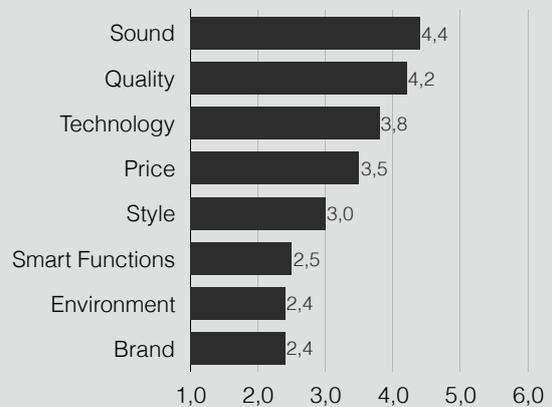
## REASON OF PURCHASE FOR ACTIVE SPEAKERS



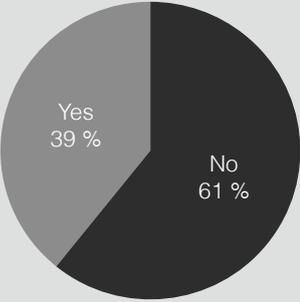
## MOST IMPORTANT ASPECTS AT PURCHASE OF HEADPHONES



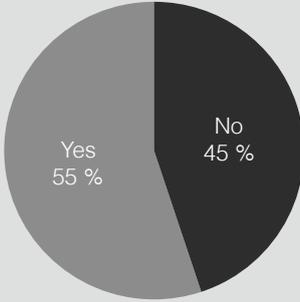
## MOST IMPORTANT ASPECTS AT PURCHASE OF ACTIVE SPEAKERS



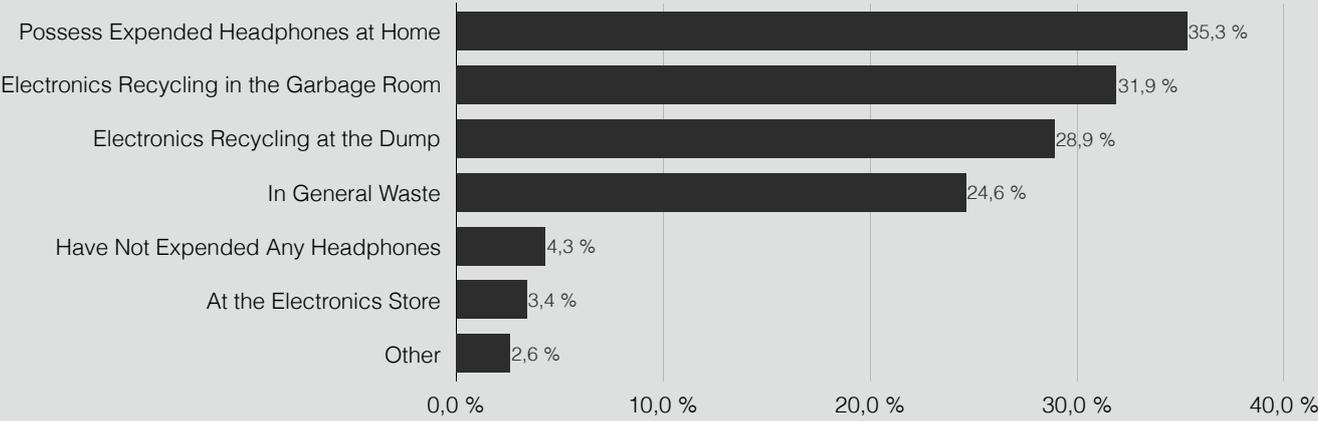
**KNOW WHERE TO DISPOSE OLD HEADPHONES**



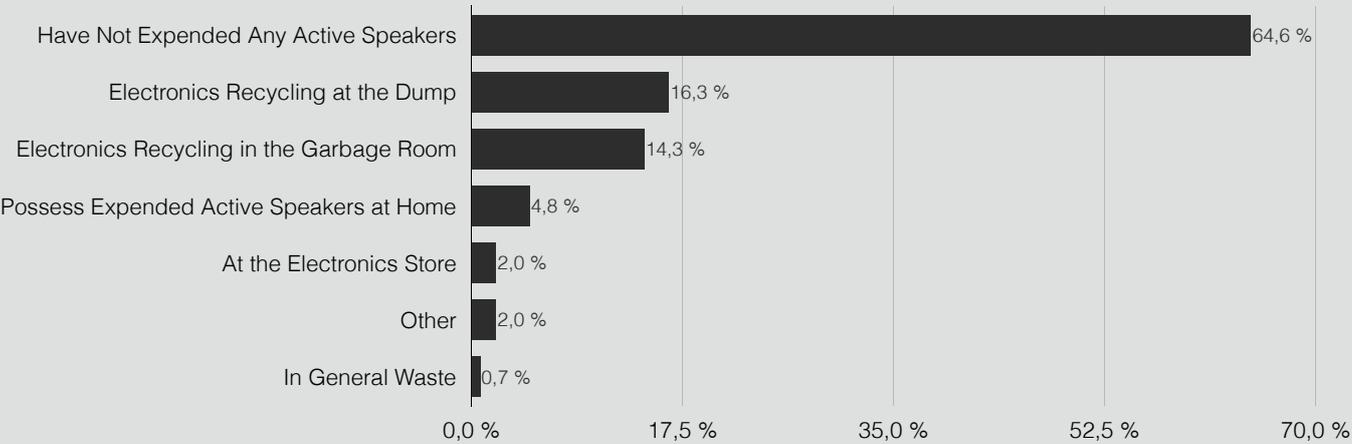
**KNOW WHERE TO DISPOSE OLD ACTIVE SPEAKERS**



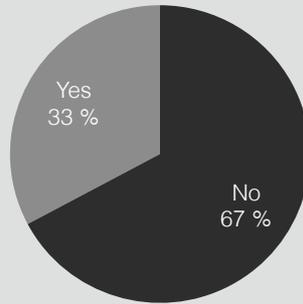
**PLACES OF DISPOSAL FOR HEADPHONES**



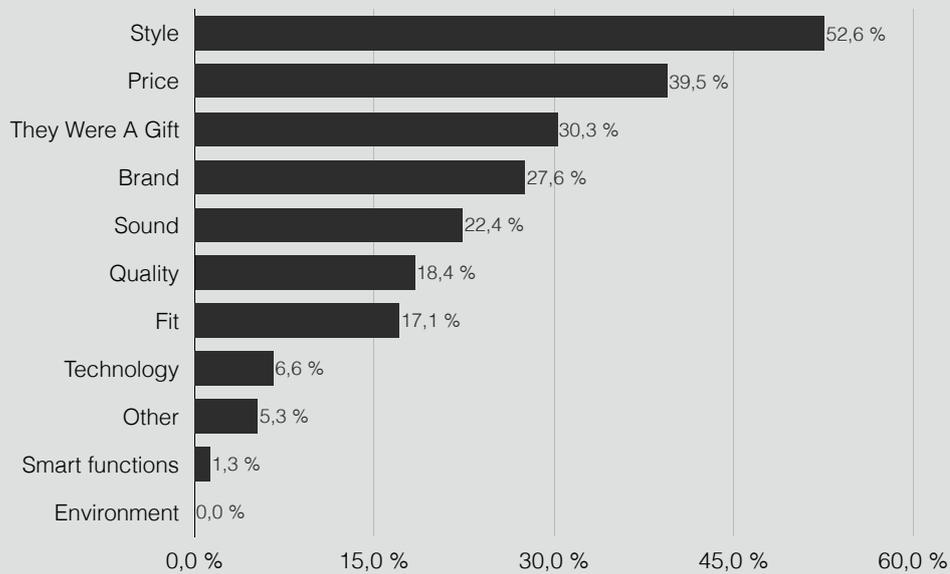
**PLACES OF DISPOSAL FOR ACTIVE SPEAKERS**



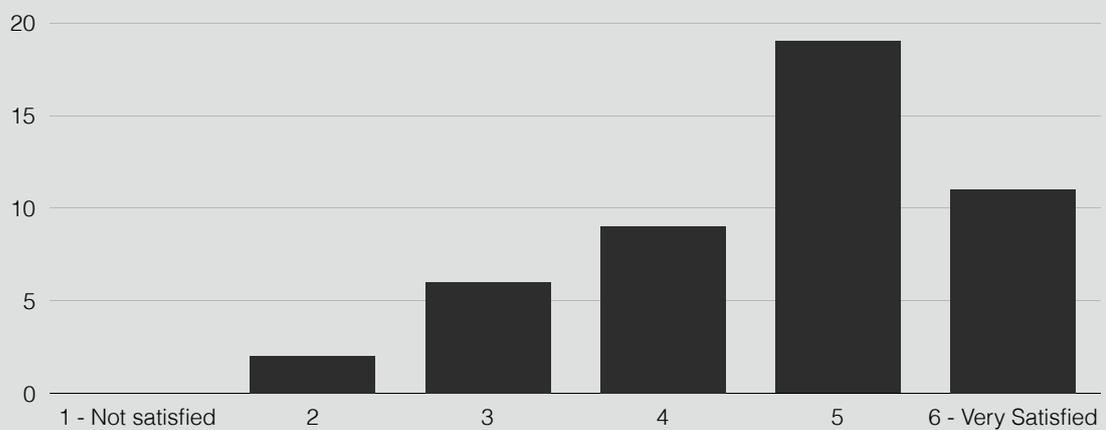
### OWN URBANEARS HEADPHONES



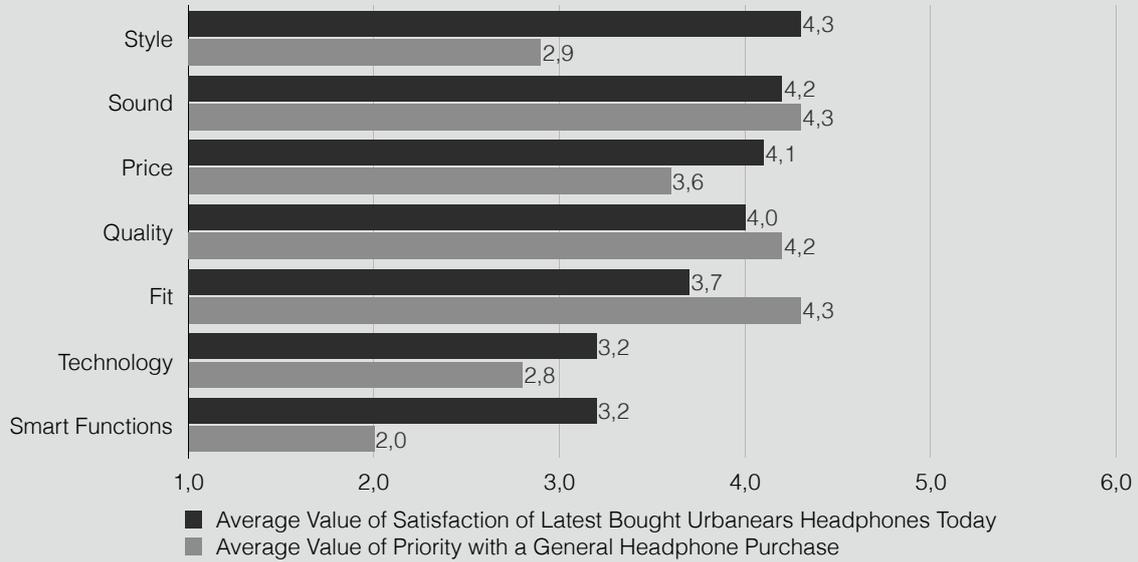
### REASON OF PURCHASE FOR URBANEARS HEADPHONES



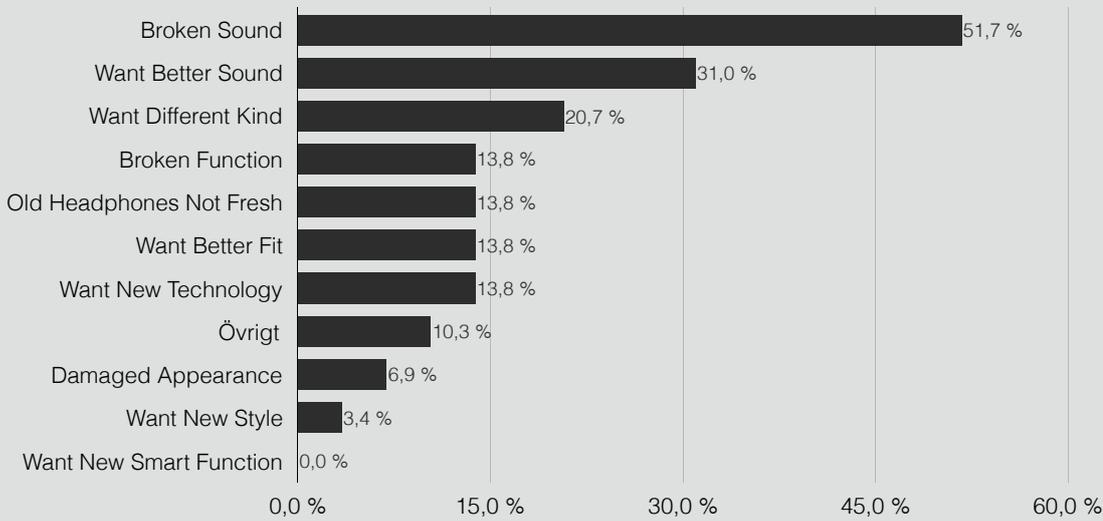
### SATISFACTION OF LAST BOUGHT URBANEARS HEADPHONES



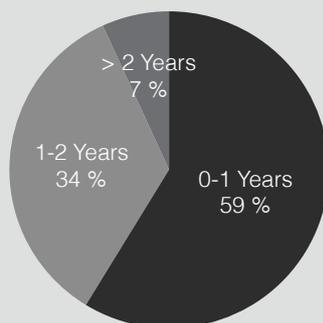
### SATISFACTION OF LAST BOUGHT URBANEARS HEADPHONES' PROPERTIES



### REASONS FOR END OF USE FOR LAST BOUGHT URBANEARS HEADPHONES



### USAGE TIME OF LAST BOUGHT URBANEARS HEADPHONES



## Appendix E - Elements of value

This Appendix consist of the result from the methodology Elements of Value. User needs are assessed from a general perspective and includes the categories: Functional, Emotional, Life Changing and Social Impact. The view of the brand today is presented followed by prioritised user needs for the development project.

### Urbanears today

#### **Reduces Effort**

Make it easier and more accessible to listen to music and handle the products.

#### **Avoid Hassles**

By adding smart functions with an easy human interface which makes technology easier to use.

#### **Variety**

Offers a large variety of colors and different models for different need.

#### **Sensory Appeal**

Provides audio that sounds good, works with design to attract the user and use tactile controls which creates natural interactions.

#### **Simplifies**

Always aims to make activities easier for the user and constantly works to improve the interaction.

#### **Integrates**

Integrates with smartphones and takes music providers such as spotify into the products.

#### **Connects**

Makes product which connects the users to music and digital platforms.

#### **Wellness**

Through sport segment

#### **Fun/Entertainment**

With colorful products and a humoristic branding

#### **Attractiveness**

By making fashion inspired products

#### **Provides Access**

Enables listening experiences wherever the user wants

#### **Nostalgia**

Analogies to radio use with manual controls

#### **Design/Aesthetics**

User centred and modern design is important in every product

**Badge Value**

The use of the products has the potential to be a colorful fashion statement

**Motivation**

The sports segment is motivating to activity. Speakers and headphones are made to motivate users to listen to music

**Affiliation/Belonging**

The trend of Urbanears products has created a feeling of belonging among the users

**Self-Actualisation**

The use can contribute to a feeling of being fashionable and fulfilling one's will to express themselves.

**Self-Transcendence**

To some extent Urbanears headphones are a sign of fashion and music together. It makes you take part in a social trend.

**Focus for the project**

Top priority

**Quality**

Increase quality for prolonged use and a better experience of both sound and material feel. This to create a stronger attachment to the user.

**Variety**

Offer variety in order to enable personalisation of the products to create emotional linkage or multifunctionality which makes it possible for the product to transform between different usage.

**Self-Actualisation**

By personalising the headphones they become a product which evolves with the user. It adjusts after the user's needs and enables a personal expression and a feeling of 'this is me'.

**Self-Transcendence**

To make users feel as a part of the new headphone fashion trend, colors 2.0 which is more about materials and the lifetime. To make users experience they step aside from the take-make-waste system and instead are a part of an environment caring brand.

**Badge Value**

To make users sympathise with the brand values. Create a feeling of being proud of the product.

**Simplifies**

Simplify every step of the user journey by smart user centred interaction solutions. Easy assembly and use of components.

**Reduces Effort**

Making the threshold to buy into the product system low. Reduce effort of maintenance and dispose of the product.

**Avoid Hassles**

Work with all main technology standards in order to avoid hassles for the user. To have an experience of fast and direct access to music and media.

Lower priority

**Design/Aesthetics**

Continuing the design language of Urbanears and developing it to communicate a desired expression.

**Provides Hope**

Create a green branding which is experienced as the future and rewarding to be a part of. To make users take care of the products and symbolise that to taking care of the environment.

**Integrates**

Integration with other devices should be easy and straightforward. The product should be perceived as modern and up to date in every way.

**Connects**

Connect users to media sources and to sound experiences.

**Attractiveness**

The product shall be attractive through both design, functionality and business value arguments to the user in order to create emotional values.

**Provides Access**

To provide access to media in different user situations.

**Motivation**

To motivate users to be fashionable, listen to media, to care for sustainability and take part of a new journey.

**Affiliation/Belonging**

To make users feel apart of something new, trendy and human which altogether is the sustainable future.

**Reduces Risks**

The modularity reduces risk for the user as parts can be replaced or repaired which secure a longer lifetime and therefore a potential to invest more money into the product.

## **Appendix F - Core, Offerings, Market & Society**

Appendix F presents an analysis of the Urbanears brand made with the Core, Offerings, Market and Society technique. This was used to analyse and develop the Urbanears brand.

### **Core**

Urbanears' brand is raised from the fashion world and strive to personalise style. Urbanears is for everyone and focus to be an easy brand to buy into. Moreover, Urbanears puts the user in front by centring on good user experience and bringing technology to users by making it more accessible.

### **Offerings**

Urbanears delivers fashionable products which allow personalisation and humanised technology interaction. Their products simplify everyday use with smart functions.

### **Market**

Sales are directed towards electronics stores and occasional fashion stores. Custom retail solutions such as podiums and signs are used at larger resellers. The website is used as an flagship store and showcases the brand and all the products.

### **Society**

Urbanears is represented on all main social media channels and focuses on lifestyle, events and new product launch. Lifestyle pictures are reposted from other accounts which show their products in user contexts and convey the human and fashion orientated brand. Pictures and videos are posted from events around the brand in order to show that the brand stays relevant and modern. New product launches are displayed with videos or pictures with a key pitch. Also, some pictures are related to music and artists. Finally, associations are made to holidays with themes of their products or video series with products displayed in different ways. Campaigns with product deals are sometimes displayed at especially the website, but also occasionally in other medias.

## Appendix G - Brand Archetype

This appendix presents an analysis of the brand made with the technique Brand Archetypes. It states how the brand has been communicated before and how it is done today.

Urbanears is today a mix between the innovative creator and the experience focused magician, but have its roots in the provocative rebel. It all started as a brand that wanted to do something completely new and redefined everything that headphones were about. Urbanears products stood out, showed that you cared about fashion and wanted to not only buy into a sound device but also be something more. Products were sold at special fashion stores together with cloths. As time past the brand grew bigger, the market turned and their headphones started to sell at ordinary electronic stores.

The brand is today rather a mix between a creator and a magician. Urbanears as a creator is about engaging in music listening and to make it easier to access and share it. Their products aim to simplify and have always some smart function which makes the use easier. Urbanears as a magician is about experience and personalisation. Everything around their products are made with the user experience in mind and the desire to influence people to listen to music. The brand has from the start been about colors and the personalised style is in the brand's DNA.



