Smartphone Repair in Denmark:

Informing Consumers on How to Handle Smartphone Defects

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ABSTRACT

We worked with Forbrugerrådet in Copenhagen, Denmark to advise Danish consumers on how to obtain a functional smartphone after experiencing smartphone defects. Interviews with Danish consumers to determine what information is important to them in choosing to repair or replace a defective smartphone revealed a desire to better understand consumer rights, warranties and repair costs. The findings were compiled to develop a guide to encourage consumers experiencing smartphone defects to seek repairs. The guide was published in *Forbrugerrådet Tænk* as a part of the organization's campaign for product durability and reparability.

EXECUTIVE SUMMARY

Electronic waste has become a pressing issue across the globe following the surge in the development of high-tech products beginning in the mid-20th century. Countries are being encouraged to implement sustainable and efficient methods of waste disposal. Denmark has mandated a municipal waste tax in attempts to lower the amount of waste being sent to landfills, but waste from the manufacturing process of products continues to negatively impact the environment. In regards to electronic waste specifically, the quantity of hazardous, rare, and valuable metals required to manufacture these products and meet performance demands has risen to as much as 60 different metals in complex electronics (Izatt, 2015). The mining, processing, and manufacturing of these metals result in various environmental and public health problems such as excessive water and energy expenditure, generation of waste materials, and release of chemicals and toxins (Izatt, 2015).

Forbrugerrådet, a non-profit organization that advocates for consumer rights, is interested in increasing the lifetime of electronic products in their recent campaign for product durability and reparability. Today's products, particularly electronics, are less repairable than in the past. In many cases, the cost of repair is higher than the cost of a replacement and the design of the electronics and a lack of available spare parts makes repairs costly and time-consuming (RREUSE, 2012). A survey conducted by Forbrugerrådet showed that only 23% of consumers were satisfied with their ability to repair electronics (Forbrugerrådet, 2015). This low statistic could be improved if consumers found the repair process cheaper and easier to navigate.

METHODOLOGY

The goal of our project was to assist Forbrugerrådet in their campaign for product durability and reparability by advising Danish consumers on the methods to obtain a functional smartphone after experiencing smartphone defects. To accomplish our goals, the following objectives were completed:

Objective #1. Determining the criteria used by consumers for purchasing smartphones.

The first step in making a guide for smartphone repairs was to determine the criteria Danish consumers use to purchase smartphones, which helped us understand what smartphone features are important to consumers. We conducted semi-structured interviews with Danish consumers, which included free-list questions about smartphone purchasing criteria.

Objective #2. Assess the current smartphone reparability process in Denmark.

We researched various aspects of the repair process for smartphones in Denmark. This research included determining the costs of numerous smartphone repairs from local repair shops in Denmark, as well as interviewing Danish consumers to better understand their smartphone repair experiences.

Objective #3. Develop a guide for Danish consumers on how to handle smartphone defects.

Finally, we constructed an informative guide for Danish citizens to streamline the reparability process of smartphones. Results obtained in semi-structured interviews were used to identify the weaknesses in the current reparability process. In addition, testimonials from Danish consumers who have experienced various smartphone defects provided advice to include within the guide. The guide also includes decision trees that consumers can use to determine the best action to take after experiencing a smartphone defect, such as to repair the defect, replace the

phone, or wait to replace the phone. Supplementary information about repair and replacement options, as well as extensive information about the repair process provided within the guide make seeking smartphone repairs easier for smartphone users.

RESULTS

The creation of the smartphone repair guide involved 15 interviews with Danish consumers, extensive background research on smartphones and smartphone defects, and collection of information about smartphone repairs in Denmark, such as price ranges for various defects.

Finding #1. The criteria Danish consumers use when purchasing smartphones:

1. Feature Functionality (Camera, Audio, Touchscreen, Keypad)
2. Functionality of Applications
3. Battery Life
4. Physical Preferences (Size, Color, Style)
5. Network Capability
6. Application Capability
7. Storage Capacity

After completing text analysis and coding on free-listed responses of smartphone purchasing criteria, salience indices were calculated. Physical preferences were shown to be the most frequently listed purchasing criteria.

Finding #2. Consumers need to be more informed on the rights they have through both the legal guarantee and various warranty options provided by the seller.

From our interviews with Danish consumers, we found consumers to be most confused about their rights under a legal guarantee and other warranties. When asked for advice to give to other consumers, the interviewees suggested that being knowledgeable about consumer rights and the product's defect is an effective way to make obtaining a repair or replacement simpler.

Finding #3. Consumers are concerned that the cost of repairing a defective smartphone is too expensive.

The cost of repairs hinders consumers from taking action to repair defective smartphones. To combat this issue, we included repair costs for smartphone defects within the guide. This information was gathered from extensive research of local repair shops.

Finding #4. Consumers will choose to wait to repair or replace their phone if they consider the defect to be minor.

This finding introduced a third option outside of repairing or replacing your smartphone, which is to wait until a later date to seek a replacement. As a result, this option was included as a final outcome in the smartphone defect decision trees. To counteract the negative aspects of using an old phone, information about how to optimize a phone while waiting for a replacement was provided within the guide.

Final Outcome.

A smartphone reparability guide was developed from these finding. The contents of the guide include decision trees for various smartphone defects, information about warranties, repair prices, and options when repairing or replacing your smartphone. After identifying the components necessary to include within the reparability guide, researching the various topics provided further insight. The main focus of the guide was the decision trees. These decision trees guide the user through a series of questions designed to determine the best action they can take to

resolve common smartphone defects or damages. Answering the questions in the decision tree will lead the user to one of three answers: repair phone, replace phone, or keep the phone and wait until a later date to repair, or replace it.

CONCLUSION

The purpose of this project was to provide consumers in Denmark with simple, easy-to-understand information about what actions to take when a smartphone is damaged, or defective. In order to accomplish this goal, information and data gathered from research and interviews with Danish consumers were used to construct a guide intended for consumers who are experiencing problems with their smartphone. Furthermore, supplemental information about how to recycle smartphones, how to avoid replacing a smartphone by optimizing their smartphone instead, and the benefits of buying used, or refurbished smartphones were added to the guide. Responses and feedback collected from testing the preliminary guide were then passed along to the marketing and design teams of Forbrugerrådet, who finalized the guide for publication. The guide "To Repair or Not to Repair: A Guide for Defective Smartphones" was ultimately published in *Forbrugerrådet Tænk.*

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CHAPTER 1: INTRODUCTION

Electronic waste has become a pressing issue across the globe following the surge in the development of high-tech products beginning in the mid-20th century. According to the international organization STEP, "electronic waste" is "a term used to cover items of all types of electrical and electronic equipment (EEE) and its parts that have been discarded by the owner as waste without the intention of re-use" (STEP, 2014). The amount of e-waste generated globally and per capita has steadily increased and the annual growth rate is estimated to be 4% to 5% (Baldé et al., 2015). In 2014, 41.8 million tons of e-waste was generated and estimated to contain 16,500 kilotons of iron, 1,900 kilotons of copper, and 300 tons of gold (Baldé et al., 2015). In addition to rare and valuable metals, EEE can also contain potentially toxic materials, including arsenic and mercury. Therefore, sustainable and responsible recycling and reclamation of material and components for reuse have become major issues globally from both environmental and economical perspectives (Tanskanen, 2013). The mining, processing, and manufacturing of these metals result in a variety of environmental and public health problems such as excessive water and energy expenditure, generation of waste materials, and release of harmful chemicals and toxins (Izatt, 2015).

Despite being the 24th smallest country in Europe, Denmark is forging the path for environmental sustainability (European Union, 2015). Denmark has dropped its carbon dioxide emissions by 22% since 1990 and has plans to become independent of fossil fuels by 2050 (Spongenberg, 2011). In efforts to decrease its carbon footprint, Denmark has implemented a variety of environmental reforms and waste management plans. The goals of these waste management plans focus on preventing pollution by restricting the use and waste of raw

materials, improving waste disposal techniques, and introducing cleaner technology (Hjelmar, 1996). One example of these policies is the Landfill Tax, implemented in 1987 to help reduce the amount of waste sent to landfills and incinerators and encouraging recycling (Fischer, 2012) by increasing disposal costs. Since 1985, Denmark has decreased its municipal solid waste to 3.5%, but with only 5.6 million citizens, Denmark still ranks high in terms of waste generation per capita. In 2014, it had the highest per capita e-waste generation in the world (Baldé et al., 2015).

Product repairs is one of the many methods to decrease the amount of municipal waste generated, and as such, is of interest to Denmark's sustainability efforts. By repairing defective or old products instead of buying new products to replace them, product waste is decreased, thereby reducing products' negative impact on the environment. When a product reaches the end of its life, there are various options that allow the recovery of its materials. Among these options is the ability to repair the product, which postpones the end of the product's life and diverts waste from landfills (Chidi Nnorom et al., 2007). While countries like Portugal, the United States, and France are implementing policies that help lower repair costs and putting in to effect additional policies such as the Hamon Law to ease the reparability process (Thill-Thayara, 2014), Denmark, the fifth greenest country in the world as of 2014 (Pantsios, 2014), is still providing its citizens with minimum coverage for product reparability.

In the case of smartphones, there are currently a variety of options for handling defects, but consumers are often uncertain about which method is best to obtain a functional smartphone. The options available to consumers include unauthorized or authorized repair shops, as well as replacing a phone with new, used, or refurbished phones. The optimal solution depends on many situational aspects such as affordability, functionality, and warranty coverage, which can make the decision process tedious and confusing. When dealing with smartphone defects, many

consumers lack clear guidance on what to consider when determining what action to take and how repair and replacement options differ in benefits.

Our project was to assist Forbrugerrådet in their campaign for product durability and reparability by advising Danish consumers on the methods to obtain a functional smartphone after experiencing smartphone defects. Forbrugerrådet was motivated by the possible implications reparability can have on product lifetime and the environment. In order to advise Danish consumers, decision trees were made for various smartphone defects. Decision trees visually demonstrate the decision making process of consumers and ultimately lead the consumer to a final suggested outcome based on their path through the tree. Interviews, which have proven to be useful methods in previous research about consumers and decision making, were conducted as part of the construction of the decision trees. Finally, we designed a guide on the methods of action to take to obtain a functional smartphone after experiencing smartphone defects. This guide was published in *Forbrugerrådet Tænk*, a consumer magazine.

CHAPTER 2: BACKGROUND

2.1 The Emerging Risk of the 21st Century - Electronic Waste

The mid-20th century saw the beginning of a surge in the development of new high-tech products and materials with special properties (Izatt, 2015). As time passed, new generations of electronics are developed and older electronics reach the end of their lives, eventually becoming electronic waste. The international organization STEP defines "electronic waste" (often abbreviated as "e-waste") as "a term used to cover items of all types of electrical and electronic equipment (EEE) and their parts that have been discarded by the owner as waste without the intention of re-use" (STEP, 2014). Electronic waste contributes significantly to waste in Europe, with an estimated potential loss in 1997 of 2.4 million tons of ferrous metals, 1.2 million tons of plastic, and 0.65 million tons of copper. Considering the substantial growth of the electronics industry in the last two decades, these numbers can be assumed to have grown significantly as well (Gupta, 2011).

The amount of e-waste being generated continues to grow, with the annual growth rate estimated to be 4% to 5% (Baldé et al., 2015). Table 1 below lists the annual amount of e-waste generated in million tons, population in billions, and kilograms of e-waste generated per inhabitant from 2010 through 2014 and forecasts for years 2015 through 2018. The steady increase in the quantity of e-waste has been driven by growing consumer demand for high tech devices as well as shorter life cycles of electrical and electronic equipment (Baldé et al., 2015). Consequently, the quantity of hazardous, rare, and valuable metals required to manufacture these products and meet performance demands has risen to as much as 60 different metals in complex

electronics (Izatt, 2015). The mining, processing, and manufacturing of these metals result in various environmental and public health problems such as excessive water and energy expenditure, generation of waste materials, and release of harmful chemicals and toxins (Izatt, 2015).

Table 1: Global Quantity of E-Waste Generated (Yuan Adapted from Baldé et al., 2015)

GLOBAL QUANTITY OF E-WASTE GENERATED			
Year	E-waste generated (Mt)	Population (billion)	E-waste generated (kg/inh.)
2010	33.8	6.8	5.0
2011	35.8	6.9	5.2
2012	37.8	6.9	5.4
2013	39.8	7.0	5.7
2014	41.8	7.1	5.9
2015	*43.8*	*7.2*	*6.1*
2016	*45.7*	*7.3*	*6.3*
2017	*47.8*	*7.4*	*6.5*
2018	*49.8*	*7.4*	*6.7*

Data 2015 onwards are forecast.

Note: Data from *The Global E-Waste Monitor – 2014* published by the United Nations University IAS.

Due to the steady increase in electronic waste, sustainable recycling and reclamation of material and components for reuse have become major issues globally from both environmental and economical perspectives (Tanskanen, 2013). In 2014, 41.8 million tons of e-waste was generated and estimated to contain 16,500 kilotons of iron, 1,900 kilotons of copper, and 300

tons of gold (Baldé et al., 2015). E-waste is often informally collected, which commonly leads to illegal exportation of harmful, non-renewable resources to China, West Africa, and India, where unsafe recycling practices are used. To combat this, the European Union has amended a directive focused on electronic waste in hopes of decreasing the waste from electronic equipment generated to 45% of production by 2016 (Friege et al., 2015). Some countries have also taken their own initiatives, such as Denmark, who has implemented one of the most successful electronic collection systems in the European Union.

2.1.1 Electronic Waste Generated By Cell Phones

Electronic waste generated from cell phone usage is an increasingly severe issue as more mobile phones are produced every year. On average, mobile phones have an average life cycle of two years, leading to a high turnover rate (Huisman et al., 2007). The quantity of smartphones, in particular, have grown at an amazingly fast pace, with the number of smartphones sold to end users rising dramatically from about 122 million units in 2007 to more than 1.4 billion units in 2015, seen in Figure 1 (Gartner, n.d.). With such a demand for mobile phones, especially for smartphones, the disposal of obsolete and end of life mobile phones have a growing non-negligible impact on the amount of e-waste generated annually. Compared to the older and more basic generations of cell phones, smartphones contain more metals and potentially hazardous materials (Izatt, 2015), yet only about 15% of phones are responsibly disposed (Zink et al., 2014).

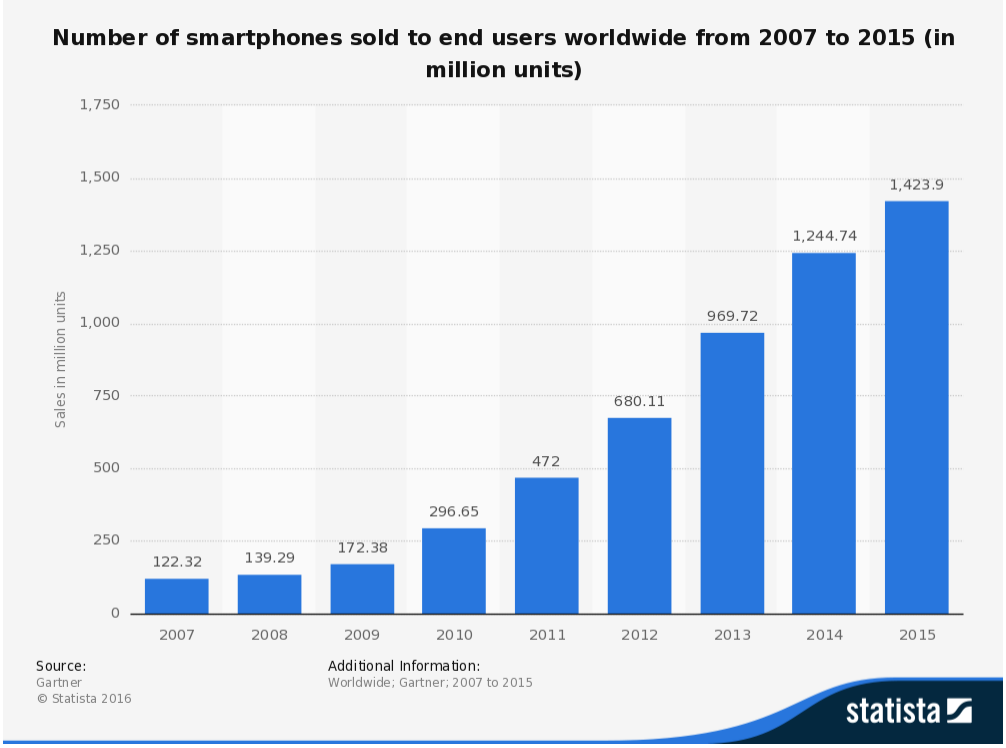

Figure 1: Number of Smartphones Sold to End Users Worldwide from 2007 to 2015 (Gartner, n.d.)

2.2 Improving Reparability as a Method of Decreasing Product Waste

By repairing defective or old products instead of buying new products to replace them, product waste is decreased, thereby reducing the products' negative impact on the environment. When a product reaches the end of its life, there are various options that allow the materials in the product to be recovered. Among these options is the repair of the product, which postpones the end of the product's life and diverts waste from landfills (Nnorom et al., 2007). Repairing a product also increases the value of all the materials and parts used in the product, as well as all resources used during the manufacturing process (Giudice et al., 2006). These evident environmental advantages help to reduce municipal solid waste, the mining of natural resources, and energy consumption (McCollough, 2010).

When an electronic device reaches the end of its life, the ideal method for recovery of materials and assets is to reuse the device, which involves the repair of a device to allow its use to be continued (Nnorom et al., 2007). Reusing a product coincides with the EU's Waste Electrical and Electronic Equipment Directive (*WEEE* Directive) hierarchy for end of life products. This hierarchy states that after the avoidance of waste, the reuse of parts, components, and materials should be prioritized. Once all of these have been attempted, landfilling may take place (European Union, 2008). Electronics pose major environmental threats, which make avoiding their disposal especially important and repair and reuse even more beneficial.

2.3 Legal Guarantees and their Impact on the Reparability Process

In 1999, the European Union released the "Directive 1999/44/EC of the European Parliament and of the Council." This Directive was designed to create a baseline for selling goods within the European market by setting the length of legal guarantees to a minimum of two years from the delivery date. Legal guarantees are defined as "any undertaking by a seller or producer to the consumer, given without extra charge, to reimburse the price paid or to replace, repair or handle consumer goods in any way if they do not meet the specifications set out in the guarantee statement or in the relevant advertising" (European Union, 1999). The Directive requires sellers to guarantee the conformity of products within a contract of two years. Under the European Union rules, a seller must repair, replace, or provide you with a full, or partial refund if the product you purchased was faulty, or did not work as advertised (European Commission, 2016).

Even though the Directive states that repairs are a remedy option in cases of product nonconformity, the provisions of the legal guarantee can affect the consumer's ability to obtain a product repair. According to the European Commission's report, *Consumer market study on the*

functioning of legal and commercial guarantees for consumers in the EU, consumers' low awareness and confusion about the seller's liability are problem areas that inhibit the consumer to execute their rights more efficiently when a seller redirects them to the manufacturer (Ipsos-London Economics-Deloitte consortium, 2015). The study indicated that a significant amount of respondents across all countries (between 10% in Malta and 49% in Spain) thought that both the seller and manufacturer have the legal obligation to address consumer claims (Ipsos-London Economics-Deloitte consortium, 2015). Additionally, a significant amount of consumers (between 3% of respondents in Slovakia to 34% in Italy) believed the manufacturer had the sole responsibility (Ipsos-London Economics-Deloitte consortium, 2015). In actuality, consumers are not able to make a claim against the manufacturer in several EU countries such as Denmark, Slovakia, and the United Kingdom. Across the other EU countries, consumers are able to make a claim against the seller and manufacturer, but never solely the manufacturer.

For product types other than clothing and footwear, free repairs are often the most common final outcome when customers contacted the seller about product problems (Ipsos-London Economics-Deloitte consortium, 2015). Even in cases where the customer wants a replacement rather than a repair, Article 3 of Section 3 in the Directive states that the seller may choose to repair and not replace in certain situations. A seller can refuse to replace if the cost of replacement compared to repair is disproportionate, there is no significant inconvenience to the customer if a repair was to be completed, and a repaired product would be as good as a new product (European Union, 1999). This situation is exemplified by a 2006 Norwegian Supreme Court case in which the purchaser demanded a new pair of boots as a replacement of boots that had one heel fall off after six weeks of purchase. The Court ruled that the cost of replacement to

the seller would be unreasonable and the seller was able to choose to repair instead of replace to compensate the purchaser (Jato AS v. Solbakken, 2006).

2.4 Denmark's Means To Be Green

Denmark, a small Scandinavian country with a population just over 5.6 million people, is leading the world in environmental sustainability. Following the 1973 oil crisis, Denmark, which was once 90% dependent on petroleum, shifted its focus to more sustainable energy (Walsh, 2009). Along with this shift came a plethora of environmental policy changes and waste management plans, which focused on preventing pollution by restricting use and waste of raw materials, improving waste disposal techniques, and introducing cleaner technology (Hjelmar, 1997). The Landfill Tax was implemented in Denmark in 1987 to help reduce the amount of waste sent to landfills and incinerators, as well as to encourage recycling. In 2010, the Landfill Tax was raised to 475 DKK per ton of waste, an increase of 435 DKK from the first implementation of the tax (Fischer, 2012). Since 1985, Denmark has decreased its municipal solid waste to 3.5%, one of the lowest shares in the European Union (Kreiser et al., 2012). Figure 2 illustrates the negative correlation between the landfilling tax and the amount of waste sent to landfills (Fischer, 2012).

Figure 2: Development of waste sent to landfills and landfill tax in Denmark

From 1985 to 2008, Denmark saw a 77% reduction in the amount of household waste sent to landfills (Kjær, 2013). By applying the Landfill Tax, individuals in Denmark were held responsible for the waste they produced each year. In addition to the various environmental policies, Denmark aims to be independent of fossil fuels by 2050, and will further this goal by eventually switching to all renewable energy. Not only does Denmark as a whole look towards increased sustainability, but Danish citizens are also willing to support the environmental effort. In a survey conducted by the European Commission, 86% of Danish consumers reported that they are willing to buy environmentally friendly products, putting them far ahead of most other European countries surveyed. Danes also hold a strong belief that individuals are responsible for environmental protection (European Commission, 2008).

This combination of personal responsibility and the willingness to support environmentally friendly products lays a strong groundwork for environmental changes in Denmark. Danish citizens' interest in sustainability provides an excellent basis for encouraging environmentally friendly actions, often resulting in significant improvements in the environment,

as seen from the Waste Management Plan. These environmental interests motivate the focus of this project on aiding in Forbrugerrådet's campaign on product durability and reparability of smartphones. An increase in the availability of spare parts and ease of electronic repairs has the ability to increase the lifetime and durability of electronics, and in turn limit the overuse of resources and waste (The European Consumer Organisation, 2015).

2.5 Issues in Denmark's Reparability Process

A circular economy was introduced to Europe in 2015 with the European Commission's Circular Economy Package. This package focused on eliminating waste through reuse and repair while also supporting local business by creating more jobs (Riisgaard et al., 2016). An example of circular economy can be shown in Figure 3. This figure also shows that recycling creates more energy than repairing. After recycling a phone, the phone still has to go through multiple steps before it can be used again. Because this package was introduced only one year ago, there is still a general focus on recycling rather than repairing in the European Union.

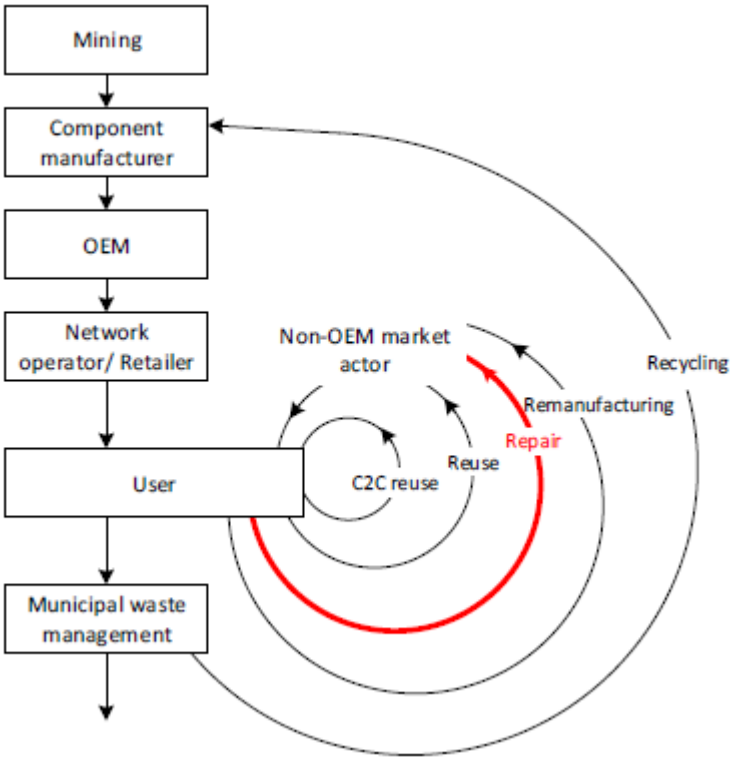

Figure 3: An example of a circular economy created by the Ellen MacArthur Foundation

Despite the continuing focus on recycling in many European countries, Denmark has seen an increase in the repairing of electronics. A significant increase can be seen in the number of repair shops since 2009, resulting in 80 new repair shops (Riisgaard et al., 2016). This shift due to time-consuming repairs from the retailer that frequently take up to three weeks. Even though repair shops often do not provide the consumer with a replacement phone, local repair shops are cheaper and faster than retailer, incentivizing consumers to seek out local repair shops to obtain functional smartphones instead retailers.

Moving towards a society focused on the durability and reparability of electronics is beneficial due to its likelihood to increase job opportunities throughout the product lifecycle, including the maintenance, repair, and reuse of the product (RREUSE, 2012). However, the reparability of a product is often times difficult from the perspective of a consumer. Today's

products, particularly electronics, are less repairable than in the past. In many cases, the cost of repair is higher than the cost of a replacement and the design of the electronic and lack of available spare parts makes repairs costly and time consuming (RREUSE, 2012). While 77% of consumers prefer to repair defective products rather than buy new ones (European Commission, 2012), a survey conducted by Forbrugerrådet showed that 44% of consumers chose not to repair defective washing machines because they assumed the repair would be too expensive (Forbrugerrådet, 2015). Overall, only 23% of consumers were satisfied with their ability to repair electronics (Forbrugerrådet, 2015). This low statistic could be improved if consumers found the repair process cheaper and easier to navigate.

The price of the repair, as well as inconvenience are main reasons why consumers do not chose to get their phone repaired, but instead chose to wait until they upgrade their phone (Forbrugerrådet, 2015). Making smartphone repair a simpler and more accessible process for Danish consumers could reduce the amount of smartphones that are disposed, reduce the demand for new smartphones, and decrease the amount of waste generated by the cellphone industry.

2.6 Reparability Laws in Various Countries Benefiting Consumers

Within recent years, countries around Europe have been implementing consumer-friendly policies in efforts to increase consumer satisfaction with product repairs and replacements. For example, Portugal has extended their burden of proof policy to two years, 18 months longer than the mandated European Union minimum. Other countries, such as France and the United States, have also created policies to give the consumer more rights during the repair process. The actions taken by these nations could provide useful insight about successful initiatives undertaken to improve product reparability.

2.6.1 Burden of Proof Extension - Portugal

The Consumer Rights Directive (2011/83/EC) states that a seller is liable for a product for two years after purchase (European Union, 2011). If the consumer notices a defect within the first six months of the delivery date, it is assumed that the product was delivered with that defect. The seller is then required to replace or repair the product based on the severity of the defect. However, after six months from the purchase date, the burden of proof is placed on the consumer, who now has the responsibility of proving that the product had a defect and did not conform to the legal guarantee on the delivery date (European Union, 1999). Despite this policy, Portugal has implemented an extended reversed burden of proof period, covering the entire two year legal guarantee period, in which the sellers have the responsibility of proving that the defect was not present at time of purchase. This extended burden of proof period may motivate producers to make longer-lasting products, as well as make repairs more feasible during the legal guarantee period (European Commission, 2012).

2.6.2 Hamon Law - France

There is no European-wide legal obligation to supply consumers with information about spare parts availability. However, France introduced the Hamon Law on March 17, 2014, which aimed to improve consumer protection and inform consumers on the availability of spare parts for domestic appliances and high-tech products (The Connexion, 2015). Sellers in France must provide consumers with information of the availability period of spare parts and the manufacturers must be able to provide spare parts to either sellers or repairers within two months, given the availability has not run out (Official Journal of the French Republic, 2014). According to The Connexion, France's English-Language Newspaper (2015), the information regarding spare parts availability is most commonly displayed in product labels on the item and

the purchase receipt, but could also be seen on the shelf. This law has the potential to decrease the amount of defective products being thrown away by allowing consumers to gain insight on the ease of reparability for the products they purchase.

2.6.3 Right to Repair Act - Massachusetts, United States

Providing consumers with more affordable repair costs is a vital improvement that could be applied to Denmark's reparability process. The Motor Vehicle Owner's Right to Repair Act, more commonly referred to as Right to Repair, was introduced in Massachusetts in 2012 and allowed automobile owners to have the ability to choose the automobile service center for their vehicle repairs. Ray Magliozzi, co-host of a National Public Radio show, described the new legislation as an act that "protects consumer choice and levels the playing field for independent repair shop" ("Mass. Repairers", 2012, para. 4). He also stated that without this law, "many repairers do not have access to the information and the customer pays big for that disadvantage" ("Mass. Repairers", 2012, para. 4).

2.6.4 California Civil Code 1793.03 - California, United States

The United States of America does not mandate warranties under federal law. However, sellers and manufacturers have the option to implement warranties on their products. Federal law requires that if a warranty is provided to the consumer, detailed descriptions of the warranty coverage need to be provided to the consumer with purchase (The Federal Trade Commission, 2001). Despite a lack of federal law for warranties, California enacted Civil Code 1793.03 to increase consumer warranty coverage after a purchase of an electronic or appliance. This code mandated that service and repair facilities should be provided with sufficient service literature and functional parts for the repair of a product with a wholesale price greater than $50.00 and

less than $100.00 for at least three years after the date of manufacturing, regardless of the warranty period (Official California Legislative Information, 2016). This code also made this service available for at least seven years after the date of manufacturing for products greater than $100.00.

2.7 Summary

Electronic waste is a global issue, pressing countries to develop more efficient and sustainable methods of disposal for electronic products. While Denmark has implemented a municipal waste tax, waste from the manufacturing process of products is continuing to negatively impact the environment. Andrew King, from the University of Bristol, described an idea coined by Matthew Meadows about the total waste produced in the life cycle of a product in the following quote taken from *Reducing Waste: Repair, Recondition, Remanufacture, or Recycle?:* "One rule of thumb cited is that every ton of consumer waste has also generated 5 tons of manufacturing waste and 20 tons of resource extraction waste" (King, 2006). Rather than improving recycling methods for electronic products, repairing and remanufacturing defective electronics are more environmentally friendly solutions to combat the issue of electronic waste. The reuse of mobile devices helps limit the overuse of raw materials by increasing the lifetimes of the products. Forbrugerrådet, an independent, not-for-profit organization established to advocate for the rights of Danish consumers, is interested in a guide for Danish consumers to improve the overall repair process for smartphones.

CHAPTER 3: METHODOLOGY

The goal of our project is to assist Forbrugerrådet in their campaign for product durability and reparability by advising Danish consumers on the methods to obtain a functional smartphone after experiencing smartphone defects. We completed this task by determining the criteria used by consumers for purchasing smartphones, understanding the current reparability process in Denmark, and developing a guide for Danish consumers on how to handle various smartphone defects. To accomplish our goals, the following objectives were completed (Figure 4):

1. Determine the criteria used by consumers for purchasing smartphones,
2. Assess the current smartphone reparability process in Denmark, and
3. Develop a guide for Danish consumers on how to handle smartphone defects.

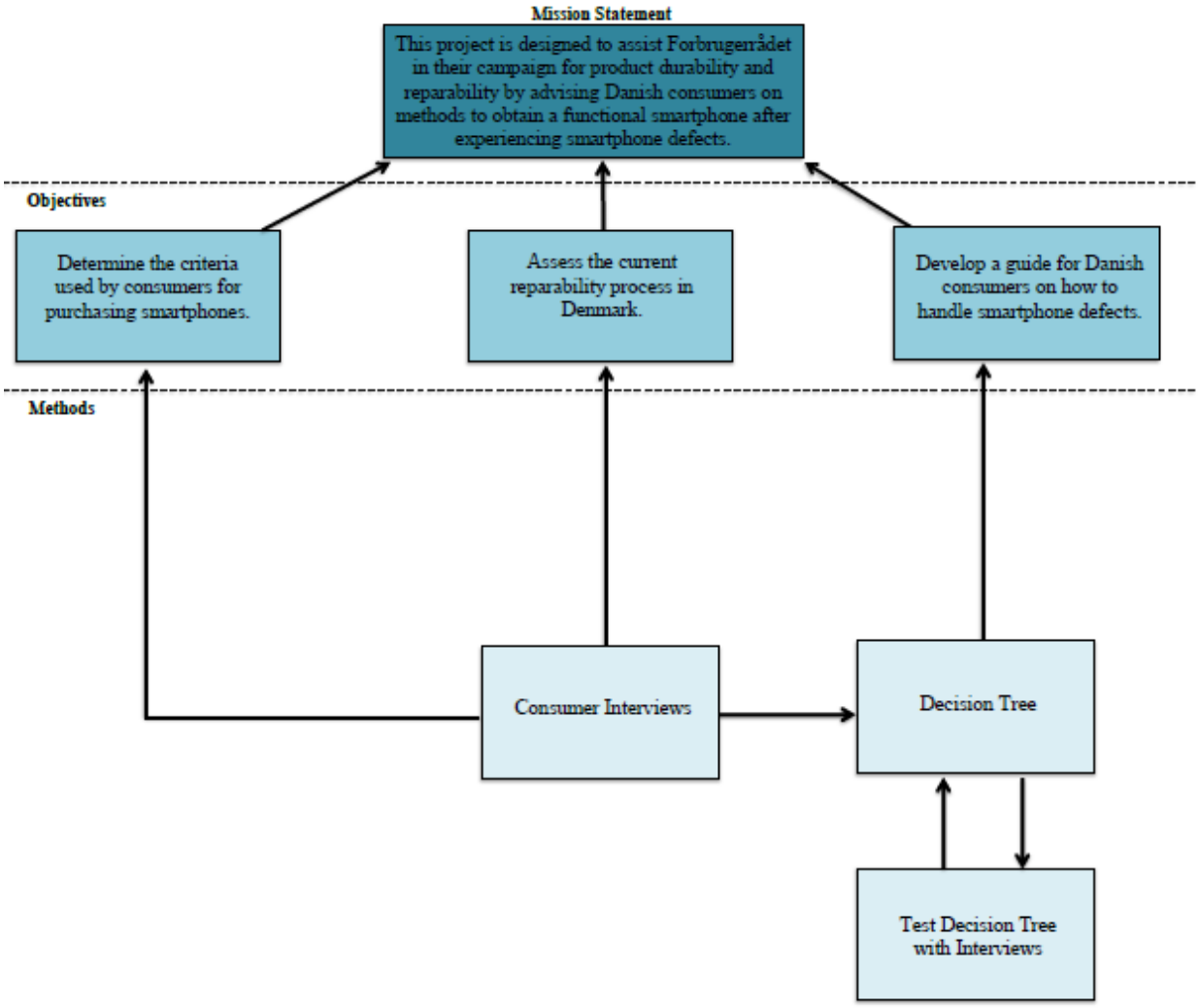

Figure 4: Overview of Mission Statement, Objectives, and Methodology (Yuan, 2016)

3.1 Objective #1. Determine the criteria used by consumers for purchasing smartphones.

Prior to developing a guide for Danish consumers on smartphone reparability, it was useful to understand the criteria used by Danish consumers for purchasing smartphones. Determining the criteria Danish consumers use to purchase smartphones helped us to understand the features of a smartphone that are important to consumers. The method we used to gain knowledge on consumer purchasing criteria was semi-structured interviews with Danish consumers. Although the purchasing criteria listed by our respondents varied, general themes

were extracted from responses, along with other criteria gathered from online sources, including an online guide for purchasing smartphones (Spoonauer, 2015) and an online resource for technical support (A Tech Journey, 2015). The identified themes are listed below in Table 2.

Table 2: Danish Consumer Interview Text Analysis Themes (McHugh, 2016)

Themes
Feature Functionality (Camera, Audio, Touch Screen, Keypad)
Functionality of Applications
Battery Life
Physical Preferences (Size, Color, Style)
Network Capability
Application Capability
Storage Capacity

3.1.1 Semi-structured interviews with Danish consumers

The individual interviews were conducted with Danish consumers to help understand the criteria used when purchasing smartphones. We asked interview subjects to list the criteria they use when purchasing smartphones and recorded the responses using a Google form. The interviews were completed using a semi-structured format, allowing for flexibility of questions and clarifications when necessary. Free-listing questions were used to gather important smartphone purchasing criteria from consumers. These types of interview questions permit the interviewee to not only answer our questions in detailed responses but also introduce new ideas and thoughts. A benefit of using free-listing is the rapidness and simplicity of the method and it allows the results to be quantifiable (Quinlan, 2005). An issue that occurred when using free-

listing as a method of collecting data was that some free-lists were very short, only amounting to two or three criteria. This issue is commonly seen when free-listing because interviewees oftentimes forget to list criteria or intentionally omit them (Quinlan, 2005).

We aimed to interview a convenience sample of 26 Danes (Guest et al., 2006), recruited through contacts of Forbrugerrådet. However, due to a language barrier and a holiday during our interview period, only five Danish citizens were available to interview. The interview questions can be seen in Appendix A. We recorded the responses on a Google form through paraphrasing, quoting, and categorizing. Interviews were conducted by two people. One took notes, while the other led the interview. This removed the burden of note-taking on the interviewer, helping him or her to focus more easily on extracting the necessary information. To ensure accuracy of notes taken during interviews, we also audio recorded the interviews with the interviewees' permission and transcribed the interviews. The transcribed interviews can be seen in Appendix B.

3.1.2 Text analysis of semi-structured interviews with Danish consumers

The data collected from semi-structured interviews were transcribed verbatim and coded using a single coder. Coding is a method of text analysis in which a coding scheme is developed and tested for intercoder reliability, or agreement between different coders (Campbell et al., 2013, 299). The initial coding scheme was completed, consisting of seven categories and four subcategories (Table 3).

Table 3: Initial Codes Established for Text Analysis (McHugh, 2016)

Initial Codes	Definitions
● Feature Functionality ○ Camera ○ Audio ○ Touch Screen or Screen ○ Physical Keyboard	"The quality of being suited to serve a purpose well." ● Camera - Is the picture quality sufficient? Is the placement of the camera sufficient for your needs (front/back)? Are the capture settings satisfactory? ● Audio - Is the volume and quality of your speaker satisfactory? ● Touch Screen or Screen - Is the resolution of your screen sufficient? Is there adequate sensitivity of your screen? Are the touches accurate? ● Physical Keyboard - Is the keyboard a sufficient size for your needs? Do the necessary keys work for the keyboard?
● Functionality of Applications	● Does the smartphone run applications at an adequate speed? Does the smartphone run applications smoothly (little glitching)? Does the smartphone operate applications properly?
● Battery Life	● Does the smartphone have an adequate battery life for daily usage?
● Physical Preferences	● Is the smartphone a sufficient size, color, style, etc.?
● Network Capability	● Does the smartphone run a wireless network at a satisfactory speed? Is the smartphone equipped to run at a fast network speed (i.e. 4G)?
● Application Capability	● Does the smartphone have the ability to run all desired applications?
● Storage Capacity	● Is your phone capable of supporting the desired storage capacity?

Following the completion of a preliminary coding scheme, the scheme was used to code one of the interview transcriptions by two different coders. The results of the code were compared and no differences in codes were discovered. Our code was tested on one of five interview transcripts, or 20% of the intended documents. Testing the code on 10% of the

intended set of documents is sufficient to determine if the code is accurate (Campbell et al, 2013). Due to the low number of initial codes and limited responses, the coding scheme was concluded to have a high intercoder reliability. Although adjustments must often be made to a coding scheme to increase intercoder reliability (Campbell et al., 2013), the coding scheme we used did not require any alterations.

One issue we encountered was discrepancies in unitization. Unitization can be described as portions of codes, such as words, sentences, or paragraphs that are identified to be units of analysis and are subjective to the coder (Campbell et al, 2013). Our method to alleviate this problem was to have an individual mark (bracket) all portions of text that may contain information relevant to the predetermined codes. The coders then identified the codes that are applied to each marked area. Therefore, the only discrepancies to be determined after another coding trial were the codes themselves, resulting in the highest intercoder reliability.

A previous method to determine intercoder reliability completed by Miles and Huberman (1984) was calculated by dividing the number of times any coder used the code in the same text by the number of times any coder used the code in the complete interview transcript. While there is no percentage deemed satisfactory in literature for intercoder reliability, Miles and Huberman cited 80-90% agreement is adequate (1984). We achieved 100% intercoder reliability with this method after solving the issue with unitization using brackets.

3.1.3 Calculating salience scores for free-listed responses

The interviewees' responses to the first free-list question asked in the semi-structured interviews were used to determine criteria that Danish consumers consider significant when purchasing a smartphone. The frequently listed criteria can be assumed to be a consensus within the group of interviewers (Quinlan, 2005), thereby indicating that these criteria are very

important factors for most Danish consumers. In order to extract empirical data from the coded interviews, salience indices, frequencies of mention, and net mean rank of mention were computed.

Salience indices, which are considered to be the most accurate representation of important criteria, were calculated to determine what Danish consumers consider important aspects of smartphones. Salience indices consider the frequency of mentions across all of the lists, as well as the order in which the interviewee listed each criteria (Smith, 1993). Other measurements exist to determine the significance of listed criteria; however, these measurements are not as comprehensive as salience indices. The net mean rank, which is the average rank of where a criterion appears in subjects' lists, can be skewed when subjects do not list an item at all. For example, if one interview subject were to list the battery life first in their free-list response, but no other interview subjects listed battery life in their responses, then the net mean rank would be one. Then, if all interview subjects listed physical preferences second in their free-list responses, the rank would be two. These ranks imply that the battery life is more important, however, all but one interview subject did not consider this criteria at all. The frequency of mention is another measurement. The frequency of mention is simply the number of lists that each criterion appears in. This measurement does not take into account the order in which criteria is listed.

The salience indices for smartphone criteria were calculated by taking into account the rank of each criterion, the size of the lists it appears in, and the number of lists it appears in. To calculate the salience index, each criterion for each subject is given a percentile rank. This is determined by Equation 1, where list length is the number of items in the given list, and rank is the position of the criterion in the list, with the first item in a list being given a rank of zero. To

determine the salience index of a criterion, the sum of the criterion's percentile ranks is divided by the number of lists it appears in, as shown in Equation 2.

Equation 1:

$$percentile\ rank\ = \frac{list\ length - rank}{list\ length}$$

Equation 2:

$$salience\ index\ = \frac{\sum criterion's\ percentile\ ranks}{number\ of\ lists}$$

3.2 Objective #2. Assess the current smartphone reparability process in Denmark.

Understanding the current reparability process in Denmark was a two-step approach. First, we gathered information about consumer satisfaction on their ability to solve issues with smartphones. Then, we assessed the cost of various smartphone repairs from local repair shops in Denmark. We analyzed the consumer responses to smartphone defects in order to guide consumers to the best method of reparability.

3.2.1 Semi-structured interviews with Danish consumers

The individual interviews were conducted with Danish citizens to help understand the current reparability process in Denmark. We asked interview subjects to describe their experiences with defective smartphones and the actions they took to replace, repair, or refund the smartphone. The questions we asked the interviewees were focused on determining their

smartphone defect, the process they used when seeking a functional smartphone and any advice or information they would like to provide for future consumers handling smartphone defects. These interviews were conducted at the same time as the interviews completed in Objective 1 and the questions can be seen in Appendix A.

At the completion of the five interviews, the audio recordings were transcribed and the information was used to develop a guide for Danish consumers on how to handle smartphone defects, seen in the following objective.

3.3 Objective #3. Develop a guide for Danish consumers on how to handle smartphone defects.

The goal of this objective was to construct an instructional guide for Danish citizens to streamline the reparability process of smartphones. We completed this task by using the results obtained in semi-structured interviews to identify the weaknesses in the current reparability process and using testimonials from Danish consumers who have experienced various smartphone defects to provide advice within the guide. To build this guide, we first analyzed responses from consumer interviews, then constructed a decision tree to represent all possible options to take when faced with a defective smartphone, and designed a preliminary instructional guide to aid consumers handling smartphone defects. The next step was to test the guide using individual interviews and evaluate the success of the guide using observational studies and interview feedback. An illustration of our process can be seen below in Figure 5.

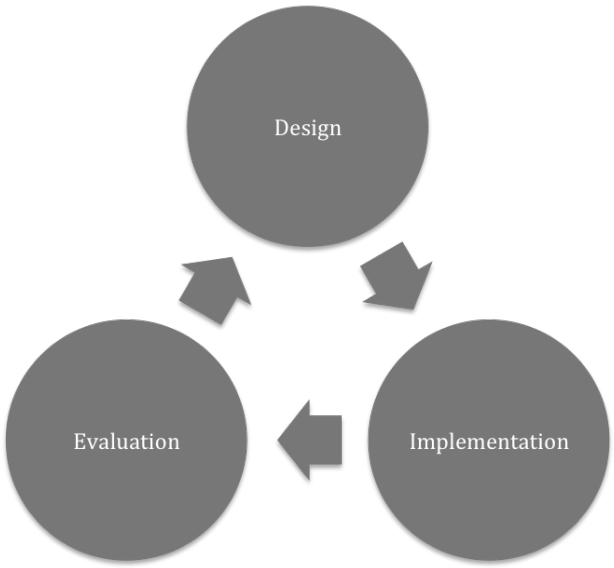

Figure 5: Cyclic process used to develop final smartphone reparability guide (McHugh, 2016).

3.3.1 Step #1. Analyze interview responses from Danish consumers

To analyze the interview responses from Danish consumers, we transcribed the interviews and used an open coding system to determine the dominant themes in interview responses. Identifying, naming, and categorizing the information received in interview responses determined the themes, including when the defect occurred and the model of the smartphone. Categorizing the data based on when the defect occurred after purchasing (less than six months, between six months and two years, more than two years) identified whether the product was covered by the legal guarantee, which would entitle the buyer to various remedies for product nonconformity. Identifying the product defect provided us with a list of common product defects to specifically address in the instructional guide. We also used the interviewee's responses to determine whether or not the product was covered under a commercial guarantee.

Determining the guarantee coverage of the product, whether under the legal guarantee or a commercial guarantee, plays an important role in how the consumer responds to the defect. By

understanding the success of consumer's attempts to repair product defects, both under guarantees and not under guarantees, we were able to analyze the different experiences they had and how guarantees impacted their efforts to resolve smartphone defects. This information was then passed on to consumers who are in similar situations.

The interviews also provided an opportunity for consumers who have experienced problems with smartphones to make suggestions for other consumers who find themselves in similar situations. We asked the interviewees whether they have any specific recommendations to make and determined the trends in the advice given. Any comments or advice that recur throughout interviews was assumed to be an indication that that topic is of greater thematic importance (Guest, 2006). Information and advice deemed more important is provided to other consumers in the smartphone repair guide. Themes considered important from the advice provided by Danish consumers were to seek out local repairs rather than manufacturers when repairing a defective smartphone and to know your rights under the legal guarantee. Additional advice gathered was included in the guide in the form of consumer testimonials, which have been shown to increase consumer's willingness to take certain actions. A study by Avishag Spillinger and Avi Parush showed that consumers are more trusting towards websites that provided testimonials (Spillinger & Parush, 2011). Similarly, consumers will be more trusting of product defect resolution advice when testimonials are provided to support the guide. The advice given by consumers will also be taken into consideration when advising consumers on what action to take to resolve their product defect.

3.3.2 Step #2: Construct a decision tree of possible methods of repair for smartphones

In order to determine the ideal actions a consumer can take to resolve a defect with smartphones, a series of decision trees were constructed. The decision trees were used to

determine the ideal actions by asking a series of questions, and were modeled using techniques from the chapter "Classification: Basic Concepts, Decision Trees, and Model Evaluation" of *Introduction to Data Mining* by Pang-Ning Tan, Michael Steinbach, and Vipin Kumar. To first construct the decision trees, various attribute test conditions about smartphone defects were created. Each attribute test condition was designed to narrow down a set of defects and situations into smaller subsets. Each attribute was a binary condition. Binary conditions split a set of smartphone defects into two groups. One example of a binary attribute condition used in the decision tree was “Do you have proof of purchase of your smartphone?”, which can be answered with "Yes" or "No." Whether or not the respondent has proof of purchase for their smartphone plays a significant role on using their rights under a legal guarantee. If the respondent was not at fault for the defect, had purchased the smartphone in the last six months, and had a proof of purchase for their smartphone, they would be able to seek a replacement or repair from the seller at no cost under the legal guarantee. However, without a proof of purchase, the legal guarantee benefits would not be an option.

Once sufficient attributes that identify the best solution to resolve the product defect were determined, the attributes were used to construct the preliminary decision trees. A decision tree is a hierarchical structure that consists of nodes and directed edges. The decision tree begins at a root node, which has no incoming edges and zero or more outgoing edges. Each node contains an attribute test condition to begin identifying the best solution. Based on the answer to the test condition, a follow up question is asked. This continues until a terminal node is reached, which is a node with exactly one incoming edge and no outgoing edge (Tan et al., 2006). Terminal nodes contain information about the best course of action for resolving the product defect.

3.3.3 Step #3: Develop a guide for the reparability process of smartphones

After formulating decision trees with different courses of action to take to obtain a functional smartphone, an instructional guide for Danish consumers was developed. The purpose of the guide was to provide consumers who are experiencing a problem with a smartphone with easily accessible information about the best way to solve their problem. Supplementary information in the guide helped consumers better understand the decision tree and fill any gaps in their knowledge of the repair and replacement process. This supplementary information included consumer testimonials, information helping the consumer answer questions within the decision trees, and information regarding how to optimize, backup, and recycle your smartphone. This content not only explained to consumers how to make their smartphone function more efficiently and quickly, but also how to back up their smartphone and how to recycle their smartphone in the case of a replacement. The consumer testimonials were presented in the guide to provide insight to Danish consumers experiencing similar product defects. Information helping the consumer answer questions within the tree was provided, including whether or not their smartphone supports software updates, the cost of repairs for different defects for their smartphone, and if their warranty provides coverage for their defect. The design of the guide was adapted from an existing guide on bank loans and negotiation featured in *Forbrugerrådet Tænk.*

3.3.4 Step #4: Test guide using interviews with Danish citizens

To judge the quality of the reparability guide, we conducted individual interviews with Danish citizens to ensure the guide was useful and beneficial. A two-fold approach was taken when determining the success of the reparability guide. First, individual interviews with 10 Danish citizens were completed. The individuals were able to use their own experience with a smartphone defect to progress through the guide, or were given a smartphone defect scenario.

The interviewees were then provided with the instructional guide and were asked to use the guide in attempt to determine the best method in obtaining a functional device based on their scenario. The observation and interview schedule can be seen in Appendix C. Throughout the process, we observed the interviewees actions while using the guide. Observations focused on the interviewees' ease of navigating the guide and the amount of time taken to achieve a solution for their smartphone defect. One group member observed an interviewee and recorded notes of behaviors while recording the time until completion of the guide. After the interviewees came to a final resolution, we assessed their satisfaction with the guide through the use of interview questions. The interview questions can be seen in Appendix D. This presented another opportunity for us to understand the issues consumers face during the reparability process and how to improve the guide to reduce frustrations in this process. The observations taken during the testing, along with the feedback provided by the consumers through interview questions can be seen in Table 4. This evaluation helped us modify the guide in efforts to increase understanding and applicability for users.

Table 4: Guide Evaluation (Adapted from Hayes et al., 2013)

Guide Evaluation		
Source	**Results**	**Re-Design**
Observations	Had difficulty finding additional information.	Inserted an *Additional Information* table of contents on each page of the decision tree as a reminder.
	Frequent flipping back to content list from decision tree.	Inserted an *Additional Information* table of contents on each page of the decision tree as a reminder.
	Didn't notice the page numbers to get additional information	Increased the font size of the page numbers listed in the decision tree.
Interviews	Add a map of the entire guide on each page as a refresher of the table of contents.	Inserted an *Additional Information* table of contents on each page of the decision tree as a reminder.
	Add a title for the defect on each decision tree.	Inserted descriptive titles of smartphone defect on the top of each decision tree.
	The introduction paragraph was too large.	Made paragraphs containing information shorter, including the optimization paragraph and the introduction paragraph. Broke down paragraphs into smaller sections.
	Add a starting point on each decision tree to add clarity.	Inserted a "Start" box at the beginning of each decision tree.
	Break larger sections down into smaller sections. Use bullets.	Made paragraphs containing information shorter, including the optimization paragraph and the introduction paragraph. Broke down paragraphs into smaller sections.
	Directions after coming to a solution in the decision trees.	Inserted page numbers for repair/replace and waiting options at each final outcome.
	Address what to do if defect is not listed.	Inserted information about contacting repair shop if defect is not listed.
	Move the defect table of contents to the first page.	Shortened the opening paragraph and merged the *Table of Contents.*

CHAPTER 4: RESULTS

The creation of the smartphone repair guide involved 15 interviews with Danish consumers, extensive background research on smartphones and smartphone defects, and gathering information about smartphone repair in Denmark such as price ranges for various different defects. This guide was published on the *Forbrugerrådet Tænk* website to be made available to consumers who face issues with their phone. The guide was developed to help consumers determine the best methods to solve smartphone problems and to obtain a fully functional smartphone. The following results were found in the development of "To Repair or Not to Repair?: A Guide for Your Smartphone Defects."

4.1 Determined the criteria used by consumers for purchasing smartphones.

4.1.1 Interviews with Danish consumers

Danish consumers provided us with criteria that they use to make decisions when purchasing smartphones. This information was integrated into the guide as the basis of what consumers should consider when determining whether their current smartphones fulfill their needs. Our defect decision trees frequently ask the user to determine if their current smartphone fully meets their needs. In order to help the user determine this, we refer them to a list of these decision criteria, which is intended to encourage them to consider many different aspects of their phone and what could be improved. This list appears on its own page in the guide, shown in Figure 6.

Does your phone currently meet your needs?

Understanding what you desire in a smartphone is an important part of deciding whether or not to repair or replace your phone. You want to consider many different attributes of your smartphone to get the full understanding if your phone *really* meets your needs. Below is a list of smartphone characteristics and attributes to consider. Please keep in mind that the list is not to provide a concrete yes/no answer, but to get you thinking about how your smartphone's attributes meet your needs.

Consider the following to help you decide if your phone currently meets your needs:

- ❑ **Does the phone size fit your preferences and needs?**
  - ❑ Do you need your phone to fit in your pocket? Or would you rather have a phone big enough to watch videos on or read with?
- ❑ **Is the phone functionalities satisfactory?**
  - ❑ Camera (picture quality, capture settings, etc.)
  - ❑ Audio (volume and quality)
  - ❑ Touch screen or screen (sensitivity, accurate touches, resolution, etc.)
  - ❑ Physical keypad or keyboard (if applicable)
- ❑ **Does your phone run apps and other programs fast or smoothly enough?**
  - ❑ Can your phone start and operate apps without significant crashes or freezes?
- ❑ **Is the phone capable of running the apps you want or use?**
  - ❑ Consider the capability of updating current applications you use.
- ❑ **Is the battery life adequate for your daily usage?**
- ❑ **Does the phone have enough storage?**
  - ❑ If not, does your phone have an SD card slot?
- ❑ **Is your phone's network capability sufficient?**
  - ❑ Is your phone equipped for a 4G network, or is it too old?

Figure 6: "Does Your Smartphone Currently Meet Your Needs?"

4.1.2 Salience indices of purchasing criteria for smartphones

Transcribing and coding interviews from Danish consumers allowed us to calculate the salience indices of the purchasing criteria for smartphones and quantitatively analyze the free-listed responses. Salience indices provided information regarding important criteria considered when making smartphone purchases. The indices consider the frequency of mentions across all of the lists, as well as the order in which the interviewee listed each criteria (Smith, 1993). Table

5 summarizes each subject's response when asked to list the purchasing criteria of smartphones. The subject's responses are shown in the order in which they were listed during the interview. Once the criteria were extracted from transcribed interviews and organized into Table 5, salience indices were calculated and can be seen in Table 6. This table also lists the percentile rank of each criterion for each interview subject, as well as the net mean rank and frequency of mention, which are less comprehensive measurements of criteria that are used to calculate the salience indices.

Table 5: Ordered Subject Responses of Purchasing Criteria

Subject A	Subject B	Subject C	Subject D	Subject E
Physical preferences	Battery life	Physical preferences	Features	Physical Preference
Features (camera)	Battery life	Battery life	Features (Camera)	Functionality of applications
Physical preferences	Physical preferences	Features (audio)	Battery life	Features (audio)
	Physical preferences		Physical preferences	Application capability
	Battery life			
	Application capability			

Table 6: Salience Indices, Frequency of Mention, Net Mean Rank, and Percentile Rank of Smartphone Purchasing Criteria

Criteria	Subject A	Subject B	Subject C	Subject D	Subject E	Index	Freq.	Rank
Physical preferences	100	66.7	100	25	100	78.3	5	2
Battery life	00	100	66.7	50	00	43.3	3	2
Application capability	00	16.7	00	00	25	8.34	2	5
Functionality of applications	00	00	00	00	75	15	1	2
Features	00	00	00	100	00	20	1	1
Features (camera)	66.7	00	00	75	00	28.34	2	2
Features (Audio)	00	00	33.3	00	50	43.3	2	3

4.2 Assessed the current smartphone reparability process in Denmark.

4.2.1 Interviews with Danish consumers

Consumers were interviewed about their experience in resolving smartphone defects (see Appendix A for interview questions and Appendix B for transcribed interviews). Through consumer testimonials, we determined that many consumers do not understand their rights as a consumer. The advice most frequently suggested by consumers was to be knowledgeable of both consumer rights and warranties that extend outside of the legal guarantee. The interviewees also recommended being knowledgeable on your smartphone and its defect. One recommendation

was to take notes about the smartphone defect and its functionality prior to the defect. The seller believed that the defect had been the consumer's fault, but because Subject C had written down all the defects and was prepared, they were able to convince the seller otherwise. This experience, combined with advice other consumers gave during interviews, led to the conclusion that many consumers need to be more informed on the rights they have through both the legal guarantee and various warranty options provided by the seller. From this result, we decided to add a section in the guide titled, "Is Your Current Smartphone Defect Covered Under a Legal or Commercial Guarantee?" This section details the rights the consumer has through the legal guarantee and some options that sellers and manufacturers offer. Table 7 was included in the guide as an easy way for consumers to find warranty information on their phone.

Table 7: "Is Your Current Smartphone Defect Covered Under a Legal or Commercial Guarantee?"

Phone Type	Warranty	How Long Are You Covered After Purchase?	What Is Covered?
Apple	AppleCare	Hardware Repair: 1 year. Software Support: 90 days.	Hardware Repair: Coverage includes: iPhone, battery replacement (less than 80% of original battery life), earphones and accessories. Authorized Apple technicians only. Software Support: Troubleshooting iPhone, iCloud, iOS and apple-branded apps.
	AppleCare +	Hardware Repair: 2 Years. Software Support: 2 Years.	Hardware Repair: Same coverage as AppleCare, with the addition of coverage for 2 incidents of accidental damage, not including theft or loss of smartphone. Software Support: Same as coverage as AppleCare.
LG	Legal guarantee	2 years.	Same coverage as legal guarantee.
HTC	Legal guarantee	2 years.	Same coverage as legal guarantee.
LG	Legal guarantee	2 years.	Same coverage as legal guarantee.
Samsung	Legal guarantee	2 years.	Same coverage as legal guarantee.
Sony	Legal guarantee	2 years.	Same coverage as legal guarantee.
Windows	Manufacturer's Warranty	2 Years: Hardware repair.	Same coverage as with legal guarantee, as well as a one year warranty on accessories that come with the device.

We also found that if the consumer's defect is minor and doesn't affect the consumer, they will choose to deal with the defect and wait until they want to purchase a new phone. This concept of waiting also supported the notion of consumers often choosing not to go through the repair process due to expense and inconvenience. We included a section in the guide titled, "How to Optimize Your Smartphone" to help those who choose to wait until a future date to replace their phone. This section details the process of optimizing the performance and battery of a smartphone, suggesting that consumers make sure their software is up to date and that they have enough phone storage. It also discusses how to preserve smartphones' battery life and the simple steps smartphone users can do daily to extend their battery life.

To point consumers towards relevant information about their current decision tree node, notes in the decision trees recommend which page in the guide consumers should navigate to for such information. In particular, when a decision tree suggests that consumers wait until they can afford a new smartphone, the optimization section provides helpful information about how to make a smartphone perform like new. This complete section can be seen in Appendices F and G.

4.2.2 Research of repair costs from local repair shops in Copenhagen, Denmark

Another important aspect of assessing the reparability in Denmark is investigating the prices to get each defect repaired. Repair costs were assessed by contacting repair shops throughout Copenhagen. Due to possible price differences between Copenhagen and mainland Denmark, we expanded our research to include other repair shops throughout Denmark to ensure a more accurate price range. The list of repair shops contacted and used within the repair cost tables can be seen in Appendix E. The repair prices of the different defects included in the guide for iPhones are shown in the table below (Table 8). Prices for various android phones can be seen in the guides in Appendices G and H. The ranges of prices vary greatly. This is in part due to the repair shop's ability to replace parts using both original equipment manufactured (OEM) and non-original equipment manufactured parts. OEM spare parts refer to parts that were produced by the original manufacturer of the device, while non-OEM spare parts are frequently sold as generic spare parts by other companies.

Table 8: Apple Smartphone Defect Repair Costs

	3G	3Gs	4	4s	5	5c	5s	6	6+	6s	6s+
Screen Damage	200-500	200-500	300-700	300-800	600-1300	600-1500	600-1400	900-1700	1200-2500	2000-3000	2400-3400
Back Cover Damage	300-800	300-800	200-300	200-300	800-1200	800-1300	800-1200	1200-1600	1700-2000	1500-2200	1500-3500
Battery Problems	300-400	300-400	200-400	200-500	250-600	300-600	300-600	370-600	350-600	400-600	500-800
USB Connection Problems	270-500	300-500	200-400	200-500	300-600	300-600	300-600	375-600	320-600	360-700	460-800
Camera Not Working	200-500	200-500	200-400	200-500	280-600	300-600	300-600	380-600	380-600	400-700	400-800
Headphone Jack Not Working	400-500	400-500	280-400	280-500	300-600	300-600	300-600	300-600	380-600	500-600	400-800
Buttons Not Working	280-500	300-500	200-400	250-500	200-600	200-600	200-600	250-600	380-600	400-700	340-800
Running Slow/Glitching	200-250	200-250	150-250	150-250	200-250	200-250	200-250	200-250	200-250	200-250	200-400

4.3 Developed a guide for Danish consumers on how to handle smartphone defects.

Interviews with Danish consumers provided us with vital information to include within the instructional guide on smartphone reparability. Analyzing the results from the interviews was important in creating a useful guide. A preliminary guide was developed based on interview results for smartphone purchasing criteria, consumer testimonials, and research of local repair costs. Then the guide was evaluated using individual interviews and feedback was obtained from a combination of observations and interviews. A cyclic approach was used to develop the final guide, including design, implementation and evaluation.

4.3.1 Development of the preliminary smartphone reparability guide

The preliminary guide was designed in collaboration with Martin Salamon and Emma Borello, employees involved in the campaign for reparability and durability of products at Forbrugerrådet. The contents of the guide were established using a combination of insight from Martin Salamon and analyzing the consumer interviews from Objective 2 to determine additional

information they were interested in. The contents of the guide can be seen in the guide Table of Contents below in Figure 7:

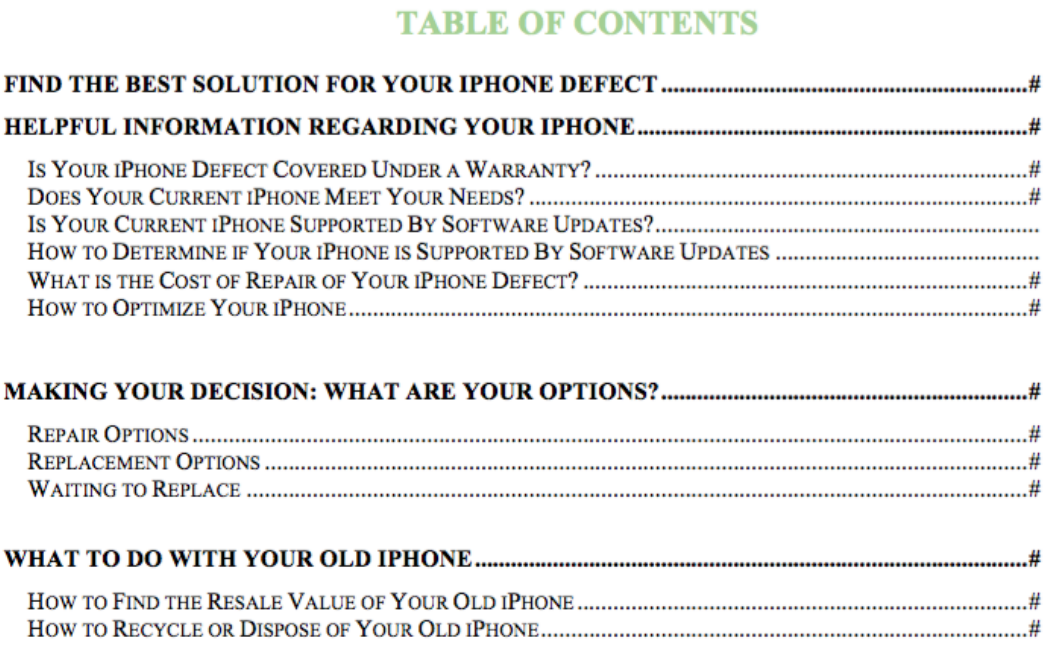

TABLE OF CONTENTS

Figure 7: Table of Contents in "To Repair or Not to Repair?: A Guide for Smartphone Defects"

After identifying the components necessary to include within the reparability guide, the sections were researched to provide insight on each topic. The main focus of the guide was the decision trees. These decision trees guide the user through a series of questions designed to determine the best action they can take to resolve common phone defects or damages. Figure 8 shows the decision tree for a broken screen. Answering the given questions will lead the user to one of three answers: Repair phone, replace phone, or keep the phone and wait until the future to replace it.

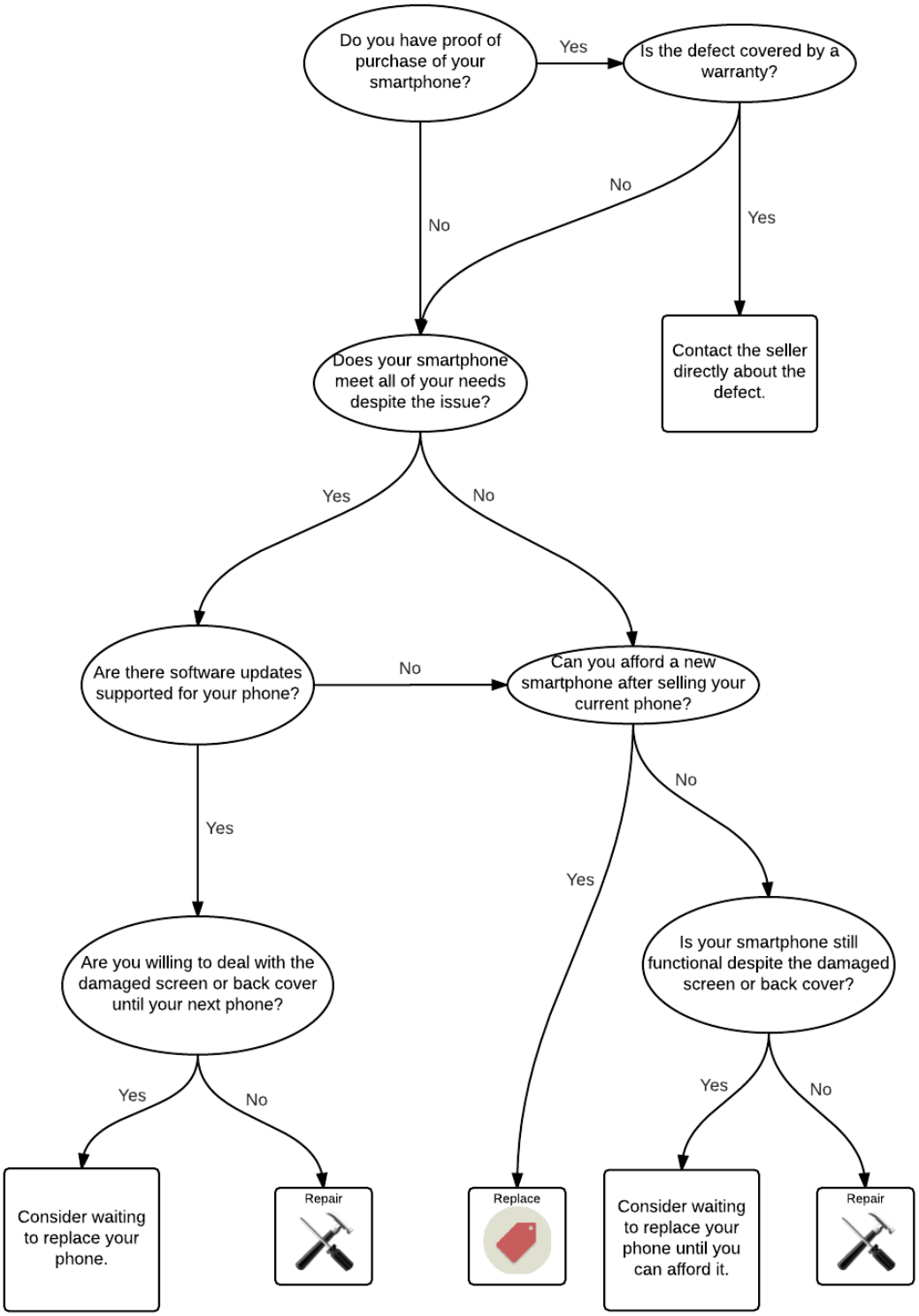

Figure 8: iPhone Broken Screen or Back Cover Decision Tree

For some of the questions in the tree, consumers may need additional information in order to answer. For example, a consumer may not know what the resale value of their phone is, therefore they can navigate to the section, “How to Find the Resale Value of Your Old iPhone” to find an answer. The tree helps the consumer determine whether or not to repair or replace their smartphone. However, there are multiple options within each of these categories. The section “Making Your Decision: What are Your Options?” details all the possible ways to get a smartphone replaced, or repaired. In order to give more insight on the different options, we added icons to let the consumer know if the option is environmentally friendly, less expensive, time saving, or still has a warranty coverage (Figure 9). The completed preliminary guide was then translated into Danish.

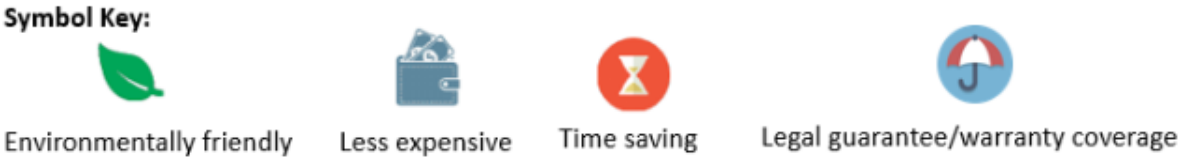

Figure 9: Symbol Key for Repair and Replace Options

4.3.2 Testing the preliminary smartphone reparability guide on Danish consumers

The preliminary smartphone reparability guide was evaluated using individual interviews on ten Danish consumers. Observations were taken during the interviews while they used the guide to determine a method of repairing a functional smartphone and follow-up interview questions were used to gather feedback from interviewees. The interviews with Danish consumers highlighted areas where consumers struggled while navigating the guide. The follow-up questions focused on gathering information about the structure, understandability and

usefulness of the guide. Table 9 is the feedback gathered from both the observations and interviews.

Table 9: Feedback of Preliminary Guide from Observations and Interviews with Danish Consumers

Source	Results
Observations	Had difficulty finding additional information.
	Frequent flipping back to content list from decision tree.
	Didn't notice the page numbers to get additional information.
Interviews	Add a map of the entire guide on each page as a refresher of the table of contents.
	Add a title for the defect on each decision tree.
	The introduction paragraph was too large.
	Add a starting point on each decision tree to add clarity.
	Break larger sections down into smaller sections. Use bullets.
	Directions after coming to a solution in the decision trees.
	Address what to do if defect is not listed.
	Move the defect table of contents to the first page.
	Add information about how to determine if your phone has an SD card slot and 4G.

4.3.3 Development of the final smartphone reparability guide: "To Repair or Not to Repair: A Guide on Smartphone Reparability"

To develop a final draft of the smartphone reparability guide, the results from interviews were collected and potential solutions to identified problems were identified. The feedback that we received in our testing, as well as our suggested modifications, were sent to *Forbrugerrådet Tænk*. *Forbrugerrådet Tænk* used this information to finalize the guide, including translations and formatting for publication.

CHAPTER 5: CONCLUSION

The purpose of this project was to provide consumers in Denmark with simple, easy-to-understand information about what actions to take when a smartphone is damaged or defective. In order to accomplish this goal, we worked for one seven-week term to research relevant topics and gather information about Danish consumers. Once this information was collected, it was used to construct a guide intended for consumers who are experiencing problems with their phone.

Our work began with extensive background research relating to the need for a smartphone repair guide in Denmark. We analyzed smartphones' contribution to e-waste and the impact that repairing, instead of disposing a smartphone, can have on waste production. We also assessed Denmark's focus on sustainability. This research played a significant role in the information provided in the smartphone guide. We determined that it was important to align our guide with the interests of Danes, which meant including information about how to recycle smartphones, how to avoid replacing a smartphone by optimizing an old smartphone instead, and the benefits of buying used or refurbished smartphones.

After significant background research we began constructing the smartphone guide. The first step in creating the guide was to interview Danish consumers to get a better understanding of their specific interests in smartphones. Next, we constructed a preliminary guide. The guide began with a selection of common smartphone defects, which were identified from background research. The defects directed users to a decision tree to help them determine whether to wait to buy a new phone, or to repair, or replace their phone. Other important information was included to supplement the decision trees. Once the guide was completed, it was tested to identify

problematic or confusing areas. The responses and feedback were then passed along to Forbrugerrådet, who finalized the guide for publication.

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APPENDICES

Appendix A: Interview Questions

Verbal Consent Speech for Consumers:

We are a group of students from Worcester Polytechnic Institute in Massachusetts. We are conducting an interview of Danish consumers to learn more about the current phone repair process in Denmark to construct a guide for Danish consumers on the best methods of repair for various smartphone defects. We strongly believe this kind of research will ultimately benefit consumers and enhance their experience.

Your participation in this interview is completely voluntary and you may withdraw at any time. Please remember that your answers will remain confidential. No names or identifying information will appear on any of the project reports or publications. May we have your permission to record the audio of this interview?

This is a collaborative project between the Forbrugerrådet Tænk and WPI, and your participation is greatly appreciated. If interested, a copy of our results can be provided at the conclusion of the study.

1. Please list the criteria you use when purchasing a smartphone.
2. Do you typically research a smartphone before purchasing it?
    a. If yes, what kind of information do you look for?
3. Have you ever had a defective smartphone?
    a. If yes, what was the product defect?

b. What was the model of your smartphone?

c. How long after purchasing the product did the defect occur?

    i. Less than 6 months

    ii. Between 6 months and 2 years

    iii. More than 2 years

d. Were you at fault for the defect?

e. Was the product covered under a commercial guarantee/extended warranty?

f. Did you choose to purchase a new product or repair the product? Why?

    i. If you repaired your smartphone, describe the process and the final outcome.

    ii. How much time and money did you have to spend during this process?

    iii. Did you hire a third party to aid in the process of the product repair?

g. Do you have any advice for other consumers with similar product defects?

4. What information would have made handling the product defect easier?

Appendix B: Coded and Unitized Transcribed Interviews

The following are coded and unitized transcribed interviews. Brackets indicate the text that are unitized. Footnotes state what the unitized texts are coded as.

Interview with Subject A

INTERVIEWER 1: So we're going to start off the interview by having you list some of the criteria you use when you purchase a smartphone. Do you need any like information on that like an example of information?

SUBJECT A: Maybe.

INTERVIEWER 1: Okay so if you prefer a large phone over a small one. Or like the functionality of it so if you like things that are very fast or like any type of thing you look for in a smartphone.

SUBJECT A: Mmhm...I remember my first smartphone I wanted a really [small phone][1] because I didn't like the big ones. You can't have them in your pockets. But like I think one of the smallest ones in the market like that. And other than that, I think maybe the [camera][2] is important to me. Other than that, I can not high-tech, I'm not a high-tech person.

INTERVIEWER 1: So technology is not very important for you?

SUBJECT A: It's more like I'm really into photography so that is important. And then also like [working habit, can you have it in your pocket like][3]...

INTERVIEWER 1: Practicality?

SUBJECT A: Exactly.

INTERVIEWER 1: Do you typically research a smartphone before you purchase it? Like look online to see if there is any reviews on it or anything like that.

SUBJECT A: I haven't really. I've gotten more help from my dad.

INTERVIEWER 1: Okay! And what would you like ask him when you asked him a like if you asked if you consult your dad, what would you ask him about? Any certain…

[1] Physical preferences
[2] Feature functionality: camera
[3] Physical preferences

SUBJECT A: The price and the [size][4] and the [camera][5]. And also if it's [up to date, like can it have the apps][6] I need, but like most of them can now so.

INTERVIEWER 1: Okay! Have you ever had a defective smartphone?

SUBJECT A: Like my old one was kind of defective but then I got a new one.

INTERVIEWER 1: Okay so what was the defect of the old phone?

SUBJECT A: It was too old so it keep crashing like when it was going into apps, it would close down. So it wasn't actually, the phone wasn't broken. But it was just too old like. And I try to buy more memory for it. But I could do that but it did not help it processing apps. And it could store more pictures but running like...

INTERVIEWER 1: Apps were very slow?

SUBJECT A: Yeah and it would break down all the time. And then it was too annoying.

INTERVIEWER 1: Right.

SUBJECT A: So I don't think you can get that fixed.

INTERVIEWER 1: So how long after purchasing the product, did it have the defect. So was it like between was it in the first 6 months when you got the product, was it between 6 months and 2 years, or was it after 2 years?

SUBJECT A: I think it was like I had it for like between 6 months and 2 years.

INTERVIEWER 1: Perfect.

INTERVIEWER 2: What was the phone type?

SUBJECT A: Most of the phone types, my first one was the last Sony Ericsson smartphone, like before they split up.

INTERVIEWER 1: Okay. So the defect, were you at fault for it? It doesn't sound like you were. Like you didn't drop it in water?

SUBJECT A: I did do that but that's not why it was slow.

SUBJECT A: It was a pretty solid phone but I don't think that.

[4] Physical preferences
[5] Feature functionality: camera
[6] Application capability

INTERVIEWER 1: It was just old?

SUBJECT A: It was old. I don't think it was not handled with care.

INTERVIEWER 1: Was the product covered under a commercial guarantee or extended warranty or any type of insurance?

SUBJECT A: I don't know.

INTERVIEWER 1: You don't know. That's okay.

SUBJECT A: Probably have the insurance but I never used it.

INTERVIEWER 1: Okay. So you chose to purchase a new smartphone instead of getting that one repaired, correct?

SUBJECT A: Yes.

INTERVIEWER 1: Was there a reason you thought you had to purchase a new phone rather than repairing it?

SUBJECT A: No, I think I wanted an iPhone because it has the advantages.

INTERVIEWER 1: Yeah, so you wanted like a newer phone rather than a...

SUBJECT A: Yeah, also because I have the Mac so I wanted something that was compatible.

INTERVIEWER 1: Yep! Okay, do you have any advice for consumers with similar defects in their smartphones? Would you say to get a new phone if it's running really slow or get it repaired or?

SUBJECT A: I think maybe it depends, like I also my iPhone now is an iPhone 4 I bought it like I don't know, half a year ago. So I bought it kind of late so of course now, it's also running slow so I guess buying the newest phone is going to make it last longer. And I think I heard that sometimes you can clean the phone kind of like wipe the phone and then it should be faster. But I've never tried it myself but I just heard that's that.

INTERVIEWER 1: Yeah.

SUBJECT A: I've had lots of phones but only two smartphones.

INTERVIEWER 1: Okay. And then do you have any information that would've made handling... What information could you have gotten that would've made handling product defect easier?

INTERVIEWER 1: Like if you knew certain information, would you have repaired it rather than purchased a new one or?

SUBJECT A: Maybe if it was something that if like if you have this problem, you can get it fixed. Maybe because I didn't know if I could get that fixed. I didn't really check. I thought it was just because it was old. If there was. I don't know.

INTERVIEWER 1: If there was some type of like information that was provided, that if you had this defect, you could get it fixed.

SUBJECT A: Yeah.

INTERVIEWER 1: Okay! Do you have any other questions, INTERVIEWER 2? Or do you need any clarification on anything?

INTERVIEWER 2: Just looking through my notes again.

INTERVIEWER 1: Okay. Yea, so I think that was all of our questions. Thank you for your information. It was helpful.

Interview with Subject B

INTERVIEWER 1: We're interested in understanding what people are looking for when they are buying smartphones and when they are going to buy a new smartphones if they are if they're smart phone is broken or something like that. So could you list the criteria or the things that you find important when you are looking for a new smartphone? Just any amount of things works.

SUBJECT B: Yeah I don't know, [battery life][7]? Like stuff like that? I guess?

INTERVIEWER 1: Yeah really anything that you would consider a good part of the smartphone.

SUBJECT B: [Battery life time][8] definitely a thing I think has gotten way worse. Smartphones and that's a bit annoying so that's one of my things, I'm not into [big screens][9] either. I like [Small screens][10] and I don't need that much [power][11] for my phone.

INTERVIEWER 1: Okay.

SUBJECT B: That stuff and then I need, like I need either android or iPhone because of the [apps][12].

[7] Battery life
[8] Battery life
[9] Physical preferences
[10] Physical preferences
[11] Battery life

INTERVIEWER 1: So which one do you use?

SUBJECT B: I have an iPhone right now.

INTERVIEWER 1: Okay, do you typically research your smartphone before you purchase them or do you kind of just go into a shop and try to buy them?

SUBJECT B: I think for my next phone I will do a lot of research, yeah. And I've had three smartphones before and the first one was horrible and the second two are good.

INTERVIEWER 1: So if you were to go into looking for your smartphone, next smartphone, what would you be specifically looking for when you are researching it?

SUBJECT B: I'd go on the internet and look for like reviews and such.

INTERVIEWER 1: So maybe things that other people said about it and things like that?

SUBJECT B: Yeah, maybe.

INTERVIEWER 1: And do you think what you are looking for would be in line with what you said earlier about what you want in a smartphone? So battery life and things like that?

SUBJECT B: Yeah, yeah probably yeah, not too expensive.

INTERVIEWER 1: Okay so the cost is also?

SUBJECT B: Yeah.

INTERVIEWER 1: So have you ever had a defective or damaged smartphone?

SUBJECT B: Yeah.

INTERVIEWER 1: Yeah okay, what was the defect? Or say pick one of them if there is more than one.

SUBJECT B: I had my first I had broken the screen and then it still worked but it kept overheating for some reason so it just got really warm sometimes and then shuts down. And my current phone does the opposite and it shuts down if it is too cold outside.

INTERVIEWER 1: Oh yep, yeah my phone does that as well.

SUBJECT B: It's really not great in the winter in Denmark.

INTERVIEWER 1: So what were the models of these smartphones?

SUBJECT B: My current phone is an iPhone 4 I think and the other was an android something. Android. One of the first.

INTERVIEWER 1: So was the android the one that had the broken screen?

SUBJECT B: Yes.

---

[12] Application capability

INTERVIEWER 1: And then the iPhone 4 was, was the cold, the battery problems?

SUBJECT B: Yeah.

INTERVIEWER 1: Okay, and how long do you know how long after you purchased it that these damages occurred? And that you started noticing the battery and things like that?

SUBJECT B: I had this for like over half a year at least.

INTERVIEWER 1: So over six months?

SUBJECT B: Yeah.

INTERVIEWER 1: And you didn't notice the, the battery before that?

SUBJECT B: No, no not really it worked fine and then it started not working.

INTERVIEWER 1: Okay, and when did the screen brake? Do you remember when the screen broke on the android phone? Just like a general time frame.

SUBJECT B: No, I can't remember when it exactly broke.

INTERVIEWER 1: Okay, no problem. So did you cause the defect or the damage so for the phone screen breaking?

SUBJECT B: The screen breaking I caused.

INTERVIEWER 1: You dropped it or something like that?

SUBJECT B: Yeah.

INTERVIEWER 1: You don't think you did anything to cause the battery in the other one?

SUBJECT B: No, I don't think so.

INTERVIEWER 1: Do you know at the time of the damage if they were covered by a warranty or a guarantee or something like that?

SUBJECT B: I don't think I was covered by a guarantee.

INTERVIEWER 1: So after you broke the screen on your android phone, did you chose to repair it or did you just buy a new one?

SUBJECT B: I just waited until it got too annoying and then I got a new one.

INTERVIEWER 1: So how come you choose to buy a new one, is there any reasons that made you want to buy one instead of repairing the current?

SUBJECT B: The current no... it had gotten too old. I felt and there were new models that were able to do more and it was slow.

INTERVIEWER 1: Yeah, so you didn't feel like it was worth repairing if you could buy a new one?

SUBJECT B: Yeah.

INTERVIEWER 1: Okay.

SUBJECT B: Yeah, it was a bad, a bad phone, it was Android. I don't know, Wildfire? Or something I think it was called or something?

INTERVIEWER 1: And this phone that you currently have, do you have any plans to repair it or are you going to buy a new one or going to send it back to Apple?

SUBJECT B: I'll probably wait a little more until it gets really horrible and then I'll look for something new I guess.

INTERVIEWER 1: Okay, so you wouldn't you wouldn't try to repair it, you'd rather just buy something new?

SUBJECT B: no, no I don't think I would repair it I don't know where I would go for….

INTERVIEWER 1: So, if someone else were to experience the same damage with the screen breaking or something like that with that phone that android phone that you had is there anything that would've made the whole process easier knowing, like, any information at the beginning that could've aided... I guess you didn't repair it but...

SUBJECT B: Always get the, the plastic stuff.

INTERVIEWER 1: Oh, yeah, the case?

SUBJECT B: Yeah, that's always a good idea.

INTERVIEWER 1: I've broken plenty of phones.

SUBJECT B: Put phones in pockets that have what's it called, zippers? So you can keep it.

INTERVIEWER 1: Okay, and just as a general last question, is there anything that would, any information that you can think of that would make you more likely to, or make the whole repair process easier if you wanted to repair your phone? Is there anything that would make repairing the phone easier that you can think of that you didn't know at the time?

SUBJECT B: If I felt like I knew more about phone repair because I have actually not heard of any friends who was like yeah, you should this and should do the repair.

INTERVIEWER 1: Oh really, so most people you think would be inclined to buy a new one or wait until...

SUBJECT B: Yeah and wait and then buy a new one. Usually, I don't know, you lose your phone after some amount of time so.

INTERVIEWER 1: Alright, well I think that is about all the questions we have, do you want us to go through and review the answers if you want, up to you, do you have any interest in that?

SUBJECT B: Up to you.

INTERVIEWER 1: No, if you wanted to do it we could.

SUBJECT B: It's fine I guess.

INTERVIEWER 1: Well I think that's it then.

Interview with Subject C

INTERVIEWER 1: Can you list the criteria you use when purchasing a smartphone?

SUBJECT C: Criteria? It's, well, if it's easy to use and it's not too big--[the screen is not too big][13]. And I need the [battery][14]can last for some time and that it won't break down easily and something I can bring wherever I go. And well the most important thing that it is easy to use and that I can use it daily and many times a day without it failing. Or I need good [sound][15] and yeah.

INTERVIEWER 1: Perfect. Do you typically research a smartphone before you purchase it?

SUBJECT C: Do I what, sorry?

INTERVIEWER 1: Do you typically research a smartphone before you buy it?

SUBJECT C: Yes, yeah, I look a lot online and I check the prices and see what the price differences where to go if I want to get a discount on it. Also, I read, I have an iPhone and I read that some of the models they were not good so they came out with-- they made a newer version so I kind of read what kind of what's good with the phone and what's not so good and based on the quality and price, I make an assessment.

INTERVIEWER 1: Have you ever had a defective smartphone?

SUBJECT C: Yes, a few years ago I had my old phone it well it broke down once and awhile it just completely shut off and I had to reboot it several times just to get it started. And my apps I had on the phone they just closed down completely when using them. And well I need to get it solved, and it looks like a defect in the hardware system so I went to the place where I bought it. And I told them I wrote down the thing that had happened with the phone and the reasons why I brought it back so yeah that my experience to that.

INTERVIEWER 1: What was the model of your smartphone?

SUBJECT C: It was the iPhone 4s, yep.

INTERVIEWER 1: And how did long you have your phone after purchasing did the defect occur?

SUBJECT C: After the defect occurs? I had it for I think I had it for a year or something. And I was doing a study abroad and when I came home it started acting weird. And it was a rather new

[13] Physical preferences
[14] Battery life
[15] Feature functionality: audio

phone actually so I knew it wasn't something I had done. It was something with the phone so that's why I started writing down the things that happen to the phone and I told the seller and I told the shop about it and they were really skeptic. And at first they thought that I handled it wrong or they asked me if I had dropped the phone or I mean something I could've done to damage it. And I emphasized several times that I never did anything wrong and that I never dropped and that I suspected that it was hardware so it was something that I could've done but it was something that was there from the beginning and manufacture and they agreed-- well after I really spoke my case and being subject to a lot of suspicion they agreed to take it in and they told me if they didn't find anything and it wasn't the hardware they would send the bill to me and I would be responsible for paying. I'm mean the trouble that they have had. But it turns out that I was right what I said it was the hardware and I got a new phone.

INTERVIEWER 1: So did were-- was your product covered under a commercial guarantee or extended warranty?

SUBJECT C: Yep it was, yeah.

INTERVIEWER 1: So, they repaired your phone?

SUBJECT C: Yes, well they, they decided that it couldn't add up to repair it they couldn't repair it so they gave me a new one I'm guessing that the old one was. I have no idea what they did with it but I got a completely new one.

INTERVIEWER 1: So if you were to estimate, how much time and money do you think you spent working on getting it repaired?

SUBJECT C: Well I had they borrowed me a phone and it took maybe and I had to borrow a phone for a week and I think. It was quite a while and it was some hassle. Yeah, it was definitely annoying, the most annoying thing wasn't having to wait but it was more the way that the business or I mean the shop that I bought it because they were kind of putting the responsibility one me and it must've been something I'd done to break it.

INTERVIEWER 1: Do you have any advice for other consumers with similar product defects?

SUBJECT C: Yeah, definitely be consistent and I mean know your rights. And if you are covered by a guarantee use it and write down the things that are wrong with the phone and just go back to the place where you bought it online or shop and play to your rights but it definitely takes some courage because it can be a bit. Especially if you're not an IT geek you need to man up a bit because, yeah, if they see someone that sounds a bit unsure about the whole technical aspect they start questioning immediately. Like if you know more about the products and it and hardware then they take you more seriously and that's good to know too.

INTERVIEWER 1: What information would have made handling the product defect easier?

SUBJECT C: I'm not sure.

INTERVIEWER 2: What would have liked to know before like going out and finding the seller? Would you have known what's covered by like the legal guarantee what's in your coverage the guarantee kind of thing? Or would you have rather known that you're supposed to call the manufacturer versus the seller, that kind of stuff?

SUBJECT C: Well, I had to read the contract, I mean the guarantee before going back but I was still unsure of my rights in that sense if it came back it was something you did. And I would have to pick up the bill for them sending it back and then I'd like to know where to do the math from then and since it's technical I mean yeah I'm not really sure, but just maybe yeah I'm not sure.

INTERVIEWER 1: Okay, that's all of our questions, thank you for taking your time.

SUBJECT C: You're welcome.

INTERVIEWER 1: Have a nice day.

INTERVIEWER 2: Yeah, thank you so much.

SUBJECT C: You're welcome have a good day!

INTERVIEWER 1: Bye.

Interview with Subject D

INTERVIEWER 1: Alright! Cool. So first question is when you're buying a smartphone, what kind of criteria do you use?

SUBJECT D: Well I'm in the IT business so for me it has to be a [cutting edge device][16].

INTERVIEWER 1: Mmhm. Anything else?

SUBJECT D: [Camera][17], [battery][18], and [size][19].

INTERVIEWER 1: Alright. Cool. Do you typically research a smartphone before purchasing it? What kind of information do you research?

SUBJECT D: I mostly of course all the [technical specs][20]. I review just to make sure it's interesting for me and then I'll read all the reviews from internet sources that conduct these tests and so on.

INTERVIEWER 1: Okay. Have you ever had a defective smartphone?

SUBJECT D: Yes.

INTERVIEWER 1: Okay. What was the product defect?

[16] Feature functionality
[17] Feature functionality: camera
[18] Battery life
[19] Physical preferences
[20] Feature functionality

SUBJECT D: Well I had several. One of them had a flaw on the camera. It had made some purple colors. Another one had some because these modern phones are glued together. It was the and it was, it wasn't that way, it was opening in the base of the phone.

INTERVIEWER 1: Okay.

SUBJECT D: It was falling apart.

INTERVIEWER 1: So the frame of the phone was the problem?

SUBJECT D: And then of course, usually that's not our fault. But I've dropped the phone a few times.

INTERVIEWER 1: Okay, what kind? Was this all in one phone or what type of phones were they?

SUBJECT D: No, different phones. Android phones…HTC and Samsung.

INTERVIEWER 1: Do you remember the model of those phones? Like if they were HTC One or?

SUBJECT D: I've had so many phones so I had the problem with the HTC One, I think it, I think it was the One. And then, I had problems with the Samsung and the Galaxy S2.

INTERVIEWER 1: Okay.

INTERVIEWER 2: Which defect went with which phone?

SUBJECT D: The HTC went with the glue thing. And the camera part, and the, and the One. And the Samsung one had the coloring issue, the camera.

INTERVIEWER 1: Okay, great. How long after purchasing the products did the defect, did you discover the defect or did the defect occur?

SUBJECT D: Well, the camera was, that was within a few months. And the falling apart was a year.

INTERVIEWER 1: Okay, great. Would you consider yourself to be at fault for the defect? Maybe not for like the camera but you said you dropped the phone?

SUBJECT D: Oh yeah yeah. No, I it was all due to some manufacturing process.

INTERVIEWER 1: Great. So was the product covered under a commercial or extended guarantee or warranty?

SUBJECT D: Commercial guarantee.

INTERVIEWER 1: So like the seller guarantee or like the manufacturer?

SUBJECT D: The seller.

INTERVIEWER 2: For both defects?

SUBJECT D: Yeah.

INTERVIEWER 1: Great. So did you choose to repair the smartphone or get it replaced completely?

SUBJECT D: Repaired.

INTERVIEWER 1: Repaired. Okay. Why did you choose a repair over replace?

SUBJECT D: Because I don't think I had the, I didn't have the, I couldn't choose to, I couldn't choose to have the replacement.

INTERVIEWER 1: Oh okay. So the seller told you to just repair it. So what was it like trying to get your phone repaired? Like what kind of process did you go through and what was the actual outcome?

SUBJECT D: I just, I just went to the store and they, and they made a, what do you call it, RMA?

INTERVIEWER 1: Oh yeah, like a report.

SUBJECT D: Yea. And then, within a few weeks, I got it back. So it was very simple.

INTERVIEWER 1: Okay. So like not really too much effort or time?

SUBJECT D: No, no.

INTERVIEWER 1: So did you have to spend any money for the repairs?

SUBJECT D: No.

INTERVIEWER 1: Okay so free repair. That's great!

SUBJECT D: Yeah, good. But then again, it was under the guarantee so.

INTERVIEWER 1: How much time did it take you to get your phone back after a repair?

SUBJECT D: I think it was a few weeks.

INTERVIEWER 1: Did they offer you any like any substitute while you were waiting for it?

SUBJECT D: Yeah, yeah. But I had, I had my own so. And they usually, they offer you a really old phone.

INTERVIEWER 1: So did you go back directly to the seller to repair your phone or was it a different third party to repair your phone?

SUBJECT D: I think it actually, it was a different third party. Because it was for, on the internet, and then they had this arrangement with the...

INTERVIEWER 1: So it was like an authorized repair shop?

SUBJECT D: Yeah.

INTERVIEWER 1: Okay. Great. With your experience with defective smartphones, do you have any advice for like other consumers with similar product defects about like how to get through the process or like what to know kind of thing.

SUBJECT D: Well, if you're within the, the guarantee. Then it's no problem. You just, just go to the shop and you, and you will get the repair. That's very, it works quite smoothly in Denmark. I haven't experienced it myself but I have heard from others that at this. That for months without their phones and you have to, have to decide if you want to. I think they have, that part of the guarantee is that they, they reserve the right to repair and not to replace it. So you cannot, you cannot demand a new phone. Or a replacement phone. If its, if its, like what I had with the camera if its within the very first month of it, you should actually have it replaced. But otherwise I think it actually, it works really well.

INTERVIEWER 1: Okay, good to know. What information would have made like handling the product defect easier? I know it like seemed kind of simple for you in your experience. But like what kind of information would have been like good to know before like about before getting your phone repaired.

SUBJECT D: Well I think the, the criteria for when to get a replacement and when they repair. And how long you have to wait for the repair and how long will it if the repair is very, it will take a long time for the phone to be repaired, that's when, when are you, when do they have to give you a replacement phone. Some of those simple questions would be nice.

INTERVIEWER 1: Well, so that's it to the interview questions. Do you have any other questions?

INTERVIEWER 2: For each defect, was it always that easy to get a repair?

SUBJECT D: Yeah.

INTERVIEWER 2: You never ran into any kind of difficulty?

SUBJECT D: No, no. And it's, I think it's also because its, it was actually the same, the same repair, authorized repair shop.

INTERVIEWER 1: Oh that's convenient. They do all sorts of smartphones?

SUBJECT D: I think they're actually now… They're still there.

INTERVIEWER 2: Where did you go? Do you remember the name of the place?

SUBJECT D: It's been couple of years. No, I can't remember the name of the place.

INTERVIEWER 1: No problem! Any other questions?

INTERVIEWER 2: No. I think that's it.

INTERVIEWER 1: Well, great! Thank you!

Interview with Subject E

INTERVIEWER 1: So to start off if you could list the criteria you use when purchasing a smartphone?

SUBJECT E: Haha I actually don't have a lot, I think I should be able to go online I don't really care too much about the quality of the photo because I don't take a lot. It'd be nice if it was like [small][21] but you still have to see stuff on it not that heavy, [fast][22]. [Good audio][23] cause I listen to a lot of music on it what else? It should support like um [PowerPoint, excel, word][24] stuff like that and I think that's it.

INTERVIEWER 1: Okay, do you typically research a smartphone before purchasing it?

SUBJECT E: I didn't buy a lot of them but yeah, of course I would if I were to buy a new one.

INTERVIEWER 1: What kind of information would you look for?

SUBJECT E: I think I would go online and look for a comparison of phones and the price and see what fits my wallet and then yeah and the criteria that I have.

INTERVIEWER 1: Have you ever had a defective smartphone?

SUBJECT E: No, I've ruined some.

INTERVIEWER 1: You've ruined some? What happened?

SUBJECT E: Dropping them I did in water too that's not a good idea. Actually right now both my front and back screen broke it's been that way for over a year I think.

INTERVIEWER 1: Wow, so what's the model of your smartphone?

SUBJECT E: iPhone 4s.

INTERVIEWER 1: Okay, and how long after purchasing it did you break it?

SUBJECT E: First time, probably like 6 months after I'm not like a careful person I don't use the coverage I do now because otherwise I'd get glass in my hands whenever I use it, but that's why.

INTERVIEWER 1: So was the products covered until commercial or extended warranties, guarantee?

SUBJECT E: No, just the two years thing I think, but that doesn't cover you dropping it I don't think.

INTERVIEWER 1: How come you chose not to get it repaired?

[21] Physical preference
[22] Functionality of applications
[23] Feature functionality: audio
[24] Application capability

SUBJECT E: I did a couple of times and then I figured I'll just do it again and it works alright and it's pretty old now. I think it's like what is it like four years old so now I'm thinking like whenever its done its done. I don't want to spend any more money on it.

INTERVIEWER 1: So can you describe the repair process you went through when you did get it fixed?

SUBJECT E: I just went to a shop close to where I live?

INTERVIEWER 1: Was it third party shop?

SUBJECT E: Yes, I think you called it that. It wasn't like an apple store or anything like that.

INTERVIEWER 1: Was it authorized by Apple?

SUBJECT E: I think it was. I don't know, I went there and they made in like 20 min they changed the screen. I don't remember if I had some problems with the home buttons too. I think I did and I had it repaired too.

INTERVIEWER 1: And it cost you money.

SUBJECT E: Yes, it did.

INTERVIEWER 1: How much was it?

SUBJECT E: I think repairing both front and back is like 800.

INTERVIEWER 1: Oh, oh, kroner.

SUBJECT E: Yeah, yeah, but that's a lot cheaper than if I went to go to Apple to have them fix and it would probably take a lot longer.

INTERVIEWER 1: Did you look at going to Apple like did you do research before?

SUBJECT E: I looked online how much it kinda cost so like and then I decided this is not like this is not like one of the expensive places so I'll just go there. But, yeah, as I said sometimes so I've been different places but it is kind of similar every time and they provide warranty too for their work.

INTERVIEWER 1: That's cool.

SUBJECT E: I don't know exactly what it means I guess it means if the screen doesn't work when I had it repaired I could come back.

INTERVIEWER 1: Do you know how long it lasted?

SUBJECT E: I think it's two years because I think that's the usual when you buy something here when I ruin it before.

INTERVIEWER 1: So do you have any advice for consumers with similar product defects?

SUBJECT E: Use something protective, I don't know I think I've been satisfied with going where I did for less money and then if I have to go to an apple store next. But I guess now they have a

lot of stronger equipment that doesn't break that easily I would probably actually look for that when I'm going to buy a new phone cause I didn't drop it all the time.

INTERVIEWER 1: So you're going to look for more durability, if you were going to buy a new smartphone soon?

SUBJECT E: Yeah, durability I guess durability, yeah. I should buy a new one, I just think they are so expensive. So I would rather, like that's why I hadn't change for some time. But now I feel like, yeah, I think it's almost done so that's why I'm not going to do it again.

INTERVIEWER 1: What information would have made handling the product easier so what would've helped you decide what to do?

SUBJECT E: Hm, I don't think I had any problem deciding what to do because you can look a lot up online. And for me it was mostly the price and it was an authorized place to go to, but I think I don't know I don't think there could've been a lot more. Mostly because I don't think there would be provided a lot of information about that stuff I don't know what to expect kinda, yeah.

INTERVIEWER 1: When you brought the phone did the sellers ask you any questions or did you just tell them "oh I dropped it?"

SUBJECT E: Well, yeah, I said well I think I just need my screen fixed and that was it. Kind of like yeah, no they didn't ask me anything actually. But, I also think that they look at it and they make whatever needs to be fixed and then they fix it.

INTERVIEWER 1: So, the purpose of this is we are making a guide on how to repair products, so as a consumer is there anything that you think would be useful that you'd like more information on outside of screen breaking or?

SUBJECT E: I think it is nice to know that warranty does not wear off if you get it made somewhere. Or like there should be some kind of guide to tell that if you have it made here the warranty won't wear out. But I also think it should be clear that I think you pay a lot more if you get it done through Apple than everywhere else. And I think the product is the same it's as durable if I had it made by Apple, which is also why I would never buy insurance cover extra from Apple because I think the only reason to do that is to be able to, when the warranty is almost up, to break your thing to get a new one. I think a lot of people do that but yeah, I don't do that.

INTERVIEWER 1: Do you have a new phone in mind?

SUBJECT E: I'd probably buy a new iPhone.

INTERVIEWER 1: Another iPhone?

SUBJECT E: Yeah.

INTERVIEWER 1: iPhone 6

SUBJECT E: Probably, but I'll wait for a while because I think they are expensive. But yeah, because now I'm used to the iPhone way and I've been pretty happy with it. I think it's not good at all anymore it's super slow and like crashes all the time, but I think it's been holding for like four years which is okay I think, I don't really know.

INTERVIEWER 1: Do you have any other questions?

INTERVIEWER 2: No, I think I'm all set.

INTERVIEWER 1: Thank you.

SUBJECT E: No, thank you.

Appendix C: Observation and Interview Schedule

Schedule was based off the one described in "Communicating about the management of medications as patients move across transition points of care: an observation and interview study" (Manias et al. 2016).

Observations

- Brief the subject with the provided consent form.
- Ask about any previous smartphone defects the subject has encountered. If the subject can reflect on one, skip to the fourth bullet. If the subject cannot recall an experience, or cannot reflect on it, then go to the next bullet.
- Describe the smartphone defect scenario and how this scenario will be applied to the use of the reparability guide.
- Provide the subject with the guide and ask them to do their best to read through the guide and use what they read to come to a solution.
- Begin the stopwatch when the first page of the guide is read.
- Take notes on any behaviors that are prevalent to the guide. For example, if the subject continues to flip through pages, or if the subject remains on one page for an extended period of time.
- Stop the stopwatch when the subject signals completion.

Follow-Up Interview

- See Appendix D.

Appendix D: Observation and Interview Questions

Verbal Consent for Danish Citizens

We are a group of students from Worcester Polytechnic Institute in Massachusetts. We are conducting an observational and interview study of Danish consumers. During this study, we will ask you to think of a previous smartphone defect you've experienced, or provide you with a smartphone defect scenario. Using our guide on smartphone reparability, you will determine the best method of obtaining a functional smartphone. We will be observing your behaviors during the use of the guide. Our goal is to make improvements on the guide based on your feedback from both observations and interview questions. We strongly believe this kind of research will ultimately benefit consumers and enhance their experience.

Your participation in this interview is completely voluntary and you may withdraw at any time. Please remember that your answers will remain confidential. No names or identifying information will appear on any of the project reports or publications. This is a collaborative project between the Forbrugerrådet Tænk and WPI, and your participation is greatly appreciated. If interested, a copy of our results can be provided at the conclusion of the study.

Now that you have read the guide, I will ask you some specific questions about it – but first let me know if you have any general comments or first impressions on the guide?

1. Did the order of the guide's information make sense?
2. Did the respective headlines in the Contents list make sense? Do you understand what to expect from the different headlines?

3. How did you navigate to the decision tree for your smartphone defect? How was the navigation process?
4. (Go through each question in the respective guide) Did this question make sense? Why or why not?
5. When navigating to another page to obtain additional information, did you find it easy to locate the page and then go back to the guide? Was the additional information helpful? Why or why not?
6. Was the overall guide easy to understand? Why or why not?
7. Did you experience any difficulty or confusion when using the guide?
8. Was the guide helpful in determining an easy method of repair or replace?
9. Do you think this guide would be a useful resource to have as a consumer?
10. Is there any information lacking that you think would be useful to include in the guide?
11. Do you have any recommendations to help make the guide more understandable?

Appendix E: List of Websites Used to Gather Smartphone Repair Prices

www.smartphonecare.dk

www.phonetrade.dk

www.brugteiphones.dk

www.justrep.dk

www.ip-support.dk

www.mytrendyphone.dk

www.teleone.dk

www.irep.dk

www.samsungrep.dk

www.gophone.dk

www.phoneservice.dk

www.phonecare.dk

www.mobilecentermidt.dk

www.irepair.dk

www.dktech.dk

www.phonefixpro.dk

Appendix F: Guide to iPhone Defects (English)

Guide to iPhone Defects: To Repair or Not to Repair Your iPhone

This guide will advise you on whether to repair or replace your iPhone based on your defect and your needs. It will also give you information on how to back-up, assess the resale value, recycle, and dispose your iPhone.

To begin this "To Repair or Not to Repair" guide for defective iPhones, first determine the defect description that best fits your problem. Throughout the guide, a series of questions will be asked to understand your iPhone's condition. If you do not understand a question or need help answering a question, additional information is provided at referenced page numbers. After a decision on whether to repair, replace, or wait has been determined, information about different repair types, replacement options and what to do while waiting to replace your phone can be found at the end of the guide.

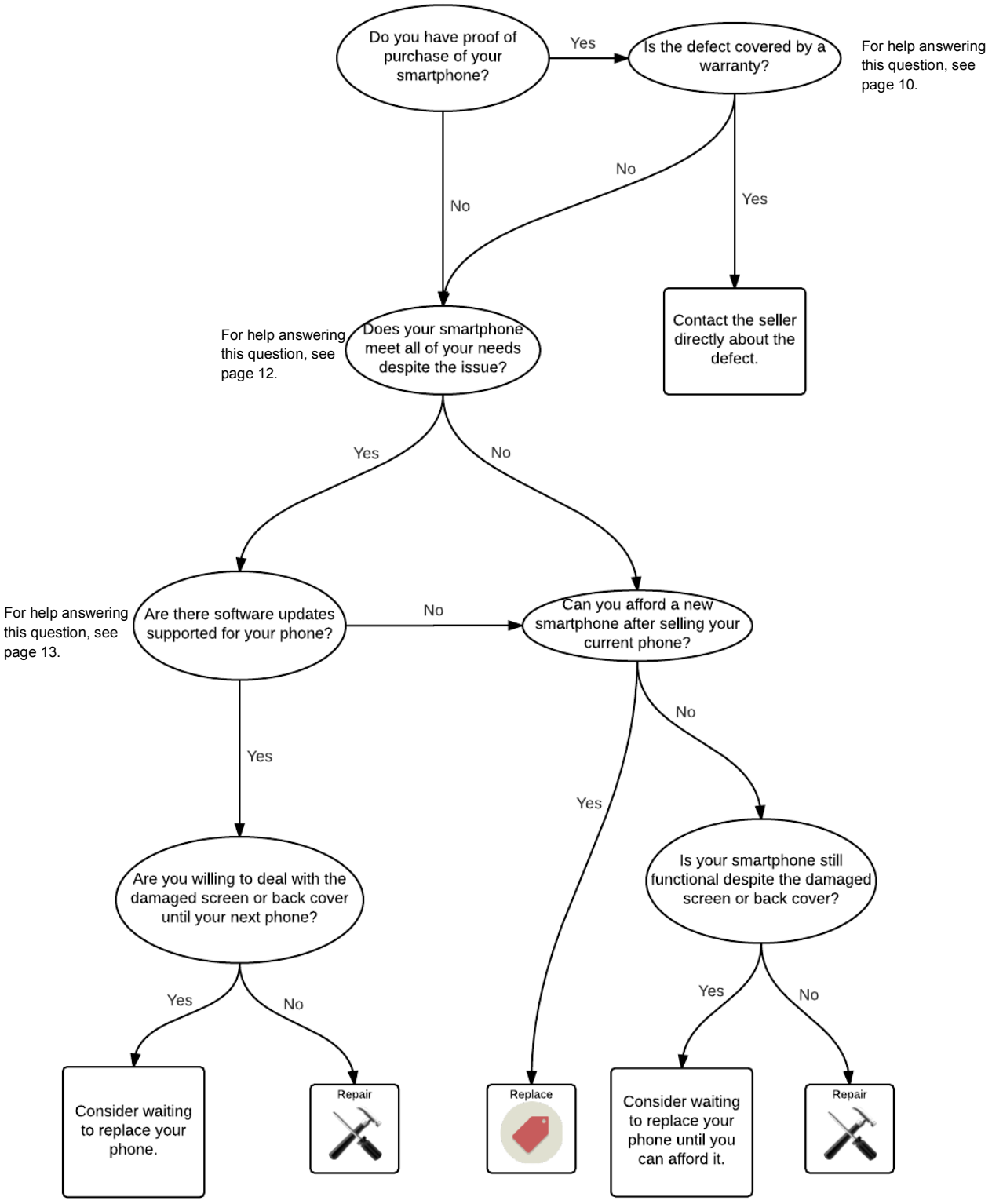
TABLE OF CONTENTS

Find the Best Solution for Your iPhone Defect: Repair or Replace?

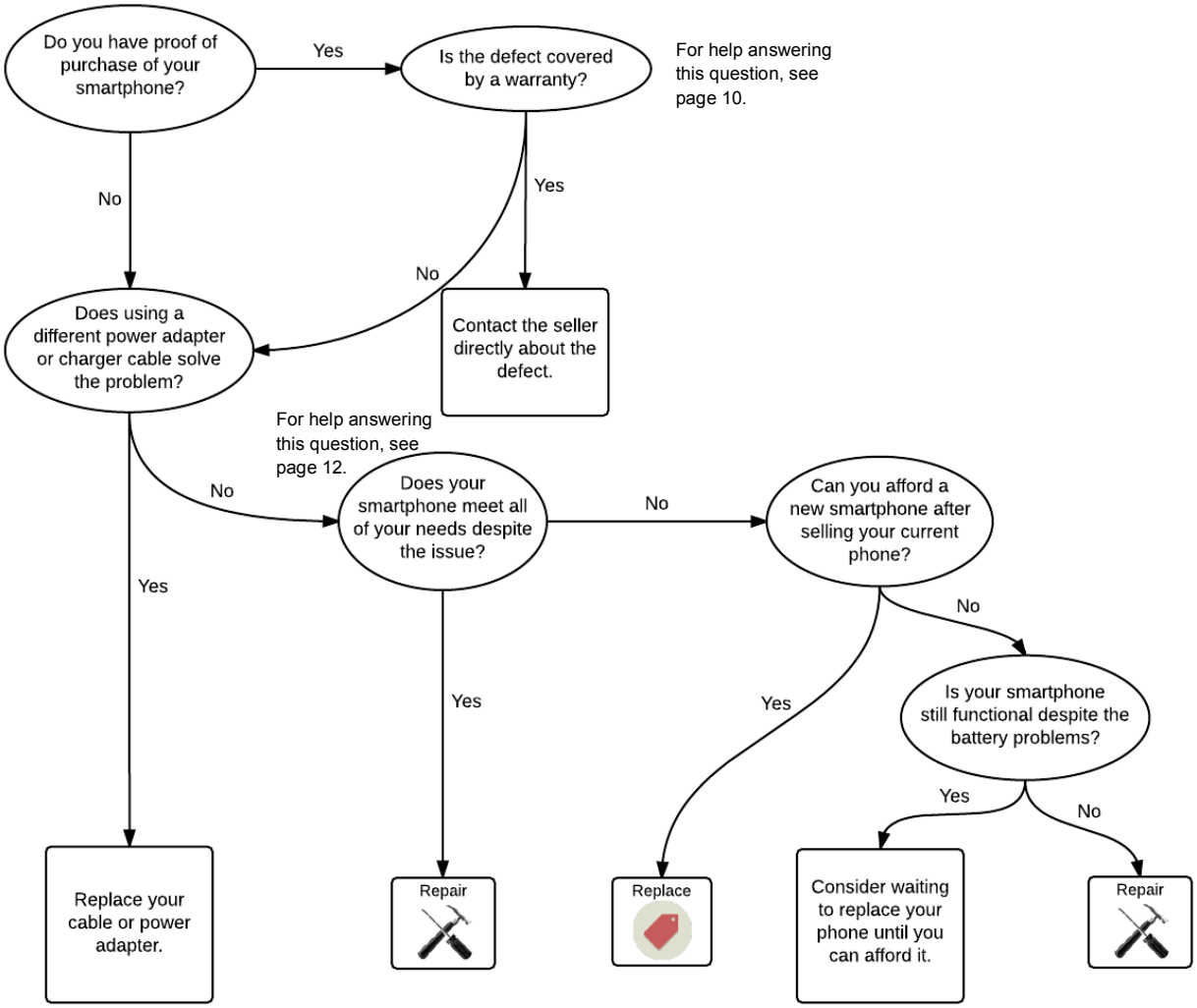
Find the defect listed under your operating system that *best* describes the iPhone defect(s)[1] you are experiencing and navigate to the corresponding page.

[1]In the case of multiple defects on one iPhone, you can either choose to navigate through multiple defect guides, or you can choose the defect that is most cumbersome to you and find a solution. However, your solution for one defect may not solve the other defects. Navigating through multiple defect guides may provide different solutions, at which you should choose the one that works best for you.

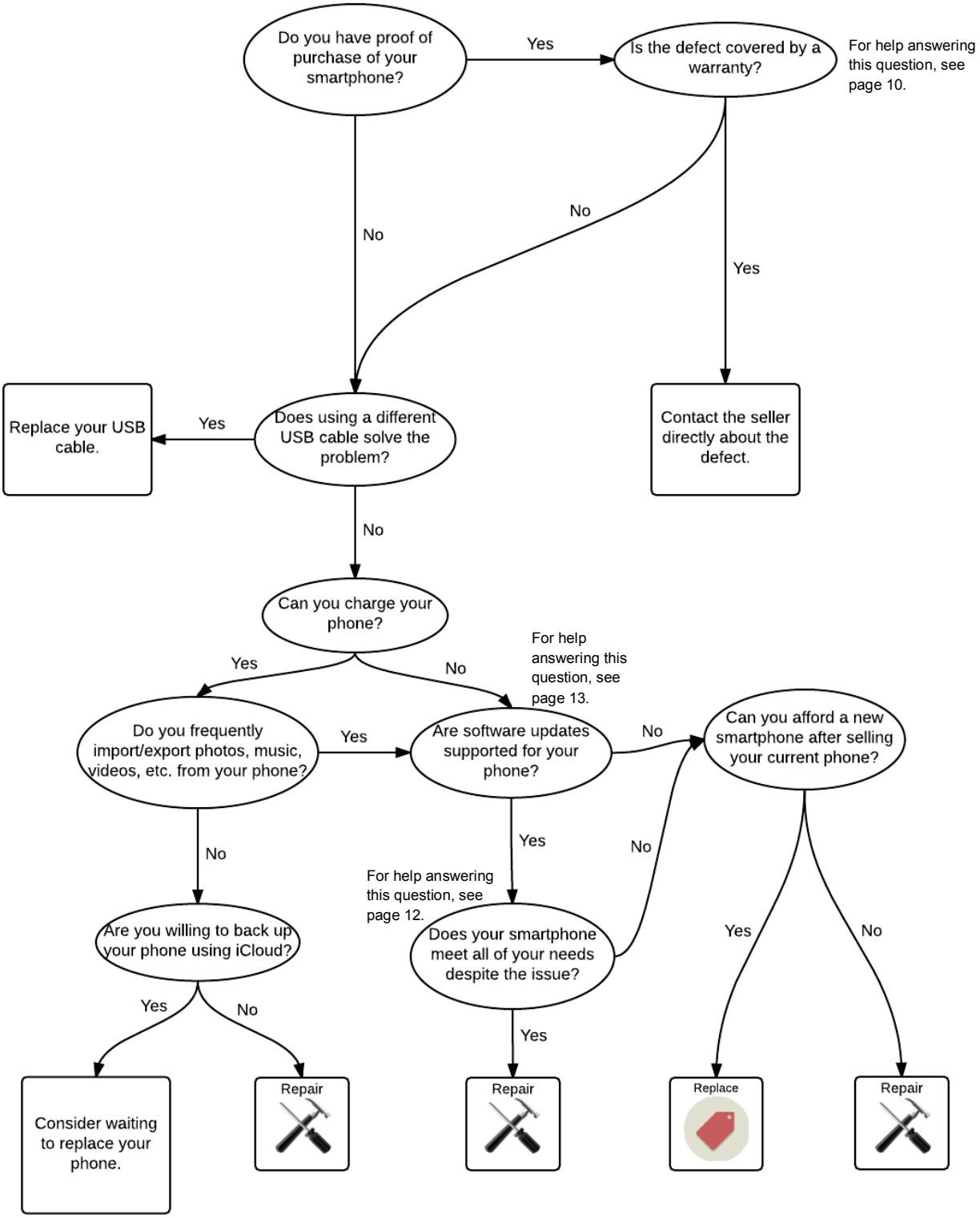
Defect: Screen Damage/Malfunction or Back Cover Damage



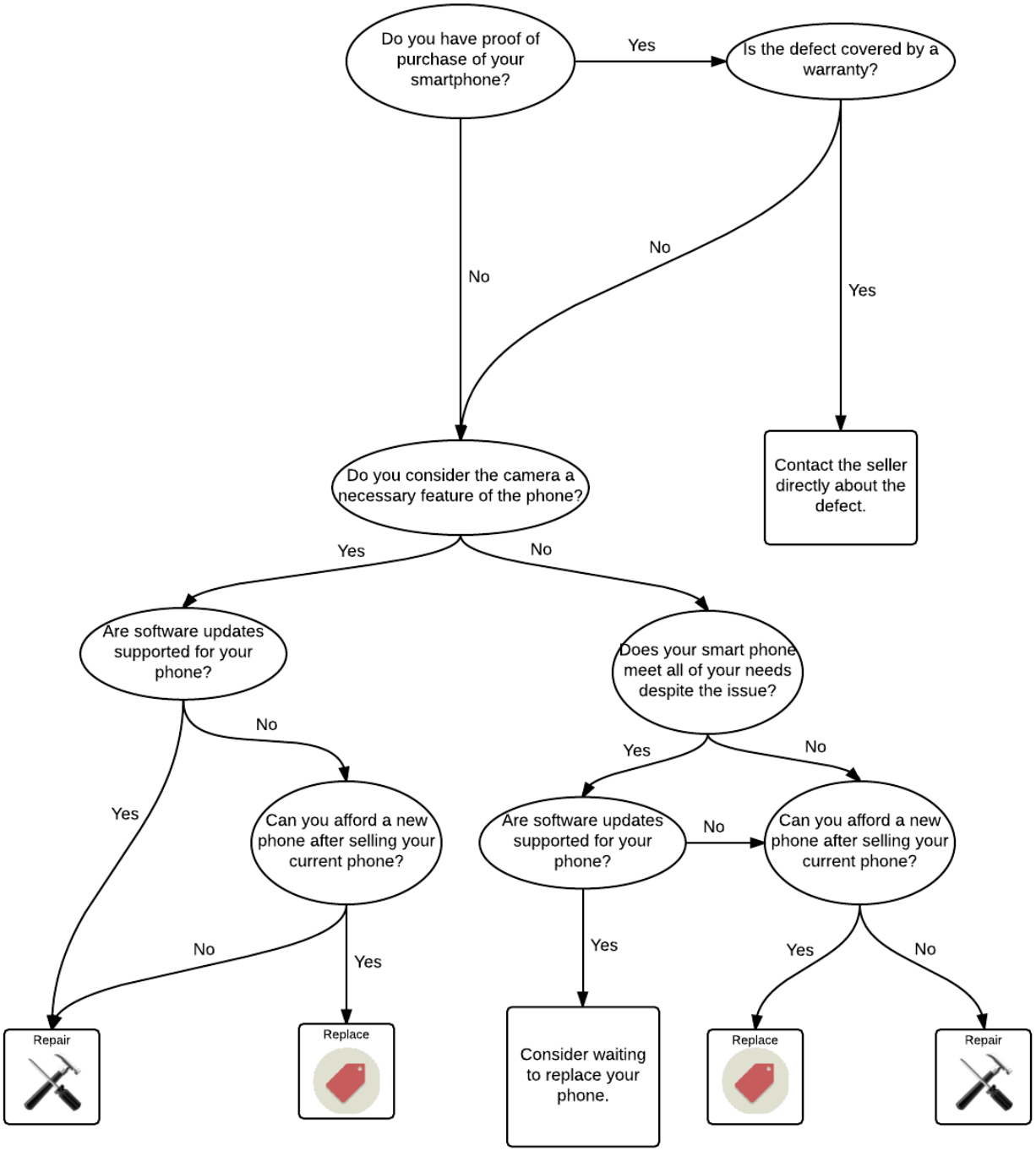
Defect: Battery Problems



Defect: USB Connection Problems

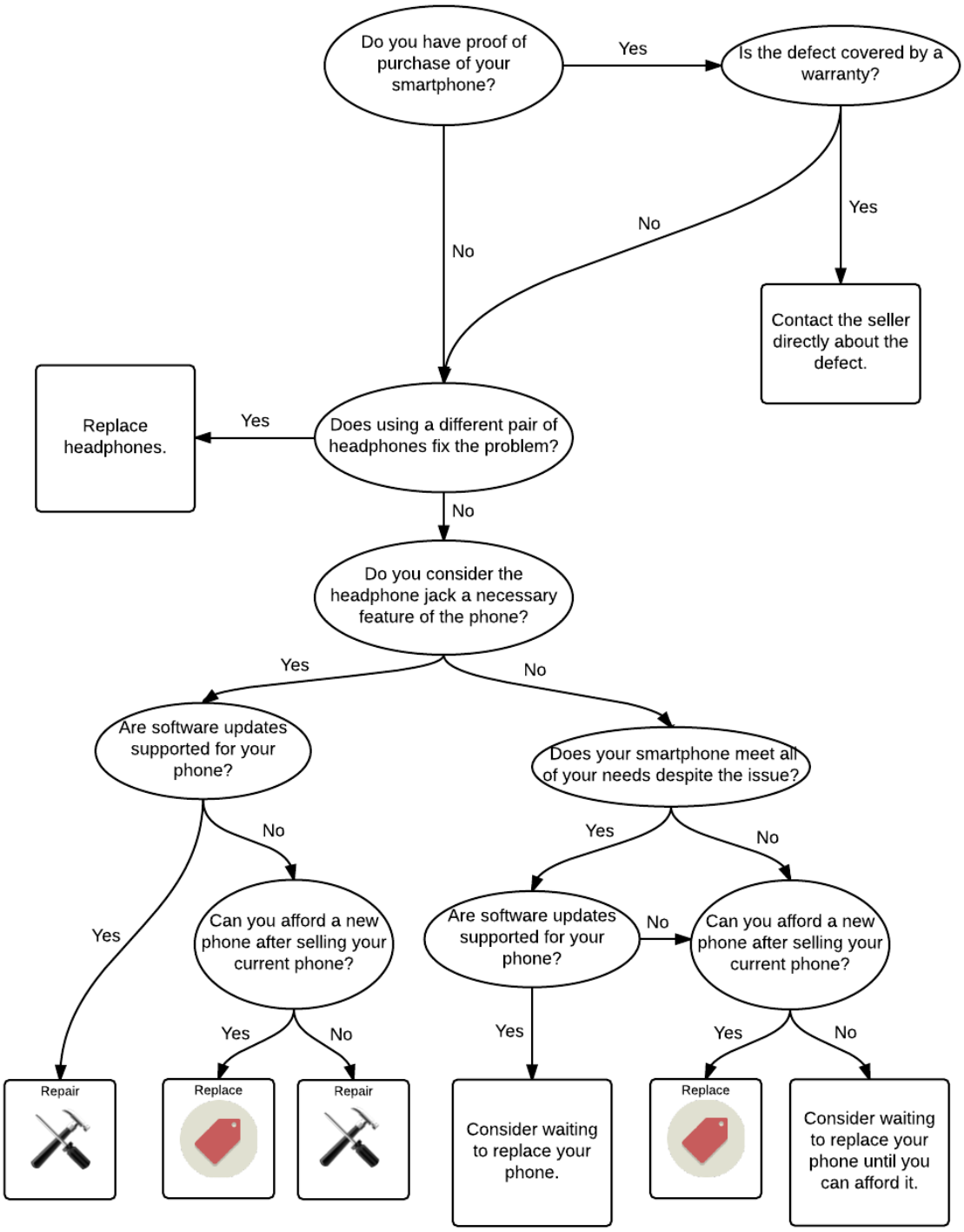


Defect: Camera Not Working

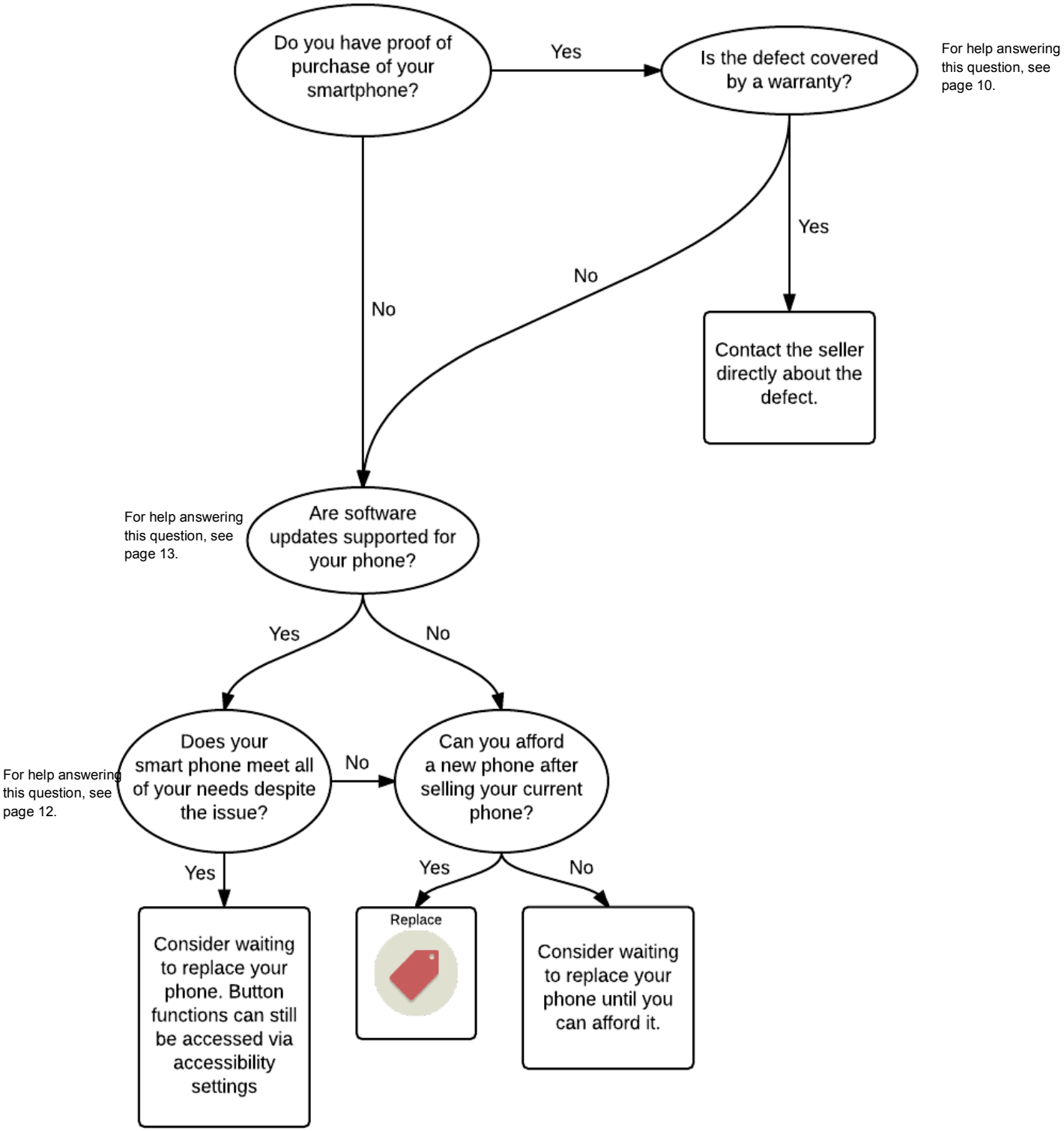


For help answering this question, see page 10.

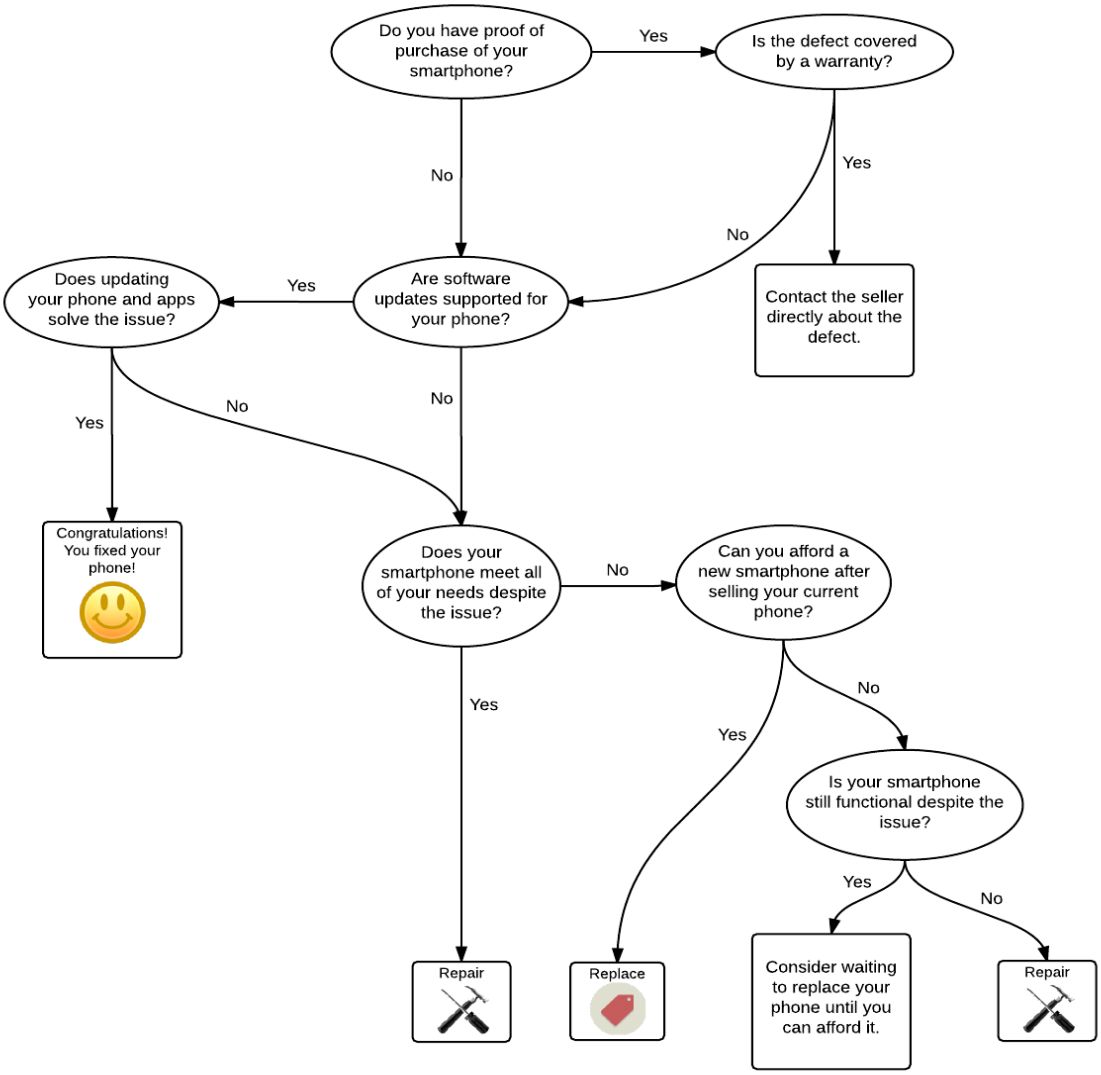
Defect: Headphone Jack Not Working



Defect: Buttons Not Working



Defect: Running slow/glitching



Is your defect covered by a warranty?

It is important to know whether your defect is covered by a warranty before considering other options. If the defect is covered, the best option is to contact the provider of the warranty directly, as the price of repair or replacement is substantially lower or free. A quote from a Danish consumer highlighted the importance of product knowledge saying, “If you know more about the products and its hardware, then they take you more seriously.”

Know Your Rights as a Consumer

Under Danish law, all products sold within Denmark come with a **two year legal** guarantee at no cost. The legal guarantee allows the buyer to return a product that is faulty or not as advertised to the seller and receive either a replacement, repair, or refund. In order to benefit from the legal guarantee, the defect must be faulty at the time of receipt. Repair shops will often charge a fee to inspect the phone and determine whether the defect was your fault. If the defect is determined to be your fault, the phone is not covered under the legal guarantee. If the defect is not your fault, the inspection fee may be refunded and the phone is covered under the legal guarantee. Be sure to ask about this fee before having your phone inspected.

If you would like to return a product within six months of receipt, you need only provide the seller with proof of purchase and show that the product is faulty. After these six months, however, you must prove that the product was faulty at the time of receipt (eg. the product was constructed poorly which resulted in a malfunction) in order to take advantage of the legal guarantee.

Check to see if your defect is covered under your warranty.

Phone Type	Warranty	How Long Are You Covered After Purchase?	What Is Covered?
Apple	AppleCare	**Hardware Repair:** 1 year. **Software Support:** 90 days.	**Hardware Repair:** Coverage includes: iPhone, battery replacement (less than 80% of original battery life), earphones and accessories. Authorized Apple technicians only. **Software Support:** Troubleshooting iPhone, iCloud, iOS and apple-branded apps.
	AppleCare +	**Hardware Repair:** 2 Years. **Software Support:** 2 Years.	**Hardware Repair:** Same coverage as AppleCare, with the addition of coverage for 2 incidents of accidental damage, not including theft or loss of iPhone. **Software Support:** Same as coverage as Applecare.

Does your phone currently meet your needs?

Understanding what you desire in a smartphone is an important part of deciding whether or not to repair or replace your phone. You want to consider many different attributes of your phone to get the full understanding if your phone *really* meets your needs. Below is a list of characteristics and attributes to consider. Please keep in mind that the list is not to provide a concrete yes/no answer, but to get you thinking about how your phone's attributes meet your needs.

Consider the following to help you decide if your iPhone currently meets your needs:

- **Does the phone size fit your preferences and needs?**
  - Do you need your phone to fit in your pocket? Or would you rather have a phone big enough to watch videos on or read with?
- **Is the phone functionalities satisfactory?**
  - Camera (picture quality, capture settings, etc.)
  - Audio (volume and quality)
  - Touch screen or screen (sensitivity, accurate touches, resolution, etc.)
  - Physical keypad or keyboard (if applicable)
- **Does your phone run apps and other programs fast or smoothly enough?**
  - Can your phone start and operate apps without significant crashes or freezes?
- **Is the phone capable of running the apps you want or use?**
  - Consider the capability of updating current applications you use.
- **Is the battery life adequate for your daily usage?**
- **Does the phone have enough storage?**
  - If not, does your phone have an SD card slot?
- **Is your phone's network capability sufficient?**
  - Is your phone equipped for a 4G network, or is it too old?

Does your iPhone support software updates?

iPhone updates provide users with new features, but more importantly fix bugs and patch security vulnerabilities. If your phone is no longer supported by software updates, it means that any vulnerabilities and bugs will not be fixed. Using an unsupported iPhone can put your phone and your data at risk.

How to determine if your iPhone is supported

If you have recently downloaded a software update for your iPhone then it is likely that your phone is still supported. You can also check with Apple to see if there are any software updates available for your phone at the moment. If you have not noticed a software update for an extended period of time, and there are no updates currently available, you should check with your phone carrier to determine if the phone is supported or not.

What are the costs for repairs of iPhone defects?

Spare parts are readily available online and in many repair shops for smartphones. There are two types of spare parts you should be aware of when you are attempting to fix your defective phone: OEM and non-OEM replacement parts. OEM stands for Original Equipment Manufacturer parts, meaning the products were produced by Apple. Non-OEM replacement parts are frequently sold as generic spare parts by other companies. OEM parts are more expensive, but usually come with a warranty. Non-OEM replacement parts can be less expensive but quality of the parts will vary. Using non-OEM parts voids any existing warranties and may not come with additional warranties. Additionally, repairs done by authorized service shops will not void your iPhone's original warranty whereas repairs done by unauthorized service shops will void it but the shop may offer its own warranty for the repair. Authorized service shops are also more likely to repair with OEM spare parts.

The prices below are costs of iPhone repairs from local repair shops in Copenhagen. The wide range of prices is due to the ability to purchase both OEM and non-OEM replacement parts. Be aware of the risks associated with non-OEM replacement parts, including poor quality spare parts and the lack of a warranty.

Apple

	3G	3Gs	4	4s	5	5c	5s	6	6+	6s	6s+
Screen Damage	200-500	200-500	300-700	300-800	600-1300	600-1500	600-1400	900-1700	1200-2500	2000-3000	2400-3400
Back Cover Damage	300-800	300-800	200-300	200-300	800-1200	800-1300	800-1200	1200-1600	1700	1500-2200	1500-3500
Battery Problems	300-400	300-400	200-400	200-500	250-600	300-600	300-600	370-600	350-600	400-600	500-800
USB Connection Problems	270-500	300-500	200-400	200-500	300-600	300-600	300-600	375-600	320-600	360-700	460-800
Camera Not Working	200-500	200-500	200-400	200-500	280-600	300-600	30-600	380-600	380-600	400-700	400-800
Headphone Jack Not Working	400-500	400-500	280-400	280-500	300-600	300-600	300-600	300-600	380-600	500-600	400-800
Buttons Not Working	280-500	300-500	200-400	250-500	200-600	200-600	200-600	250-600	380-600	400-700	340-800
Running Slow/Glitching	200-250	200-250	150-250	150-250	200-250	200-250	200-250	200-250	200-250	200-250	200-400

How to optimize your iPhone

If you choose to wait before you replace your phone or to repair your current phone, there are a few things you can do to make sure your phone is running as fast and as efficiently as possible. Before anything else, make sure your phone's software is up-to-date.

One simple way to make sure your iPhone is running optimally is to ensure that there is enough free storage space. Having ample unused storage is not only helpful for when you want to install new apps or take videos, but it also allows the phone to run smoothly and quickly. The simplest way to clear space is to delete large files that you don't need. Most likely, these files include photos, videos, music, and apps. To view the files on your phone that are taking up the most space, navigate to settings, select "General," then "Storage & iCloud Usage," and then "Manage Storage". Here you can view the apps that take up the most space on your phone. Consider deleting large apps.

Next, remove photos, videos, and music files from your device. This can be done by simply deleting the files from your phone. If you would like to save the files off of your phone, plug the phone into a computer and backup the phone using iTunes. Alternatively, cloud services such as iCloud and Google Drive allow you to upload files directly to your account without a USB connection.

From the moment you begin using your phone, the battery starts to degrade. In order to get the most out of your battery, be sure to frequently close out of apps that you are not using. To do this, navigate to the settings and select "Battery". Here you can view apps that are using the battery. To close an app, double tap the home button and swipe up on an app. To further increase your battery life, reduce the screen brightness and disable features that you do not use, which may include location services and Bluetooth.

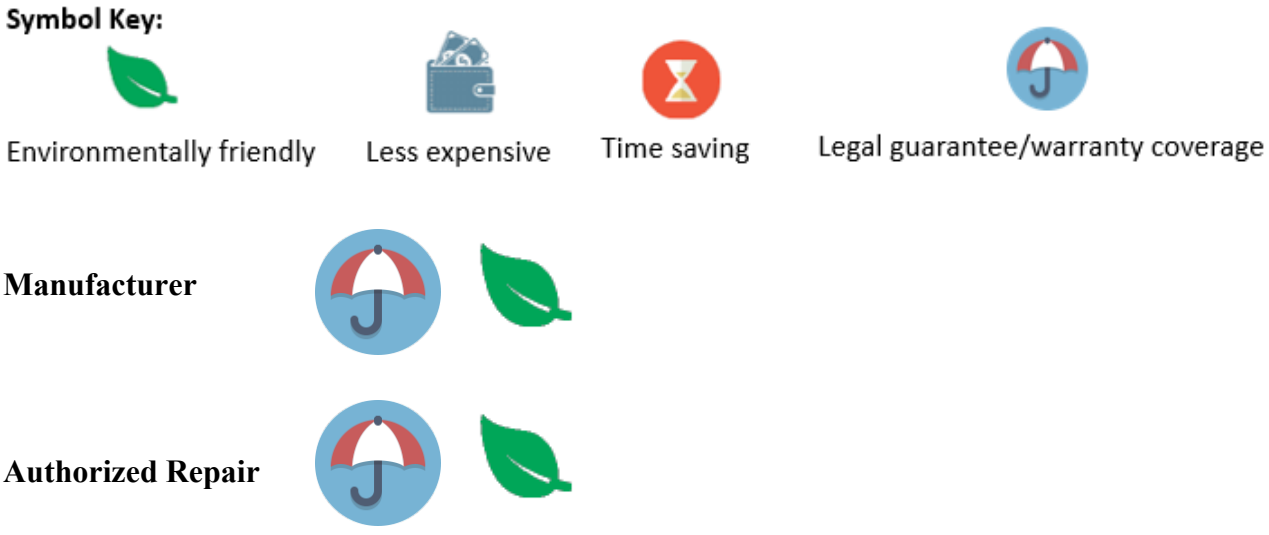
What are your options after you come to your decision?

Repair Options

Repairing an iPhone can be done in various ways. One common option to repair an iPhone is to take it back to the manufacturer, which in this case would be Apple, or an Apple-authorized repair shop. If your phone is still under warranty, then this repair method may be the only way to maintain the warranty, and the repair may even extend the warranty of the phone. A manufacturer repair also ensures that no further damage will be done to your phone.

Taking your iPhone to a third party repair shop is an alternative repair. Consumers are often more satisfied with third party repair work than repairs done by manufacturers, and the repairs can be cheaper as well. It is important to research third party repair options, to find one that best fits your needs. Reading reviews online can help give a better understanding of the quality and price of the repairs. Be sure to also check whether the repair shop is authorized by Apple. If the repair shop is authorized, then repairs will not void the phone's warranty. If the repair shop is not authorized, any repair may void the existing warranty of the phone and should therefore be avoided.

The final option for repairing iPhone defect is do-it-yourself. If the iPhone is still under a warranty, then attempting a DIY repair will void the warranty. Repairing iPhones can be very difficult, so it is important to understand the risks before it is attempted. This option, however, is usually the cheapest repair option. To find information about how to repair many different defects, visit www.ifixit.com.



Non-Authorized Repair

DIY

Replacement Options

You can replace your iPhone by acquiring a brand new phone, a refurbished phone, or a used phone, depending on your budget and preference. A refurbished phone is a phone that has been returned by the owner either due to a problem or a change of mind. It is technically not a new phone anymore but before being sold again, the phone is tested for problems and defects and fixed when necessary. The main difference between a refurbished phone and a used phone is that a used phone is sold as it is and has not been tested or fixed. Compared to a new phone, a refurbished phone is less expensive, but should work like a new phone and come with a warranty or guarantee of some sort. The legal guarantee also covers a secondhand product bought from a trader with a 2-year minimum guarantee.

To gain more insight on the characteristics you should consider when purchasing a new smartphone, see "The Expert's Advice: How to Find the Right Mobile" at the following link: http://taenk.dk/test/smartphones-og-mobiltelefoner/ekspertens-raad-saadan-finder-du-den-rigtige-mobil

New

Refurbished

Used

Waiting to replace

From the article Mobil: Køb på det rigtige tidspunkt og spar penge: http://taenk.dk/gode-raad/prisudvikling-koeb-billigt-paa-rigtige-tidspunkter/mobil-koeb-paa-det-rigtige-tidspunkt-og

"Priserne på de nye iPhones er høje. Venter du med at købe til bare et par måneder senere, kan du få telefonen en del billigere. For eksempel bliver topmodellerne fra Android-producenterne lanceret i forårsmånederne og falder hurtigt i pris hen mod sommeren. Samsung Galaxy S6 32 GB kostede for eksempel 5.399 kroner ved udgivelsen i april 2015. Kun 2 måneder efter kunne du spare 1.000 kroner og få samme telefon for 4.387 kroner. Ventede du en måned til, var prisen helt nede på 3.872 kroner. Sony og HTC lancerer også deres topmodeller i løbet af foråret, og samme mønster gælder for disse telefoner. iPhones er de seneste år blevet lanceret i starten af efteråret.

Modellen fra sidste år bliver typisk sat væsentligt ned, når dens efterfølger kommer på markedet. Så hvis du ikke har noget imod en telefon med 1 år på bagen, er der rigtig mange penge at spare. Du skal dog huske, at telefonen vil blive forældet et år før. Det gælder blandt andet i forhold til styresystemet.Samsungs S5-telefon var ved lanceringen af S6-modellen faldet fra omkring 5.000 kroner til 3.098 kroner. S6-modellen kostede 5.399 kroner – så hvis du kan leve med sidste års model, kan du spare mere end 2.000 kroner.Prisudviklingen på iPhones minder meget om den for Samsungs telefoner."

What to do with your old iPhone

How to find the resale value of your iPhone

To find the resale value of your iPhone, you can go into phone stores that buy used phones, or go online to get a quote. You will usually be asked about the condition of the phone, including whether there are existing defects and if there are accompanying accessories (chargers, headsets, etc.). The condition of the phone will affect how much you are offered for your phone and some stores will still buy your phone even if it has physical and software defects. Different stores and sites will give different resale values for your phone so it may be worthwhile to ask multiple places for a quote.

How to Recycle Or Dispose of Your Old iPhone

For advice on how to recycle, donate and dispose of your old iPhones, use this link. Here you will find information on deleting your hard drive, selling, donating, and recycling your old iPhone.

http://taenk.dk/tema/affald-er-en-ressource/elektronikskrot-saadan-skaffer-du-dig-af-med-det

Appendix G: Guide to Smartphone Defects (English)

Guide to Smartphone Defects: To Repair or Not to Repair

This guide will advise you on whether to repair or replace your smartphone based on your defect and your needs. It will also give you information on how to backup, assess the resale value, recycle, and dispose your smartphone.

To begin this "To Repair or Not to Repair" guide for defective smartphones, first determine the defect description that best fits your problem. Then, use the guide to help you determine whether to repair or replace your smartphone based defect type. Throughout the guide, a series of questions will be asked to understand your smartphone's condition. If you do not understand a question or need help answering a question, additional information is provided at referenced page numbers. After a decision on whether to repair, replace, or wait has been determined, information about different repair types, replacement options and what to do while waiting to replace your phone can be found at the end of the guide.

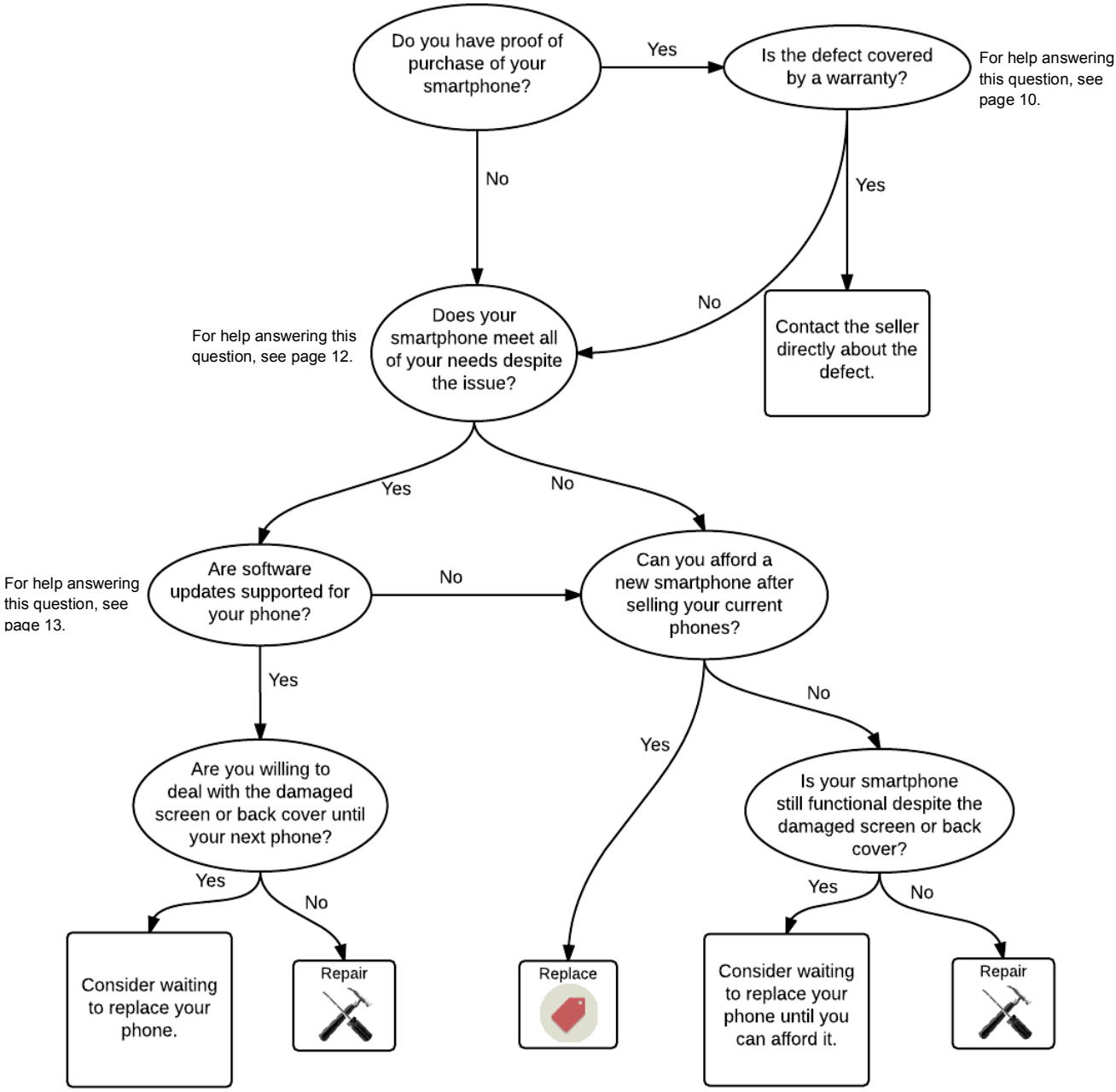
TABLE OF CONTENTS

Find the Best Solution for Your Smartphone Defect: Repair or Replace?

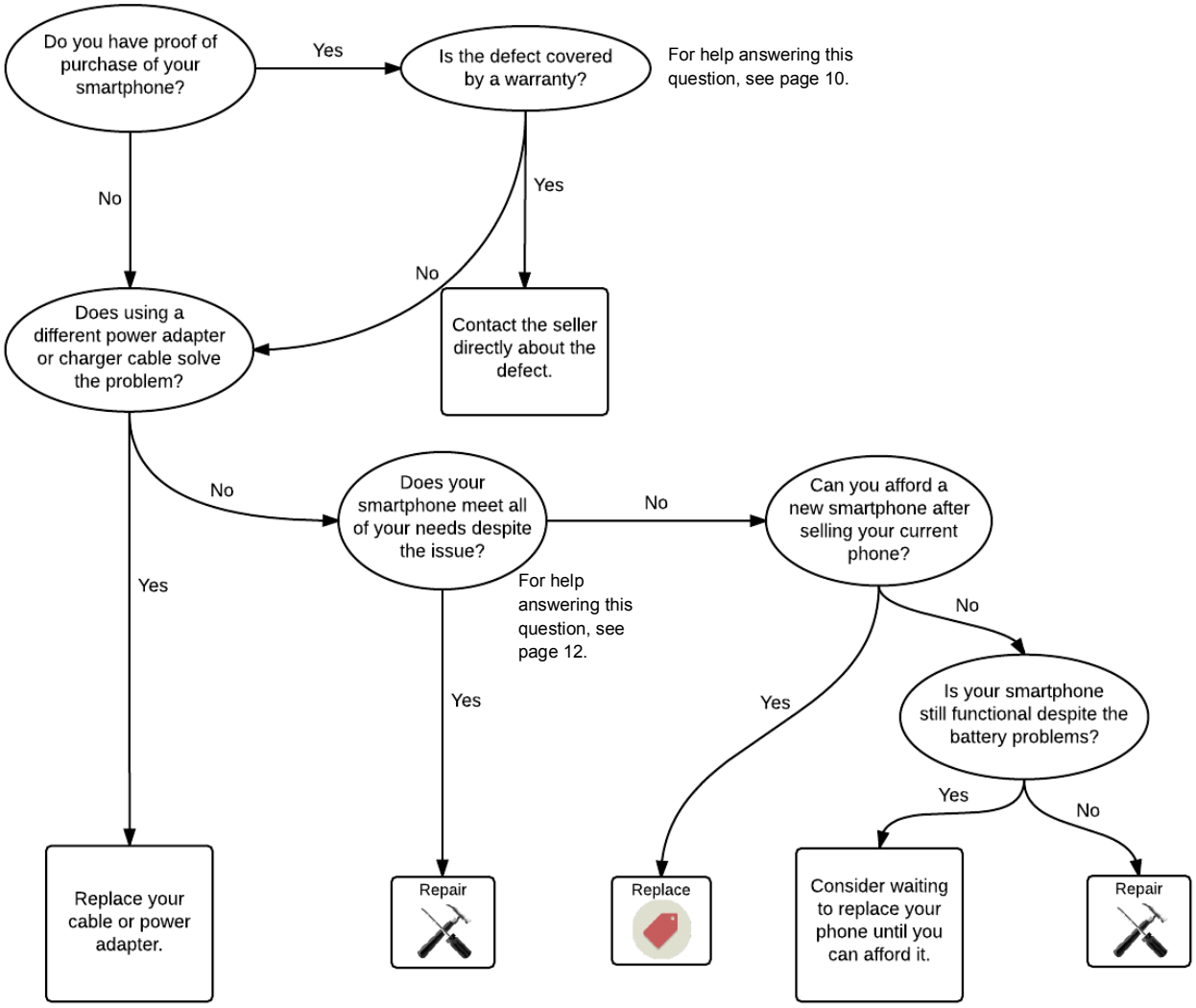
Find the defect listed below *best* describes the smartphone defect(s)[1] you are experiencing and navigate to the corresponding page.

[1]In the case of multiple defects on one smartphone, you can either choose to navigate through multiple defect guides, or you can choose the defect that is most cumbersome to you and find a solution. However, your solution for one defect may not solve the other defects. Navigating through multiple defect guides may provide different solutions, at which you should choose the one that works best for you.

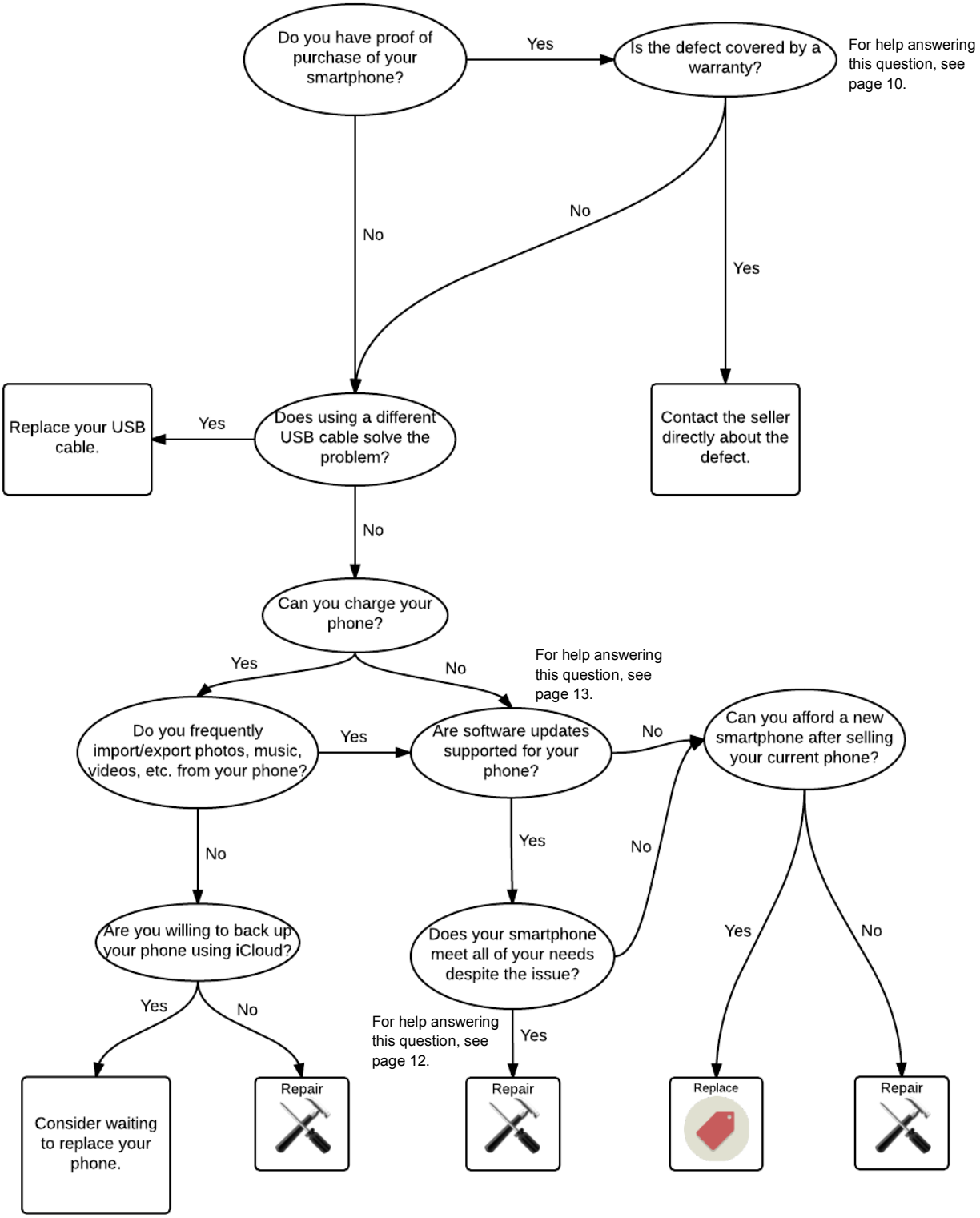
Defect: Screen Damage/Malfunction or Back Cover Damage



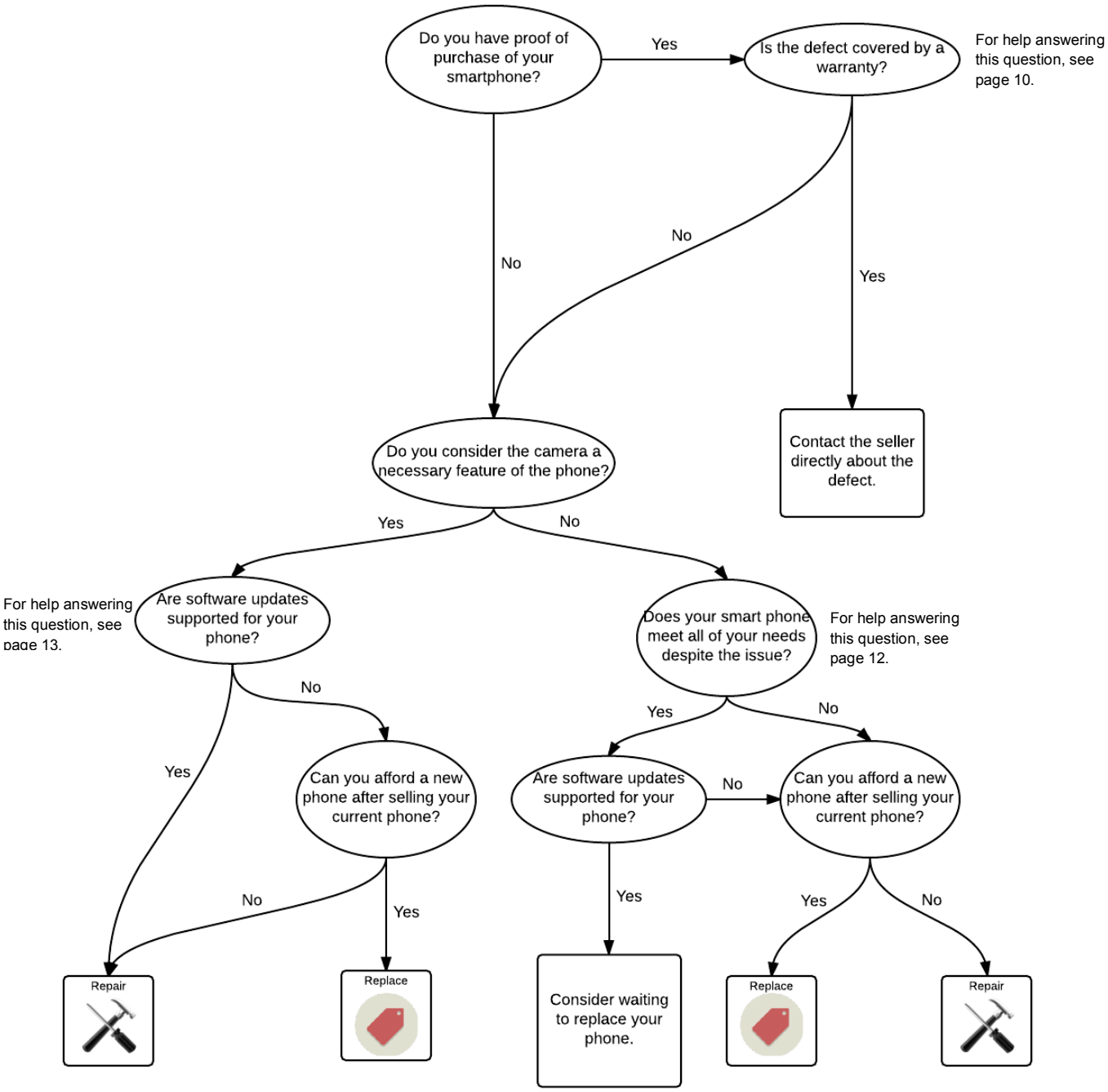
Defect: Battery problems



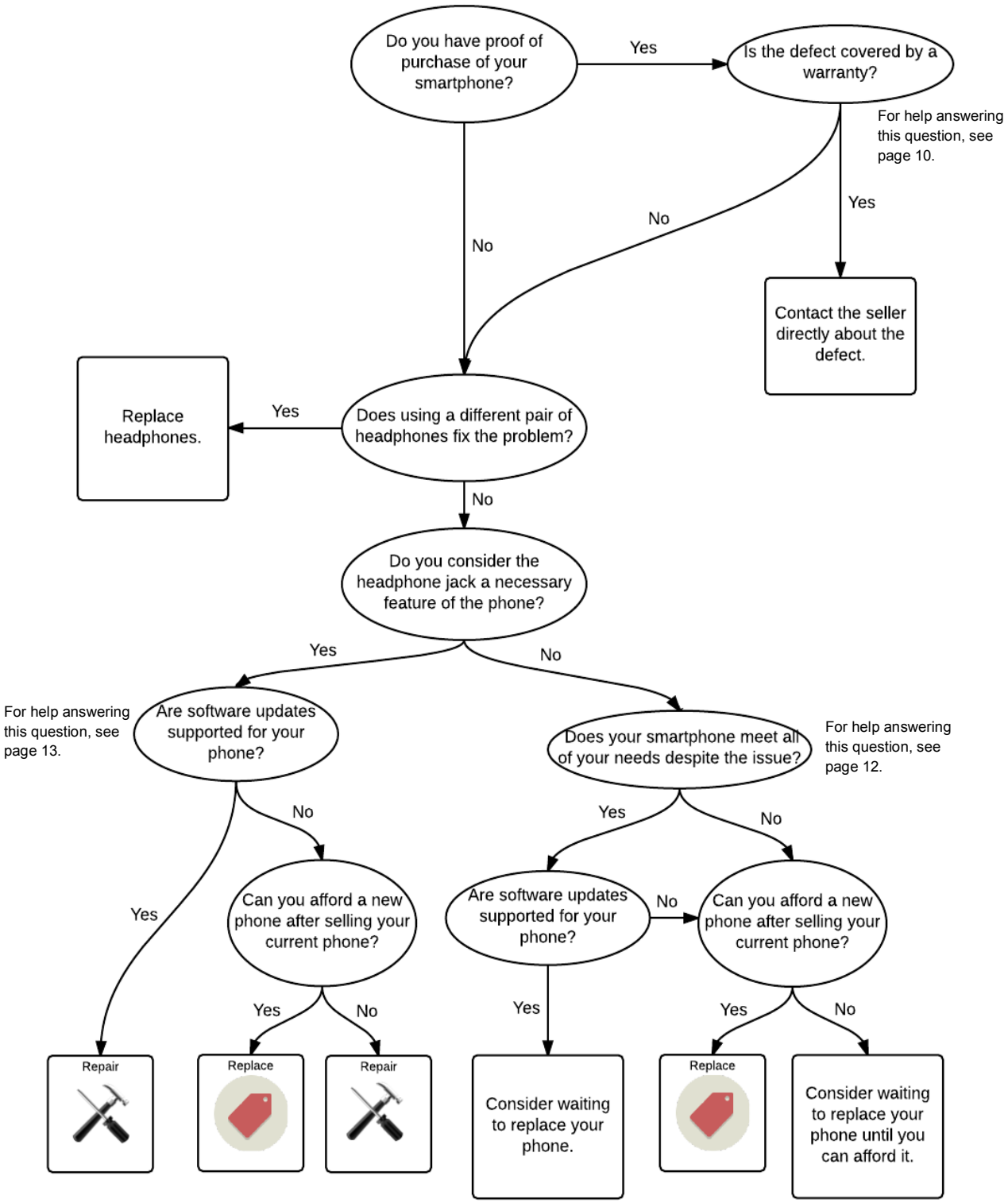
Defect: USB Connection Problems



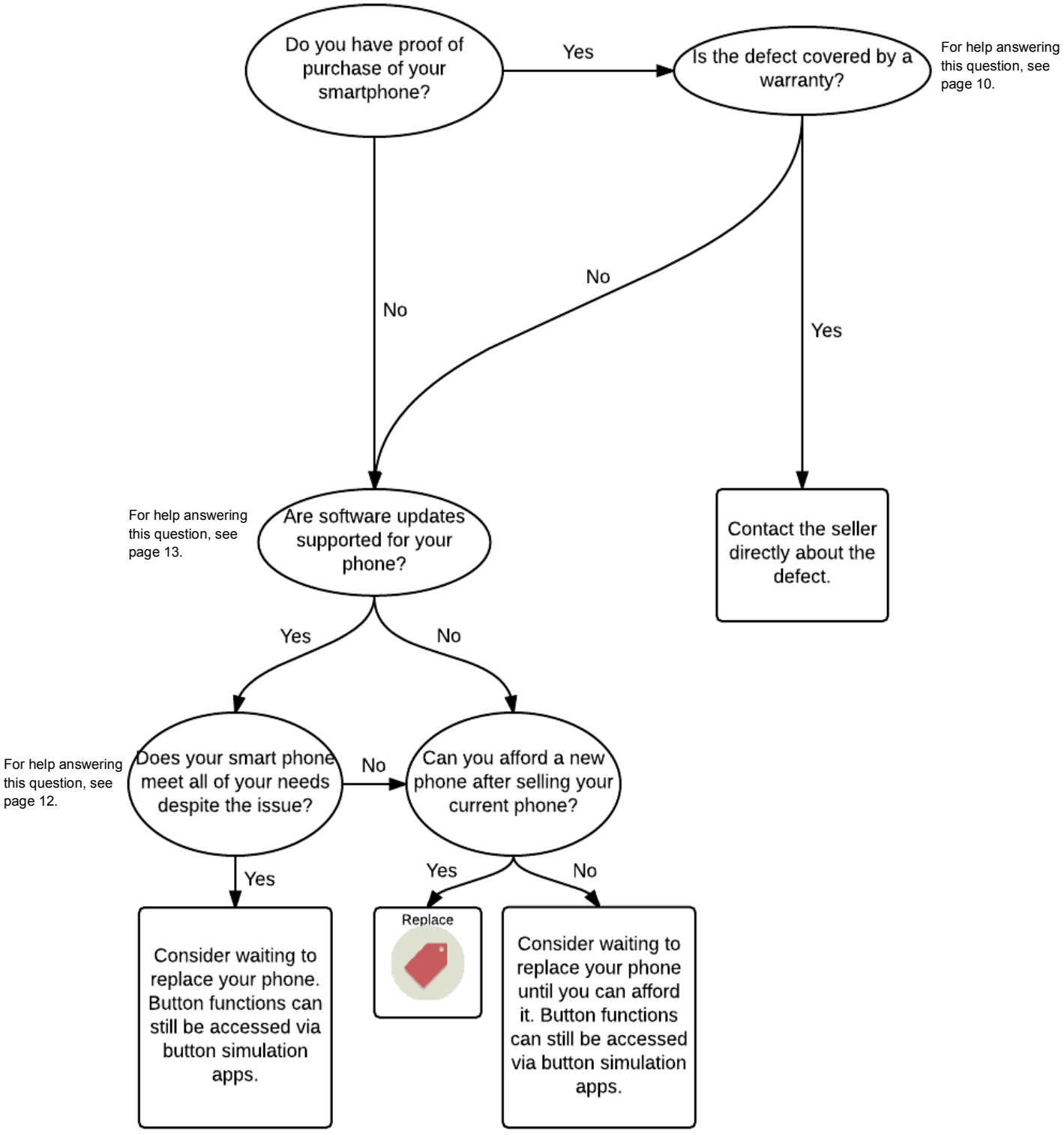
Defect: Camera Not Working



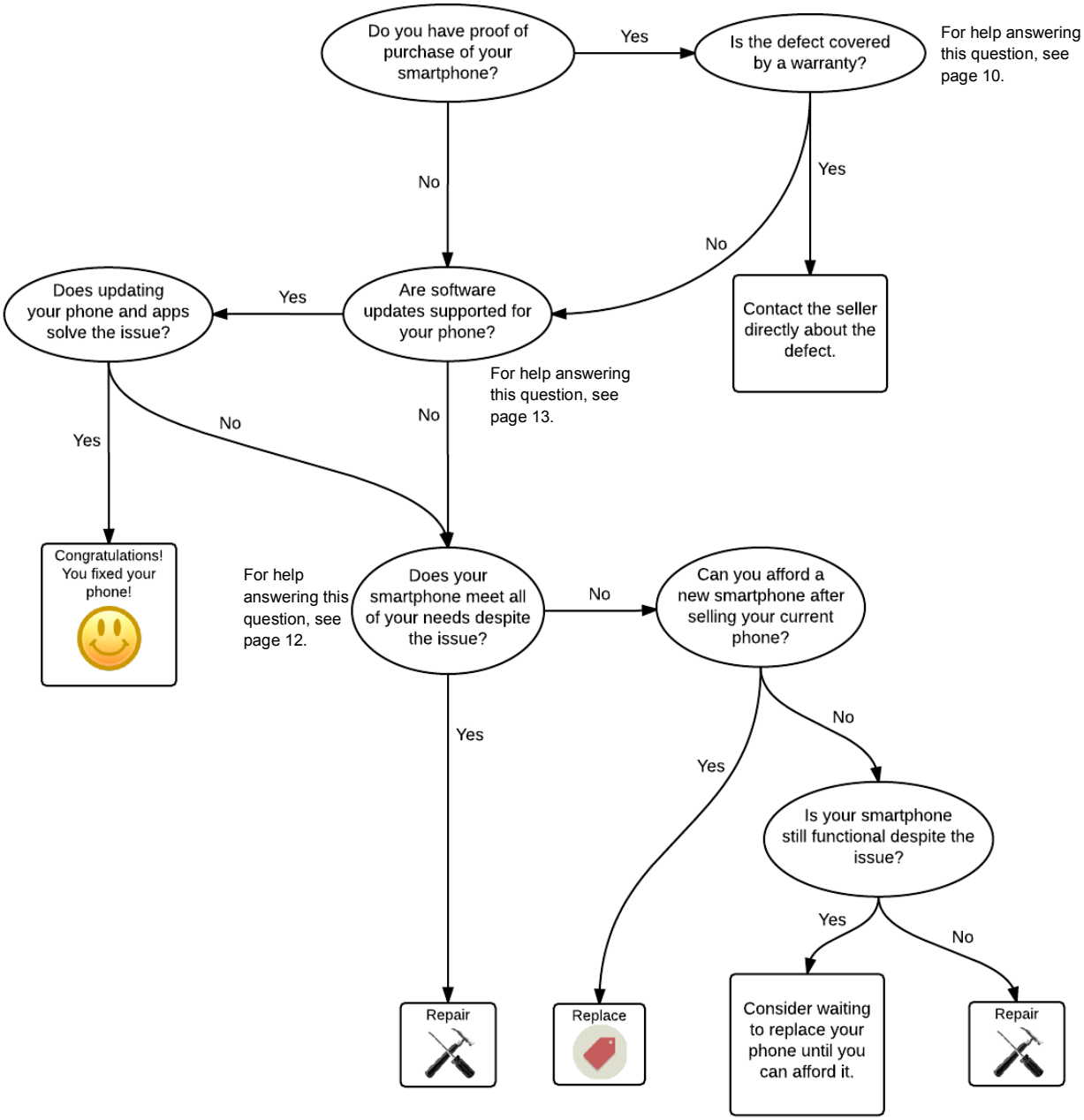
Defect: Headphone Jack Not Working



Defect: Buttons Not Working



Defect: Phone running slow/glitching



Is your defect covered by a warranty?

It is important to know whether your defect is covered by a warranty before considering other options. If the defect is covered, the best option is to contact the provider of the warranty directly, as the price of repair or replacement is substantially lower or free.

Know Your Rights as a Consumer

Under Danish law, all products sold within Denmark come with a **two year legal** guarantee at no cost. The legal guarantee allows the buyer to return a product that is faulty or not as advertised to the seller and receive either a replacement, repair, or refund. In order to benefit from the legal guarantee, the defect must be faulty at the time of receipt. Repair shops will often charge a fee to inspect the phone and determine whether the defect was your fault. If the defect is determined to be your fault, the phone is not covered under the legal guarantee. If the defect is not your fault, the inspection fee may be refunded and the phone is covered under the legal guarantee. Be sure to ask about this fee before having your phone inspected.

If you would like to return a product within six months of receipt, you need only provide the seller with proof of purchase and show that the product is faulty. After these six months, however, you must prove that the product was faulty at the time of receipt (eg. the product was constructed poorly which resulted in a malfunction) in order to take advantage of the legal guarantee.

Check to see if your defect is covered under your warranty.

Phone Type	Warranty	How Long Are You Covered After Purchase?	What Is Covered?
HTC	Legal guarantee	**2 years.**	Same coverage as legal guarantee.
LG	Legal guarantee	**2 years.**	Same coverage as legal guarantee.
Samsung	Legal guarantee	**2 years.**	Same coverage as legal guarantee.
Sony	Legal guarantee	**2 years.**	Same coverage as legal guarantee.
Windows	Manufacturer's Warranty	**2 Years:** Hardware repair.	Same coverage as with legal guarantee, as well as a one year warranty on accessories that come with the device.

Does your phone currently meet your needs?

Understanding what you desire in a smartphone is an important part of deciding whether or not to repair or replace your phone. You want to consider many different attributes of your smartphone to get the full understanding if your phone *really* meets your needs. Below is a list of smartphone characteristics and attributes to consider. Please keep in mind that the list is not to provide a concrete yes/no answer, but to get you thinking about how your smartphone's attributes meet your needs.

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  - Touch screen or screen (sensitivity, accurate touches, resolution, etc.)
  - Physical keypad or keyboard (if applicable)
- **Does your phone run apps and other programs fast or smoothly enough?**
  - Can your phone start and operate apps without significant crashes or freezes?
- **Is the phone capable of running the apps you want or use?**
  - Consider the capability of updating current applications you use.
- **Is the battery life adequate for your daily usage?**
- **Does the phone have enough storage?**
  - If not, does your phone have an SD card slot?
- **Is your phone's network capability sufficient?**
  - Is your phone equipped for a 4G network, or is it too old?

Does your smartphone support software updates?

Smartphone updates provide users with new features, but more importantly fix bugs and patch security vulnerabilities. If your phone is no longer supported by software updates, it means that any vulnerabilities or bugs with your phone's software will not be fixed. Using an unsupported smartphone can put your phone and your data at risk.

How to determine if your phone is supported

If you have recently downloaded a software update for your smartphone then it is likely that your phone is still supported. You can also check to see if there are any software updates available for your phone at the moment, which indicates that your phone is supported. If you have not noticed a software update for an extended period of time, and there are no updates currently available, you should check with your phone carrier to determine if the phone is supported, or not.

What are the costs for repairs of smartphone defects?

Spare parts are readily available online and in many repair shops for smartphones. There are two types of spare parts you should be aware of when you are attempting to fix your defective phone: OEM and non-OEM replacement parts. OEM stands for Original Equipment Manufacturer parts, meaning the products were produced by the same manufacturer that produced the smartphone. Non-OEM replacement parts are frequently sold as generic spare parts for various smartphones by companies that are not the original manufacturer. OEM parts are more expensive, but usually come with a warranty. Non-OEM replacement parts can be less expensive but quality of the parts will vary. Using non-OEM parts voids any existing warranties and may not come with additional warranties. Additionally, repairs done by authorized service shops will not void your phone's original warranty whereas repairs done by unauthorized service shops will void it but the shop may offer its own warranty for the repair. Authorized service shops are also more likely to repair with OEM spare parts.

The prices below are costs of smartphone repairs from local repair shops in Copenhagen. The wide range of prices is due to the ability to purchase both OEM and non-OEM replacement parts. Be aware of the risks associated with non-OEM replacement parts, including poor quality spare parts and the lack of a warranty.

Samsung

	Galaxy S2	Galaxy S2+	Galaxy S3	Galaxy S3 Mini	Galaxy S4	Galaxy S4 Mini	Galaxy S5	Galaxy S5 Mini	Galaxy S6	Galaxy S6E	Galaxy S6E+	Galaxy Note	Galaxy Note 2	Galaxy Note 3	Galaxy Note 4
Screen Damage	600-1900	600-1400	800-1400	600-1000	1250-2000	850-1110	1200-2300	850-2000	1300-2300	1400-1800	1900-2200	1200-1300	1100-1500	1250-1600	1200-1400
Back Cover Damage	175-300	175-300	200-350	175-400	200-500	200-400	200-400	200-300	400-600	400-800	375-800	200-500	200-300	200-500	200-300
Battery Problems	200-400	200-400	200-250	200-500	200-500	200-500	250-299	275-500	475-500	500-800	500-800	275-500	300-400	300-500	300-400
USB Connection Problems	300-600	300-400	260-400	250-400	400-500	400-500	500-600	300-600	450-600	450-800	360-800	400-600	350-400	400-600	500-600
Camera Not Working	200-600	200-400	200-360	200-300	200-600	200-500	400-600	400-600	400-600	400-800	480-800	200-400	300-400	300-600	300-600
Headphone Jack Not Working	300-700	300-600	300-600	300-400	300-400	300-400	300-600	300-600	300-600	300-600	300-600	400-600	400-600	500-600	270-500
Buttons Not Working	250-500	250-400	250-400	400-500	250-500	400-500	270-360	280-400	260-350	260-350	260-360	250-500	250-500	400-500	400-500
Running Slow/Glitching	250-450														

Sony

	Z3	Z3 Compact	Z3+	Z5	Z5 Compact
Screen Damage	930-2500	1200-2400	1550-2800	1750-3200	1200-2300
Back Cover Damage	400-800	300-800	500-800	450-1000	650-1000
Battery Problems	350-500	310-500	Call repair shop for price	Call repair shop for price	Call repair shop for price
USB Connection Problems	250-350	250-350	250-350	250-350	250-350
Camera Not Working	500-600	350-600	350-600	300-700	300-700
Headphone Jack Not Working	250-500	250-500	250-500	250-500	250-500
Buttons Not Working	250-500	250-550	250-500	300-600	400-800
Running Slow/Glitching	150-250				

LG

	G2	G3	Nexus 4	Nexus 5
Screen Damage	1200-2100	1350-1900	1350-1500	1700-1750
Back Cover Damage	300-1000	300-1000	600-800	300-500
Battery Problems	350-600	400-700	400-500	350-500
USB Connection Problems	600-1000	600-1000	150-300	600-1000
Camera Not Working	350-500	350-500	300-500	500-600
Headphone Jack Not Working	400-700	250-600	300-700	250-700
Buttons Not Working	300-500	300-500	300-500	300-500
Running Slow/Glitching	250			

HTC

	One M7	One M8	One M9
Screen Damage	800-1300	800-2600	1100-1600
Back Cover Damage	700-1000	800-1000	Call repair shop for price
Battery Problems	350-500	390-500	Call repair shop for price
USB Connection Problems	700-1000	400-1000	Call repair shop for price
Camera Not Working	500-800	500-860	550-900
Headphone Jack Not Working	600-700	Call repair shop for price	Call repair shop for price
Buttons Not Working	500-700	500-800	Call repair shop for price
Running Slow/Glitching	200-250		

How to optimize your smartphone (Android)

If you choose to wait before you replace your phone or to repair your current phone, there are a few things you can do to make sure your phone is running as fast and as efficiently as possible. Before anything else, make sure your phone's software is up-to-date.

One simple way to make sure your smartphone is running optimally is to ensure that there is enough free storage space. Having ample unused storage is not only helpful for when you want to install new apps or take videos, but it also allows the phone to run smoothly and quickly. The simplest way to clear space is to delete large files that you don't need. Most likely, these files include photos, videos, music, apps, and downloaded files such as PDFs. To view the files on your phone that are taking up the most space, navigate to settings and search for "storage". Here you can select "Apps" and view the apps that take up the most space on your phone. Consider deleting large apps. Alternatively, you can select an app and press "Clear data," which will not remove the app, however it will delete all information within the app such as saved games or conversations.

Next, remove photos, videos, music, and downloaded files from your device. This can be done by simply deleting the files from your phone. If you would like to save the files off of your phone, plug the phone into a computer and transfer files to the computer then delete them from the phone. If you are using an Apple computer, you can download "Android File Transfer" to do this. If you are using a windows computer, plugging the phone into your computer will automatically download drivers to allow you to transfer files. Alternatively, cloud services such as Google Drive allow you to upload files directly to your account without a USB connection.

To increase the overall performance of your device, there are various features that you can disable. Remove widgets from your home screen and do not use a live wallpaper, as both of these features use processing power that can be better utilized elsewhere.

From the moment you begin using your phone, the battery starts to degrade. In order to get the most out of your battery, be sure to frequently close out of apps that you are not using. To do this, navigate to the settings, search "Battery", and select "Battery usage". Here you can view apps that are using the battery and close them. To further increase your battery life, reduce the screen brightness and disable features that you do not use, which may include location services, bluetooth, and haptic feedback.

How to optimize your smartphone (Windows phone)

If you choose to wait before you replace your phone or to repair your current phone, there are a few things you can do to make sure your phone is running as fast and as efficiently as possible. Before anything else, make sure your phone's software is up-to-date.

One simple way to make sure your smartphone is running optimally is to ensure that there is enough free storage space. Having ample unused storage is not only helpful for when you want to install new apps or take videos, but it also allows the phone to run smoothly and quickly. The simplest way to clear space is to delete large files that you don't need. Most likely, these files include photos, videos, music, and apps. To view the files on your phone that are taking up the most space, navigate to the "Storage Sense" app. Here you can select a storage drive and view the space used on each one. You can also select "apps+games" to see how much space each app on your phone uses. Consider deleting large apps.

Next, remove photos, videos, and music files from your device. This can be done by simply deleting the files from your phone. If you would like to save the files off of your phone, plug the phone into a Windows computer and back up the phone. Alternatively, cloud services such as Google Drive and OneDrive allow you to upload files directly to your account without a USB connection.

From the moment you begin using your phone, the battery starts to degrade. In order to get the most out of your battery, be sure to frequently close out of apps that you are not using. To do this, use the back button to close apps instead of the Windows button. Disabling background tasks also increases the battery life. Go to "Settings" and swipe to "Applications." Here you can select background tasks and block them from running in the background. To further increase your battery life, reduce the screen brightness and disable features that you do not use, which may include location services and NFC.

What are your options after you come to your decision?

Repair Options

Repairing a smartphone can be done in various ways. One common option to repair a smartphone is to take the phone back to the manufacturer. If your phone is still under warranty, then a manufacturer repair may be the only way to maintain the warranty, and the repair may even extend the warranty of the phone. A manufacturer repair also ensures that no further damage will be done to your phone.

Taking a smartphone to a third party repair shop is an alternative method to repair a phone. Consumers are often more satisfied with third party repair work than repairs done by manufacturers, and the repairs can be cheaper as well. It is important to research third party repair options, to find one that best fits your needs. Reading reviews online can help give a better understanding of the quality and price of the repairs. Be sure to also check whether the repair shop is authorized by your phone's manufacturer. If the repair shop is authorized, then repairs will not void the phone's warranty. If the repair shop is not authorized, any repair may void the existing warranty of the phone and should therefore be avoided.

The final option for repairing a phone defect is do-it-yourself. If the phone is still under a warranty, then attempting a DIY repair will void the warranty. Repairing phones can be very difficult, so it is important to understand the risks before it is attempted. This option, however, is usually the cheapest repair option. To find information about how to repair many different defects, visit www.ifixit.com.

Symbol Key:


Environmentally friendly


Less expensive


Time saving


Legal guarantee/warranty coverage

Manufacturer

Authorized Repair

Non-Authorized Repair

DIY

Replacement Options

You can replace your smartphone by acquiring a brand new phone, a refurbished phone, or a used phone, depending on your budget and preference. A refurbished phone is a phone that has been returned by the owner either due to a problem or a change of mind. It is technically not a new phone anymore but before being sold again, the phone is tested for problems and defects and fixed when necessary. The main difference between a refurbished phone and a used phone is that a used phone is sold as it is and has not been tested or fixed. Compared to a new phone, a refurbished phone is less expensive, but should work like a new phone and come with a warranty or guarantee of some sort. The legal guarantee also covers a secondhand product bought from a trader with a 2-year minimum guarantee.

To gain more insight on the characteristics you should consider when purchasing a new smartphone, see “The Expert’s Advice: How to Find the Right Mobile” at the following link:

http://taenk.dk/test/smartphones-og-mobiltelefoner/ekspertens-raad-saadan-finder-du-den-rigtige-mobil.

New 

Refurbished 

Used 

Waiting to replace

From the article Mobil: Køb på det rigtige tidspunkt og spar penge: http://taenk.dk/gode-raad/prisudvikling-koeb-billigt-paa-rigtige-tidspunkter/mobil-koeb-paa-det-rigtige-tidspunkt-og

"Priserne på de nye smartphones er høje. Venter du med at købe til bare et par måneder senere, kan du få telefonen en del billigere. For eksempel bliver topmodellerne fra Android-producenterne lanceret i forårsmånederne og falder hurtigt i pris hen mod sommeren. Samsung Galaxy S6 32 GB kostede for eksempel 5.399 kroner ved udgivelsen i april 2015. Kun 2 måneder efter kunne du spare 1.000 kroner og få samme telefon for 4.387 kroner. Ventede du en måned til, var prisen helt nede på 3.872 kroner. Sony og HTC lancerer også deres topmodeller i løbet af foråret, og samme mønster gælder for disse telefoner. iPhones er de seneste år blevet lanceret i starten af efteråret.

Modellen fra sidste år bliver typisk sat væsentligt ned, når dens efterfølger kommer på markedet. Så hvis du ikke har noget imod en telefon med 1 år på bagen, er der rigtig mange penge at spare. Du skal dog huske, at telefonen vil blive forældet et år før. Det gælder blandt andet i forhold til styresystemet.Samsungs S5-telefon var ved lanceringen af S6-modellen faldet fra omkring 5.000 kroner til 3.098 kroner. S6-modellen kostede 5.399 kroner – så hvis du kan leve med sidste års model, kan du spare mere end 2.000 kroner.Prisudviklingen på iPhones minder meget om den for Samsungs telefoner."

How to find the resale value of your smartphone.

To find the resale value of your smartphone, you can go into phone stores that buy used phones, or go online to get a quote. You will usually be asked about the condition of the phone, including whether there are existing defects and if there are accompanying accessories (chargers, headsets, etc.). The condition of the phone will affect how much you are offered for your phone and some stores will still buy your phone even if it has physical and software defects. Different stores and sites will give different resale values for your phone so it may be worthwhile to ask multiple places for a quote.

How to recycle or dispose of your old smartphone.

For advice on how to recycle, donate and dispose of your old smartphones, use this link. Here you will find information on deleting your hard drive, selling, donating, and recycling your old smartphone.

http://taenk.dk/tema/affald-er-en-ressource/elektronikskrot-saadan-skaffer-du-dig-af-med-det