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Transforming Consumption Practices: A Social Practice Theory Analysis of Repairability and Lifetime Extension of Smartphones

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Abstract

The lifetime extension of smartphones is seen as a prominent way to reduce the environmental impacts caused during the production of the devices. Smartphones may be small devices, but their impact is no longer small as for the past years e-waste has been the largest growing waste generated globally. This research aimed to learn what perspectives Swedish smartphone users had towards repairability and durability of their devices, to study what practices these users had in terms of repairing and additionally what conclusions could be drawn from their practices to enable access to repair options and lifetime extension practices for smartphones. Qualitative semi-structured interviews were conducted with 13 participants from Sweden who were smartphone users. Social practice theory was deemed best suited for this research as we were interested in finding out what practices consumers conduct currently for repair on smartphones. Analysis was done combining practice theory and degrowth perspective, as practice changes and smartphone lifetime extension can be seen as a strategy towards degrowth. When taken together, our results reveal that non-material aspects, such as meaning and perceived obsolescence play a critical role in the evaluation of whether to repair or replace a smartphone. This suggests that a focus on the durability of the devices over time as well as easier access to repair choices should rather be highlighted. Financial incentives would also be favoured through policy making, but overall policy makers need to have a larger guiding hand towards sustainable consumption of smartphones, they need to be influencers in the socio-material setting where currently consumers are locked in through barriers placed by manufacturers.

Keywords: smartphones, sustainable consumption, social practice theory, degrowth, environmental impact, repair, lifetime extension.

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Chapter One

1. Introduction

Consumption is a growing issue worldwide, contributing to intensive environmental damage (Anantharaman, 2018) through inconspicuous resource consumption and alarmingly increasing amounts of waste. Warde (2022, p. 26) expresses that consumption is ‘’deeply socially embedded”, meaning that the actions of social actors are based on the institutional and cultural contexts we live in. In the modern capitalistic society, mass consumption and the need for more, newer things have become normalised as the dominating paradigm in the 21st century has become consumerism (O'Rourke & Lollo, 2015; Philipsen, 2022). Consumption behaviour has become a source of social hierarchy, where obtaining brand-new products symbolises a higher-class status and privilege (Anantharaman, 2018; Warde, 2022). Individuals tend to consume more as they seek status, acceptance and respect from peers, utilising products to express self-identity (Ingram et al., 2007). This contributes to increasing social inequalities, as people who cannot afford brand-new things are associated with having a lower-class status. Consumption is further promoted by the dominating growth mindset (Sandberg et al., 2019; Büchs & Koch, 2019), which is endorsed by planned product obsolescence and infrastructures that create lock-in mechanisms of unsustainable patterns (O'Rourke & Lollo, 2015; Geels et al., 2015) as a way to facilitate unnecessary amounts of consumption.

The idea of combating unsustainable consumption patterns was first officially acknowledged in the 1992 Earth Summit, where Agenda 21 was created. The fourth chapter of Agenda 21 focuses on transforming consumption patterns towards more sustainable ones, calling for reducing resource use in order to decrease the burden put on the environment (United Nations, 1992). Since then, researchers have discussed what sustainable consumption entails and proposed various ways of achieving it. In line with the goals of Agenda 2030, we examine how to make smartphone use more sustainable, and our research relates to the 12th sustainable development goal - responsible consumption and production. It has been acknowledged that individualising responsibility by changing customer behaviour is not effective enough to achieve significant improvement (Shove, 2010; Evans et al., 2017). Such a view neglects the role played by institutions, infrastructures, and existing systems shaping unsustainable practices (Watson & Shove, 2022; Evans et al., 2017). Therefore, strong sustainable

consumption calls for a system change with distributed responsibility and collaborative action between all social actors, such as the state, city, and non-state actors (Keller & Vilhalemm, 2017; Geels et al., 2015; O'Rourke & Lollo, 2015). Our research is focused on examining sustainable consumption in relation to smartphones in order to increase their expected service life, specifically by repair.

1.1 Background on the Environmental Impact of Smartphones

Smart gadgets, such as laptops, tablets, TVs, and smartphones are considered a necessity in the modern lifestyle. It has been estimated that in 2020 around 80% of individuals in the European Union owned and used a smartphone, while in Sweden, this number reaches 90% (Eurostat, 2023). Moreover, globally around 1,5 billion phones are sold every year (Perzanowski, 2021). The primary purpose of mobile phones can be considered the connectivity options they provide through calls, texts, and online experiences. The International Telecommunication Union (ITU) has set forward a goal of achieving "universal and meaningful connectivity" by providing safe and affordable internet access to all and allowing everyone to experience the benefits provided by online platforms (ITU, 2022, p.2). This target is meant to bring us closer to achieving sustainable development goals through global access to information (ibid). Moreover, mobile technologies are an essential part of Europe's economy, generating 4.5% of GDP in 2021 (GSMA Intelligence, 2022). Therefore, policy makers focus on growing the mobile markets, as economic growth is considered the ideal social objective to increase well-being (Sternfels et al., 2021) – a concept that has been highly criticised by degrowth scholars (Kallis, 2011; D'Alisa et al., 2015).

Degrowth calls for reduced resource use in order to achieve environmental and social sustainability (D'Alisa et al., 2015; Hickel, 2020), which is proven to be difficult in the existing hegemonic growth paradigm (Sandberg et al., 2019). To remain competitive and raise profits, companies release new and innovative models every year, nudging individuals to buy new phones, despite the remaining functionality of the old models (Sarath et al., 2015). While the lifespan of a mobile phone is around seven years (Jensen et al., 2021), on average, people change their devices every three years in developing countries and less than two years in developed ones (Sarath et al., 2015). Therefore, the smartphone replacement rate is faster than any other electronic device (Deloitte, 2015). The quick turnover of mobile devices contributes to the "throwaway society" (Thiébaud -Müller et al., 2018) and to the quickly growing waste

of electronics (Sarath et al., 2015). A change in smartphone consumption is necessary in order to bridge society closer to degrowth values.

Replacing functional electronics with newer models has become a common practice (Jattke et al., 2020; Jaeger-Erben et al., 2021), yet the environmental damage from consumer actions tends to be overlooked. The majority of environmental impact is created during the production phase (Hilty & Bieser, 2017), releasing greenhouse gases (GHG) and contributing to pollution (Magnier & Mugge, 2022; Jattke et al., 2020). The production of smartphones requires more than 50 different metals, whose extraction damages the ecosystems (Proske, 2022; Thiébaud - Müller et al., 2018; Magnier & Mugge, 2022). The amount of emissions released and energy consumed from producing and using an electronic device depends on its size and storage (Jattke et al., 2020). A shift in consumer behaviour has occurred, where the larger electronics in the household are being used less; therefore, the energy consumed from them has decreased, yet this consumption is substituted by charging smartphones (Ohnmacht et al., 2017). Moreover, the storage space of every new smart gadget released is increasing, which highly impacts the released emission levels.

The environmental impact from a singular mobile device is relatively small (around 40 – 80 kg of COe); however, the high sales volumes and quickly-changing technology market account for smartphones as the highest GHG emitters from information and communication technology end-user products (Proske, 2022; Thiébaud -Müller et al., 2018). Moreover, smartphones contribute to electronic waste or e-waste, which is growing more quickly than any other type of waste (European Parliament, 2020). Globally electronic waste in 2021 was 58 Mt and is predicted to increase twice as much in the next 30 years (75 Mt in 2030 and 112 Mt in 2050), while in Europe alone, the waste in 2021 was 12 Mt (Magnier & Mugge, 2022). Furthermore, over 60% of e-waste in Europe is not recycled (European Parliament, 2020), which means it ends up in landfills and creates toxic waste. Some of the ingredients from electronics resulting in toxic waste are lithium, lead, and mercury (Perzanowski, 2021). Still, the highest emissions are released during the production phase (Jattke et al., 2020; Clément et al., 2020), attributing to over 80% of the total life cycle's GHG emissions (Jattke et al., 2020; Bieser et al., 2022). This is mainly due to the production of integrated circuits and the complicated mechanisms involved in creating more extensive data storage (Jattke et al., 2020; Clément et al., 2020).

Extending the service life of mobile phones is a meaningful way to reduce their environmental impact; thus, smartphone lifetime extension could serve as a strategy towards degrowth. A

prolonged lifetime would result in less demand for new products and, therefore, less production (Bieser et al., 2022). In a study by Hischier and Böni (2021), it was concluded that reusing and prolonging the lifetime is the best way to reduce environmental impact from devices with the highest impact in the production phase, such as smartphones. In contrast, when using appliances with high impact during the use phase, for example, refrigerators and washing machines, the age of the device needs to be taken into consideration (Hischier & Böni, 2021). Proske (2022) notes that increasing the lifetime of a smartphone from two years to four years can reduce its environmental impact by 20%. The GHG impact from the production of a new phone is more than twice as much as the impact from retention and repair practices, such as display and battery replacement (Jattke et al., 2020), proving the urgent necessity to extend the lifetime of smartphones.

There are several measures to extend the service life of smartphones. Vast research has been done on different production-oriented approaches such as design or functionality changes to mobiles such as the modular smartphone (Hankammer et al., 2018), various recycling and repurposing of the mobile's components (Zink et al., 2014; Janusz et al., 2016) offering device related repair options (Cole et al., 2016; Cole et al., 2019). Jattke et al. (2020) sort prolongation options into three categories: improved design, retention, and recirculation. Improvements in the design, such as hardware and software, depends on the action of manufacturers. Our primary focus is on retention (repair) because the power to influence it depends on both - the decisions and practices of consumers as well as the socio-material structures that consumers exist in (e.g., accessible, and affordable repair services). By examining customers as our leading actors, we present an analysis of how their views and practices can be shaped towards sustainable consumption.

1.2 Aim and Research Questions

Departing from the background, we aim to examine consumers' practices and their perspectives towards smartphone repair. We believe that the service life extension of smartphones by repair can be a starting point towards a change in consumer practices and hence degrowth transformation. This research is done by taking a social practice theory approach and studying the material, meaning, and competence involved in smartphone repair. Practice theory was chosen for this research to understand Swedish consumers' perspectives towards extending the service use of their smartphones and why people decide to replace their phones. We chose to look into the consumer side in this aspect as we see a gap in previous research in terms of

consumer-oriented measures where further insight from a qualitative perspective could give a deeper understanding. Sustainable consumption practices will not be reached through one angle or strategy, furthermore, practice theory has its strength in the three dimensions and its integration has an important relevance for this study. By using practice theory, we suggest that all three factors from policy makers and manufacturers, along with consumers' perspectives, are needed to transform consumers' smartphone use.

As previous scholars (Reckwitz, 2002) contend on practices and their influences, education, competence, and meaning are not enough alone to influence societal changes. The materials, technology and infrastructure and the integration of these three parts of practices are needed to enable a transition (ibid). We are interested in how consumers perceive and feel influenced by social norms, infrastructure such as manufacturers, repair companies or obtained skills. Understanding the meaning of consumption for individuals is important to recognise where the most change needs to happen to enable more sustainable consumption. By entering from such a point of view, this study explores what changes are needed in consumer practices to achieve sustainable consumption of smartphones and prolong their lifetime. This research can furthermore help policy makers in establishing repair policies by providing an understanding of what incentivises consumers to repair their devices. In this thesis, we explain and review previous research on sustainable consumption in general and on smartphones. We plan to analyse our primary data through the view of social practice theory, while also considering how degrowth can be used as a transition of smartphone practices. The study will answer our research questions which are stated as follows:

- What are the consumers' perspectives towards mobile durability and repairability?
- What incentives are needed to transform unsustainable consumption practices regarding smartphone lifetime extension?

Chapter Two

2. Literature Review and Theoretical Framework

2.1 Chapter Overview

This chapter will start with an overview of sustainable consumption, afterwards moving into repair legislation and previous literature around sustainable smartphone consumption, as well as barriers to prolonging the lifetime of smartphones. In the latter part of the chapter, the concept and elements of social practice theory will be reviewed, drawing parallels to how this theory is helpful in our analysis. The chapter is concluded with a discussion of degrowth in relation to sustainable smartphone consumption.

2.2 Literature Review on Sustainable Consumption

Looking into sustainable consumption is an important starting point when analysing how consumption can be changed to reduce the use of resources and the global environmental impacts that follow the overconsumption of resources (Anantharaman, 2018). However, it is vital to note that defining such a broad concept is risky, and the aim here will not be to reach a consensus on what sustainable consumption could be. Rather we approach it as a "multi-disciplinary concept, which begins with real-world problems and attempts to understand it" (Middlemiss, 2018, p. 6). Previously the sustainability discourse was led by the input of sustainable development, this was the main subject and debate among policy makers, corporate stakeholders, and scholars (Redclift, 2005). Sustainable development focuses on balancing economic growth with environmental protection and social equity, ensuring that the needs of present and future generations are met (UNFCCC, 2015). In recent years, scholars have raised concerns about the discourse surrounding sustainable development, arguing that it has led to further economic growth. Critics suggest that the focus on sustainable development has overshadowed the need for a stronger discourse on 'strong sustainability', where the emphasis is on reducing resource consumption and decreasing carbon emissions rather than relying on technological innovation (Cohen and Murphy, 2001; Geels et al., 2015). Such a 'weak sustainability' approach prioritises efficiency (consuming better), over sufficiency (consuming less) (D'Alisa et al., 2015; Watson, 2017).

Sustainable development has been adopted by neoliberal advocates, and their logic to measure social progress through gross domestic product (GDP) only (Watson, 2017). Where it has

suited their cause greatly but has likewise been challenged by social and environmental movements. The fact that sustainable developments lead to growth and environmental tradeoffs are accepted, such as technological innovation solutions to decrease global carbon emissions, makes it an oxymoron in theory (Redclift, 2005). As mentioned by Middlemiss (2018), sustainable consumption has presided in the shadows of sustainable development. Furthermore, overconsumption has often been blamed on overpopulation, this statement has enabled developed countries to hide in their own complicity (Cohen, 2001). The weaker solutions need a reconfigured approach that recognises a holistic systemic change that will address individual behaviour change and market-based solutions, a change towards a sustainable system (O'Rourke & Lollo, 2015). Moreover, recent research in France has revealed willingness among consumers to pay for sustainable and innovative products, and a positive reaction to product upgrade options. Revealing a gap in the market that manufacturers have greatly ignored options to continue their profits while congruently promoting sustainable consumption patterns (Michaud et al., 2017).

2.3 Right to Repair Legislation

Legislation of consumers' right to repair their bought goods is very relevant in this context which will be lightly touched on here. In the USA the discussion and battle over the right to repair legislation has a more extensive history. Currently, a number of US states are considering bills that would require companies to share replacement parts, and documentation and make repairability more accessible to consumers than it already is (Perzanowski, 2021). The complicated structure and steps in the US legislative system make this a gruesome change to make. In the past, there have been efforts made, mainly around automobile repair rights that have failed to be confirmed in legislation. A turnover happened in 2012 when the state of Massachusetts legalised an automotive repair bill that has since had national implications within the US (ibid). The first steps in the right-to-repair movement have been taken within the EU, which until now has fallen short of the evolution in the US, the 2020 Circular Economy Action Plan aims to reach a carbon-neutral EU by 2050 (Imarhiagbe, 2022). However, the new CE Action Plan does not address competition law directly with legislation changes. The European Commission highlights that in the upcoming legislative proposal, certain points will be demanded, such as making repairs more attractive to consumers, ensuring devices will be more durable, easier to repair and include removable and replaceable parts, and offering better consumer information on reparability to name a few (European Parliament, 2022). These are

all factors that were not included in the previous plan, it will then be interesting to see if they reach the stage of legislation.

2.4 Literature Review on Sustainable Consumption of Smartphones

Considering how short the use time of smartphones is on average it is interesting to see the results of a recent Eurobarometer survey. Results showed that 77% of people in the EU would rather repair their goods than buy new ones (European Commission, 2020). Past research on the reasons and possible solutions for the short lifespan or use time of smartphones has widely emphasised production-oriented measures (Bieser et al., 2021; Hankammer et al., 2018; Bocken et al., 2016; Proske et al., 2016). There are different production-oriented measures, but most involve the manufacturers making changes to their device designs, many of which entail avoiding obsolescence. Obsolescence means the device loses its functionality which renders it outdated due to age (Bieser et al., 2022). Obsolescence can further be divided into material obsolescence, such as materials in the device breaking (Proske et al., 2016) too fast, functional obsolescence, psychological obsolescence, and economic obsolescence due to high prices for repairing materials in the device. Moreover, there are actions taken by manufacturers that can actively shorten the products' lifetime, by ending the service and support for certain devices, referred to as planned obsolescence (ibid). Slowing down the production pace of new smartphone devices or making the replacement of parts in smartphones less expensive (Perzanowski, 2021) is not without conflicts or objectives. Economic conflict of interest is the main counterargument of manufacturers stating that making spare parts available to third-party individual repairers will plummet their profit margin and lower their competitiveness in the market (Proske et al., 2016; Bieser et al., 2021).

Repair services play a crucial part in smartphone service life extension and therefore reduce environmental impacts from smartphone production. However, whether a smartphone will be repaired highly depends on consumer decisions. Even though consumers are confident in their right to repair (Perzanowski, 2021), their expected lifetime of a mobile phone is significantly less than its actual optimal life (Huang & Truong, 2008). Erben calls this phenomenon “psychological obsolescence”, where a functional product in an individual’s mind becomes outdated due to newer gadgets being released that differ in styling. This, in turn, has resulted in a culture of non-repair (Jaeger-Erben et al., 2021), where the preferred path, whether consciously or not, is to buy a new device instead of fixing the old one and replacing a smartphone earlier than necessary (Bieser et al., 2022). It has been found that having previous

positive experiences around repair could decrease the creation of a culture of non-repair and instead create repair as the main option (Korsunova et al., 2023). Furthermore, the desire for novelty (O'Rourke & Lollo, 2015) significantly influences the increase in smartphone consumption. It must be acknowledged that wanting to obtain newer products for their novelty is a part of social consumption practices; therefore, socio-material settings must be considered when analysing repair practices (Jaeger-Erben et al., 2021).

When a consumer decides to repair their device, several barriers exist that limit their right to repair. Jensen et al. (2021) note three types of barriers – business, product development, and usage barriers. For companies, it is beneficial to create repair barriers and promote shorter product life cycles because increased consumption results in more profits (Bieser et al., 2022). From a business perspective, changing a business model to a more sustainable one with long-lasting products requires high economic costs, which many companies are unwilling to pay (Jensen et al., 2021). Therefore, they choose to make it difficult for other actors to repair their devices by concealing knowledge on how to conduct the repair, where to obtain the materials, which cannot be easily replaced, purposefully degrading the device's performance and making it more economically viable to purchase new phones instead of repairing their old ones (Perzanowski, 2021; Jaeger-Erben et al., 2021). The socio-material setting encourages fast innovation cycles, making it difficult for product developers to stay competitive in the market unless they follow the innovation trends (Thiébaud -Müller et al., 2018; Jensen et al., 2021). Moreover, as the products are changing so quickly, consumers lack attachment to their products, which withholds them from repairing devices (Jensen et al., 2021).

Planned obsolescence involves the practice of intentionally designing a product with a limited lifespan, forcing customers to replace their device more frequently than they would if the product was designed to fulfil its actual lifetime expectancy, and to further make it difficult to repair the device as well. In the case of smartphones, this can take various forms such as limited battery life, non-removable batteries, and software updates that slow down older devices (Proske et al., 2016). Planned obsolescence was proved during the Batterygate controversy around Apple in 2017 (Perzanowski, 2021). The company admitted to intentionally slowing down older iPhones to prolong battery life and prevent device shutdowns. This led to a class-action lawsuit and widespread criticism from consumers. Apple eventually agreed to pay $500 million US dollars to settle litigation related to this issue in the US along with fines in other countries (Perzanowski, 2021; Makov & Fitzpatrick, 2021). There is no indication that

manufacturers have changed their devices and stopped performing this planned obsolescence, hence seen in more recent studies revealing that the main business model among smartphone manufacturers is to gain margin from new devices (Jensen et al., 2021).

The Covid-19 pandemic presented the world with many obstacles in global supply chains which impacted the availability of new smartphones and further weakened consumers purchasing power (Mordor Intelligence, 2022). This opened a gap in the market for second-hand and refurbished smartphones which could mean that manufacturers and other stakeholders could consider new business models that are not solely built on profits from new devices. Scholars have been critical about whether the current emphasis on better repairability and emphasis on avoiding planned obsolescence is possibly having the opposite effect on consumers (Bieser et al., 2022; Makov & Fitzpatrick, 2021; Uriarte-Ruiz, 2022; Magnier & Mugge, 2022). Makov and Fitzpatrick (2021) looked further into psychological obsolescence which could also be referred to as perceived obsolescence. Perceived obsolescence refers to when products are outdated and no longer desirable even though it's still functional. This can be factors such as fashion trends, updates in technology, or social norms.

Psychological field studies and research on consumer behaviour and marketing, have revealed that consumers form a mental accounting book for each product they buy. As the product is used over time consumers slowly depreciate the utility against its' original cost until they feel their full value has been utilised from the product. The lower the value is in the mental accounting book, the easier it is for consumers to justify a replacement for a new product (Guiltinan, 2010; Roster & Richins, 2009). This is in congruity with Makov and Fitzpatrick's (2022) results, they suggested a focus on the stability and performance of devices rather than the current narratives of planned obsolescence which might have the opposite effect and convince consumers that repairing older devices is pointless. Furthermore, they suggested warranty periods of new devices give consumers the wrong idea about smartphones viability, similar to other scholars that emphasised longer warranty periods and service agreements could have an impact on consumers' perceived obsolescence (Magnier & Mugge, 2022; Uriarte-Ruiz, 2022).

Intervention studies are yet another method to study what incentives are most efficient in changing consumer practices. Bieser et al. (2022) identified three key intervention techniques to encourage device lifetime extension: person-oriented, situation-oriented, and structure-oriented. The authors suggested a framework of consumer decisions that impact smartphone

service lifetime to encourage choices that lead to a longer lifetime. Bieser et al.'s (2022) intervention further noted a need for more research to analyse the efficacy of which interventions would be the most successful. The same questions have been asked by social practice scholars when it comes to structuring out how best one can implement social transformation, especially in accordance to sustainable transformation.

2.5 Social Practice Theory

The application of social practice theory in theorising the relationship between consumption and its problematic environmental impacts has been well-established in recent years (Watson & Shove, 2022; Keller & Vilhalemm, 2017; Shove, 2003). Many domestic activities such as washing clothes, heating, and using electronic devices require resources like water and electricity, which scholars believe has become invisible to consumers (Shove, 2003; Evans et al., 2017). For instance, energy and water use are often inscribed in the architectural design of a building, leaving little agency for an individual to create change (Shove, 2010). By being dispersed in daily routine activities and habits (Halkier et al., 2011; Keller & Vilhalemm, 2017), consumption cannot be seen as a practice itself, and instead, it is "a moment in almost every practice" (Warde, 2005, p. 137). In order to mitigate environmental impacts, the consumption of these 'invisible' resources calls for changes in consumer practices (Warde et al., 2017; Keller & Vilhalemm, 2017; Shove, 2003).

By finding a middle ground between individualist and systemic paradigms, social practice theory balances attention to both structure and agency while not promoting one over the other (Spaargaren, 2011; Watson, 2017). Individual behaviour change is the dominant paradigm in policy making (Shove, 2010; Anantharaman, 2018; Evans et al., 2017), yet it has been criticised for giving too much power to individual decisions and choices and ignoring broader systemic barriers (Sayer, 2013; Spaargaren, 2011). The ABC model for social change, which stands for attitude, behaviour and choice, ignores the issue of the value-action gap and puts the responsibility on the consumer as the leading agent for change (Shove, 2010). The notion that behaviour cannot be changed by simply informing individuals was supported in a study about waste sorting. The results showed that the practice of waste sorting was abandoned in changing socio-material settings (Katan & Gram-Hanssen, 2021). In contrast, the systemic paradigm undermines individuals as change agents by promoting transitions through institutional and technological measures (Spaargaren, 2011). This paradigm leaves no opportunity for individuals to make contributions and decisions on change and, therefore, goes against the

democratic transition that degrowth promotes (Demaria et al., 2013). Therefore, practice theory is the most suitable approach for our research to explore how to implement change that also fits the degrowth ideology.

Practice theories originated in the 1970s through the works of sociologists such as Pierre Bourdieu, who conceptualised the "habitus", and Anthony Giddens, among others (Warde, 2014; Sahakian & Wilhite, 2014; Warde et al., 2017). The current area of Social Sciences, however, originates in the work of Schatzki (2001), where practices are described as "embodied, materially mediated arrays of human activity centrally organised around shared practical understanding" (p.11). Simply put, practices are not merely abstract concepts; they are a set of actions and behaviours that are learned through our shared understanding of them. Furthermore, he claims practices are at the centre of social theory as they reflect the active and embodied nature of human conduct (ibid). A common link in practice theory research is the perception that the individual is a carrier of practice (Halkier et al., 2011; Reckwitz, 2002), putting practices at the forefront of analysis instead of individuals (Watson & Shove, 2022). Reckwitz (2002) goes on to explain the importance between 'practice' and 'practices', which in German are differentiated by the names 'Praxis' and 'Praktiken'. While 'practice' (Praxis) describes human action as a whole, 'practices' (Praktiken) are the primary unit of analysis in practice theory noted as a 'routinised type of behaviour', including elements of bodily and mental activities, material, tangible things, and background knowledge, such as emotional significance and 'know-how' (ibid, p. 249).

Building on the before-mentioned practice framework by Reckwitz, Shove et al. (2012) have established three elements that define practices - material, competence, and meaning (see Figure 1). Social practices are enabled and reproduced by these three elements and the connections between them (Shove et al., 2012; Watson & Shove, 2022). We will use this framework in our research to describe and analyse repair practices and how change can occur by transforming one or more of the elements. The material aspect of practices represents the physical tools, infrastructures, hardware, tangible objects and the knowledge stored in them (Shove et al., 2012; Halkier et al., 2011). A simple example was made by Reckwitz (2002), who noted that in order to play football, a ball is needed. The ball represents one of the material entities used in the practice of playing football. Competence illustrates the skills and know-how necessary to perform a practice (Shove et al., 2012). In order to call someone on the smartphone, one must have an understanding of how to perform such an activity. The emphasis is on the knowledge that is learned through embodied experiences and repeated activities rather

than listening and reading (Keller & Vilhalemm, 2017). Finally, meanings consist of emotions, symbolic significance, ideas, desires, and socially shared notions (Shove et al., 2012). The meaning of a practice or use of an object can also contribute to an individual's self-identity (Ingram et al., 2007). For instance, buying second-hand items may hold the symbolic meaning of being environmentally conscious.

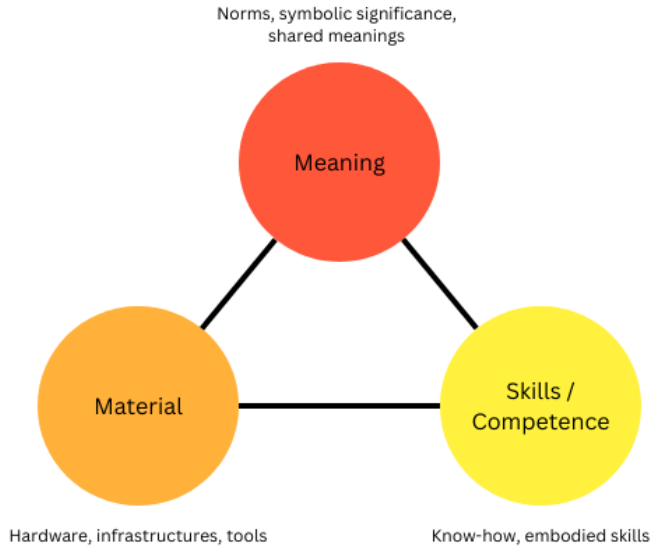

Figure 1. An adaption of the three elements that characterise social practice theory (Shove et al., 2012)

The elements of practices and practices themselves are not static. The elements must be continually reproduced to maintain the existence of a practice (Pantzar & Shove, 2010). Due to links between elements, changes between them are connected. When an element experiences change or a link is broken, this may lead to a change in other elements, in a change of the practice, or in the disappearance of it (Shove et al., 2012; Watson, 2017). An interesting example of changing meanings and creating new practices is presented in a study about Nordic Walking conducted by Shove and Pantzar. Nordic Walking emerged as a form of training for cross-country skiers but was transformed into a low-impact exercise with poles marketed towards a wider audience (Shove & Pantzar, 2005). The authors argue that such a change was able to happen due to a synergetic relationship between producers and consumers, as consumers accepted and embraced the newly marketed version of Nordic Walking (ibid). Moreover, practices can be changed through external forces or through the transformation of linked practices (Geels et al., 2015). As Magaudda (2011) noted, the emergence of new innovations in the market, such as the iPod, produces new meanings and habits. Sustainable practices can

also be achieved by the resistance to unsustainable practices by the practice carrier (Hargreaves, 2011). Considering the previous examples, we argue that it is important to examine the views of smartphone repair practice carriers as a way towards sustainable smartphone consumption.

One should make note that practice theory was originally applied within sociology to understand the role of technology in shaping social practices (Schatzki, 2001) but later it was used to study consumption behaviours and the way practices are reproduced and maintained (Hargreaves et al., 2013). Additionally, practice theory has been applied within the sustainability field and how it can assist in enabling sustainable practices (Corsini et al., 2019; Watson, 2017; Sahakian & Wilhite, 2013; Spaargren, 2011). The relevance has been made that consumption cannot be understood merely as a matter of individual preference or choice. Rather consumption should be understood as a socially embedded practice where a number of factors are shaping people's social norms and material constraints when consuming (Warde, 2005). Hence consumption occurs within and for the sake of practices (ibid). Similarly, Shove (2003) highlights how social norms and material culture interconnect and shape everyday practices and technologies. Further stressing the importance of understanding the role of culture, infrastructure, and social context in shaping consumption practices in order to identify prospects for social change. Specifically in relation to what people consider comfort and convenience in their daily life (ibid). The forming (making) of new links simply needs one change in how the links between the three elements are constructed together. Material relations can be reconfigured, for example, in the case of making automobiles and driving accessible to a larger part of the population. Whereas showing how driving requires less demanding skills than anticipated (Shove et al., 2012).

The emphasis on individual choice being the leading influence on consumption practices has been criticised (Warde, 2005; Warde, 2014), the notion that consumers only evaluate cost and utilitarian value fails to account for various material structures and social norms (Warde, 2014). Similarly, in Reckwitzs' (2002) work where he lays importance on the interconnection of all three components of practice theory. Change and stability can best be understood by how the three elements of practice are related and how practices are related to each other (Shove et al., 2012). Everyday routines and habits are reproduced through the same threefold conceptual framework of practices. Reducing habits and routines to generalised behaviour within portfolio models of action is inadequate for developing an understanding of how everyday practices are reproduced continuously (Southerton, 2012). The individualistic emphasis should be replaced

by a more holistic approach to understanding consumption practices and being able to change consumption on a societal level. Involving individual approaches in addition to broader social infrastructures and cultural norms (Warde, 2014).

Similar criticism is related to the sustainable consumption of smartphones, a more holistic approach that involves all three main actors, policy makers, manufacturers, and consumers is needed (Bieser et al., 2021; Bieser et al., 2022; Magnier & Mugge, 2022). The threefold elements that practice theory is built on and further the integration of all of them with each other may assist in giving a better understanding of what it takes to effectively implement more sustainable practices for smartphones. For instance, when the change from having a chauffeur driving the owners of cars, to the owners becoming drivers themselves, involved a change in how owners responded to mechanical failures as such failures became a nuisance. The elements of meaning and materiality in this case co-evolved (Shove et al., 2012). This shows the importance that practice changes have better success if they relate to convenience for the consumer (Shove, 2003).

Innovation and policy standards are often built on a continuous process of reconstruction of practical skills and materiality (Shove et al., 2012) which subsequently impacts social meaning (Reckwitz, 2002). Though consumers often react negatively towards changes that impact their level of comfort, as an adaptation to loss has been shown to be more difficult than adaptation to gaining products and services (Büchs & Koch, 2019), such an adjustment will be necessary in order to create a more sustainable world. Degrowth supporters acknowledge this as a barrier towards sustainable consumption (Kallis, 2011); however, consumers should be able to resist the dominant norms as a way forward (Hargreaves, 2011). Therefore, we find it important to examine degrowth ideas and how smartphone consumption can relate to them.

2.6 Degrowth Critique on Consumption

The planetary boundaries have been created as a measure in which humanity can safely operate (Rockström et al., 2009), and recent research has shown that already six of the nine boundaries have been surpassed due to the continued man-made growth and resource consumption (Persson et al., 2022; Steffen et al., 2015). The hegemonic solution to the degrading environmental effects of consumption is “green growth”, which promotes technological advancements to make production more efficient, therefore decoupling economic growth from environmental impacts (Sandberg et al., 2019). The emphasis, however, remains on growth

(Buch-Hansen, 2018) – growth of the economy, GDP, capitalism and technologies – all of which are highly criticised by degrowth scholars (D'Alisa et al., 2015; Kallis, 2011; Brossmann & Islar, 2020; Demaria et al., 2013). The business models of smartphone producers are dependent on growth – selling more devices, providing profits for shareholders and in turn, increasing GDP (Magnier & Mugge, 2022). The main argument by degrowth supporters is that growth cannot be socially and ecologically sustainable (D'Alisa et al., 2015; Büchs & Koch, 2019; Kallis, 2017) and further drives unsustainability (Brossmann & Islar, 2020). Degrowth is an alternative path, which would require a radical transformation of the existing systems (Kallis, 2011).

Degrowth is a planned downshifting and stabilisation of resource use, consequently consuming and producing less in order to tackle environmental damage done by humans and improve the well-being of society (D'Alisa et al., 2015; Sandberg et al., 2019; Hickel, 2020; Kallis, 2011). The emphasis is on the process of reducing resources through reduced consumption, which Corvellec and Paulsson (2023) call de-resourcification. In our research, smartphone retention is a strategy to reduce resources consumed during production. Short device lifespan has become the norm (Magnier & Mugge, 2022), in part due to mental depreciation: consumers expect their devices not to perform for a long time as new models with small technical and stylistic choices are frequently introduced in the market seemingly making the existing device outdated (Makov & Fitzpatrick, 2021). This leads to a need for change in norms to bridge consumer mindset towards degrowth. An example of achieving this change would be creating stronger attachments to devices through personal design measures rather than dismissing them (Jattke et al., 2020). Moreover, promoting the existing performance possibilities and functional capabilities of smartphones (Makov & Fitzpatrick, 2021), highlighting their full potential of a 7-year-long lifespan (Jensen et al., 2021) and extending warranties (Magnier & Mugge, 2022) are needed. Acknowledgement of smartphone stability and functionality can help to promote repair and retention as the perceived lifespan would be longer. This would also increase the trust in repaired smartphones, which Chun et al. (2022) note as necessary for smartphone retention.

An important part of degrowth is social well-being. O'Rourke and Lollo (2015) claim that growth based on consumption does not increase welfare and ignores societal goals. This is noticed by GDP being the primary measure of economic growth, which measures all outputs in the marketplace but fails to recognise societal values, such as happiness and health

(Philipsen, 2022; Büchs & Koch, 2019; Kallis, 2017). This in turn diminishes the well-being of people because profit motivations overcome altruistic behaviours (D'Alisa et al., 2015), impacting cultural and spiritual values (Kallis, 2011). In comparison, degrowth aims to combine social and ecological sustainability (Demaria et al., 2013) without putting profits above people or nature. Degrowth promotes the sharing of resources (Corvellec & Paulsson, 2023). Therefore, practices of smartphones in a degrowth transition would include sharing and using them as long as possible. Moreover, an important emphasis on degrowth includes social relations (Demaria et al., 2013) and local community initiatives (Joutsenvirta, 2016). Repair services could support local economies (Bieser et al., 2022), providing valuable jobs for skilled technicians and reducing the financial burden experienced by consumers by promoting longer device life spans.

Degrowth calls for a different society, a different economy that goes beyond capitalism and a different organisation of living in order to preserve ecosystems from human impact and to live a simpler life with meaningful work (D'Alisa et al., 2015; Buch-Hansen, 2018; Kallis, 2011; Sekulova et al., 2013). The "throwaway society" we exist in promotes disposable and replaceable items (Cooper, 2005), and encourages the fast replacement speed of smartphones. A social model where humans do not strive to be consumers entails a huge transition but is needed in order to live within the planetary boundaries. Degrowth scholars advocate that the change should happen collectively (Sekulova et al., 2013) and democratically (Demaria et al., 2013; Koch, 2020). While theoretically plausible, based on historical events, it seems unlikely for degrowth to take place intentionally in capitalistic nations (D'Alisa et al., 2015; Sekulova et al., 2013). We see this as an issue of growth lock-in and structural constraints. Growth is deeply embedded in the minds and bodies of people as a measure of status, identity, and success (Büchs & Koch, 2019). However, changing the practices of people is a promising way of restructuring how society is organised (Joutsenvirta, 2016).

Chapter Three

3. Methodology

3.1 Chapter Overview

In this chapter we discuss our methodological choices for our research by explaining how we designed our research, a short summary of selecting the appropriate literature, how we built our sample, how data was collected and how we analysed the data. We will additionally reflect on the limitations of our methodology, as well as cover our ethical considerations.

3.2 Research Strategy

To shed new light on practices and perspectives of smartphone consumption and repair, and where the influence of these practices comes from, we departed from the belief that practices vary across individuals but that their practices are reconstructed continuously through social norms and values (Reckwitz, 2002). In order to address our research aim, it was important to explore the field with openness in mind in consideration of our interviewee's contributions. We wanted to understand what meanings and practices people have towards repair and longer lifetime extension of their smartphone devices, building on an interpretive epistemology grounded in a relativist ontology that examines social reality as constructed by individuals (Bryman et al., 2021; Fay, 1996). We chose to gather data without a prior hypothesis hence collecting data from an inductive framework (Bryman et al., 2021). Induction emphasises the participants' own interpretations of their social worlds, thus relying on an interpretivist approach (Bryman et al., 2021; May, 2011). Fay (1996) describes "interpretivists think that to comprehend others is to understand the meaning of what they do and to understand this meaning is to understand them simply in their own terms," (p.113) or in other words how individuals' subjective meaning is comprised.

Our research involves studying many intentional phenomena, and even unintentional events that occur within a context of intentional phenomena. These intentional phenomena are inherently meaningful and are usually identified based on their meaning (Fay, 1996). This interpretivist epistemology coincides with constructivism, an ontology described by Fay as "all knowledge is constructive activity in which knowers are contributors" (ibid, p.76). Constructivist ontology grants us to explore questions relating to how people make sense of

the world around them. Further, this allows us to not only see what is going on but also to explore what are the "processes through which social realities are constructed and sustained" (Gubrium & Holstein, 2008 cited in Silverman, 2017, p.137). Falling back on this theory, we departed from the belief that consumption practices are constituted through the sayings and doings of individuals, or in other words through their practices lived and told (Reckwitz, 2002). Hence, we chose a qualitative approach by collecting data through semi-structured interviews. The qualitative approach suits the aim of our research because of the intention to explore consumer practices and perspectives in a social setting and the values and norms attached to it (Silverman, 2017). Exploring these deeper elements of consumer practices would not be possible through a quantitative methodology. The research process has unfolded as follows.

3.3 Data Collection / Collection of Empirical Data

3.3.1 Sampling

A population was first identified as adults living in Sweden between the ages of 20 to 35 that own a smartphone and have repaired it or thought about repairing it. During the research process, the age range of the participants was modified to 20 - 55 years old due to a lack of relevant participants volunteering to participate in the study. Following Flick's (2018) recommendation, we conducted data collection and analysis simultaneously in order to reflect on the interviews and note promising themes for analysis. Through continuous reflection on the data gathered from the interviews, we noticed the increased age range as a benefit. It allowed us to not only acquire more interview participants but also gain broader insights into smartphone use and repair among different generations.

The relevant participants were employed through purposive and snowball sampling techniques. Purposive sampling calls for a critical examination of the population and a careful selection of participants that fit our criteria of residing in Sweden and owning a smartphone (Silverman, 2017). The purposive sampling was fulfilled by publishing social media posts on LinkedIn and Facebook groups. The posts specified that we are looking for interview participants who fit the criteria of living in Sweden, owning a smartphone and having either contemplated repairing their device or gotten it repaired. Alongside social media posts, we sampled participants through the snowball method, inquiring friends to nominate relevant potential interviewees, as well as getting suggestions from the people that participated in the interviews. The recruitment of participants was done until we were satisfied with the quality of data gathered from the interview participants (May & Perry, 2022).

3.3.2 Interviews

To achieve our aim of understanding the practices of consumers in terms of smartphone repair, we decided to employ semi-structured interviews as a method of data collection. A semi-structured interview is useful to understand the participant's generation of meaning in life (May & Perry, 2022); therefore, we deemed it as an appropriate choice of method for our research aim. This interview method is conducted by following questions in an interview guide; however, it allows more flexibility than a structured interview as the interviewer can ask follow-up questions and probe the interview participant in order to gain a fuller view of their reality (May & Perry, 2022; Flick, 2018; Bryman et al., 2021). It allowed us to deviate from the interview guide and ask questions based on the participant's answers, gaining deeper insights into what the interviewee finds as important to note. At the same time, the structured aspect made sure that we covered all the necessary topics to answer our research questions (Bryman et al., 2021). Moreover, to capture practices during an interview, we requested the participants to recall experiences from their life and describe them in detail, gaining rich empirical data that can be analysed through practice theory.

We began the interviewing process by developing a preliminary interview guide and testing it with two pilot interviews. This is seen as good practice to notice if our interview guide allows us to acquire the data that answer our research questions (Silverman, 2017). The data gathered from the pilot interviews was not used in the final analysis but was rather used to improve the interview guide and the interviewing style. After the first pilot interview, we added and adjusted the questions to gain a deeper perception of the participants' practices. The second interview provided us with insights on how to adjust the order of questions so that the interview has a good flow (Bryman et al., 2021). In total, we ended up with 15 main questions built on the practice theory framework (see appendix 2 for the interview guide questions). In addition to the main questions, the interview guide also includes introductory questions about the demographic information of the participant as well as follow-up questions to acquire elaborated answers. However, during interviews, spontaneous questions would be asked as well if the interviewer felt it was necessary. The questions were mainly open-ended, encouraging participants to discuss the topic in more detail and present their creation of meaning, which in turn was useful for us to acquire richer empirical data (Flick, 2018).

In total, we conducted interviews with 13 participants, whose answers provided us with sufficient qualitative data to answer our research questions. The interviews lasted on average 45 minutes, with the minimum duration being 36 minutes, while the longest interview lasted

59 minutes. Table 1 provides an overview of the demographic profile of the interviewees and the details of the interviews. As seen in the table, interview participants are numbered and referred to by the acronym IP (Interview Participant). The interviews took place either in person or via video calls on platforms such as Zoom and Google Meet. Online interviews provided us with the accessibility to interview participants that live in different cities. Bryman et al. (2021) recommend being ready for unexpected distractions during interviews. Although we created a silent and comfortable environment to lessen the chance of distractions, during the online interviews, we had some internet connection issues, which interrupted the flow of participants' answers. In such cases, we would repeat the question and encourage the participants to continue expressing their thought processes.

We began the interviews by building rapport with the participants, asking how they are feeling and how their day had been, as well as assuring that there is no judgement about their interview answers. This allowed the interview participants to feel valued and be more comfortable answering questions and going into depth about their answers, which is important to acquire data that is true to the participant (Silverman, 2015; May & Perry, 2022). At the start of the interview, we restated the purpose of the study and asked the interviewees to verbally confirm their consent. During the interviews, we made sure to actively listen to the information provided, attempting to understand the participants' lived experiences (Bryman et al., 2021; Silverman, 2015). Simple confirming responses from us, such as "Mhm" and "Yeah, good point", helped the informants feel more confident in their answers and go into longer stories about their experiences. At the end of the interview, we allowed the participants to express any additional information that they would like to add and expressed our gratitude for their participation in the study. To transcribe the interviews fully from audio files into text different applications were used such as Descript, Otter and Trint.com.

Table 1. Profile of the interview participants

Name	**Sex**	**Age**	**City**	**Occupation**	**Interview date (dd.mm.yyyy)**	**Duration (min)**
IP1	M	40	Västerås	Electrical engineer	22.03.2023	39
IP2	F	41	Stockholm	Student	23.03.2023	51
IP3	M	30	Helsingborg	Student	23.03.2023	43
IP4	M	48	Ängelholm	CEO	24.03.2023	46
IP5	F	37	Höör	Architect	27.03.2023	48
IP6	M	45	Malmö	Manager	27.03.2023	54
IP7	M	23	Malmö	Factory worker	28.03.2023	38
IP8	F	30	Malmö	Psychologist	28.03.2023	46
IP9	F	25	Lund	Barista/student	03.04.2023	59
IP10	M	55	Helsingborg	Teacher	01.04.2023	36
IP11	F	27	Helsingborg	Nurse	05.04.2023	36
IP12	F	22	Helsingborg	Student	13.04.2023	47
IP13	M	25	Helsingborg	Construction worker	18.04.2023	44

3.4 Data Analysis

Analysis was done on the transcriptions, during the process of conducting interviews we began noting down concepts and would go over notes together along the process. At least sorting based on interviewees' descriptions began alongside conducting of the interviews (Rennstam & Wästerfors, 2018). An iterative process was therefore followed to analyse the transcripts where we would go somewhat back and forth transcribing the first few interviews right away to see what the analysis on them would reveal (Bryman et al., 2021). Furthermore, we chose to use a manual method where the transcripts were read separately by us, and the recurring

concepts were identified. When a large list of concepts had been analysed, we began connecting together concepts to form larger themes, where we highlighted quotes and began forming thematic categories. We found about a dozen themes of significance.

The next step was coding the interviews by grouping the text and quotes under labels and keywords organised from the thematic identification (Rennstam & Wästerfors, 2018). Throughout the analysis, we went back and forth from categories to the data and vice-versa, this was done to make sure all concepts and categories would come to light. Through the process of data reduction and reorganisation, the original concepts and themes were joined into five main themes (*practising repair, perceived obsolescence, policy making and regulation, meanings assigned to smartphone use* and *sustainable consumption and smartphones*) and eight subthemes (*repair barriers, repair enablers, meaning in society, brand aesthetics, convenience and practicality, consideration of environmental impacts, financial influence* and *promoting sustainable consumption of smartphones*). Colours were chosen for each theme and the transcripts were read through again to highlight words and sentences to be used in the arguing of results (Flick, 2018).

The last phase of the analysis involved analysing the themes through a practice theory framework and a degrowth viewpoint. As practice theory highlights the sayings and doings of practice carriers (Reckwitz, 2002), we made sure to analyse the answers from participants in terms of the surrounding contexts, looking for undertones in the interviews and unconscious meanings, as well as how consistent the answers were throughout the interviews (Flick, 2018). Through this careful process, we noticed changes in how people perceive their practices and how they perform them. The three practice elements came to light throughout the analysis process, where we took note of how the links between practice elements exist and change. When forming the interview guide, we made an effort to include questions that would render possible results related to degrowth transformation, analysis of the transcripts revealed connections in this direction as well. The above described themes and subthemes will be examined in detail in Chapter 4.

3.5 Ethical Considerations

Throughout the research process we have kept the utmost respect for research ethics according to the code of ethics of The Swedish Research Council (2017) as well as the guidelines given by Lund University. Our research was performed with that in mind to guarantee our work

would not be harmful to the participants or cause them any discomfort (Bryman et al., 2021). In advance to the interviews, we would contact our participants; there we would describe the aim of the study, inform them about the protection of their privacy, and how data would be eliminated after the study has been concluded (ibid). Informed consent was confirmed verbally at the beginning of each interview, where the interviewer would ask questions confirming statements on the consent form. Additionally, our participants were assured that the research was motivated entirely by the desire to gain new knowledge about the studied research phenomenon, though keeping in mind not to reveal too much detail about the purposes with the risk of it impacting the quality of the empirical data (Bryman et al., 2021; Silverman, 2017). The key element in relation to qualitative research, according to The Swedish Research Council (2017), is to guarantee all data be handled confidentially, we wanted our participants' identities to be preserved which would grant them a safe space to express their perspectives.

3.6 Limitations

Even though the methods for our study were carefully selected in order to answer the established research questions, there are several limitations to the methods used. During the sampling process, we encountered difficulty in finding participants of our initially chosen age range, resulting in us increasing the age range for the sample. This allowed us to collect more extensive insights into perspectives on smartphone use, which would not be possible with the original age range. Collecting empirical data through semi-structured interviews allowed us to gain a deeper understanding of the meanings involved in practice realisation. However, through this data collection method, we could not observe if the practices were true to what the participants were saying. To overcome this obstacle, when conducting the analysis, we examined how the answers changed during the interview process, as well as took notice of the manner in which the interview participants were speaking (Flick, 2018). Moreover, we asked the participants to recall specific stories and actions from their lives and to describe them in detail. Still, this also resulted in some difficulties by people not being able to remember specific situations and their actions during them. A stronger approach to capture practices would be to use other research methods when collecting data such as observations or intervention workshops, as done by Bieser et al. (2022), who note interventions as an optimal way to promote the extension of smartphone lifetime.

Chapter Four

4.Analysis of Findings

4.1 Chapter Overview

In this chapter we go over the analysis of our results and present the main themes our analysis rendered. We will provide explanations for our findings and connect our findings to practice theory and degrowth as well as previous literature. This analysis will present five main themes and eight subthemes.

4.2 Practising Repair

The first main theme analysed was around repairing. It must be noted that the practices are internally differentiated between practice carriers due to various learned understandings that differ among participants (Schatzki et al., 2001; Warde, 2005). As such, we can notice the difference in repair through the variety of practice carriers. All participants, with one exception, admitted to having taken their own or a relative's smartphone to be repaired. The participants considered it easy to find a place for repair either through certified repair providers or through individual repair shops found by a quick search on Google or by simply walking past it, as noted in the answer by IP8: "I searched on Google where to change the battery in Malmö. And then I just took the one that had, like, good reviews. Like quite cheap and good, like great things and offers."

IP11 addresses how she already knew about the repair place, even if she had never been there before. Looking through a practice theory lens, it is important to note the combination of individual actions in addition to societal infrastructures (Warde, 2014). Moreover, finding a repair place relates to competence and material practice elements (Shove et al., 2012), as one has to have knowledge of how to use a Google search bar and then find the place, as well as it is necessary that the physical repair shop is available. Despite it being simple to find a repair place, IP6 expressed concerns about the reliability of individual repair shops:

> I stay away from the small individual shops because they have a reputation for using copy products, which are off, you know, not always, but often (...) it's kind of a shady deal cause you, you're paying for something that should be good, but you get like a either a second-hand screen or a second-hand module, or you get something that is off for example, Alibaba or something like that. (IP6)

Interestingly, IP7 had taken his phone screen to be repaired at an individual repair place, and his experience confirms the concerns that IP6 had. When asked if IP7 would repair his device again, he answered: “Maybe not at this place? Because it's like, the screen isn't the best. So, it's sometimes when I'm typing on it clicks the bottom buttons that I'm not even clicking on.” This was an issue for prolonging the lifetime of smartphones. Smartphone repair should be easily accessible and trustworthy, however, if there is a lack of trust in the provided service, then there is little likelihood of repair becoming a common practice. This supports the results of Chun et al. (2022), who emphasised the necessity of trust involved in the phone’s functionality from refurbishment and repair. This action is called gatekeeping and refers to the practice of manufacturers limiting or restricting access to repair manuals, parts, and tools necessary to repair their devices (Bieser et al., 2022).

An important aspect of the participants’ smartphone practices is the evaluation process for repairing one’s smartphone. The main aspects that consumers take into consideration are the cost of the service, the age of the device and the specifics of why a repair is needed. This is clearly reflected in the answer provided by IP2 on what the deciding factors on are whether to replace or repair a device: “I would say the cost of the repair. For, yeah, that's number one. Is it worth it? And then I would have to assess how old is my device, what model is it?” (IP2). The consensus seems to be that if the device is newly bought, the issue that needs fixing is small and can be quickly repaired (such as a cracked screen) and the repair is not expensive, then participants opted for repair. However, if the phone is already fairly old and the battery needs to be replaced, the participants noted that repair is not worth it. Based on the repair evaluation process we have come up with 2 sub-categories for practising repair: repair barriers and repair enablers.

4.2.1 Repair barriers

The age of the smartphone is seen as a barrier to repairing it. After two years the smartphone feels outdated; similarly, Magnier and Mugge (2022) discussed that a short lifespan of an electronic device is seen as the norm. Once a phone was around two years old, our participants thought it was unnecessary to repair it, as there are newer technologies available, and the price would not be worth it.

> If it's an older phone, I don't think that I would [repair]. Personally, I wouldn't. Because, I mean, the cost is usually pretty high. So I would opt for a new phone. I would rather pay a bit more and get a new one. (IP13)

It’s important to emphasise the feeling that phones are outdated in relation to technological features after a short amount of time, as seen in IP6’s answer on why he did not repair his smartphone: “I decided not to repair something that was relatively close to being outdated in terms of technology and the managing system.” Such a mindset is valuable for smartphone businesses because they can change the practices of people by introducing rapid transformations of products. Even if the transformations are only small stylistic changes in the product, the frequency of releasing new products proceeds in a feeling of outdatedness (Makov & Fitzpatrick, 2021).

Another barrier is the magnitude of repair needed to be done. The participants perceived that a broken screen is a minor issue that can be quickly fixed. However, they felt that once the battery gets slow, it is easier and less expensive to get a new phone.

> I have never repaired the battery, as at that point I get a new phone when it gets slow. But I would repair small things, like a cracked screen. But I would probably get a new phone when the battery gets bad. (IP11)

Through planned obsolescence such as limited battery life, smartphone producers are able to manipulate the material element of practices and discourage repair (Proske et al., 2016). The practice elements of material, meaning and competence must be reproduced for a continued existence of a practice (Pantzar & Shove, 2010). However, extended usage of the existing smart devices cannot be maintained when the material elements are changed by the producers. Moreover, the cultural norms and material infrastructures are not lenient towards battery repair, as seen by our participant answers, which are important aspects for practice adoption and maintenance (Warde, 2005).

Other participants felt similarly that repairing a device is too expensive. Practices tend to respond to price changes (Sayer, 2013), and our results reflect that. As noted in the answer below, IP6 changed its participation in repair practice because of the high price point.

> I have got into a Samsung store and asked for a repair on Samsung. And you know, when I heard the price, I just [thought] this is no way. So it was you can go cheap and not be sure about what you get. Or you can go to Samsung, and you know you're gonna get the right thing. But the price was just, it was just too high. It was too expensive. (IP6)

IP5 expressed that she felt discouraged by retailers to repair her smartphone. Therefore, a barrier for repair is set already at the smartphone retailers that leverage price as a reason to get a new device.

> I mean, the people selling the phones, they say that it's better just to buy a new one. They say (...) it's gonna be pricy to fix it. Why not just put a bit extra money on it and get a brand new one? (IP5)

An interesting viewpoint was provided by IP3, who has repaired devices himself in the past. He noted that repair has become more expensive now because of the price increase in spare parts, as well as safety features made by manufacturers that make repair more complicated.

> Apple started removing sales of extra screens and stuff so you can only buy it through their own subsidiaries. And when that happened, it got a lot more expensive. So fixing a screen costs a thousand kronor because the screens apparently just exploded in prices. (IP3)

The increased price of spare parts creates economic obsolescence (Proske et al., 2016; Bieser et al., 2022), discouraging consumers to repair due to the high cost of repair. This can be seen as a purposeful action from the business side, as creating difficulties for repair makes it economically appealing to buy a new phone, therefore increasing their sales (Perzanowski, 2021; Jaeger-Erben et al., 2021). The discouragement of repair, lack of access to spare parts and limited information provided by manufacturers on their smartphones creates a lock-in situation of people not being able to repair whether it be because of price or lack of available information (Jaeger-Erben et al., 2021).

4.2.2 Repair enablers

Participants felt like they were not encouraged to repair their devices; therefore, very few aspects were seen as currently enabling repair. Although the cost of repair can be seen as a barrier to repair, IP1, IP7 and IP8 found that repair is cheap and encourages them to fix their existing phone rather than getting a new one. “I mean, if you just look at the prices for new ones, you get encouraged to repair your old ones” (IP8).

The answer from IP1 has emotional undertones, correlating with meanings that characterise practices (Shove et al., 2012), as strong emotions can promote repair as a practice. “Yeah, smartphones are expensive. So it's uh, I think it's crazy to not repair them and buy a new one” (IP1). Furthermore, IP7 expressed that repair is beneficial for both the personal budget and for environmental preservation:

> If I would have gotten a new iPhone, it's like, I don't know 15,000 kronas. So, I think it's pretty cheap to fix it instead. (...) it's pretty good to do it [repair] for your wallet and also for the environment. (IP7)

Lower income is correlated with decreased emissions (Sayer, 2013); therefore, it is not unusual to notice that interview participants who decided to repair their devices due to financial concerns, were also being environmentally conscious. Thus, reducing the financial cost of repair can be a way towards degrowth. As Kallis (2011) noted, degrowth would entail less material comfort however it does not mean welfare loss. If people have reduced finances, they can still have a comfortable life with a repaired phone, but without excessive consumption of new devices.

When discussing how to promote repair, the participants found that they would be more likely to repair the device if it was more accessible in terms of physical access and financial access - "the most important [is] to have access and easy access" (IP5). IP13 experienced high service costs when having his phone repaired and emphasised that financial feasibility would be the incentive for most people to repair their smartphones.

> I feel like that [money] is the incentive for 99% of the people, if they can get their phone fixed fast and like restored as to just as good as it was previously. But for the third of a cost, I feel like a lot of people would do that instead of just getting a new one. (IP13)

Financial access embodies both material and competence aspects of the practice. If repair is made more economically available, the practice of repair can become appealing to a larger group of people. Increasing trust and access towards infrastructure (repair companies) needed to perform repair more frequently would be further support to enable repair. Additionally, as Reckwitz (2002) emphasises practices are highly interconnected, infrastructure is one but skills and know-how about repair on electronics were distinctively seen in the answers of the participants. Only a few interviewees that were educated in tech or engineering had a better understanding of how easy it could be to repair smart devices. Teaching children in school or in family settings how to do simple repairs on electronics could increase repair practices (Korsunova et al., 2023), if consumers don't understand of how repair works and if it is easy or difficult, this will impact their evaluation when faced with the decision themselves.

Another repair enabler could be extended warranty contracts that guarantee a promise of repair within a specific time (Magnier & Mugge, 2022). As noted by participants, who have had

service agreements, they feel that the smartphone should be replaced once the contract has come to an end.

> When I have paid it off, I feel like it is time to get a new one. And you know, usually, it is like 2 years, the agreement. So then the phone feels a bit outdated, I guess. So it is easy to just get a new one and keep paying around the same price. (IP11)

A prolonged contract would create a perception of a longer functionality of the smartphone. As Michaud et al. (2017) concluded consumers are willing to pay extra for sustainable choices, and many of our participants chose to have insurance. If this practice and the option of longer warranties and service agreements were used better, it could be a strong tool towards extending the lifetime of smartphones. IP13 suggested that consumers should take advantage of insurance as a way to repair their phones:

> Definitely, one thing is to take advantage of insurance policies. If they break their phone before just like discarding it and getting a new one, they should really try to figure out something more sustainable and get it fixed. And the one incentive for that is to make it more economically sound, I guess. (IP13)

Still, he mentions the financial incentive. Insurance must be affordable and easily applied, as other participants experienced issues with insurance policies. For example, IP12 needed evidence of the concern she is experiencing with her phone, which she did not have:

> But I have also experienced from not getting the, like, not getting the full benefits from it. Because sometimes they need stuff that I don't have or that can I can't bring them that some evidence for the broken phone. And yeah, so for me, it's been easier not to have it. (IP12)

As consumption is deeply embedded in the cultural and societal infrastructures (Warde, 2022), the uptake of a new practice, such as creating smartphone repairs more common among a wider audience, will depend on the social norms. Therefore, it is necessary to examine the meanings of repair.

4.3 Perceived Obsolescence

The second main theme that was analysed was the perceived obsolescence of the participants in relation to their smartphones. The majority of our participants showed a consensus that it felt like the manufacturers wanted smartphones to last a certain amount of time until they "should" be replaced by a new device. The time perception mentioned by the participants

repeatedly was that after about two years they felt the batteries would be showing large performance lapses to last through the day and sometimes general slowness to the device software. Apple has in the past admitted and been indicted for planning the obsolescence of their iPhones. This was seen in the Batterygate case in 2017, where Apple paid $500 million USD to settle the lawsuit over its 'throttling' of old iPhones (Perzanowski, 2021). People's perception of an item as outdated is influenced by both its meaning and social norms. This is determined by how the device compares to others in terms of age and how people judge its obsolescence. Simultaneously a person would need certain know-how which could be learned from previous generations or education as to when a device cannot be repaired anymore and is better off replaced (Shove et al., 2012) furthermore, material lock-in occurs by smartphone manufacturers who seem to be controlling the time of obsolescence.

Many of our participants said they felt smartphones were made to be disposable, as in they felt the lifetime of smartphones was in general too short. This would correlate with the meaning of planned obsolescence in terms of software and battery (Proske et al., 2016). This was mentioned by interviewee IP2: "I think they are a bit disposable in fact (…) I think they are crap! I think they are designed to fail within a certain amount of time. Because the economy is linear and not circular. That's my opinion.". She continued to say that it felt like the manufacturers were mainly encouraging the replacement of devices no matter the situation and felt there was a lack of repair options (IP2). This corresponds with previous research on material obsolescence (Proske et al., 2016; Bieser et al., 2021; Bieser et al., 2022) where research on smartphones has shown that at a certain time, it seems the battery performance begins to slow down immensely, and the original software quality of the phone would begin to lack. As interviewee IP13 felt it was evident this two-year mark was not pulled out of thin air: "I feel like the two-year mark is not like a number that they pull out of thin air. I feel like that's when they generally want you to switch phones" (IP13).

Whether this be due to planned obsolescence from manufacturing the device or perceived obsolescence by our participants is hard for us to judge. Moreover, many participants felt the encouragement from manufacturing was not to keep devices for longer which correlates with today's business models of smartphone manufacturers (Bieser et al., 2022). But some were frustrated that repair was not recommended by technicians and discounts were advertised off new devices if an older one was handed in at purchase. As we see elaborated by one participant:

> No, I think they encourage you to buy a new one. Perhaps you have seen this bring your old phone and you'll get something in return. When you buy a new one, but I don't know what you get if you get discount or, I don't know, just maybe you feel a little better or something. (IP2)

She continued to say that this would probably push more people towards replacing their smartphones earlier than they would if service providers and manufacturers would encourage repair before replacing and offer this kind of discount at the purchase of new devices. If society was based on a model where humans don't strive to be consumers and are not encouraged to singularly be such, a practice transformation is needed in order to preserve resources and live within our planetary boundaries (Sekulova et al., 2013). Furthermore, this shows how easily a link can break when it comes to these practices, the cost evaluation of the smartphone, the know-how required to understand how repairable it is and the meaning of having a new device versus keeping the old one (Shove et al., 2012).

Some of the more tech-savvy participants mentioned it was clear to them that the repairability of smartphones had decreased from the earlier models. It used to be possible to take phones apart with screwdrivers and hardware replacements were easier in general.

> It was really easy back in the day. Like, it was really easy. Now it's hard to do it because they build in the safety features of, like, having to crack open the phone to do it. Like, it's really hard nowadays. (IP3)

He added that little original feature such as being able to plug in earphones was significant for him (IP3). The headphone jack, however, is no longer available on newer phone models. This is another way how companies make a phone feel outdated. Moreover, phone accessories become outdated together with the smartphone causing more waste, as the person cannot use the headphones anymore if they get a new device. Either way, this calls for additional consumption. This is in line with the study results by Ingram et al. (2007) who noted that a replacement of one item results in the acquisition of additional items.

Interviewee IP12 said that she regularly gets optimisation notifications from her iPhone telling her the battery has this much less performance compared to when the device was new and other features of the quality of the phone are measured. "But that doesn't help me to go and repair it or do something like that. It's more just - oh, your phone, it's really bad now, so you have to change" (IP12). She felt this had the opposite effect on consumers pushing them towards an earlier replacement of the device. This perception of obsolescence, disposability and easily

‘thrown away’ smartphones indicates that consumers are locked in by manufacturers (Cooper, 2005; Thiébaud -Müller et al., 2018). When the options are limited or high in cost, for repairing a device, the consumer will eventually be nudged and see the profit in having a new device. Similar to the concept of the mental accounting book, if a consumer perceives the value of their product as low enough in their mental accounting the more likely it is they can justify a replacement of that product (Guiltinan, 2010; Roster & Richins, 2009). This shows that the importance should rather be on showing the stability and durability of the smartphone instead of trying to prevent planned obsolescence (Makov & Fitzpatrick, 2021).

When asked about service agreements, IP11 mentioned this two-year mark which was frequently analysed. She said that when the agreement was about to expire, she would normally feel it was time to replace her smartphone or that it was outdated at that point.

> It feels like it works for like two years, and then you feel like you have to or you want to change it? At least five years would be good. Because then I would probably just want to change it because of the upgrades, yeah, but two years it's too little. (IP11)

Consequently, the perceived obsolescence of smartphones is a significant concern for consumers, with many feeling that the lifetime of smartphones is too short and that manufacturers purposely plan for obsolescence to push consumers towards purchasing new devices. This creates a feeling of disposability among consumers and a sense of being locked in by manufacturers. Consumers often perceive that smartphones only last for around two years, which leads to the replacement of devices, even when they may not necessarily need to be replaced. Disposability and perceived obsolescence play a significant role in this phenomenon, with consumers feeling encouraged to replace devices rather than repair them.

4.4 Policy Making and Regulation

There was general positivity from all participants about policy making that would regulate repair and/or encourage the longer use of each smartphone device. The interviewees also made their own suggestions and elaborations on this question of how the policy could be commissioned by the government. A handful of the interviewees mentioned a comparison of how things had changed with automobile repairs. At a certain time, it was only possible to get cars repaired by a brand-certified mechanic but today it is now regulated that car manufacturers need to give access to repair instructions (Perzanowski, 2021). This indicates that the interviewees want to have more freedom over repair options for their smartphones as well.

> Yeah, I think it's good if the EU pushes into that there needs to be the possibility to repair stuff, and that there needs to be information out there, that the producers need to provide information on how to repair and provide spare parts. So that's pretty good. Because I mean it has been like that in the car industry for long. Earlier there was a problem that you only could get your Volkswagen fixed at the Volkswagen dealership or the service centre and now it's open which is really good, and it lowers the price. Yeah. I mean, you can repair it by itself if you can. And you can buy the parts and stuff like that. (IP4)

Interviewee IP4 said he had faith in regulations to encourage better use and repair of smartphones. The EU is currently changing the right to repair landscape more in the direction of sustainability with their new regulations, the Circular Economy Action Plan which is meant to implement better access for consumers to repair their smart devices (European Parliament, 2022). IP4 added to this as well that this kind of regulation would further make it accessible to a larger group of people to consider fixing their smartphones. This is an example of how policy making towards better sustainability could give consumers the infrastructure that can allow for easier access to repair options, which could simultaneously lead to better skills and interest among consumers to get more familiar with repair. This can be seen in previous policy changes such as the switch from coal heating in houses over to gas central heating or the regulation of seatbelt use in automobiles. The switch over to gas central heating in the UK during the 1950s was done for the sake of modernisation and convenience (Watson & Shove, 2022).

> It would actually if I would have the option if I could feel like, oh, my phone is getting slower, or this is happening, and I could take it to have it updated maybe where I bought it or even if it would be included in the price or I would've to pay a little bit extra. I wouldn't mind that. (IP5)

This suggestion by interviewee IP5 was mentioned by others as well, they said it would be convenient to be able to take their smartphones for an annual or biannual tech update similar to what is done with automobiles. As described by Shove (2003), many of the practices performed in everyday life are based on what consumers feel is convenient. As the infrastructure and access to repair smartphones are not linear, the consumer will go with what is recommended and what is convenient. By reconfiguring the way materials are used in smartphones, it can be demonstrated that repairing a smartphone requires minimal skills. Interviewee IP3 was positive towards policies encouraging repair and thought it would be a smart solution to the problem. He sounded excited about the new EU regulations regarding smartphone chargers, as of this year smartphones sold within the EU all have to have USB-C:

> I do like the whole thing that everybody needs to get the USB-c cables. It's, it's amazing. Because I have my headphones that you charge with like U… It's not a USB-c, it's a USB-b, maybe. (...) I have five different charges, I thought we were past that. (IP3)

Interviewee IP6 was in consensus that this legislation within the EU for universal charging cords was a step in the right direction. This is an example of a regulation already being implemented and receiving positive feedback from consumers. Our participant (IP6) was excited that this new change within his region would mean fewer types of different chargers and in turn, this change would mean less waste in those scenarios where consumers decide to switch between smartphone brands. As in the past, this would mean an older charger would be unusable for the new device. In these last quotes about policy making from our interviewees, one notices a certain undertone is being set towards manufacturers of smartphones. Interviewee IP12 thought about her answer for a while when asked about who has the most responsibility out of the different actors involved, but after some consideration said:

> I think it's more of a company problem, they should take more responsibility and do more, instead of just marketing new products. Instead, they could market new repair methods, or I don't know something better than what they do now. (IP12)

Several of the participants said they felt the government should be regulating the manufacturers or companies making smartphones. There was a concordance that manufacturers had a responsibility to take larger steps to be more sustainable in their production, as has been seen in previous answers many perceived their devices as going obsolete at a certain stage. Interviewee IP12 continued in her answers on how the current situation in the market lacked access to repair:

> I think it's the company's responsibility because they are big businesses. And I know that also, the reason why the consumption looks like this today is mostly because they provide more money for different countries around and the government. They [the government] get some money from it. That's why they maybe don't put that much pressure on the companies. They let the companies do it. So I feel maybe the companies need more restrictions from the government of course, but they also need to feel like they have a responsibility for sustainability in the future. When it comes to consumption and repairs and everything. (IP12)

She feels that the current landscape within the smartphone market is built by the manufacturers, built on profit around new devices hence the responsibility and regulation should be aimed in

their direction. These barriers are one way for manufacturers to uphold their own profits and increase consumption (Bieser et al., 2022).

Additionally, it was interesting that a few of the participants' noted responsibility was not just on the larger actors on the manufacturing side. IP9 went on to say the responsibility needs to fall on the manufacturer to change their business and make access to repair easier; however, she said it was also important for the consumers to understand their responsibility: "I think it should be a little bit of both. So also on us consumers that we actually go and try to get our phones fixed instead of actually just getting a new one" (IP9). Which interviewee IP8 conceded but elaborated about one's responsibility for the resources consumers use continuously: "The government should be more maybe encouraging people to repair. (...) We know we're living beyond our resources, so maybe they should encourage us more to repair and not buy so many new things" (IP8).

The participants are therefore aware that the utopian outcome on everyone's tongue these days, a better more sustainable world for both people and the planet cannot be reached by only pointing fingers at others to make changes to their practices, but a holistic and interconnected method is the way forward (Reckwitz, 2002). A transition within policy making based on degrowth could be highly beneficial, to move beyond the capitalist societies towards preserving ecosystems and living simpler lives with well-being for all (D'Alisa et al., 2015; Kallis, 2017).

4.5 Meanings Assigned to Smartphone Use

The next main theme that emerged around the consumption and repair of smartphones was the meaning assigned to them. Practical activities consist of both physical doings, as well as their representations (Warde, 2005); therefore, we find it important to look at how the practice representations come about through their assigned meanings. We have sorted this theme into three sub-categories: meaning in society, brand aesthetics and convenience and practicality.

4.5.1 Meaning in Society

From the participants' answers, we noted how meaning is assigned to the smartphone through societal influence. We find this as an important category because consumer decisions and actions differ based on which contextual environments they exist in, such as the surrounding peers, social structures, and cultural norms (O'Rourke & Lollo, 2015; Keller & Vilhalemm, 2017). Although none of the participants felt that their consumption practices are impacted by

social media or advertisements, there was a common theme of feeling pressured to update the device either currently or when the participants were younger.

> When I was younger, sure. Probably also more socially you wanted to fit in and have the newest phone, but not now. Not as an adult. (...) I mean, you wanted the new cool thing so you could brag to your friends, like at schoolyard, oh look, I have the new phone. It's so cool. So I guess that was the pressure, not being on the outside. (...) But I think that that was just a general thing of being younger. You didn't want to have old stuff, I guess. You always wanted to fit in. (IP13)

His answer sheds light on how he felt the desire for novelty and experienced social comparison, which is known to be a reason to acquire new items and increase consumption (O'Rourke & Lollo, 2015; Ingram et al., 2007). Moreover, having growth as the dominant paradigm means that people are embedded in the feeling of needing more as a measure of status (Büchs & Koch, 2019). A very similar viewpoint was provided by IP12 who expressed feeling pressured in the past but not anymore:

> And I saw all my friends, they were getting new phones all the time. And I was like, Okay, I also want that. But now, I'm like, Okay, I have this, I'm going to take care of it. Even though it's not the best I will, I will still have it. And I, there's no reason for me to use it and then throw it away. I have to take care of it. (IP12)

We can see that the social setting has transformed towards not feeling influenced to buy a new smartphone. The collective understanding has become that a person should take care of their things, as long as they are functional. Still, interviewees mentioned being incentivised through price to either get a new phone or repair their existing one; consequently, the pressure they feel has become more material instead of social.

IP4 described how he has young children that are currently feeling the social pressure to have a new phone.

> It's a lot of work as well to keep them away from the pressure that the society gives them, in school that they hear from their friends - oh you have an old phone. And then they get home and are sad about that. People say that and it takes a while to get them into thinking of the sustainable lifestyle. Show them that you don't have to care about what they say about your phone. (IP4)

His answer sheds light on how important it is to actively teach the younger generation to care about sustainable living and change the existing norms. Even if the children feel influenced by

their peers that they need new things, their cultural background is very impactful on their practice generation (Warde, 2022). During his interview, IP4 discussed how meaningful he finds it to live a sustainable lifestyle, being the owner of two companies that aim to be sustainable and how he is conscious about sustainability in his life in general. Hence, his children might pick up on this mindset, imitating the family member's practices (Halkier et al., 2011).

Practices can be changed by resisting the dominant norms, which is shown in IP4's answer on why social media and advertisements are not a significant influence to him: "They're kinda pushing so hard and I have to pull back even more" (IP4). We see this as a similarity to the degrowth mindset, which resists the existing norms of growth and capitalism and instead embraces sufficiency and simplicity (D'Alisa et al., 2015). However, it is not simple to resist the pressure put on individuals by social settings. Societal pressure correlates with the brand of the phone that the participants have, which is the next sub-theme discussed.

4.5.2 Brand Aesthetics

Although the participants declared that the aesthetic and visual aspect of a smartphone was not important to them, most participants noted that they choose their device based on the brand, which we understand as an aesthetic feature. Specifically, this was seen with Apple phones. As noted by Ingram et al. (2007), during the selection of products, people produce and transfer meanings to others about themselves. In this case, people transmit the message of owning Apple products, which becomes a part of their identity as iPhone users. In the following quote, IP12 discusses how she chooses what phones to get: "It's almost or like it's only based on the brand, I would say also. So I get Apple phone" (IP12). The meanings that the participants assigned to iPhones were "quality", "user-friendliness" and "connectivity". For instance, IP6 highlighted the appeal of the design of iPhones, which makes the device easy to use. "So it's, that is their design. So people buy it. It's very well thought out. It's super user-friendly in many ways" (IP6).

Here we can notice an attachment to the brand, as people who have bought iPhones in the past, choose to do so with their next devices. However, there is a lacking attachment to the phone itself. Jattke et al. (2020) suggested that consumers would be more likely to fix their devices instead of replacing them if there was a more significant personal attachment to them. When the participants' attachment is related to the brand, it seems that people would be more likely to update their device to a newer phone but in the same brand. However, if they were attached

to the smartphone itself, they would not be as quick to change it. Similar criticism is made by IP4, who sees this attachment as an issue. Although he does not admit to being attached to his personal device, his interview revealed that he takes care of his device and has had it for over ten years.

> People are so connected to their phones and it's like, a personal thing, but for me, it's a tool only. And I think that makes it a bit easier. I am working with it and having it lying around in the workshop but yeah, if you drop it, well it's just a phone. And I think a lot of people, especially younger people, they are so personally attached to it, the iPhone and which model and which brand. I mean it's a bit different than my approach. (IP4)

Therefore, the prolongation of smartphones' lifetime can be achieved not only through personal attachment measures but also through acknowledging the phones' functionality. This correlates to previous research, which notes that the promotion of a smartphone's capabilities is needed, including its possible lifespan of seven years (Magnier & Mugge, 2022; Jensen et al., 2021).

There were other features of the iPhone mentioned which seemed to 'lock in' our interviewees to their brand. Interviewee IP8 felt connected with other people who have iPhones, because of the possibility to communicate through iMessage and FaceTime, which is not the same experience with Androids. Her experience is correlated with feeling pressured to have an iPhone, because of societal influence.

> I'm a little bit hooked on Apple and I, I like when it's all connected with Apple products. You can send a message, and it becomes blue. And my friends also told me they were angry at me that I didn't have an iPhone and my messages are green. So they kept reminding me that I didn't have one. So, communicating through iMessage and Facetime. And that kind of aesthetic and like. (IP8)

Within a practice, its performance is interconnected with embodied, routinised meanings (Reckwitz, 2002). In terms of the brand, our participants have various meanings of it, whether it be quality, design or feeling connected across devices or socially. These meanings are routinised in the sense of interviewees continually choosing the same brand over others. Despite the brand, the interviewees mentioned similar convenience and functionality aspects that they found important when choosing a device, which is the last meaning section in this theme.

4.5.3 Convenience and Practicality

The theory of social practices emphasises practical consciousness (Shove et al., 2012), which we see embodied in the participants' evaluations of what they find essential to have in their devices, where almost all participants mentioned the value of functional and comfort features. As emphasised by Shove (2003), comfort and convenience are interconnected. Our participants presented being accustomed to a certain level of comfort in terms of their smartphones and they would maintain this comfort level through convenience practices. IP13 discussed how he chooses a phone based on what he is used to: "I am a comfort person. Like I've decided which phone I like, and that is probably the phone that I will like stick to" (IP13). Moreover, he expects his smartphone to work at a certain speed, where a few-second delay makes the phone seem old in his opinion: "If I use my phone and I go from one app to another and there is a ten-second delay there because it's lagging, then that for me is that it's gotten too old" (IP13).

When this level of comfort is inadequate, people seek to regain it through the most convenient form that is allowed by infrastructures (Shove, 2003). The existing material structures enforce buying a new one instead of repairing, however, by changing the practice elements around repair, the convenient option could become repairing the phone instead of discarding it. Another participant (IP1) mentioned comfort in terms of the size of the phone and the "smoothness" of its software, which corresponds to IP13's wants of having a device w-ith no delays when switching between smartphone applications. "I select my units when it fits in my pocket. (...) It has, it has to be smooth" (IP1). The meaning of a smoothly working smartphone shows to be important to our participants; thus, it is necessary that there is trust that repair can achieve the same level of smoothness as a new device (Chun et al., 2022).

Convenience and comfort are also presented in the most commonly important features described by interviewees, which were a good lasting battery, the device's memory size, internet connection and basic functions, such as calling and texting. This is represented in IP10's answer on what he looks for when acquiring a smartphone:

> Battery, that's number one. And chips for Wi-Fi and Bluetooth is important. And the graphic quality. So pure hardware. I don't care what brand it is, if it's an iPhone or whatever, I look at the specifications. (IP10)

A similar answer was provided by interviewee IP3; however, he also acknowledged the significance of the screen size and camera quality. He said the most important features to him when choosing a device were internal memory, internet speed, screen size and good camera

quality. Therefore, mostly practical elements and the basic hardware of it were the features he valued most. Practices differ through the lived experiences of practice carriers (Watson, 2017), meaning that the needs, wants, and actions of our interviewees will differ because of their embodied understandings. Even when the practice of using the phone is the same among participants, the connecting practices in an individual's life are different. Thus, the material aspects of smartphone requirements in these practices will vary between users (Hargreaves, 2011). IP5 elaborated that an up-to-date smartphone is necessary for her career as a social media platform manager:

> It's just important to have a quality phone, good camera, to be able to keep up to social media platforms today. I can't use a phone that has an average camera now, because the new phones, they have so good cameras that you're not able to compete. (IP5)

This causes consumption she would like to avoid, however, feels locked in the socio-material settings as without the extra consumption, she would not be able to compete in her field of work. The lock-in of unsustainable consumption practices can be considered one of the most difficult barriers to cross towards sustainable behaviour as they are promoted by the ruling government and capitalistic society (Geels et al., 2015; O'Rourke & Lollo, 2015).

4.6 Sustainable Consumption and Smartphones

The last main theme analysed was the perception of sustainable consumption in relation to smartphones. In this section, we look at how environmental knowledge impacts participants' practices, how a person's financial situation correlates with sustainable actions and discuss how to promote and implement prolonged smartphone usage.

4.6.1 Consideration of the Environmental Impacts

Majority of participants noted that the environmental impact is not an aspect they take into consideration when replacing a device. This was either because the participants did not have the knowledge about the environmental impact a smartphone has, or they knew it but it did not influence their actions.

> If I'm being honest, I haven't thought about it that much. (...) But I imagine it has a cost for the environment. (...) Considering how many devices there are on this earth. (...) And the batteries, I imagine. (Are) not so good for the environment cause they're thrown out. (IP2)

Participants IP5 and IP11 recognised that even though they consider the environmental impacts of smartphone consumption, they do not see it as an influence to change their behaviour. As the existing socio-material setting encourages fast innovation cycles with new devices being released each year (Thiébaud -Müller et al., 2018; Jensen et al., 2021), consumers are locked in unsustainable practices, even when they have knowledge about their negative impacts.

> I actually do think about it. But it doesn't, if I'm quite, if I'm being completely honest, it doesn't change my behaviour towards buying a smartphone. I think I do like many other people, I think about it and I'm like, this is not good. (...) I'm thinking about it, but I'm still buying a new one. (IP5)

The answer by IP5 has notes of hopelessness around it, feeling stuck in buying new phones while also knowing about their negative environmental influence, further demonstrating the infrastructural barriers towards achieving sustainable consumption (Geels et al., 2015). This is seen in IP11's answer who noted that she thinks about the environment; however, the desire for novelty conquers environmental concerns, correlating with previous research results on consumption (Ingram et al., 2007; O'Rourke & Lollo, 2015).

> I do, but I think too little. Because I'm one of the people that get a new phone when the old one might still work. It's easy to just change my phone and not use it until it's completely dead. And you want a better camera, you want a better battery and stuff like that. I don't want to use a completely old phone. So, I know it's a big impact on the environment. But I don't think about it. (IP11)

Interviewee IP1 answered affirmatively on whether he considered the environmental impact of smartphones. However, his actual practices did not match his identification as being sustainable, as he admitted to having changed four smartphones in the last five years.

> Because there are several items inside the smartphone. For example, the battery. It's lithium and cobalt. And other metals like gold, silver. And each iPhone, I think, had two grams of gold inside, and it takes almost two tons of rock to break down to make these two grams. So you can think (...) whole mountains have been broken down to make iPhones. (IP1)

His answer indicates a deep knowledge of the environmental impacts of producing smartphones, yet he would still change his device regularly. While IP1 presents the meaning and know-how of environmental impact on smartphones, the material aspect is lacking due to socio-material design. The cultural norm of growth and consumerism discourages the lifetime prolongation of existing objects (Philipsen, 2022; Büchs & Koch, 2019). From these answers,

we notice the shortcomings of the ABC change model (Shove, 2010; Sayer, 2013). The embeddedness of practices, in this case, changing a device, even when acknowledging its harmful impact, proves a difficulty in realising substantial transformation towards sustainable consumption.

4.6.2 Financial Influence on Sustainable Practices

A causal relationship was noticed between having a stricter financial budget and conducting sustainable practices regarding smartphones. IP8 tends to buy second-hand phones or get old phones from her friends. Such practices are congenial with a degrowth transition, as it promotes the sharing of resources (Corvellec & Paulsson, 2023). However, IP8 admitted to not thinking about the environment when conducting such actions, rather they have resulted from financial considerations:

> I don't think about the environment. I mean, when I buy a phone, I have no idea on what environmental impact it has. So the only thing that I could say that I have done for the environment is that I bought recycled phones. But I think that's been mainly because of the financial interest for me. (IP8)

Similar attitude was seen by IP2, IP9 and IP12, who are all students and therefore have a limited financial budget. As IP2 noted: "it has been [in] recent years all about the money". However, the money concerns have neither resulted in repair nor buying a new device when the old one is damaged. Rather IP2 chose to use her device with a broken screen as long as possible, even if it interfered with her capacity to operate the device, as it's possible to accidentally cut your finger on a screen's broken glass. Using products for as long as possible is considered the best way to reduce the environmental impact of smartphones (Hischier & Böni, 2021), and it correlates with a degrowth mindset. Even if degrowth implies adjusting to a lower level of comfort, it should not be at the risk of one's well-being. Therefore, local community initiatives that provide or teach repair would be necessary to enjoy the full possibilities of a smartphone, while still being considerate of the environment (Korsunova et al., 2023).

IP9 expressed having the same habit as IP2 of using a broken phone, instead of repairing it. She noted that repair is "just something I don't wanna spend my money on" (IP9), mentioning that environmental impact is not something she considers. IP12 further presented being environmentally conscious due to economic concerns; however, she also notes that she lacks knowledge on how to be more sustainable in her consumption:

> I just go with the things I have. So it's more of a money problem, I would say, but that makes me, I need to take care of my devices and my things I own. And I try not to buy that much. (...) I need more knowledge around that, and how to make better choices. (IP12)

The practice of caring for her device is largely driven by the material aspect of monetary access, which intertwines with the meaning of being economically sound. Practice theory emphasises routines over deliberate actions and decisions (Warde, 2014) which can be noticed through IP12's answers. She discusses how she takes care of her devices and uses them as long as possible, yet she has switched five smartphones over the last five years. Meaning that even though she considers herself sustainable, her practices show a different view.

4.6.3 Promoting Sustainable Consumption of Smartphones

When asked about which practices could be taken towards sustainable consumption of smartphones, many were hesitant and unsure how to answer. There was some insecurity and possibly a lack of knowledge as to what needed to be done. The definition of sustainability is diverse and contested, the current discourse on sustainable consumption is that any small changes in practices will add up to a bigger change for the environment (O'Rourke & Lollo, 2015). Furthermore, it is not sufficient to make 'better choices', rather fundamental changes to daily practices and less consumption should be the aim (Watson, 2017). It's fascinating to see what kind of idealism our interviewees had regarding sustainability and smartphones.

> We need to step back and think about how everything is produced nowadays. Look back at the times when things cost a little more but they were made to last better. (...) I think that is the way to go. Stop being so disposable with everything. And then it also, it plays a part how you are as a person. Like I said, I want to use everything as long as I can. I don't want to replace everything immediately. But I, yeah. I don't know how to. (IP2)

The interviewee is looking back to when she was younger and how she felt electronics and products would last longer and were made with better quality. It was mentioned in previous sections by the tech-savvy participants that older versions of smartphones were easier to fix back then (IP1; IP4; IP6). Interviewee IP12 displayed hesitation, which was also seen in answers from other participants when it came to making suggestions about sustainable consumption:

> Yeah, maybe they [consumers] should like, just go and repair things. They can do that. They don't have to, like I think also it's, it's more of this thoughts of having new stuff. So maybe of

> like thinking what I own it's good enough. But mostly take care of your stuff, repair it if you can, and don't fall for the marketing of new products. But that's easier said than done. (IP12)

Several of the interviewees mentioned the lifetime extension by purchasing more second-hand devices. A few had in the past purchased second-hand devices; additionally, some were interested in the services from Swappie, a company selling refurbished smartphones. Nonetheless, the majority of participants had not purchased second-hand devices for themselves. IP11 was interested in seeing more encouragement towards promoting longer lifetime use of smartphones:

> So, sustainability. I need to think about this. I think it is preserving stuff for the environment and reuse all this stuff. Like not buying new stuff all the time because you probably don't need it. And getting new products, it takes a big impact on the environment and that is not good. So, I don't know how to answer that. (IP11)

Concurrently interviewee IP9 elaborated and took examples from her own consumption of smartphones. She was in general quite durable with her smartphones even though she had not done much repair. She used her phones much less than her friends and took good care of them because to her the functional aspects were more important rather than having a new device. Being a student meant that the cost of devices and repair was of important consideration to her, this was further encouragement for her to use her devices for longer.

> No, I haven't used Swappie. But if I buy a new phone because this one is getting slow, I might buy one off of there. I have friends that have and are, that are happy and satisfied with it. (...) I would just say get a new phone when you actually need one. It doesn't really have to be to the point where it's so slow that you can barely do anything, but at least have it for as long as it works fine. (IP9)

Moreover, she elaborated that from a young age, her father had made sure she would appreciate everything she had and make good choices when buying something new. This is seen well in the answer from interviewee IP4 who was very concerned about the future that his children had in stall for them and gave an elaboration on how he felt the current generation of parents has to set a good example for sustainability.

> For me, it's important to just think three times about what you really need and what is something that you just want because you don't need it but there are other reasons. I think it's nice. So I'm already always trying to buy second-hand clothes, for example. And, yeah, try to have as less impact on the planet as possible in all the consumption methods that I have. I mean, you usually

> buy some fuel for your car, so I have a car that runs with biogas. (...) That's really important for me. And I think that's the only way that we can have a future. That's why I'm pushing into that, especially when my son was born. I mean, I've engineered luxury cars, sports cars and race motorbikes and airplanes and stuff. But then I thought, okay, what am I doing for this next generation? So that's why I changed a lot in my life. (IP4)

In conclusion, while there was some hesitancy and uncertainty among the interviewees when asked about sustainable consumption of smartphones, it is clear that there is a desire for change. The participants recognise the need for fundamental changes in daily practices and less consumption, rather than just making "better choices". It is also important for individuals to think about the impact of their consumption on the environment and to make conscious decisions about what they really need versus what they simply want (D'Alisa et al., 2015). Ultimately, the interviewees' idealism about sustainability and smartphones highlights the importance of taking a step back and considering how everything is produced in today's society and to consider better the options of second-hand devices would be one such method.

Chapter Five

5. Discussion and Concluding Remarks

5.1 Chapter Overview

In this chapter, the major findings about smartphone repair, consumer practices and perspectives are discussed and summarised, as well as relating to our aim and answering the research questions. We conclude this chapter by summarising the key points of the discussion and providing recommendations for future research.

5.2 Discussion

The broad aim of the present study has been to examine the practices and perspectives of Swedish consumers towards smartphone repair. In order to achieve this aim, two research questions were established: “What are the consumers' perspectives towards smartphone durability and repairability?” and “What incentives are needed to transform unsustainable consumption practices regarding smartphone lifetime extension?” In the beginning chapters, the negative environmental impacts caused by smartphone production were noted, concluding that the lifetime extension of smartphones is the best way to reduce their emissions. We have chosen smartphone repair as a life extension strategy, and also see it as a strategy towards degrowth. The consumer side of smartphone repair was chosen due to a gap in previous research on consumer-oriented measures in smartphone lifetime prolongation. The aim was achieved by interviewing participants with residences in Sweden. The interviews were analysed by implementing a social practice theory framework of skills, meanings and materials, while also considering the degrowth transformation. By framing our analysis from a social practice theory view, we have been able to answer the research questions of the study, which will now be discussed separately.

Addressing the first question “*What are the consumers' perspectives towards smartphone durability and repairability?*” resulted in various answers depending on the participants’ backgrounds. Most commonly the participants expressed having low expectations towards the durability of smartphones. They felt that smartphones did not last long enough, therefore when a phone was around two years old, many opted to replace their device, rather than repair it. The majority of the participants weren’t conscious of what the real capacity of their smartphones was. Words such as too disposable and easily thrown away or easily replaceable were seen in

many answers from the interviewees. Moreover, the participants displayed good knowledge regarding what was needed for the environment, they mentioned consuming less, saving resources, and living within planetary boundaries. From this, we conclude that consumers are locked in a socio-material setting formed by manufacturers, as they need consumers to take part in the fast innovation cycle through regular replacements that uphold their large profits. This reveals that knowledge about certain preferred behaviour that can lead to better outcomes for the planet doesn't always lead to practice changes (Shove, 2010).

When it came to repairability, the majority of participants had repaired their smartphones in the past, and their perspectives towards doing more repairs in the future to lengthen the lifetime of devices were likewise positive. There were a couple of participants with deeper technical knowledge of smart devices. These participants presented having knowledge of the full capabilities of smartphones, as well as having an awareness of repair specifics between brands, e.g., how easy it was to repair the devices. Even though the majority had repaired their device in the past it was most often a simple replacement of a broken screen, a few had replaced batteries but no other repairs to hardware were mentioned. This shows the level of gatekeeping done by manufacturers on their devices, where fair prices and access to quality hardware repairs are rare in current times. Furthermore, it was evident that participants felt a sense of hopelessness, they were aware of the environmental impact of consuming and replacing products frequently, but they felt locked in to buy new phones in order to have a device that was technologically and functionally up to date. This gives a strong indication of a locked-in socio-material setting where through lack of infrastructure and material knowledge consumers face barriers when trying to be sustainable with their smartphones.

The brand was seen as an important factor among the participants which is why we equalled aesthetics with the brand rather than the outlook design. The conclusion was that the participants either made choices out of convenience regarding smooth and easy software functions or for practicality in terms of the best technical and functional features that suited their needs from the device. Participants who possess greater technical expertise and/or higher levels of education placed greater importance on the ease of repairing the device, and many of them observed that Apple had become more stringent in recent models in limiting access to repairs. It was evident among Apple users that the choice of brand was a part of certain identity standardisation for them. Those participants either directly or indirectly mentioned social pressure to have an iPhone for the sake of easier connectivity with other fellow users on that

platform. We conclude that an attachment towards the brand itself is stronger with iPhone users which should be seen as a barrier towards repairability, rather attachment to the smartphone device itself should be encouraged. Those participants who replaced their device less frequently demonstrated a stronger emotional attachment to it and were more diligent in its maintenance.

The second question "*What incentives are needed to transform unsustainable consumption practices regarding smartphone lifetime extension?*" is best answered by analysing how participants conduct their practices. A common topic that was intertwined in the participants' answers was the financial aspect as a significant feature in terms of smartphone use, which is attributed to the material and competence elements of practice performance. A restricted financial budget caused the participants to either consider repair when their device had been damaged or to use their phone with broken features. Purchasing second-hand phones and promoting their use is another financially feasible way to extend the lifetime of smartphones. Despite this, rarely any participants mentioned second-hand phones as their preferred choice of smartphones, revealing a gap in the competencies of sustainable smartphone consumption and possibly a lack of trust. Other participants, who had more established careers, did not put such an emphasis on the monetary aspect. Rather it was noticed that repair was deemed to be too expensive, and they found greater value in paying slightly more and purchasing a new smartphone. Conclusively, repair should be financially incentivised as a lifetime extension method for smartphones. From a degrowth viewpoint, social relations and sharing of resources are promoted, which in smartphone lifetime extension could be realised by sharing phones, handing over old smartphones to others as well as creating easier access to the spare parts of phones, in order to allow skilled technicians, conduct meaningful work through repair.

Perceived obsolescence was noticed to be a large impact to replace devices prematurely. The participants felt a sense of disposability in terms of smartphone use, as new devices were introduced every year and the retailers made it easy and appealing to obtain a new smartphone when the old one might still be functional. Thus, promoting the lasting functionality of smartphones would be a more prominent way to promote their full lifetime expectancy. One way to achieve this is by prolonging warranty agreements, which embodies the material elements, as well as meanings around the device's lifetime abilities. The participants showed signs of being influenced by the length of warranty agreements as an indicator of how long the phone would last. The agreements are usually signed for two years; similarly, interviewees noted that smartphones feel outdated when they have reached the two-year mark.

Consequently, warranty period prolongation could be an impactful incentive to extend the lifetime of smartphones.

Environmental consciousness is seen as an enabler to increase sustainable smartphone usage. It is clear that both the older and younger participants have concerns about the future from their own perspectives, the older expressed concern for their children and the world that they will be handed as they come of age. The younger participants felt the social pressure to be sustainable with their consumption and often there was an undertone of environmental anxiety when they would be purchasing products and they were aware of how bad the environmental impact is. However, it was concluded that for the participants environmental concerns were not having an impact on their consumption which leads to more replacements and fewer repairs. We think that environmental consciousness could thus be implemented through better policy making and regulation that could enable better infrastructure for repair. This demonstrates that consumers encounter challenges in adopting sustainable practices with their smartphones, primarily due to both societal expectations and limitations imposed by smartphone manufacturers.

Sustainable smartphone usage can be further promoted by increasing knowledge around repair. We see this as being done by educating children in school, specifically through workshops, where they get practical experience of how repair is done. We find the workshops as an important incentive because elements of skills and competence in practice are characterised by embodied knowledge, which is shaped through experiences (Keller & Vilhalemm, 2017). The participants who had knowledge of how to repair had more positive perspectives towards practising repair on smartphones, our results show that if this knowledge is implemented from a young age it follows into their identity as adults. Moreover, early knowledge of the importance of extending the lifetime of smartphones could result in changing societal norms around smartphone consumption. For a practice to change, a transformation in its elements must happen, and by implementing the incentives mentioned before, a change in smartphone practices could be achieved; therefore, also shaping the socio-material setting towards degrowth ideas.

By examining our participants' answers and adapting practice theory elements, we have created a post-study framework on aspects shaping the practice of sustainable smartphone consumption (see Figure 2). *Perceived obsolescence* is a precondition on how long smartphones will be consumed and when they will be replaced. As noted in the analysis, the participants felt their

phones do not last long enough, which might be in part due to planned obsolescence from the manufacturers' side. Additionally, *social norms* shape how the participants perceive devices and repair, either by being socially influenced to replace devices, obtain a specific brand of phone or seeing the norms of smartphone disposability as something to resist. *Convenience* shapes smartphone consumption and repair, meaning the participants presented being skewed towards doing what is more convenient and comfortable rather than what is best for the environment. This presents the importance of socio-material settings in practice transformation. The infrastructure towards easier access to repair can be improved by *policy making*, which would accommodate repair as the convenient option. *Knowledge* is another aspect impacting smartphone consumption practices. Participants who understood the durability of phones perceived it as valuable to extend their lifetimes through repair. However, knowledge of environmental impacts did not seem relevant in changing practices. Finally, the last element shaping smartphone practices were *financial* considerations, resulting in being both a barrier and an enabler to repair. By creating this framework, we contribute to the academic discussion around smartphone practices and hope it can be a valuable tool for producing sustainable practices.

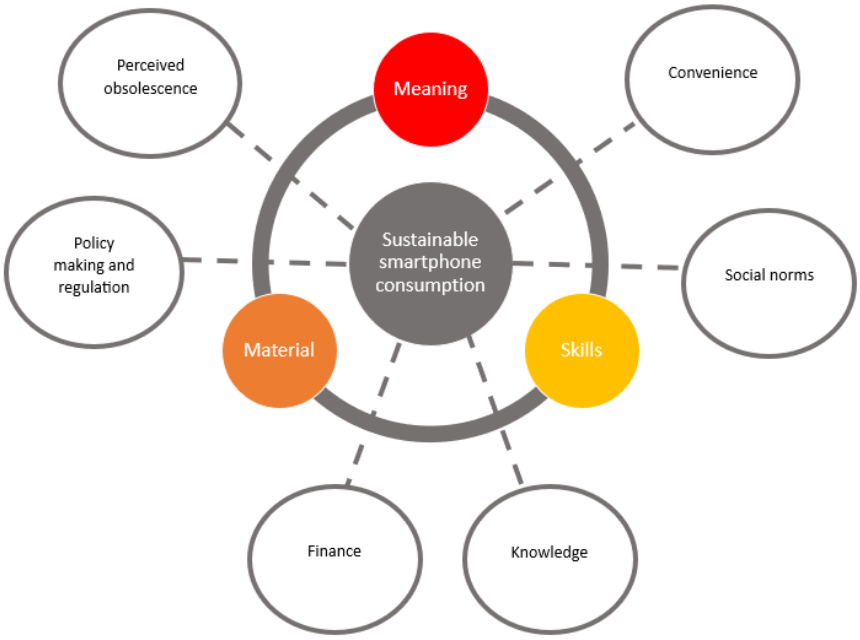

Figure 2. Sustainable smartphone consumption framework designed through a practice theory lens.

5.3 Conclusion

Firstly, it is possible to conclude that smartphone consumption is complex, involving practices built on convenience and practicality, practising repairability, practising with environmental considerations, financial evaluation, meaning and functional knowledge. This study shows that individuals have varying understandings and knowledge of how their consumption practices affect the environment. But this is not necessarily only due to individuals having different meanings, more so it involves various interpretations of their own socio-material settings. The ingrained practices of smartphone replacement, even when being aware of the harmful impact, proves to be difficult when attempting to transform towards sustainable consumption.

Secondly, changing the practices of Swedish consumers to enable longer lifetime expectancy of smartphones will entail changes to the mindsets of consumers, manufacturers, and governments. Consumers are still attracted to new device releases and are replacing their smartphones prematurely. This study shows that the decision to replace smartphones prematurely is influenced at large by perceived obsolescence, lack of promotion for repair and lack of regulations to enable easy and affordable repairs. Further regulation in the smartphone market is needed to incentivise both consumers and manufacturers towards increased sustainability in their consumption practices. Raising awareness of product durability and

longevity, minimum requirements of manufacture reliability, development of initiatives making repair accessible and alternate refurbishing options should enable a reduction of climate change impact from smartphone production.

Thirdly, it is possible to conclude that smartphone devices have become firmly embedded into people's daily lives and this study reveals that despite consumers owning their devices the usage is being restricted and even managed by manufacturers immensely. Consumers perceive this in their usage, that manufacturers are impacting the performance and longevity of their devices. The users value personal practicality, trust, availability of choices and price when it comes to making lifetime extension choices for their smartphones. In addition to these conclusions, the next section outlines what this study contributes to current smartphone research, practice, and society.

5.4 Theoretical Implications and Future Research

The present research contributes to the field of smartphone lifetime extension studies. Previous research has been focused on production-oriented measures to prolong the life of smartphones but lacks consumer perspectives (Bieser et al., 2021; Hankammer et al., 2018; Bocken et al., 2016; Proske et al., 2016). The current study intends to lessen this research gap by providing consumer perspectives in Sweden. The results reveal a feeling of smartphones being outdated after two years even when they were still functional. Similar findings of replacing smartphones due to perceived obsolescence have been found in other studies (Jaeger-Erben et al., 2021; Bieser et al., 2022; Makov & Fitzpatrick, 2021). It also corresponds to the smartphone replacement timeframe of two years (Sarath et al., 2015). As such, our research strengthens the existing findings on perceived obsolescence while also contributing new findings on what elements shape sustainable smartphone consumption practices.

Our study notes that overall, there is a positive attitude towards repair; however, the socio-material settings and lack of knowledge about repair creates a lock-in situation of premature replacement of smartphones. Purposeful barriers have been noted to be applied by smartphone businesses and manufacturers, who gatekeep information on smartphone spare parts and repair, employ planned obsolescence by degrading smartphones performance, as well as make it financially unappealing (Jensen et al., 2021; Perzanowski, 2021; Jaeger-Erben et al., 2021) which our participants discussed as being of significant impact on their repair choices. The lacking knowledge and the infrastructural setting can be changed by policy frameworks; thus,

we have noted that stricter frameworks from policy makers are a valuable tool to incentivise extended smartphone use. Our study also adds value to policy makers by providing an understanding of what barriers individuals encounter in smartphone repair and by noting that there is support from consumers towards policies for the right to repair.

We have taken an innovative approach to examining smartphone lifetime extension as a degrowth strategy, therefore adding value to degrowth transition literature. Although degrowth entails a radical change of social and material systems (Kallis, 2011, D'Alisa et al., 2015; Buch-Hansen, 2018), sustainable smartphone consumption can be a starting point in at least one area of life. Practice change is deemed necessary in order to achieve substantial transformation in society towards sustainable living (Joutsenvirta, 2016); thus, a study combining practice theory and a degrowth mindset has been a rewarding choice to contribute to the existing academic field. The research reveals that practice theory can be fruitfully applied to study smartphone consumption and repair practices. Taken together, we noticed how the practice elements of skills, meanings and materials are interconnected in smartphone use, presenting how practical actions of replacing smartphones overcome conscious acknowledgements of the environmental damage. This has been stressed by other authors who noted that practices are socially embedded and shaped by surrounding settings, social norms and embodied practical understandings (Warde, 2005; Schatzki, 2001; Keller & Vilhalemm, 2017; Shove, 2003).

Further research could be focused on analysing the incentives put in place by repair stores and/or refurbishing companies to promote their services and compare the analysis with the current study. This would give a better view of what needs to be done from a repair store viewpoint in order to persuade more people to choose repair when their smartphone has been damaged. Moreover, it would be interesting to do further research on smartphone lifetime extension through the second-hand market. Our study revealed a gap in participants perceiving second-hand smartphones as a viable option for themselves. It would be valuable to do a similar study as this one focused on consumer perspectives towards the second-hand market in electronics. This would help gain knowledge on how to promote second-hand devices as a strategy to reduce the production of new smartphones and prolong the lifetime of existing phones.

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Appendices

Appendix 1. Interview Guide - Semi-structured interviews

Prior to interviews we sent the Informed Consent to our participants for them to review. The interview has to start with the confirmation of the consent form, which was given with verbal confirmation.

Informed Consent

Title of Research:

Researchers and their contact information:

Marite Putna +46 763035101, mariteputna@gmail.com

Ester Waage +46 724445776, ester.waage@gmail.com

1. **Introduction and purpose of the study**

Thank you for agreeing to participate in this study. This informed consent is necessary for us to make sure that you, as a participant, are fully aware of the research process and your contribution to it, according to The Swedish Research Council. A signed copy of this Consent Form will be provided to you. You can contact the researchers on the provided contact information above about any questions that may arise.

The purpose of the study is to recognize the practices and perceptions of smartphone repair in Sweden. The study is conducted as a part of a master's thesis at Lund University.

2. **Description of the research**

In this research, you will be asked to participate in an interview that will last up to one hour. The interview will be audio-recorded. The information we aim to collect is about your actions, habits and views involving smartphone use and repair.

3. **Confidentiality**

The study will be published in the Lund University database. Your participation is confidential, your identity will not be disclosed, and your answers will not be used in a way that could reveal

your identity. When presenting the results, your real name will not be used and instead, a pseudonym will be provided.

The audio recordings from interviews will be destroyed after they have been coded and transcribed.

4. **Voluntary Participation**

Your participation in the study is completely voluntary, and you have the right to withdraw from the study at any time.

5. **Authorization**

By signing this form, you authorise the use and disclosure of your provided answers during the interview. We don't anticipate that there are any risks associated with your participation.

I voluntarily agree to participate in this research:

- **Yes**
- **No**

Appendix 2. Questions for Semi-structured interviews

Before the interview:

- Is your participation in the study completely voluntary?
- And you are aware you have the right to withdraw from the study at any time and to also not answer any questions you don't want to answer?
- Do you agree to this interview being recorded for the research analysis purposes presented to you in the Consent form?

Introductory Questions

1) We began by asking participants about their age, profession, the highest level of education and where in Sweden they lived.
2) For how long have you had a smartphone?
3) In the past 5 years how many smartphones have you changed?

Smartphones

4) How did you obtain your last phone? (Was it purchased, obtained through work or gifted?)
5) What was the main reason for changing out your last device? (Technical aspects, broken feature, or old devices?)
    a) Has the length of the device's insurance or your service agreement with your provider been an impact when it comes to replacement? Could you please elaborate on how it has had an impact?
    b) Have physical/aesthetic features of the device been an impact when deciding to replace it? How?
    c) What things do you evaluate most when replacing or repairing a device?
6) When a hardware function of your phone needs repairing, have you in the past gotten it fixed? (If they ask to elaborate on hardware function - screen, battery, slowness; if they have gotten it repaired - go to question 4, if not - do the follow-up question)
    a) If not, what did you do instead?
7) If you have gotten your phone repaired, could you please tell us about how the process was?
    a) Why did you need repairing?
    b) Where did you get it repaired?
    c) Was it easy to find a place where to repair your phone? How did you find it?

d) How long did it take?
e) How expensive was it?
f) Would you do it again?

8) Do you think that smartphones last long enough or the right amount of time?
    a) How long would you want your device to last for?

9) Material and infrastructure

10) Do you feel that you are encouraged to repair your smartphone?
    a) If so, where does the incentive come from (manufacturers, repair shops or second-hand refurbishment companies)?

11) What are your thoughts on policies influencing the repair possibilities?
    a) Where is the biggest responsibility? (policy makers, companies, consumers?)

12) How do you see yourself and/or consumers becoming more responsible and sustainable in our smartphone use?
    a) How do you think people could decrease the amount of smartphone replacements?

13) How much do you consider environmental impact in relation to the purchase and consumption of your smartphone?

14) Understanding sustainable consumption

15) What does sustainable consumption mean to you?
    a) Could you please describe how you understand sustainable consumption in relation to smartphones?

16) Have your views on sustainable smartphone consumption changed over time? How?

17) How does social media/adverts impact your decision on repairing a device or buying a new one?
    a) Have you ever seen an ad for repair?

18) Do you feel pressure to update your phone? Have you felt pressure in the past?
    a) Where do you think this pressure comes from? How have you experienced it?

19) How important is it for you to stay up-to-date with your smartphone?

20) Closing:

21) We are now done with the questions. Is there anything else you would like to add?

Thank you for your participation!