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Investigating the determinants of customer satisfaction: comparing post-purchase evaluations of new and refurbished smartphones

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Abstract

The continued deterioration of the global environment indicates that a shift towards more sustainable production and consumption patterns is needed. Refurbishment - *"a process in which a professional company collects and restores used products to a functional and satisfactory state, after which these refurbished products are sold to new consumers."* – is a way to help facilitating this. By establishing new products from used components, resource and energy savings combined with waste reductions can be achieved.

(refurbished) Smartphones were chosen as the study object, and the aim of the research was to investigate the factors that determine the satisfaction of new and refurbished smartphone buyers in the Netherlands. Data was collected through interviews with Dutch smartphone buyers (N = 10), and an online survey among new and refurbished buyers (N = 205). The interviews pointed out nine aspects on which smartphones are being evaluated, and a distinction could be made between easy and difficult-to-evaluate aspects. Moreover, through statistical analyses of the survey, it could be confirmed that disconfirmation has a positive effect on customer satisfaction. Disconfirmation, in turn, was found to be positively influenced by perceived performance. However, it could not be confirmed that retrospective expectations have a negative effect on disconfirmation.

In terms of evaluability, the easy-to-evaluate aspects seemed to be more prominent in respondents' customer satisfaction formation than the difficult-to-evaluate aspects. Perceived performance of the difficult-to-evaluate aspects, on the other hand, was shown to have a larger effect on disconfirmation than perceived performance of the easy-to-evaluate aspects, although these effects did not differ significantly. Hence, the results indicate that evaluability might have different effects on disconfirmation and customer satisfaction, although further research is needed to confirm this. Finally, it was found that new and refurbished buyers do not differ significantly in terms of their level of customer satisfaction. Hence, this indicates that (for some customer segments) refurbished smartphones might be a promising alternative for their brand-new equivalents.

Keywords: post-purchase evaluations, customer satisfaction, refurbishment, evaluability, smartphones

Preface

This thesis is part of the Master's programme "Management, Economics, and Consumer Studies" at Wageningen University. It is written within the department Urban Economics. Sustainable consumption, one of the pillars of this chair group, is applicable to a variety of areas. Refurbished products, such as smartphones, is just one of the examples. By establishing new products from used components, refurbished products can be assembled using less energy and resources than their brand-new equivalents. However, although refurbished phones have been on the market for a few years already, their market share is still rather limited. With this thesis, I hope to provide more knowledge on refurbished smartphones, with the ultimate goal of establishing more sustainable consumption and production patterns in the field of consumer technologies.

During this thesis, I was supervised by Gerrit Antonides. A special thank you goes out to him for his constructive feedback, new insights, and all the time and effort he invested in improving my research. In addition, I would like to thank Eveline van Leeuwen for reviewing my thesis. I am grateful that she was willing to invest time and energy in my research project.

Moreover, I would like to thank Green Mobile for their collaboration. They have been so kind to distribute my thesis among their network of customers, which enabled reaching a large group of refurbished buyers. Without their help, this definitely would not have been possible.

In addition, a heartfelt thank you to all participants. I really appreciate that they have been willing to answer my questions, and that they agreed to share their ideas and opinions with me. Their answers were the basis of this study, so without them, it would not have been able to conduct this research.

Finally, I would like to thank you, as a reader, for taking the time to look at my research. I hope that you will find it interesting, and that it might inspire you to learn more about sustainable consumption.

Lies Hovestadt

Wageningen, the Netherlands
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List of abbreviations

IPCC: Intergovernmental Panel on Climate Change

List of concepts

Disconfirmation: the outcome of a comparison between what a consumer expected and what (s)he received.

Evaluability: *"the extent to which a person has relevant reference information to gauge the desirability of target values and map them onto evaluation."* (Hsee & Zhang 2010, p 344 - 345)

Expectation: one of the components of disconfirmation. It is *"a predisposing prediction – sometimes stated as a probability or likelihood – of attribute or product performance."* (Oliver 2006, p 570). Expectations can be *predicted* (before consumption) or *retrospective* (recalled after consumption).

New buyers: consumers owning a new smartphone.

Performance: the perceived amount of received outcomes, and is usually expressed on a scale ranging from good to bad levels of performance.

Recycling: used products are converted to raw materials, which can then be used for future manufacturing processes (Michaud & Llerena, 2011; Gray & Charter, 2007).

Refurbished buyers: consumers owning a refurbished phone.

Refurbishment: *"a process in which a professional company collects and restores used products to a functional and satisfactory state, after which these refurbished products are sold to new consumers."* (Van Weelden et al., 2016, p 743)

Remanufacturing: as is the case with refurbishment, products are assembled utilizing used components. However, the aim of remanufacturing is to bring a product to a like-new condition, whereas refurbished products should be of satisfactory quality, but do not necessarily have to be equal to the original condition (Van Weelden et al., 2016; Ijomah, Bennett & Pearce, 1999).

Reuse (or second-hand products): *"Reuse implies that items are used by a second customer without prior repair operations or as originally designed."* (Rathore et al., 2011, p 1710)

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Chapter 1 Introduction

The current, unsustainable pattern of consumption and production is problematic, since it is attributed to be the major cause of continued deterioration of the global environment (Ijomah et al., 2004; Ciroth, Finkbeier, Hildenbrand, Klöpffer, Mazijn et al., 2011). In order to reduce the environmental impact of contemporary activities, international institutions have started to emphasize the need for sustainable development over the past decade (Cohen, 2005). For instance, the Intergovernmental Panel on Climate Change (IPCC) recently concluded that fundamental societal transitions and transformations are necessary to limit global warming (IPCC, 2018).

Hence, these developments signify the need for more sustainable business practices, part of which can be facilitated by refurbished products (Abbey, Meloy, Guide & Atalay, 2015). Refurbishment is defined as *"a process in which a professional company collects and restores used products to a functional and satisfactory state, after which these refurbished products are sold to new consumers."* (Van Weelden, Mugge & Bakker 2016, p 743) By establishing new, more sustainable products from used components, refurbished products can be assembled using up to 70% less raw materials, 80% less emissions and 60% less energy in comparison to newly manufactured products (Wang, Wiegerinck, Krikke & Zhang, 2013). Hence, significant resource and energy savings combined with waste reductions can be achieved. Therefore, refurbished products can be considered as "green products" (Michaud & Llerena, 2011).

Next to these environmental benefits, refurbished products also provide benefits for manufacturers and consumers. The costs of remanufacturing are 40–60% lower and only require 20% of the effort in comparison to the production of new products (Dowlatshahi, 2000). Therefore, remanufacturing can provide manufacturers with competitive advantages, while also broadening the market by attracting consumers that are unwilling to pay the full price for products (Michaud & Llerena, 2011; Vorasayan & Ryan, 2006). From the consumer perspective, refurbished products are a way to obtain goods with comparable quality to their new equivalent, at a lower price (Vorasayan & Ryan, 2006; Wang et al., 2013).

Hence, refurbishment seems promising. However, there is a problem preventing these products from reaching their full potential. Even though consumers are more and more aware of the unsustainability of contemporary consumption and production patterns, and become more concerned about environmental issues, this does not always result in environmentally-friendly consumption behaviour (Pedersen and Neergaard, 2006; Pickett-Baker & Ozaki, 2008). The Eurobarometer (2011), for instance, reports that 95% of EU citizens find that protecting the environment is important to them personally, and 87% of Europeans think that they can help protecting the environment. However, buying environmentally-friendly products is not yet a commonplace activity; only 17% of the respondents indicated that they did so in the month before filling in the survey.

This limited environmentally-friendly consumption behaviour is illustrated in the market share of refurbished smartphones. Although refurbished phones have been on the market for a while already, the secondary (e.g. refurbished) smartphone market represents only

6% of the primary market in Europe (Ellen MacArthur Foundation, 2012). Hence, this signifies the need to better understand how consumers perceive and evaluate refurbished products, in order to increase the market share of these products (Van Weelden et al., 2016; Wang & Hazen, 2016).

For the current research, the product category of refurbished smartphones was chosen, since refurbishment is developing rapidly in the mobile phone industry (Van Weelden et al., 2016). Moreover, refurbished smartphones have been available to consumers for a few years already. This enables executing the research in a real-life setting and the possibility of interviewing actual buyers. Finally, smartphones are being replaced at an increasing rate, resulting in large amounts of electronic product waste and the loss of scarce materials (Mugge et al., 2017). However, after their first use, smartphones still have sufficient value for reuse, so refurbishing (parts of) existing phones could help to address these problems. However, as explained before, the market share of refurbished smartphones is still very limited compared to total smartphone sales. In order to increase this share, more research is needed on the consumer perception of refurbished smartphones.

In previous research, van Weelden et al. (2016) applied Kotler's (2002) five-stage model of the consumer buying process to investigate the consumer decision-making process with regard to refurbished smartphones. The first four stages (problem recognition, information search, evaluation of alternatives and purchase decision) have received most attention, and the main factors that influence the choice of a refurbished product over a new one were identified. Refurbished items might not be taken into consideration, because consumers are simply not aware of them, or misconceive what refurbishment entails (Van Weelden et al., 2016). On the other hand, consumer awareness of refurbishment and perceived environmental benefits were shown to positively impact purchase intention of refurbished smartphones (Mugge, Jockin & Bocken, 2017). Moreover, a negative trade-off between perceived risks and benefits often results in the rejection of refurbished items (Van Weelden et al., 2016; Wang & Hazen, 2016). The most mentioned risk with regard to refurbished smartphones was *performance risk*: the fear that a refurbished phone will have a poor functionality (Van Weelden et al., 2016).

Hence, these results indicate that in order to increase the market share of refurbished smartphones, still work needs to be done. Consumers need to be better informed about refurbished smartphones in order to let them consider buying these phones. On the other hand, consumers who have already purchased a refurbished smartphone (refurbished buyers) have not been researched yet. These consumers are in the post-purchase phase, which is the fifth phase of Kotler's (2002) five stage model. This is an essential phase, since consumers will then evaluate whether they like the product and whether the purchase was a good deal. This will result in some level of satisfaction or dissatisfaction (Huarng, 2002). Paying attention to factors that determine customer satisfaction is of vital importance for a company, as customer satisfaction is described to be the best indicator of a company's future profits (Kotler, 1991 in Anderson & Sullivan, 1993). Having loyal customers, for instance, reduces costs for firms, since the expenses for acquiring new customers are much higher than for keeping an existing one (Matzler & Hinterhuber, 1998).

It is thus worthwhile to also pay attention to refurbished smartphone buyers. How do they evaluate their refurbished smartphones? How satisfied are they with their smartphones? And what is the effect of easy and difficult-to-evaluate aspects (i.e. the evaluability) of smartphones on their satisfaction? And how does this compare to non-refurbished buyers? The current research will contribute to the refurbishment and customer satisfaction literature by investigating these questions. This will be done on the basis of the following research question:

Which factors determine customer satisfaction of new and refurbished smartphone buyers in the Netherlands?

By answering this research question, this paper will contribute to the academic literature on post-purchase product evaluations. Research on customer satisfaction of (refurbished) smartphone buyers is rather still scarce to date. This study will contribute to more knowledge on the factors that determine satisfaction of these buyers. Moreover, to the researcher's best knowledge, this study will be the first to apply the expectancy-disconfirmation model in the context of (refurbished) smartphones. In addition, the effect of evaluability on customer satisfaction in the context of new consumer technologies has not been investigated yet. This research will also shed more light on this topic.

The results of this study will be of practical interest for new and refurbished smartphone dealers. The research will give more insight into the role of expectations, perceived performance, and evaluability in the formation of customers' satisfaction. Moreover, it will be interesting to find out whether new and refurbished smartphone buyers differ in terms of customer satisfaction. If this is not the case, this might indicate that (for certain customer segments) refurbished smartphones might indeed be a promising alternative for their brand-new equivalents.

To answer the research question, the concept of refurbishment will firstly be further explained in Chapter 2. In Chapter 3, literature about the consumer decision-making process for (refurbished) products will be discussed, as well as models of customer satisfaction. This chapter concludes with a conceptual framework, after which the hypotheses will be explained. Chapter 4 is dedicated to the research methods, and will include the operationalization of the concepts and the used research methods. The results of the qualitative and quantitative research will be discussed in Chapter 5, which will be followed by a discussion and a conclusion.

Chapter 2 The current state of the refurbished products market

2.1 Definition of refurbishment

In the current paper, refurbishment is defined as *"a process in which a professional company collects and restores used products to a functional and satisfactory state, after which these refurbished products are sold to new consumers."* (Van Weelden et al., 2016, p 743) Another term for refurbishment is reconditioning (Rathore, Kota & Chakrabarti, 2011). There are a number of other end-of-life strategies, such as reuse, repair, remanufacturing and recycling (see Figure 1; Rathore et al., 2011). Since distinctions between these concepts are often misunderstood, they will be further explained below.

Refurbishment should not be confused with remanufacturing, although both terms are often used interchangeably in academic literature. In both processes, products are assembled utilizing used components, but the aim of remanufacturing is to bring a product to a like-new condition, whereas refurbished products should be of satisfactory quality, but do not necessarily have to be equal to the original condition (Van Weelden et al., 2016; Ijomah, Bennett & Pearce, 1999). However, due to the lack of literature on customer satisfaction of refurbished products, findings for remanufactured products are used as well because of their similarities.

Moreover, refurbishment differs from recycling, since refurbished products keep their original function. With recycling, on the other hand, used products are converted to raw materials, which can then be used for future manufacturing processes (Michaud & Llerena, 2011; Gray & Charter, 2007). This difference is depicted in Figure 1.

Finally, refurbishment is not the same as reuse (or second-hand products). *"Reuse implies that items are used by a second customer without prior repair operations or as originally designed."* (Rathore et al., 2011, p 1710)

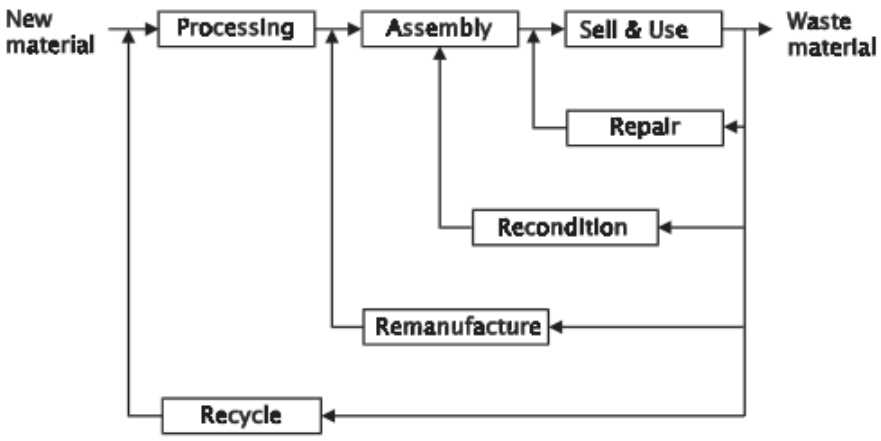


Figure 1: The differences between recycling, remanufacturing, reconditioning and repairing (King, Burgess, Ijomah & McMahon, 2006)

2.2 Products suitable for re-using

In theory, any product that can be manufactured could also be remanufactured. However, whether remanufacturing is economically feasible varies between sectors and products (Gray &

Charter, 2007). In terms of remanufacturing, a distinction can be made between two categories: spare parts, such as motors or clutches for a car, and entire products, such as vending machines (Gray & Charter, 2007). Items (products or parts) that are remanufactured nowadays are, for instance, machine tools, medical instruments, copiers, automobile parts, computers, office furniture, aircraft, aviation equipment, telephone equipment and tires (Teunter & Vlachos, 2002). These items indicate which products are most suitable for remanufacturing. NI Business Info (n.d.) describes that remanufacturing works best when the product is: *"Of high value, complex, durable and not marketed as a basis of personal status or lifestyle."* Moreover, remanufacturing is less popular in lifestyle and fashion industries, since customers may perceive remanufactured products in those markets as second class (NI Business Info, n.d.).

In the current research, smartphones are chosen as the object of research. Nowadays, most people own a smartphone, and they are being replaced rapidly. Therefore, it is crucial to find ways to extract value from the discarded phones (Mugge et al., 2017). After they have been discarded, smartphones still have sufficient value for reuse. Therefore, refurbishment is a promising strategy for these devices (Mugge et al., 2017).

2.3 Relevance of re-using products

Refurbishment is seen as *"an environmentally beneficial strategy that allows companies to retain the value of products and materials."* (Mugge et al., 2017, p 285) In terms of environmental benefits, the production of refurbished products requires up to 70% less raw materials, up to 80% less emissions, up to 60% less energy and up to 50% less total production costs in comparison to new products (Wang & Hazen, 2016). Because refurbishment minimises waste and retains the value of materials, it also contributes to the circular economy (Mugge et al., 2017).

However, refurbishment is not only relevant because of environmental concerns, but it brings along opportunities for organizations as well. Since resources and raw materials are becoming scarcer and more expensive, companies can gain a competitive advantage by adopting efficient resource-management practices (Porter & van der Linde, 1995). These economic reasons were originally the motive for firms to adopt refurbishment, since organizations recognized the potential materials and energy savings (Michaud & Llerena, 2011). Because of the utilization of used components, refurbishment reduces the costs of purchasing and processing raw materials. Therefore, refurbishment can actually be commercially viable for companies (e.g. Linton, 2008; Atasu, Guide & Van Wassenhove, 2010).

Another reason for refurbishment is the marketing opportunities that are enabled by consumers' increasing concern for environmental issues (Michaud & Llerena, 2011). The remarkable growth of the global market for environmentally friendly products has indicated that consumer choices do not only reflect price and quality preferences, but also social and moral values (Mazar & Zhong, 2010). This environmental awareness has led to new market opportunities, and various "green" products have been introduced since the early 1980s. Examples are recycled paper, energy-saving electronic appliances and organic products (Michaud & Llerena, 2011). These "green" products *"have the same basic functions as*

conventional products but their impact on the environment over their life cycle is mitigated. They can be considered as private goods affiliated with public (environmental) characteristics in the sense that they provide both a private benefit to the consumer and a public environmental benefit." (Michaud & Llerena, 2001, p 409) Because of their energy and material savings, as well as waste reduction, refurbished products could also be categorized as "green products" (Michaud & Llerena, 2011).

Hence, refurbishment is relevant for organizations because of economic, customer-orientation and environmental reasons. In addition, refurbishment could also be a strategy to deal with the constantly rising costs of waste management (Michaud & Llerena, 2011). For instance, the Waste Electrical & Electronic Equipment (WEEE) Directive has recently been introduced to enhance resource efficiency by improving the collection, treatment and recycling of electronics (European Commission, 2018). This directive makes producers responsible for the recovery of their used products (Michaud & Llerena, 2011). In order to oblige to this legislation, producers need suitable recovery strategies, which can be facilitated by refurbishment.

2.4 The (re-used) smartphone market

Nowadays, more and more people own a smartphone. The total number of smartphone users is expected to increase from 2.1 billion in 2016 to around 2.87 in 2020 (Statista, 2018). Moreover, the number of mobile devices in use per citizen is assumed to be 1.4 by 2030 (Andrae & Edler, 2015). Not only the increasing number of smartphone users puts pressure on the environment, the shorter lifecycles of the devices are also troublesome. On average, people use their phone around 2.5 years, resulting in significant amounts of electronic waste (Mugge et al., 2017).

Concerning the Netherlands, 93% of the Dutch respondents of Deloitte's Global Mobile Consumer Survey 2017 owned or had ready access to a smartphone, which is the highest smartphone penetration of the countries surveyed (Deloitte, 2017). Out of the 1783 Dutch respondents, most people owned a Samsung (41%), followed by Apple (28%) and Huawei (8%) (Deloitte, 2017). When looking at whether these smartphone owners would recommend their current device, Apple and Samsung owners were most likely to do so, while Nokia and Huawei owners seem least enthusiastic about their devices (Deloitte, 2017).

In terms of the share of used phones, only 12% of the phones (n=197) currently in use are second-hand (i.e. used or refurbished). Of the second-hand devices, Apple is the most common brand: 19% of all Apple owners had an used or a refurbished phone (Deloitte, 2017). Although the penetration rate of used smartphones in the Netherlands is not that high yet, Deloitte has positive expectations for the future of these devices. It is forecasted that the growth rate of the global used smartphone market will be 4-5 times higher than the overall smartphone market (Deloitte, 2016). Moreover, the lifespan of smartphones is expected to be prolonged as well: *"We predict at least 10 percent of premium smartphones ($500 or higher) purchased new in 2016 will end up having three or more owners before being retired, and will still be used actively in 2020 or beyond."* (Deloitte 2016, p 1)

2.5 Involved parties

2.5.1 Parties offering refurbished smartphones

In the Netherlands, there is a large number of companies offering refurbished smartphones. 69% of the refurbished smartphones are being sold via online channels, whereas only 31% of the sales happens via offline channels (BigSpark.com, 2018). Online channels are, for instance, Green Mobile, Partly, reBuy, SWOOP, and WeCell. Leapp, on the other hand, also offers refurbished smartphones in offline stores. Next to that, well-known retailers such as Coolblue and Bol.com also sell refurbished smartphones. Coolblue offers "second chance" smartphones, i.e. phones that have been returned and have been checked and repaired afterwards. Bol.com, on the other hand, offers refurbished smartphones from retailers such as 2ND, Renewd and Forza. Data about the market shares of these parties is, unfortunately, not publicly available.

In the current research, we will collaborate with Green Mobile, a company offering refurbished smartphones, smartwatches, tablets and MacBooks. The company was founded in 2013 in the Netherlands, but currently also serves the other EU countries. This collaboration enabled reaching actual buyers of refurbished products.

Chapter 3 Theoretical framework

3.1 Consumer decision-making process for refurbished products

The consumer buying process has been described in various models. The most well-known models are proposed by Howard and Sheth (1969), Nicosia (1966) and Engel et al. (1978) (Mitchell & Boustani, 1994). Although these models have varying levels of detail, they all recognize five stages in the consumer buying process: problem recognition, information search, evaluation of alternatives, purchase decision and post-purchase behaviour (see Figure 2). Although the models indicate that consumers go sequentially through the stages, some steps may sometimes be skipped or reversed (Kotler, 2002). The models are described as being most relevant for complex decision making, in which significant risks are involved (Mitchell & Boustani, 1994).

Figure 2: The five-stage model of the consumer buying process (adapted from Kotler, 2002)

Based on the consumer decision-making model of Engel et al. (1968), a model was established to describe the consumer decision-making process for refurbished products (Van Weelden et al., 2016). This process consists of four phases: the pre-purchase, orientation, evaluation and post-purchase phase (see Figure 3), which will be further explained below.

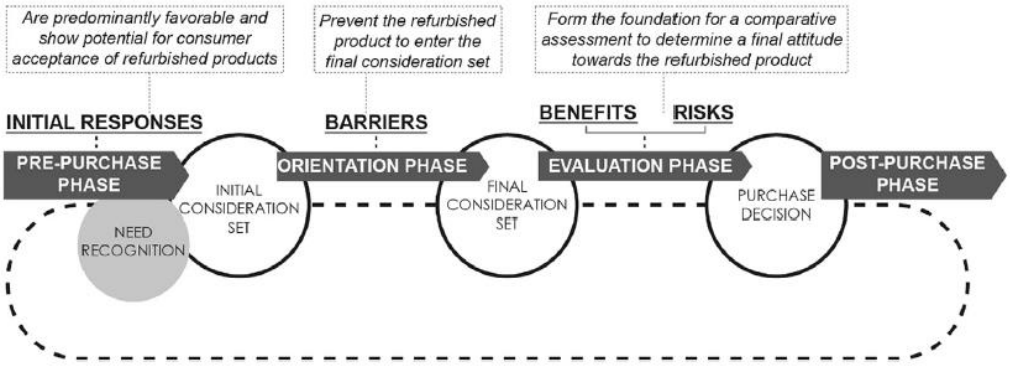


Figure 3: Model of the consumer decision-making process showing the main factors that influence consumer acceptance of refurbished mobile phones (Van Weelden et al., 2016)

3.1.1 Pre-purchase phase

The pre-purchase phase comprises people's initial response towards (refurbished) products. In a preliminary research conducted by Van Weelden et al. (2016), a difference was found regarding people's initial responses between "refurbished buyers", i.e. people who own a refurbished phone, and "new buyers", i.e. people who own a new smartphone. The first group was found to have a high level of satisfaction and an enthusiastic attitude towards refurbished products, whereas the latter group showed interest in the products, but also reported doubts resulting from a lack of knowledge about refurbished products (Van Weelden et al., 2016).

However, customer satisfaction was not thoroughly examined during this research. Therefore, determinants of customer satisfaction regarding refurbished smartphones are still unknown.

3.1.2 Orientation phase

In the orientation phase, consumers decide which product alternatives could satisfy an unfulfilled need. At the beginning of the phase, the consumer has an initial consideration set of alternatives recalled from memory, which are associated with a favourable attitude. The remainder of the phase consists of information search, during which new alternatives may be discovered. This results in a final consideration set, which includes the alternatives the consumer is aware of and that are worthy of further consideration.

Relevant for the consumer acceptance of refurbished products are the barriers that prevent refurbished products from ending up in the final consideration set. An important barrier for refurbished products is their availability, since there is not a refurbished version of every product yet (Mugge et al., 2017). However, whenever a refurbished product is available, there are two other essential barriers: the lack of awareness and a misconception of the refurbished concept (Van Weelden et al., 2016; Wei, Cheng, Sundin & Tang, 2015). Refurbished products may not enter the final consideration set, because consumers simply do not know that these products exist (Mugge et al., 2017). Moreover, even if consumers are aware of such products, they may not exactly know what refurbishment entails and confuse it with second-hand products. Because of the association with inferior quality, refurbished products might be rejected before being taken into consideration. Other reported barriers are the lack of availability and the lack of the thrill of newness (Van Weelden et al., 2016).

3.1.3 Evaluation phase

If the barriers did not prevent the refurbished product from ending up in the final consideration set, the refurbished product will enter the evaluation phase. During this phase, its perceived risks and benefits will be assessed (Van Weelden et al., 2016). This is in accordance with the decision-making literature, which argues that individuals consider both the risks and benefits when making decisions (Halpern-Felsher, Biehl, Kropp & Rubinstein, 2004).

One of the most important benefits of refurbished smartphones is their relatively low price. Refurbished products are sold at a lower price than their new equivalent, resulting in a *financial benefit* for consumers (Jiménez-Parra, Rubio & Vicente-Molina, 2014). Next to that, refurbished products also have an *environmental benefit*, since they can be produced using up to 70% less raw materials, 80% less emissions and 60% less energy in comparison to newly manufactured products (Wang, Wiegerinck, Krikke & Zhang, 2013). However, most consumers are unaware of these benefits, since refurbished smartphones are currently only marketed as having a lower price than new phones (Mugge et al., 2017). Hence, environmental considerations are often not the main driver for purchasing refurbished smartphones. However, whenever environmental benefits are made more salient, for instance by informing consumers about their environmental impacts, consumers were shown to rather choose the refurbished option (Michaud & Llerena, 2011). Other perceived benefits of refurbished smartphones are *the*

absence of undesirable innovative features, *unique product features* and a *higher performance than second-hand products* (Van Weelden et al., 2016).

With regard to perceived risks, *performance risk* was found to be most important. In the context of refurbished smartphones, a concern is that the phone will have an inferior functionality or short lifetime (Van Weelden et al., 2016). Another important factor is *financial risk*: *"a fear that the relatively high amount of money paid for the refurbished phone is not spent well and will have a negative influence on the consumer's monetary resources."* (Van Weelden et al. 2016, p 748). The third perceived risk is *time risk*, the concern of losing time when the phone does not meet the promised possibilities, or when the phone has to be returned for repairing. Finally, *obsolescence risk* refers to the concern that the smartphone will become obsolete quickly, or that the phone has limited technological capabilities (Van Weelden et al., 2016).

The risk-benefit balance was found to be influenced by twelve factors, which were categorized into personal, contextual and product-related factors, as shown in Figure 4 (Van Weelden et al., 2016).

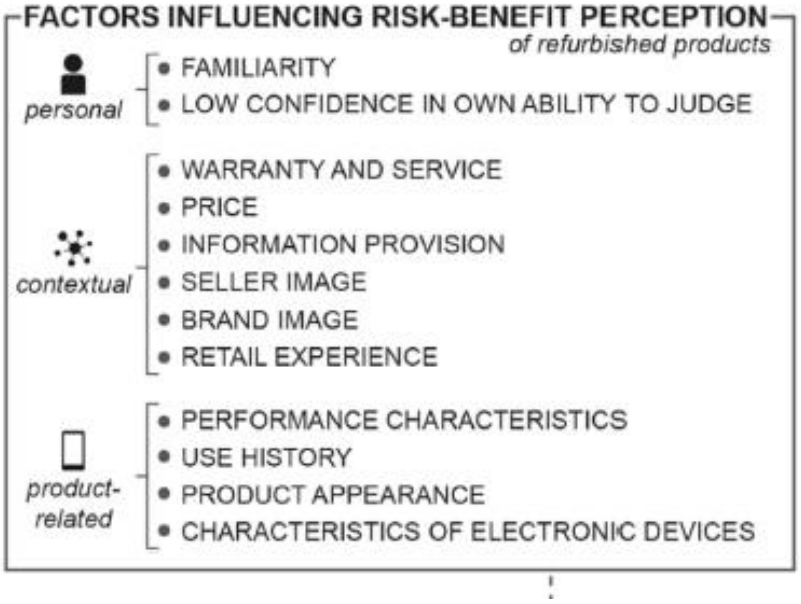


Figure 4: Factors influencing the risk-benefit balance of refurbished products (Van Weelden et al., 2016)

The final purchase decision is determined by the risk-benefit evaluation. Although most consumers initially have positive responses towards refurbished mobile phones, the items are often rejected as final purchase alternative due to perceived obstacles during the decision-making process (Van Weelden et al., 2016). This rejection can be the result of barriers encountered in the orientation phase, or during the evaluation of the risks and benefits. This low consumer acceptance was reported to be due to a lack of familiarity and weak image associated with refurbished products (Van Weelden et al., 2016).

3.1.4 Post-purchase phase

Once the consumer has made a decision and has bought a refurbished smartphone, the post-purchase phase starts. During the post-purchase phase, the consumer will evaluate whether

(s)he likes the product and whether the purchase was a good deal. Moreover, the consumer will experience some level of satisfaction or dissatisfaction (Huarng, 2002). (Dis)satisfaction with the product will influence the consumer's post-purchase behaviour. Satisfied consumers are, for instance, more likely to purchase the product again. In addition, it is more probable that they talk positively about the product to others (Kotler, 2002; Sivadas & Baker-Prewitt, 2000). Word-of-mouth, i.e. what customers say to one another, has a major influence on purchases (Swan & Oliver, 1989).

Dissatisfied consumers, on the other hand, are less likely to engage in such activities. They may look for redress, i.e. ask for a refund, exchange or repair (Blodgett, Wakefield & Barnes, 1995). This way, the problem may be solved. However, many dissatisfied customers do not try to remedy the problem, but instead exit (vow to never visit the store again, or to never repurchase the product) and express negative word-of-mouth (tell others about their experience) (Blodgett et al., 1995). Moreover, they may undertake public action by complaining to government agencies and other organizations (Kotler, 2002). This results in lost sales and profits for the retailer (Blodgett et al., 1995).

The post-purchase phases of refurbished buyers and new smartphone buyers, however, have not been investigated yet. Therefore, the current research will focus on researching whether the post-purchase phase of refurbished buyers differs from this phase of new buyers. Do the two groups of buyers differ in their post-purchase evaluations? And do their levels of customer satisfaction vary as well? To answer these questions, the concept of customer satisfaction will be further investigated first.

3.2 Customer satisfaction

Section 3.1.4 has stated that consumer (dis)satisfaction impacts post-purchase behaviour. But what is customer satisfaction exactly? Why is it important for organizations? And how can it be measured? These questions will be answered in the current section.

Customer satisfaction has been described to be essential to long-term business success, and therefore as an important goal of all business activities (Nam, Ekinci, Whyatt, 2011; Chan, Hui, Lo, Tse, Tso & Wu, 2003). Organizations need to produce products and services that yield highly satisfied and loyal customers to survive in the contemporary global and very competitive economy (Dimitriades, 2006). The goal is not to gain higher market shares than competitors, but to create sustainable competitive advantages within certain market segments through high customer satisfaction and loyalty (Matzler & Hinterhuber, 1998).

High customer satisfaction is associated with many benefits for the firm, such as increased consumer loyalty, lower costs of future transactions, reduced price elasticities and a better firm reputation (Chan et al., 2003). In addition, loyal customers are assumed to create steady future cash flows, and require less costs than attracting new customers. The American Marketing Association estimates that acquiring a new customer costs five or six times more than keeping an existing one (Matzler & Hinterhuber, 1998).

Hence, customer satisfaction is of vital importance for the survival of organizations. Therefore, the construct of customer satisfaction has been researched intensively (Giese & Cote, 2000). Various frameworks have been developed to explain this concept, such as Expectancy-Disconfirmation Theory, Equity Theory, Attribution Theory, Value-Percept Theory, Dissonance Theory, and Contrast Theory (Yüksel & Yüksel, 2001; for a review, see Yi, 1990). However, although customer satisfaction has been researched thoroughly, there is no consensus on a definition yet (Giese & Cote, 2000). In the current paper, the following definition will be used: *"Satisfaction is the consumer's fulfilment response. It is a judgment that a product/service feature, or the product or service itself, provided (or is providing) a pleasurable level of consumption-related fulfilment (...)."* (Oliver 2006, p 13)

In previous studies, customer satisfaction has been researched using varying levels of specificity, including satisfaction with a product attribute, a salesperson and a consumption experience, for instance (Chan et al., 2003). However, satisfaction with a product, either a commodity or a service, is *"a more fundamental level"* [of customer satisfaction] (Chan et al., 2003). Therefore, the current research will focus on investigating customer satisfaction with a product, i.e. a (refurbished) smartphone.

3.2.1 Models of customer satisfaction

3.2.1.1 The expectancy-disconfirmation model

One of the first models explaining customer satisfaction is the expectancy-disconfirmation (alternatively confirmation/disconfirmation) model (Oliver, 1980). This theory states that customer satisfaction is the result of a process of comparison (Yi, 1990). The main antecedents of customer satisfaction are expectations, performance (alternatively perceived quality) and disconfirmation (see Figure 5; Oliver, 1980; Yi, 1990). According to this framework, consumers compare their perceptions of product performance with their expectations, which serve as a reference point (Oliver, 1980; Tsiros, 1998). Expectations are influenced by the factors that Helson (1959) suggested for his adaptation theory: *"(1) the product itself including one's prior experience, brand connotations, and symbolic elements, (2) the context including the content of communications from salespeople and social referents, and (3) individual characteristics including persuasibility and perceptual distortion."* (Oliver 1980, p 461)

Perceived performance is the consumer's perception of a product's performance, and whether this product fulfils consumer needs, wants and desires (McKinney, Yoon & Zahedi, 2002). If the perceived performance meets the expectations, confirmation results. Disconfirmation, on the other hand, results when perceived performance does not meet the reference point. Hence, the gap between prior expectations and actual performance is called *expectancy disconfirmation* (Oliver, 1980; Yi, 1990). Disconfirmation can be positive, when perceived performance exceeds the expectations, or negative, when perceived performance fails to meet the expectations (Van Ryzin, 2005; Tsiros, 1998). The paradigm assumes disconfirmation determines customer satisfaction (Yi, 1990; Oliver & Linda, 1981). Although many studies accept the paradigm, different views about e.g. the interrelationships among the key variables are held (Yi, 1990).

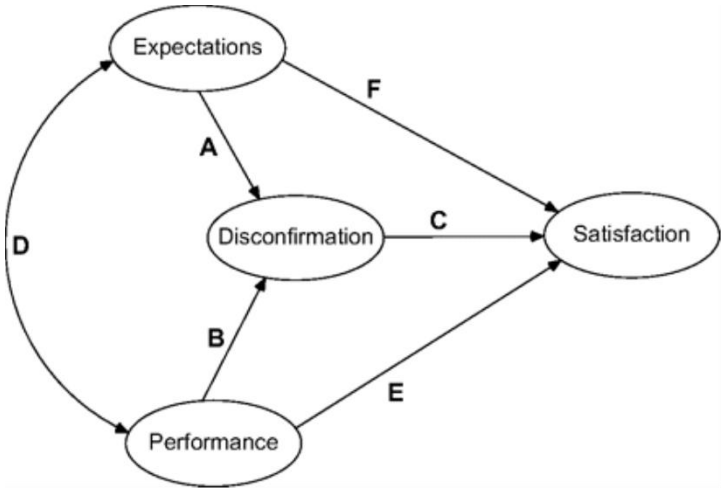


Figure 5: The expectancy-disconfirmation model (Van Ryzin, 2005)

The expectancy-disconfirmation model is dominant in satisfaction research (Maute & Forrester, 1993) and has been applied to various domains. The model has, for instance, been used to test customer satisfaction in the financial sector (e.g. Montfort, Masurel & Rijn, 2000), in the public domain (e.g. Van Ryzin 2004; Van Ryzin, 2005; Reisig & Stroshine Chandek, 2001), in negotiation settings (Oliver, Balakrishnan & Barry, 1994), in the tourist industry (e.g. Weber, 1997), and in online consumption settings (Liao, Liu, Liu, To & Lin, 2011). However, research on customer satisfaction with (new) technologies is rather scarce, especially in the phone industry. Woo & Fock (1999) have examined customer satisfaction in the Hong Kong mobile phone industry, but mainly focused on aspects of the network provider, such as transmission quality and network coverage, pricing policy, staff competence, and customer service. Hence, researching customer satisfaction of (refurbished) smartphones using the expectancy-disconfirmation has not been performed yet.

3.2.1.2 Oliver's (2006) antecedents and consequences of satisfaction

Building on the expectancy-disconfirmation theory, Oliver (2006) has developed his model on several antecedents and consequences of satisfaction (see Figure 6). Antecedents, such as mood, quality, value, attitude and expectations, determine how a consumer (un)consciously constructs satisfaction (Oliver, 2006). **Moods** are positive or negative feelings of a mostly non-thinking nature, which may have been preceded by certain events. **Quality** *"is a cognitive judgement that summarizes the exceptionally good (or bad) elements of the product, especially when compared to other direct alternatives or offerings (brands)."* (Oliver 2006, p 570) **Value** results when consumers compare what they will receive, e.g. performance, with the corresponding acquisition costs, such as effort (Oliver, 2006). An **attitude**, on the other hand, is a relatively stable judgement that a product/service has (un)desirable properties. This judgement is based on a variety of evaluations of product features. Attitudes are based on deliberate processing of product/service-based information (Oliver, 2006). These four antecedents can already exist before purchasing or using a product.

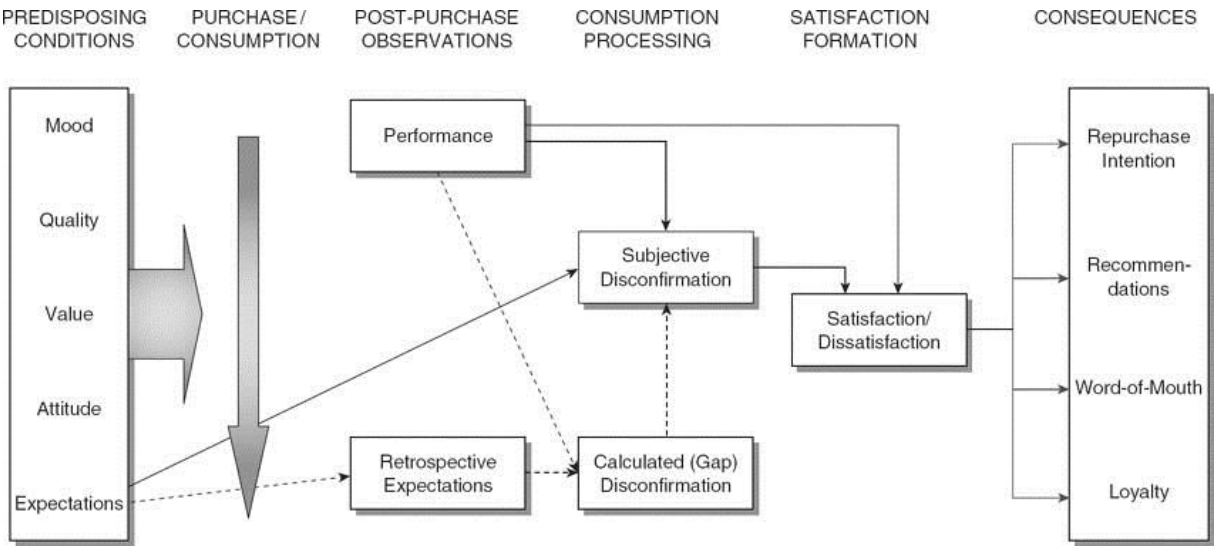


Figure 6: Antecedents and consequences of satisfaction (Oliver, 2006)

Then, after purchase or consumption (reflected by the downward arrow), **disconfirmation** may result. This is the outcome of a comparison between what a consumer expected and what (s)he received. **Expectation**, one of the components of disconfirmation, is *"a predisposing prediction – sometimes stated as a probability or likelihood – of attribute or product performance."* (Oliver 2006, p 570) **Performance**, on the other hand, is the perceived amount of received outcomes, and is usually expressed on a scale ranging from good to bad levels of performance.

The middle, unboxed part of the figure represents the process happening after purchase. Then, a consumer compares expectations, whether predicted (before consumption) or retrospective (recalled after consumption), and performance, which results in an "objective" or gap disconfirmation level. This provides the basis for a subjective interpretation of the difference between expectation and performance, which is a direct cause of satisfaction. Besides the indirect effect via disconfirmation, performance also has a direct effect on satisfaction (Oliver, 2006).

Concerning the consequences of satisfaction, customer satisfaction has a positive influence on **repurchase intention**: the intention of consumers to repurchase a product/service. **Recommendations** and **worth-of-mouth** are two other, related consequences of satisfaction: *"While WOM can consist of praising or damning (to other consumers as opposed to the firm or its representatives), recommendations are targeted communications to potential purchasers. Note that recommendations is a general term and can be either positive (to buy) or negative (to not buy)."* (Oliver 2006, p 585) Lastly, **loyalty** is a commitment to repurchase a certain product or service in the future. It is not just random repetitive behaviour, but a deeply rooted commitment. This might also be a consequences of customer satisfaction (Oliver, 2006).

3.2.1.3 Anderson and Sullivan's (1993) model on customer satisfaction

An alternative to Oliver's (2006) model is Anderson and Sullivan's (1993) model on the antecedents and consequences of customer satisfaction (see Figure 7). They have tried to further

improve the expectancy-disconfirmation model by surveying 22,300 Swedish customers regarding a variety of products and services.

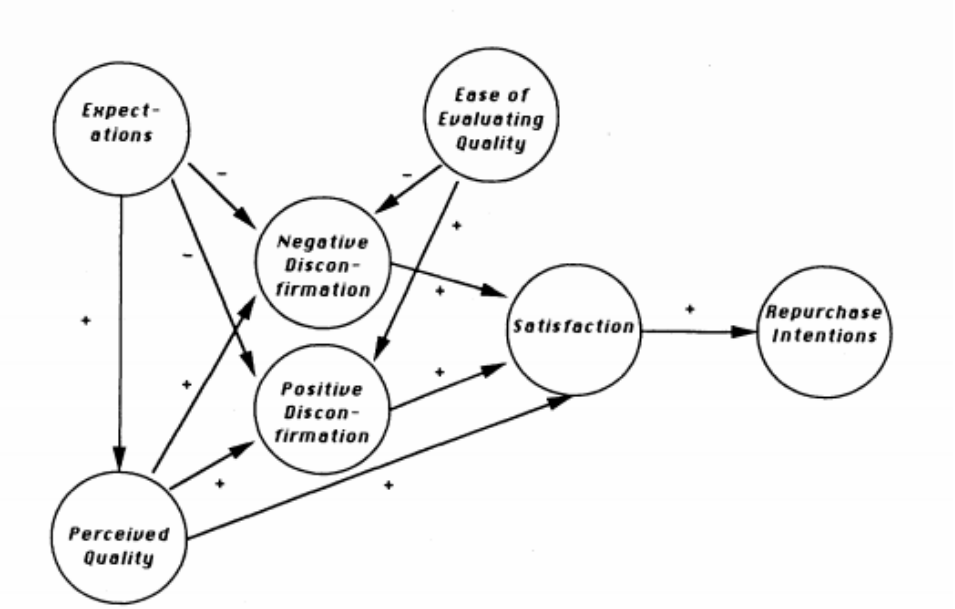


Figure 7: Antecedents and consequences of customer satisfaction (Anderson & Sullivan, 1993)

In accordance with the expectancy-disconfirmation model, they reported that both perceived quality and disconfirmation were associated with an increase in satisfaction. Disconfirmation was defined as the extent to which perceived quality does not meet pre-purchase expectations. In this model, disconfirmation was split in a negative and positive component, with separate effects on satisfaction. Disconfirmation was found to be influenced by the ease of evaluating quality, which is the degree of perceived difficulty in evaluating quality. The ease of evaluating quality had a positive effect on both positive and negative disconfirmation. It was found that when quality is easy to evaluate, disconfirmation is more likely to occur. Therefore, Anderson and Sullivan (1993) conclude: *"Hence, it may be more important to manage customer satisfaction when customers are very familiar with a product or the product is not complex. When quality is ambiguous or difficult to evaluate, then expectations will play a greater role in determining satisfaction."* (p 141)

Moreover, satisfaction was found to positively impact repurchase intentions. An interesting finding here is the difference between positive and negative disconfirmation. Quality which fails to meet expectations was reported to have more impact on satisfaction and retention than quality which surpasses expectations. Hence, this model also underlines the importance of managing expectations. Moreover, expectations were found to positively affect perceived quality (or performance), as is also the case in the expectancy-disconfirmation model. However, in contrast to the model from Oliver (1980), the framework of Anderson and Sullivan (1993) holds that expectations do not directly affect satisfaction. The reason for this is that there is mixed evidence about this relationship. Churchill and Suprenant (1982), for instance, reported that satisfaction for durable is affected by perceived quality instead of expectations. Anderson and

Sullivan (1993) also found that satisfaction was not directly affected by expectations, but only indirectly via perceived quality and disconfirmation.

3.2.2 Evaluability

Related to Anderson and Sullivan's (1993) concept of ease of evaluating quality is *evaluability*: *"the extent to which a person has relevant reference information to gauge the desirability of target values and map them onto evaluation."* (Hsee & Zhang 2010, p 344 - 345) Hence, for attributes that are considered to be difficult to evaluate, the decision maker lacks knowledge or information to adequately judge the given value of the attribute. For easy-to-evaluate attributes, on the other hand, the decision maker is able to judge how good an attribute is relative to other attributes, based on prior experience and knowledge (Dager & Sweeney, 2007).

The concept of evaluability was illustrated by Hsee (1996) in the famous Dictionary Study. It was shown that an object will be evaluated differently when it is considered in isolation compared to when it is being evaluated jointly. In the study, the participants were exposed to two dictionaries (A vs B). The dictionaries had the same year of publication, but differed in their number of entries (10,000 vs 20,000) and their condition (like-new vs having a torn cover). During joint evaluation (JE), the participants were asked to indicate their willingness to pay (WTP) for each dictionary. During single evaluation (SE) participants were only shown one dictionary, and were asked how much they were willing to pay for this object. Hsee (1996) showed that in JE, dictionary B had higher WTP values, whereas dictionary A had higher WTP values in SE.

This difference was explained in the *evaluability hypothesis* (Hsee, 1996). This hypothesis proposes that *"PRs* [preference reversals] *between joint and separate evaluations occur because one of the attributes involved in the options is hard to evaluate independently and another attribute is relatively easy to evaluate independently."* (Hsee, 1996, p 247) For instance, in the dictionary case, the number of entries is difficult to evaluate in isolation. The evaluator does not really know how good the given value on the attribute (the number of entries) is, if (s)he cannot compare it with other cases. So, most people probably will not know how good a dictionary with 10,000 entries is, if they cannot compare it to the number of entries in other dictionaries. The condition of a dictionary, on the other hand, is easier to evaluate in isolation. Most people will find a dictionary with a like-new condition attractive, even if there is no other dictionary to compare it with.

The concept of evaluability is relevant for customer satisfaction, since satisfaction has been described to be an "isolated evaluation" (Auh & Johnson, 2005). Therefore, it was argued that easier-to-evaluate attributes would be more important than difficult-to-evaluate attributes for determining customer satisfaction (Auh & Johnson, 2005). This was also confirmed by Hsee and Tsai (2007). They reported that when evaluability is low, people's utility function will look like a steep function (see the dashed line in Figure 8). This means that people will be happy if they receive a bonus on the attribute in question but will be quite indifferent about how much they receive. However, when evaluability is high, people's utility function will become steeper. If people are more knowledgeable about the attribute in question, they will be happier if they

receive a larger bonus (Hsee & Tsai, 2007). However, this is not always the case, as *"consumers do not have much information about the range and distribution of most product attributes. Thus, more of a good thing does not necessarily make consumers happier."* (Hsee & Tsai 2007, p 643)

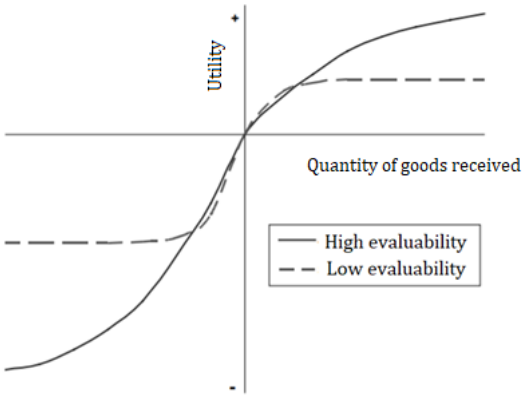


Figure 8: Utility functions of people evaluating attributes with high evaluability (solid line) and attributes with low evaluability (dashed line) (adapted from Hsee & Tsai, 2007)

Although the relationship between evaluability and customer satisfaction has been researched before, this has mostly been the case in the health care (e.g. Hibbard, Slovic, Peters & Finucane, 2002; Hibbard & Peters, 2003) and service quality domains (e.g. Dagger & Sweeney, 2007). However, it also seems relevant for the field of (new and refurbished) smartphones. Since refurbishment is a relatively new phenomenon, it seems plausible that refurbishment would be a difficult-to-evaluate attribute for consumers. Moreover, it seems interesting to investigate whether new and refurbished smartphone buyers differ in the aspects they find easy and hard to evaluate, and whether these aspects have similar or different effects on their satisfaction. This will be done in the current study.

3.2.3 Other factors influencing customer satisfaction

The previous section has made clear that there is a number of concepts associated with customer satisfaction, such as perceived performance, expectations, disconfirmation and evaluability. However, there might also be other factors affecting one's satisfaction. In the current research, socio-demographic factors, such as gender, age, and level of education will be controlled for. This will be done in order to make sure that these factors will not interact in the relationship between one's expectations, perceived performance, disconfirmation, and satisfaction. Next to that, two other factors, duration of ownership and price of the product, were reported to influence one's satisfaction with a product. These will be discussed next.

3.2.2.1 Duration of ownership

Mittal, Kumar and Tsiros (1999) reported that the key drivers of customer satisfaction may vary over time. It was shown that consumers who had just purchased a vehicle considered dealership service to be twice as important as vehicle quality for determining their overall satisfaction with the ownership experience. However, 24 months later, analysis proved that the same customers found vehicle ownership far more important than dealership service (Mittal & Katrichis, 2000). Hence, it is important to keep in mind that the importance of an attribute in determining

satisfaction is not static, but might shift as the consumer owns the product for a longer period of time (Mittal, Katrichis & Kumar, 2001).

3.2.2.2 Price of the product

Many scholars have researched the relationship between price and product evaluation and/or customer satisfaction (e.g. Bei & Chiao, 2001; Raju, 1977; Tse & Wilton, 1988; Jiang & Rosenbloom, 2005). Raju (1977), for instance, found a positive relationship between price and product evaluation. Moreover, it has been reported that consumer (dis)satisfaction is likely to be affected by the price paid (Tse & Wilton, 1988). This was confirmed by Jiang and Rosenbloom (2005), who reported that price perception might have a direct and positive effect on overall customer satisfaction and intention to return.

3.3 Conceptual model of the current research

As indicated in Section 3.2.1, the main components of customer satisfaction are perceived performance, expectations, disconfirmation, evaluability, and satisfaction (Oliver, 1980; Oliver, 2006; Anderson & Sullivan, 1993). These concepts are depicted in the conceptual model (see Figure 9).

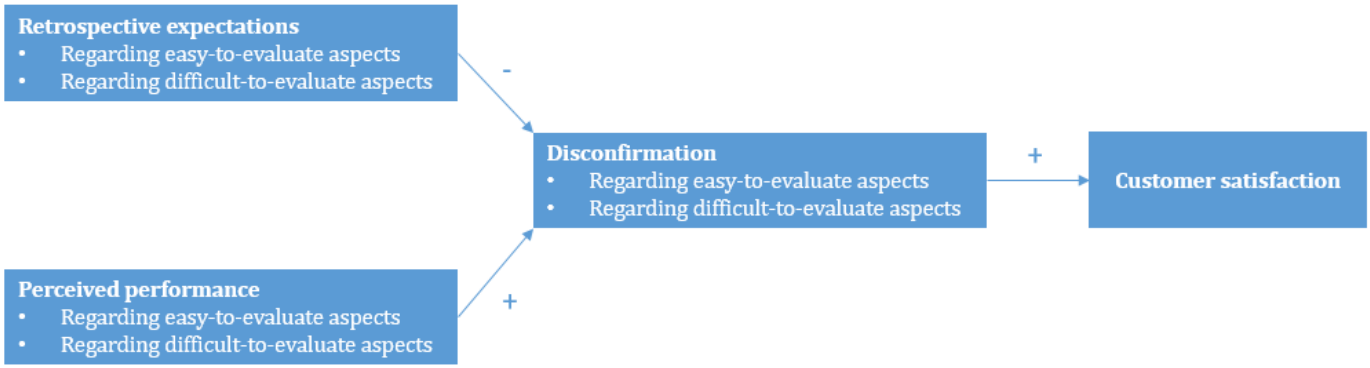


Figure 9: Conceptual model of customer satisfaction of refurbished smartphones

As explained before, disconfirmation is the outcome of a comparison between what a consumer expected and what (s)he received (Oliver, 2006). Hence, it is the gap between (retrospective) expectations and perceived performance. Disconfirmation can be positive, when perceived performance exceeds the expectations, or negative, when perceived performance fails to meet the expectations (Van Ryzin, 2005; Tsiros, 1998).

A negative association is expected between (retrospective) expectations and disconfirmation. If one's expectations increase, it is predicted that disconfirmation will decrease (i.e. become negative), since the gap between expectations and perceived performance will become larger if perceived performance remains the same. An increase in perceived performance, on the other hand, is expected to have a positive effect on disconfirmation. If perceived performance increases, it is more likely that perceived performance exceeds the expectations, and that disconfirmation will be positive. These expectations are reflected in Hypotheses 1 and 2:

Hypothesis 1: retrospective expectations have a negative effect on disconfirmation.

Hypothesis 2: perceived performance has a positive effect on disconfirmation.

Positive disconfirmation has been positively associated with customer satisfaction, and negative disconfirmation with consumer dissatisfaction (Anderson & Sullivan, 1993; Oliver, 1997; Yi, 1990). This is reflected in Hypothesis 3:

Hypothesis 3a: disconfirmation has a positive effect on customer satisfaction.

Concerning evaluability, it was reported that easier-to-evaluate attributes are more important than difficult-to-evaluate attributes for determining customer satisfaction (Auh & Johnson, 2005). This was also confirmed by Hsee and Tsai (2007), who stated than when evaluability is low, people's utility function is rather flat. However, when evaluability is high, people's utility function will become steeper. Therefore, it is expected that disconfirmation regarding easy-to-evaluate aspects will have a stronger effect on customer satisfaction than disconfirmation regarding difficult-to-evaluate aspects.

Hypothesis 3b: disconfirmation regarding easy-to-evaluate aspects has a larger effect on customer satisfaction than disconfirmation regarding difficult-to-evaluate aspects.

Since it is expected that disconfirmation is determined by retrospective expectations and perceived performance, it is hypothesized that evaluability will also affect these items. Hence, it is reasoned that easy-to-evaluate aspects will have a larger influence on retrospective expectations and perceived performance than difficult-to-evaluate aspects.

Hypothesis 4a: retrospective expectations regarding easy-to-evaluate aspects has a stronger effect on disconfirmation than retrospective expectations regarding difficult-to-evaluate aspects.

Hypothesis 4b: perceived performance regarding easy-to-evaluate aspects has a stronger effect on disconfirmation than perceived performance regarding difficult-to-evaluate aspects.

Chapter 4 Methods

4.1 Research methods

To answer the research question *"Which factors determine customer satisfaction of new and refurbished smartphone buyers in the Netherlands?"* a combination of qualitative and quantitative research has been used.

4.1.1 Qualitative research

First of all, qualitative research has been carried out to determine the most important attributes of perceived quality. This has been done by brief surveys. A convenience sample of smartphone buyers has been asked the following question: *"Imagine that you are asked to evaluate a smartphone. Which attributes of the phone are most important to you in evaluating the quality of the phone? Please list these attributes, and afterwards, rate them from 1: most important to* n*: least important."* This question was sent to them by e-mail, in order to facilitate reaching a diverse group of people. The participants were encouraged to fast forward the e-mail to 2-3 others, preferably of varying genders, ages and levels of education.

Afterwards, these interviews were coded and analysed using the program Atlas.ti. The results of the interviews were coded to uncover similarities and categories in the data. The process was performed in several sequential stages of coding, comparing codes, re-coding and grouping codes into attributes (Van Weelden et al., 2016). A "proper level of feature abstraction" was used to try to cover all mentioned attributes (Oliver, 2006).

4.1.2 Quantitative research

Once perceived quality had been operationalized, quantitative research was carried out. Using Qualtrics, a questionnaire (see Appendix II, in Dutch) was sent to refurbished buyers via Green Mobile. An e-mail was sent to customers who had bought a smartphone in the last two years, and who agreed on receiving the Green Mobile newsletter. The clients were encouraged to fill in the survey by raffling three gift Green Mobile vouchers of €10, €20 and €30 amongst the respondents. The same questionnaire was sent to new buyers with the help of the snowball effect. Relatives and friends were asked to spread the survey to people they know, in order to increase the size and representativeness of the sample.

The remainder of this chapter is structured as follows: first, it will be explained how the concepts from the theoretical framework have been operationalized. Afterwards, the set-up of the survey and the quantitative analysis will be explained.

4.1.2.1 Operationalization of the concepts

4.1.2.1.1 Perceived performance

Generally, performance could be defined in two ways: *perceived* or *subjective* product performance, and *objective* product performance (McKinney, Yoon & Zahedi, 2002). Since the expectation-disconfirmation paradigm focuses on customers' subjective judgments of product performance (Oliver, 2006), perceived performance has been used in the current study. This concerns the perceived amount of received outcomes, which is usually expressed on a scale ranging from good to bad levels of performance (Oliver, 2006). To measure consumers'

perceived performance of (refurbished) smartphones, the following question (see Appendix II) was used:

9. At this moment, how would you evaluate the following aspects of your phone? (1: very poor – 7: very good)

The names of the scales were based on Brown (2010). The list of aspects that the respondents had to evaluate, was established using qualitative research, as described in section 4.1.1.

4.1.2.1.2 Retrospective expectations

As explained before, expectation is *"a predisposing prediction – sometimes stated as a probability or likelihood – of attribute or product performance."* (Oliver 2006, p 570) Expectations can be **predicted** (before consumption) or **retrospective** (recalled after consumption), and researchers are advised to measure both (Oliver, 2006). However, predicted expectations could not be used in the current research, since the respondents had already bought a smartphone, and thus had already passed the pre-purchase phase. Therefore, retrospective expectations were used. Oliver (2006) suggests measuring this type of expectations by referring respondents back to the time they purchased the product, and then asking them to describe their expectations of the product. This was also done for the current research in Question 8: *Before you bought your current phone, you might have had expectations about the following aspects of your phone. What were your expectations?* (see Appendix II)

A 7-point semantic differential scale ranging from 1 (I expected [the aspect] to be very poor) to 7 (I expected [the aspect] to be very good) was used. 4 is the neutral midpoint and corresponded to "neither good nor bad." The respondents had to indicate their expectations regarding all ten aspects of their phones (see Appendix II).

4.1.2.1.3 Disconfirmation

In academic literature, there is a debate regarding the measurement of the disconfirmation construct (McKinney, Yoon & Zahedi, 2002). There are two major approaches: *"(i) to compute disconfirmation by subtracting expectation from perceived performance or (ii) to measure disconfirmation directly as an independent construct of the perceived gap."* (McKinney, Yoon & Zahedi 2002, p 300) Various marketing scholars consider disconfirmation to be an independent construct that influences customer satisfaction (e.g. Oliver, 1980), and therefore advocate to use the second approach (McKinney, Yoon & Zahedi, 2002). Therefore, in the current research, this subtractive approach has been used. Based on Oliver (1980), this has been done in Question 11 (see Appendix II): *How have the following aspects of your phone performed in comparison to your expectations?*

A 7-point semantic differential scale ranging from 1 (much worse than you thought) to 7 (much better than you thought) was used. 4 is the neutral midpoint and corresponded to "the same as you expected." Positive disconfirmation is measured by scale values above 4 (>4 to 7), negative disconfirmation by scale values below 4 (0 to <4), and 4 reflects 0 disconfirmation. The ten aspects that the respondents had to evaluate are shown in Appendix II.

4.1.2.1.4 Satisfaction

As recommended by Oliver (2006), the questions regarding satisfaction have been posed at the end of the survey, in order to avoid an effect on the questions about expectations and performance. In order to measure customer satisfaction, Oliver (2006) suggests to ask people whether the object (in this case one's smartphone) has met one's expectations or not, and whether one is content or not with the object. This was done in Questions 14 and 15 (see Appendix II):

14. To what extent has your current phone met your expectations? (1: this phone has not met my expectations at all – 7: this phone has completely exceeded my expectations).

15. To what extent are you content with your phone? (1: I am not at all content with my phone – 7 I am really content with my phone).

In order to create one construct for satisfaction, reliability analysis has been carried out to find out whether Questions 14 and 15 could be merged into a scale.

4.1.2.1.5 Evaluability

In the current research, evaluability is defined as the degree of perceived difficulty in evaluating quality (Anderson & Sullivan, 1993). To measure how easy or difficult it was for respondents to evaluate the ten aspects of their phone, the following question was used:

12. How was evaluating the following aspects of your phone for you? (1: very difficult – 7: very easy)

4.1.2.1.6 Control variables

In order to make sure that socio-demographic variables would not influence the relationship between disconfirmation and customer satisfaction, respondents were asked to fill in their gender, year of birth, and highest level of educational attainment. This enabled correcting for age, gender and educational attainment.

For educational attainment, a distinction has been made between a low, middle and high level of education based on CBS (2017):

- *Low level of education*: basic education and lbo/vmbo.
- *Middle level of education*: havo, vwo, mbo, and mavo.
- *High level of education*: hbo and wo.

Moreover, in order to be able to control for the price of one's phone, Question 5 was posed:

5. What was the (refurbished) price of your current phone at the moment of purchase? (€0-300; €301-600; more than €600)

Next to that, to be able to control for the duration of ownership, respondents were asked to fill in Question 1:

1. When did you buy your current phone? (less than six months ago; 6-12 months ago; more than 12 months ago)

4.1.2.2 Set-up of the survey

The questionnaire consisted mainly of questions based on a 7-point Likert scale, as suggested by Oliver (2006). Malhotra (2006) advises to use between five to nine scale points, and states that the number of scale categories should be large enough to have a fine discrimination between the answer options, but should not become too extensive because this will confuse respondents. Therefore, a 7-point Likert scale seemed appropriate for this research. The complete survey is shown in Appendix II.

4.2 Analysis

The data have been analysed using SPSS Statistics 23. First of all, the data from the two different questionnaires were merged. The variable "Questionnaire ID" was added for all respondents, with two options: 1 for respondents who filled in the refurbished buyers questionnaire, and 2 for respondents who answered the new buyers questionnaire.

Malhotra (2006) advises to use a consistent scoring procedure, such that high scores always reflect a favourable response. Therefore, two variables related to price (Q7 and Q9) were recoded. These variables have been negatively coded, i.e. a high value represents a high price, which is different from the other, positively coded variables.

Afterwards, a frequency table was created to check which aspects were considered to be difficult and easy to evaluate. For both refurbished and new buyers, "warranty", "durability" and "service" turned out to be the three most difficult-to-evaluate aspects. The remaining items, i.e. "features of the phone," "battery," "capacity," "availability," "design," and "price" turned out to be "easy to evaluate." It was decided to exclude "refurbishment" from these analyses, since it was reasoned that new buyers would not be able to evaluate this aspect, which was confirmed by the large number of non-responses for the questions regarding refurbishment. To test whether the easy-to-evaluate aspects differed significantly from the difficult-to-evaluate aspects, a paired samples t-test was executed.

Then, scores for people's retrospective expectations, perceived performance, disconfirmation, and evaluability were calculated for both the "easy-to-evaluate" as well as the "difficult-to-evaluate" aspects. This was done by creating new variables in the following way:

- To calculate the score for expectations regarding the easy-to-evaluate aspects:
  ExpEasy = mean (Q7_1 + Q8_1 + Q8_2 + Q8_3 + Q8_4 + Q8_8)
- To calculate the score for expectations regarding the difficult-to-evaluate aspects:
  ExpDifficult = mean (Q8_5 + Q8_6 + Q8_7)
- To calculate the score for perceived performance regarding the easy-to-evaluate aspects:
  PercperfEasy = mean (Q9_1 + Q10_1 + Q10_2 + Q10_3 + Q10_4 + Q10_8)
- To calculate the score for perceived performance regarding the difficult-to-evaluate aspects:
  PercperfDifficult = mean (Q10_5 + Q10_6 + Q10_7)

- To calculate the score for disconfirmation regarding the easy-to-evaluate aspects: *DisconEasy = mean (Q11_1 + Q11_2 + Q11_3 + Q11_4 + Q11_5 + Q11_9)*
- To calculate the score for disconfirmation regarding the difficult-to-evaluate aspects: *DisconDifficult = mean (Q11_6 + Q11_7 + Q11_8)*
- To calculate the score for evaluability regarding the easy-to-evaluate aspects: *EvaluabilityEasy = mean (Q12_1 + Q12_2 + Q12_3 + Q12_4 + Q12_5 + Q12_9)*
- To calculate the score for evaluability regarding the difficult-to-evaluate aspects: *EvaluabilityDifficult = mean (Q12_6 + Q12_7 + Q12_8)*

Next, a reliability analysis was carried out to find out whether the questions regarding customer satisfaction (Q14 and Q15) could be merged into one factor. Cronbach's alpha has been computed, and a scale with a score above 0.7 was retained, since this is the cut-off value for being "acceptable" (Santos, 1999).

Once the variables had been computed, multiple linear regression analyses were carried out. To test hypothesis 1 and 2, Equation 1 was used:

Equation 1: $$Disconfirmation_i = b_0 + b_1 \sum_e RE_e + b_2 \sum_d RE_d + b_3 \sum_e PP_e + b_4 \sum_d PP_d + \varepsilon_i$$

RE_e = retrospective expectations about the easy-to-evaluate aspects
RE_d = retrospective expectations about the difficult-to-evaluate aspects
PP_e = perceived performance of the easy-to-evaluate aspects
PP_d = perceived performance of the difficult-to-evaluate aspects
ε_i = model error/the difference between the predicted and observed value for the *i*th respondent

To test hypothesis 3a, Equation 2 was used:

Equation 2: $$Customer\ satisfaction_i = b_0 + b_1 \sum_t DI_t + \varepsilon_i$$

DI_t = disconfirmation concerning both easy and difficult-to-evaluate aspects
ε_i = model error/the difference between the predicted and observed value for the *i*th respondent

Equation 2 can also be rewritten into Equation 3 below, which was used to investigate hypothesis 3b:

Equation 3: $$Customer\ satisfaction_i = b_0 + b_1 \sum_e DI_e + b_2 \sum_d DI_d + \varepsilon_i$$

DI_e = disconfirmation concerning the easy-to-evaluate aspects
DI_d = disconfirmation concerning the difficult-to-evaluate aspects
ε_i = model error/the difference between the predicted and observed value for the *i*th respondent

All analyses have been controlled for gender, age, highest level of educational attainment, price of the smartphone, duration of ownership and type of phone (i.e. refurbished or new).

Finally, to test whether the refurbished and new buyers differed in terms of socio-demographics, a probit analysis was performed using Equation 4. Note that the age-group <20

years old, female gender and low level of education were chosen as reference groups, and therefore they were not included.

Equation 4: $$\text{QuestionnaireID} = b_0 + b_1 * A_{21-30} + b_2 * A_{31-40} + b_3 * A_{41-50} + b_4 * A_{51-60} + b_5 * A_{61-70} + b_6 * A_{70+} + b_7 * G_M + b_8 * E_M + b_9 * E_H$$

QuestionnaireID: new buyers (0) and refurbished buyers (1)
$A_{21\text{-}30}$: age group 21-30 years old
$A_{31\text{-}40}$: age group 31-40 years old
$A_{41\text{-}50}$: age group 41-50 years old
$A_{51\text{-}60}$: age group 51-60 years old
$A_{61\text{-}70}$: age group 61-70 years old
A_{70+}: age group 70+
G_M: male gender
E_M: middle level of education
E_H: high level of education

Chapter 5 Results

5.1 Qualitative research

The brief qualitative research resulted in ten answers from a diverse group of smartphone buyers. Ten respondents turned out to be enough to reach saturation, since no new answers were given anymore. Amongst the respondents were five males and five females, varying in age between 23 years old and 62 years old.

Their answers were coded using Atlas.ti, to be able to combine similar answers in the same construct. The nine most mentioned answers were retained, which resulted in the following list of aspects:

- *Price*: the price paid for the smartphone, either the new or refurbished price.
- *Features of the phone*: for instance, the camera of the phone, whether the phone is water resistant or not, and other functionalities.
- *Battery*: the quality of the phone's battery.
- *Storage capacity*: the phone's amount of storage capacity.
- *Availability*: the ease of purchasing the phone.
- *Service*: the service that came with the phone, e.g. contact with the supplier and ease of repair.
- *Warranty*: the warranty that came with the phone.
- *Durability*: the phone's lifetime.
- *Design/appearance of the phone*: how the phone looked, including its size.

Hence, this resulted in a list of aspects on which smartphones were being evaluated. Lastly, although no participant mentioned the aspect "refurbishment," this was added to the list. The reason for this being that, for the current study, it was of interest whether refurbishment would be an easy or difficult-to-evaluate aspect. Hence, a list of ten smartphones aspects was retained, which was used for the new and refurbished buyers survey. It was chosen to focus on ten aspects and not more, since this might have been too exhausting for respondents of the new and refurbished buyer surveys. Too few aspects, on the other hand, would not have been able to represent all aspects on which smartphones are being evaluated.

5.2 Quantitative research

5.2.1 Participants

In total, 116 people filled in the refurbished buyers survey, whereas the new buyers survey got 159 responses. After deleting partial responses, a total of 224 respondents was left. To make sure the refurbished buyer respondents only included refurbished buyers, and the new buyers group only comprised new smartphone buyers, a frequency table was made for Question 4: *What type of phone did you buy? (a new phone, a refurbished phone, or a second-hand phone)*

Table 1: Type of phone owned by the respondents of the refurbished buyer and new buyer surveys

	N	Percent
Refurbished buyer survey (total)	**94**	**100**
New phone	4	4.3
Refurbished phone	90	95.7
New buyer survey (total)	**130**	**100**
New phone	115	88.5
Refurbished phone	3	2.3
Second-hand phone	10	7.7
I don't know	2	1.5

Hence, the four new smartphone owners who answered the refurbished buyers survey were deleted, as well as the 15 respondents who filled in the new buyers survey, but did not own a new smartphone. Therefore, in total, 205 respondents were retained. For every respondent, a variable named "Questionnaire ID" was added, with 0 representing respondents who filled in the new survey, and 1 representing respondents who filled in the refurbished survey. Then, the respondents of the two questionnaires were merged into one data file.

Table 2: Demographics of the sample

	Refurbished buyers		**New buyers**	
	N	Percent	N	Percent
Gender				
Male	49	54.4	59	51.3
Female	41	45.6	56	48.7
Total	**90**	**100**	**115**	**100**
Highest level of educational attainment				
Primary education (basic education)	2	2.2	0	0
Lower general secondary education (lbo/vmbo)	3	3.3	0	0
Lower general secondary education (mavo)	7	7.8	1	0.9
Intermediate vocational education (mbo)	22	24.4	11	9.6
Higher general secondary education (havo)	9	10	15	13
A-level/pre-university education (vwo)	1	1.1	4	3.5
Higher vocational education (hbo)	27	30	42	36.5
University (wo)	15	16.7	42	36.5
No answer	4	4.4	0	0
Total	**90**	**100**	**115**	**100**
Age				
Until 20 years old	7	7.8	2	1.7
21-30 years old	6	6.7	49	42.6
31-40 years old	5	5.6	12	10.4
41-50 years old	19	21.1	15	13
51-60 years old	14	15.6	18	15.7
61-70 years old	11	12.2	18	15.7
71 and older	5	5.6	0	0
No answer	23	25.6	1	0.9
Total	**90**	**100**	**115**	**100**

As shown in Table 2, the men-women ratio in both groups was almost 50-50, although slightly more men than women filled in the surveys. The average age of the refurbished buyers was 47.7 years (SD = 16.92), and the average age of the new buyers was 39.39 years (SD = 16.33).

To test whether the refurbished and new buyers differed in terms of socio-demographics, a probit analysis was performed to test Equation 4 (the age-group <20 years old, female gender and low level of education were chosen as reference groups, and are therefore not included):

Equation 5: $$\text{QuestionnaireID} = b_0 + b_1 * A_{21-30} + b_2 * A_{31-40} + b_3 * A_{41-50} + b_4 * A_{51-60} + b_5 * A_{61-70} + b_6 * A_{70+} + b_7 * G_M + b_8 * E_M + b_9 * E_H$$

QuestionnaireID: new buyers (0) and refurbished buyers (1)
$A_{21\text{-}30}$: age group 21-30 years old
$A_{31\text{-}40}$: age group 31-40 years old
$A_{41\text{-}50}$: age group 41-50 years old
$A_{51\text{-}60}$: age group 51-60 years old
$A_{61\text{-}70}$: age group 61-70 years old
A_{70+}: age group 70+
G_M: male gender
E_M: middle level of education
E_H: high level of education

The insignificant chi-square (see Table 3) indicated that the model did not adequately predict the dependent variable QuestionnaireID (χ^2 (195) = 198.85, p = .41), despite the fact that all age groups bought less refurbished phones than those under 20 years of age.

Table 3: Parameter estimates for the dependent variable QuestionnaireID

	Estimate	***SE***	**Z**
Male gender	0.06	0.21	0.27
Age group 21till30 years old	-2.41	0.40	-6.03***
Age group 31till40 years old	-1.71	0.46	-3.70***
Age group 41till50 years old	-1.07	0.39	-2.75***
Age group 51till60 years old	-1.41	0.39	-3.58***
Age group 61till70 years old	-1.56	0.41	-3.80***
Age group 70 and older	1.34	2.43	0.55
Mid level of education	-2.11	1.88	-1.12
High level of education	-2.40	1.88	-1.28
Intercept	3.45	1.90	1.81

*$p < .05$
**$p < .01$
***$p < .001$

Table 3 shows that the age groups 21-30, 31-40, 41-50, 51-60, 61-70 and 70+ years old were the only significant predictors of QuestionnaireID. Concerning the variable "QuestionnaireID", a 0 represented new buyers and a 1 refurbished buyers. Since the significant

parameters are negative, people in the before mentioned age groups were less likely to buy a refurbished phone than the youngest age group.

5.2.2 Measures

5.2.2.1 Evaluability of easy and difficult-to-evaluate aspects

To test whether the difficult-to-evaluate aspects (warranty, durability and service) differed significantly from the easy-to-evaluate aspects (features of the phone, battery, capacity, availability, design, and price) in terms of evaluability, a paired samples t-test was performed. There was a significant difference in the scores for easy-to-evaluate aspects (M = 5.25, SD = 0.95) and difficult-to-evaluate aspects (M = 4.64, SD = 1.42); t(195) = 6.83, p = 0.00. Hence, it can be stated that the easy-to-evaluate aspects differed significantly from the difficult-to-evaluate aspects.

5.2.2.2 Scale for customer satisfaction

Reliability analysis was conducted to find out whether Q14 and Q15 could be merged into a scale to measure customer satisfaction. Cronbach's α of the two items was .76, indicating high reliability and therefore it was decided to use this scale for further analyses. The variable customer satisfaction was computed by taking the mean of Q14 and 15.

5.2.3 Hypothesis testing

5.2.3.1 Retrospective expectations and disconfirmation

Hypothesis 1 was formulated as follows: *retrospective expectations have a negative effect on disconfirmation.* To test this hypothesis, a linear regression was executed using Equation 1:

Equation 6: $$Disconfirmation_i = b_0 + b_1 \sum_e RE_e + b_2 \sum_d RE_d + b_3 \sum_e PP_e + b_4 \sum_d PP_d + \varepsilon_i$$

RE_e = retrospective expectations about the easy-to-evaluate aspects
RE_d = retrospective expectations about the difficult-to-evaluate aspects
PP_e = perceived performance of the easy-to-evaluate aspects
PP_d = perceived performance of the difficult-to-evaluate aspects
ε_i = model error/the difference between the predicted and observed value for the *i*th respondent

Multiple linear regression showed that the model explained 35.3% of the variance (R^2 = .353, F (14, 190) = 7.41, p < .001). As shown in Table 4 below, both retrospective expectations regarding easy-to-evaluate attributes (β = -.06, p = .39) as well as retrospective expectations regarding difficult-to-evaluate attributes (β = -.10, p = .18) had a negative effect on disconfirmation. However, both were not significant. Therefore, hypothesis 1 could not be confirmed.

Table 4: Multiple linear regression for the dependent variable disconfirmation

	B	***SE B***	**B**
Constant	1.73	.71	
Refurbished phone (vs new phone)	.03	.13	.02
$RetrospectiveExpectations_{easy}$	-.09	.11	-.06
$RetrospectiveExpectations_{difficult}$	-.11	.08	-.10
$PerceivedPerformance_{easy}$	.32	.10	.27***
$PerceivedPerformance_{difficult}$	.33	.07	.38***
<6 months duration of ownership (vs 12+ months of ownership)	-.20	.13	-.11
6-12 months of ownership (vs 12+ months of ownership)	-.20	.14	-.11
Male (vs female)	.14	.10	.09
Low level of education	.96	.49	.18
Mid level of education	.08	.38	.05
High level of education	.01	.38	.01
Middle price of phone (vs low price)	-.09	.12	-.05
High price of phone (vs low price)	.02	.15	.01
Age	.00	.00	.01

*$p < .05$
**$p < .01$
***$p < .001$

5.2.3.2 Perceived performance and disconfirmation

Hypothesis 2 stated that perceived performance has a positive effect on disconfirmation. Again, Equation 1 was used to test this hypothesis. Table 4 shows the results. Both perceived performance regarding easy-to-evaluate aspects ($\beta = .27$, $p < .001$) as well as perceived performance regarding difficult-to-evaluate aspects ($\beta = .38$, $p < .001$) turned out to have a positive and significant effect on disconfirmation. Hence, Hypothesis 2 was accepted.

5.2.3.3 Evaluability and disconfirmation

Hypothesis 4a and 4b were formulated as follows:

- *Hypothesis 4a: retrospective expectations regarding easy-to-evaluate aspects has a stronger effect on disconfirmation than retrospective expectations regarding difficult-to-evaluate aspects.*
- *Hypothesis 4b: perceived performance regarding easy-to-evaluate aspects has a stronger effect on disconfirmation than perceived performance regarding difficult-to-evaluate aspects.*

As shown in Table 4, retrospective expectations regarding difficult-to-evaluate aspects had a larger effect on disconfirmation ($\beta = -.10$, $p = .18$) than retrospective expectations regarding easy-to-evaluate aspects ($\beta = -.06$, $p = .39$). However, neither of the predictors was significant. Therefore, Hypothesis 4a was not confirmed.

Also for the perceived performance predictors, perceived performance regarding difficult-to-evaluate aspects ($\beta = .38$, $p < .001$) had a larger effect on disconfirmation than perceived performance regarding easy-to-evaluate aspects ($\beta = .27$, $p < .001$). Both predictors were significant. Therefore, another multiple linear regression was performed to test whether

the effect of perceived performance regarding difficult-to-evaluate aspects on disconfirmation differed significantly from the effect of perceived performance regarding easy-to-evaluate aspects on disconfirmation. It was assumed that the effects of the two attribute types were equal (see Verbeek, 2005, p.26). The variable "z" was added to Equation 1, which was computed as follows: $z = PP_e + PP_d$. This resulted in Equation 1.1, based on which a multiple linear regression was run:

Equation 7.1: $$Disconfirmation_i = b_0 + b_1 \sum_e RE_e + b_2 \sum_d RE_d + b_3 \sum_e PP_e + b_4 * z + \varepsilon_i$$

RE_e = retrospective expectations about the easy-to-evaluate aspects
RE_d = retrospective expectations about the difficult-to-evaluate aspects
PP_e = perceived performance of the easy-to-evaluate aspects
PP_d = perceived performance of the difficult-to-evaluate aspects
$z = PP_e + PP_d$
ε_i = model error/the difference between the predicted and observed value for the *i*th respondent

Again, there has been controlled for gender, age, highest level of educational attainment, price of the smartphone, duration of ownership and type of phone (i.e. refurbished or new).

The results of the multiple linear regression indicated that the model explained 35.5% of the variance ($R^2 = .35$, $F(14, 190) = 7.42$, $p < .001$). Significance of the coefficient for PP_e in this regression indicates significant difference in the effects of the two attribute types. However, this was not the case ($\beta = -.01$, $p = .95$). Hence, it could not be confirmed that the effect of perceived performance regarding the easy-to-evaluate aspects on disconfirmation differed significantly from the effect of perceived performance regarding the difficult-to-evaluate aspects. Therefore, Hypothesis 3b could not be confirmed.

5.2.3.4 Disconfirmation and customer satisfaction

Hypothesis 3a was dedicated to the effect of disconfirmation on customer satisfaction: *disconfirmation has a positive effect on customer satisfaction*. To test hypothesis 3a, Equation 2 was used:

Equation 8: $$Customer\ satisfaction_i = b_0 + b_1 \sum_t DI_t + \varepsilon_i$$

DI_t = disconfirmation concerning both easy and difficult-to-evaluate aspects
ε_i = model error/the difference between the predicted and observed value for the *i*th respondent

The results of the multiple linear regression showed that the model explained 55% of the variance ($R^2 = .55$, $F(11, 193) = 21.47$, $p < .001$). Table 5 shows that disconfirmation is a positive and significant predictor of customer satisfaction ($\beta = .71$, $p < .001$), confirming Hypothesis 3a. Moreover, short-duration (<6 months; $\beta = .20$, $p < .001$) and mid-duration of ownership (6-12 months; $\beta = .17$, $p < .001$) were also positive, significant predictors of customer satisfaction. The reference variable was long duration of ownership (>12 months), indicating that a short-duration or mid-duration of ownership was associated with a higher level of customer satisfaction than long duration of ownership.

Next to that, male gender turned out to be another significant predictor of customer satisfaction (β = -.12, p < .05). Hence, this indicated that being a male was associated with a lower level of customer satisfaction than being female. Finally, "middle price of phone" (€300-600) was found to have a positive, significant effect on customer satisfaction (β = .16, p < .01). Compared to "low price of phone" (<€300), having a mid-priced phone was associated with a higher level of customer satisfaction.

Table 5: Multiple linear regression for the dependent variable customer satisfaction

	B	***SE B***	**β**
Constant	1.34	.44	
Disconfirmation	.78	.05	.71***
Refurbished phone (vs new phone)	-.20	.11	-.11
<6 months duration of ownership (vs 12+ months of ownership)	.39	.12	.20***
6-12 months of ownership (vs 12+ months of ownership)	.35	.12	.17**
Male (vs female)	-.22	.09	-.12*
Low level of education	-.12	.44	-.02
Mid level of education	.41	.34	.21
High level of education	.36	.34	.19
Middle price of phone (vs low price)	.31	.11	.16**
High price of phone (vs low price)	.16	.13	.07
Age	.00	.00	-.02

*$p < .05$
**$p < .01$
***$p < .001$

5.2.3.5 Evaluability and customer satisfaction

In the previous paragraph it was reported that disconfirmation is a significant predictor of customer satisfaction. However, is there a difference between disconfirmation regarding easy-to-evaluate aspects and disconfirmation regarding difficult-to-evaluate aspects? This was reflected in Hypothesis (3b): *disconfirmation regarding easy-to-evaluate aspects has a larger effect on customer satisfaction than disconfirmation regarding difficult-to-evaluate aspects.* In order to investigate this issue, Equation 3 was used:

Equation 9: $$Customer\ satisfaction_i = b_0 + b_1 \sum_e DI_e + b_2 \sum_d DI_d + \varepsilon_i$$

DI_e = disconfirmation concerning the easy-to-evaluate aspects
DI_d = disconfirmation concerning the difficult-to-evaluate aspects
ε_i = model error/the difference between the predicted and observed value for the *i*th respondent

The results of the multiple linear regression showed that the model explained 57.2% of the variance (R^2 = .57, F (12, 192) = 21.34, p < .001), which was slightly more than the previous model using "total disconfirmation." As shown in Table 6, both disconfirmation concerning the easy-to-evaluate aspects (β = .50, p < .001) as well as disconfirmation concerning the difficult-to-evaluate aspects (β = .30, p < .001) were highly significant predictors of customer satisfaction. Moreover, disconfirmation concerning the easy-to-evaluate aspects was shown to have a larger effect on customer satisfaction than disconfirmation concerning the difficult-to-evaluate aspects.

Table 6: Multiple linear regression for the dependent variable customer satisfaction

	B	***SE B***	**β**
Constant	.61	.43	
$Disconfirmation_{easy}$	.56	.07	.50***
$Disconfirmation_{difficult}$	.28	.06	.30***
Refurbished phone (vs new phone)	-.16	.11	-.09
Males (vs females)	.20	.09	.11*
<6 months duration of ownership (vs 12+ months of ownership)	.33	.11	.17**
6-12 months of ownership (vs 12+ months of ownership)	.30	.12	.15*
Low level of education	-.11	.43	-.02
Mid level of education	.42	.33	.22
High level of education	.42	.33	.23
Middle price of phone (vs low price)	.27	.11	.14*
High price of phone (vs low price)	.15	.13	.07

*$p < .05$
**$p < .01$
***$p < .001$

To test whether disconfirmation concerning the easy-to-evaluate aspects differed significantly from disconfirmation concerning the difficult-to-evaluate aspects, another multiple linear regression was executed, assuming that the effects of the two attribute types were equal (see Verbeek, 2005, p.26). The variable "z" added, which was computed as follows: $z = DI_e + DI_d$. Then, a multiple linear regression was run using Equation 3.1:

Equation 3.1: $$Customer\ satisfaction_i = b_0 + b_1 \sum_e DI_e + b_2 * z + \varepsilon_i$$

$z = DI_e + DI_d$
DI_e = disconfirmation concerning the easy-to-evaluate aspects
ε_i = model error/the difference between the predicted and observed value for the *i*th respondent

Again, there has been controlled for gender, age, highest level of educational attainment, price of the smartphone, duration of ownership and type of phone (i.e. refurbished or new).

The results of the multiple linear regression indicated that the model explained 57.5% of the variance ($R^2 = .58$, $F(12, 192) = 21.64$, $p < .001$). Significance of the coefficient for DI_e in this regression indicates significant difference in the effects of the two attribute types. Disconfirmation concerning the easy-to-evaluate aspects turned out to be a significant predictor of consumer satisfaction ($\beta = .29$, $p < .01$), thereby confirming that the effect of disconfirmation concerning the easy-to-evaluate aspects on customer satisfaction differed significantly from the effect of disconfirmation concerning the difficult-to-evaluate aspects. Therefore, Hypothesis 3b was accepted.

5.2.3.6 Difference in customer satisfaction of new and refurbished buyers

Sections 5.2.3.4 and 5.2.3.5 showed that the type of phone (refurbished versus new) was not a significant predictor of customer satisfaction. However, to confirm that new and refurbished buyers did not differ with regard to their level of customer satisfaction, a one-way ANOVA with

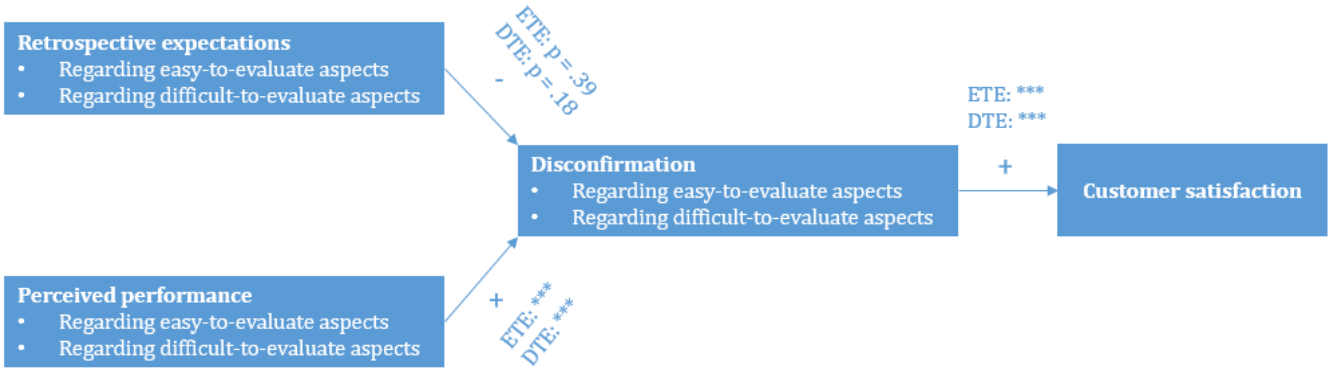
"QuestionnaireID" (i.e. refurbished or new phone buyers) as independent variable and the level of customer satisfaction as dependent variable was executed.

The one-way ANOVA showed that there was no significant difference between groups (F (1, 203) = .986, p = .322), suggesting that new and refurbished buyers did not differ significantly with regard to their level of customer satisfaction. Table 7 shows that the average satisfaction score of both refurbished and new buyers was around 5 (measured on a 7-point scale, with 7 corresponding to the maximum level of customer satisfaction).

Table 7: Descriptives regarding customer satisfaction of the two groups

	N	Mean	Std. dev.	Std. error
New buyers	115	5.08	0.78	0.07
Refurbished buyers	90	4.96	1.05	0.11
Total	**205**	**5.03**	**0.91**	**0.06**

5.2.4 Overview of hypotheses



*p < .05
**p < .01
***p < .001

Figure 10: Schematic overview of the main hypotheses (ETE: easy-to-evaluate aspects; DTE: difficult-to-evaluate aspects)

Figure 10 visually depicts the main hypotheses. In sum, Hypothesis 1 (*retrospective expectations have a negative effect on disconfirmation*) could not be confirmed. Both retrospective expectations regarding easy-to-evaluate attributes (β = -.06, p = .39) as well as retrospective expectations regarding difficult-to-evaluate attributes (β = -.10, p = .18) had a negative effect on disconfirmation, but both were not significant.

Hypothesis 2 (*perceived performance has a positive effect on disconfirmation*) could be accepted, since perceived performance regarding easy-to-evaluate aspects (β = .27, p < .001) and perceived performance regarding difficult-to-evaluate aspects (β = .38, p < .001) turned out to have a positive and significant effect on disconfirmation. Moreover, also Hypothesis 3a (*disconfirmation has a positive effect on customer satisfaction*) could be accepted, since

disconfirmation was shown to be a positive and significant predictor of customer satisfaction (β = .71, p < .001).

Regarding evaluability, disconfirmation concerning the easy-to-evaluate aspects (β = .50, p < .001) had indeed a larger effect on customer satisfaction than disconfirmation concerning the difficult-to-evaluate aspects (β = .30, p < .001). This difference was significant (p < .001), confirming Hypothesis 3b (*disconfirmation regarding easy-to-evaluate aspects has a larger effect on customer satisfaction than disconfirmation regarding difficult-to-evaluate aspects*).

Hypothesis 4a was formulated as follows: *retrospective expectations regarding easy-to-evaluate aspects has a stronger effect on disconfirmation than retrospective expectations regarding difficult-to-evaluate aspects.* Retrospective expectations regarding difficult-to-evaluate aspects has a larger effect on disconfirmation (β = -.10, p = .18) than retrospective expectations regarding easy-to-evaluate aspects (β = -.06, p = .39). However, neither of the predictors was significant, and thus Hypothesis 4a could not be confirmed.

Finally, Hypothesis 4b (*perceived performance regarding easy-to-evaluate aspects has a stronger effect on disconfirmation than perceived performance regarding difficult-to-evaluate aspects*) could not be confirmed. It was found that the perceived performance regarding difficult-to-evaluate aspects (β = .38, p < .001) had a larger effect on disconfirmation than perceived performance regarding easy-to-evaluate aspects (β = .27, p < .001). However, this difference was not significant (p = .95).

Chapter 6 Discussion

The main aim of the current research was to investigate which factors determine customer satisfaction of new and refurbished smartphone buyers in the Netherlands. The post-purchase product evaluations of these consumers were researched to find out which factors contribute to their satisfaction, and which role evaluability plays in this. It was researched whether smartphone attributes with low evaluability (i.e. difficult-to-evaluate aspects) had a different effect on customer satisfaction than attributes with high evaluability (i.e. easy-to-evaluate aspects), and whether new and refurbished buyers differed with regard to their level of satisfaction. To investigate these issues, the following research question has been used:

Which factors determine customer satisfaction of new and refurbished smartphone buyers in the Netherlands?

To research whether evaluability influences customer satisfaction, qualitative research was performed to find out the aspects on which smartphones are being evaluated. Nine aspects were identified: price, features of the phone, battery, storage capacity, availability, service, warranty, durability, design/appearance of the phone. "Refurbishment" was added to this list, because for the aim of this research it was essential to investigate how consumers evaluate this aspect. A paired t-test showed that the smartphone aspects differed in terms of evaluability. Warranty, durability and service were considered to be "difficult to evaluate" aspects, whereas features of the phone, battery, capacity, availability, design, and price turned out to be "easy to evaluate". These aspects were grouped into two separate constructs, i.e. easy-to-evaluate aspects and difficult-to-evaluate aspects, for further analysis.

Based on this list of aspects, a survey was created in which (amongst other things) consumers were asked to evaluate these aspects, and to indicate how easy or difficult this evaluation was for them. Together, these questions could be used to answer the research question. The survey was filled in by 116 refurbished buyers and 159 new buyers.

Multiple linear regression analysis in SPSS showed that disconfirmation had a positive and significant effect on customer satisfaction, which was in accordance with earlier research (e.g. Oliver 1980; Oliver, 2006; Yi, 1990). Concerning evaluability, it was reported that when quality is easy to evaluate, disconfirmation is more likely to occur (Anderson & Sullivan, 1993). In terms of customer satisfaction, Auh and Johnson (2005) and Hsee and Tsai (2007) reported that easier-to-evaluate attributes would be more important than difficult-to-evaluate attributes for determining customer satisfaction. Therefore, it was expected that disconfirmation concerning the easy-to-evaluate aspects would have a larger effect on customer satisfaction than disconfirmation concerning the difficult-to-evaluate aspects. Disconfirmation concerning the easy-to-evaluate aspects indeed differed significantly from disconfirmation concerning the difficult-to-evaluate aspects.

Disconfirmation, in turn, was expected to be determined by retrospective expectations and perceived performance (e.g. Oliver, 1980; Anderson & Sullivan, 1993). Disconfirmation was found to be positively influenced by perceived performance, but it could not be confirmed that

retrospective expectations had a negative effect on disconfirmation. Regarding evaluability, the perceived performance of difficult-to-evaluate aspects was shown to have a larger effect on disconfirmation than perceived performance of the easy-to-evaluate aspects, but this difference was not significant. For retrospective expectations, again retrospective expectations regarding the difficult-to-evaluate aspects turned out to have a larger effect on disconfirmation than retrospective expectations regarding the easy-to-evaluate aspects. However, neither of these predictors was significant.

Hence, the results show that for customer satisfaction, aspects with high evaluability had a larger effect than the ones with low evaluability. For disconfirmation, on the other hand, aspects with low evaluability had a larger effect than aspects with high evaluability, although the difference between these concepts was not significant. Hence, this seems to indicate that when consumers are (unconsciously) comparing the performance of a smartphone with their expectations, the performance of difficult to evaluate items has a more prominent position in this comparison process than the easy-to-evaluate aspects. This will result in a form of disconfirmation, either positive or negative. However, for customer satisfaction, disconfirmation concerning the aspects with high evaluability was shown to have a larger effect than disconfirmation regarding the aspects with low evaluability. Although the difficult-to-evaluate aspects have a larger influence in the disconfirmation formation, this apparently changes in the determination of customer satisfaction. It might be the case that the aspects with high evaluability are more prominent in respondents' customer satisfaction formation, because they are easier to evaluate, and therefore they might score better than the aspects with low evaluability. Moreover, when comparing the characteristics of the difficult-to-evaluate aspects (warranty, durability, and service) with the easy-to-evaluate aspects (features of the phone, battery, capacity, availability, design, and price) it seems plausible that the difficult-to-evaluate aspects matter less for people's satisfaction with their phones. The respondents were asked to indicate how satisfied they were, in general, with their current phones. When asking that at a specific point in time, people probably evaluate how pleased they are at that moment with their phones. The aspects with low evaluability might be less important for people's "daily contentment," since the respondents probably do not often encounter the warranty, durability and service provided with their phones. The design, battery life and features of the phone, on the other hand, probably have more effect on respondents' daily encounters with their phone. Therefore, more significance might be attached to the disconfirmation of these easy-to-evaluate aspects, resulting in a larger effect on customer satisfaction.

Additional interesting findings concern the other significant predictors of customer satisfaction. A short- or mid-duration of ownership was found to be associated with a higher level of customer satisfaction than long duration of ownership. This indicates that consumers who have owned their phone for a longer period of time (>2 years), are (on average) less satisfied than consumers who have bought their phones less than two years ago. A reason for this might be that after two years, the quality of a smartphone might start to decline. It could also be a matter of comparison: maybe the phone itself still functions properly, but in comparison to new devices on the market, it might have lower performance. This links to the joint- versus single mode of evaluation of Hsee (1996), who reported that an object will be

evaluated differently when it is considered in isolation compared to when it is being evaluated jointly. Hence, an interesting topic for further research would be to find out what the effect of mode of evaluation (i.e. single versus joint evaluation) is on customer satisfaction in the context of refurbished smartphones.

Moreover, being a male was associated with a lower level of customer satisfaction than being female. Apparently, males in this study were on average less satisfied with their phones than females. It could the case that men have (on average) higher expectations of their smartphones than women, but further research is needed to confirm this. Finally, compared to "low price of phone" (<€300), having a mid-priced phone (€300-600) was associated with a higher level of customer satisfaction. The perceived performance of the mid-priced phones might have been higher than the perceived performance of the low-priced phones, and it might be the case that therefore, buyers of mid-priced phones were with a higher level of customer satisfaction than buyers of low-priced phones. Moreover, it is interesting that having a high-priced phone (>€600) was not a significant predictor of customer satisfaction. This might be due to raised expectations. Buyers of high priced phones might have higher expectations of their devices than buyers of mid- and low-prices phones. Therefore, for buyers of high priced phones, it might be more difficult to meet these expectations, resulting in lower levels of customer satisfaction.

Finally, it was tested whether new and refurbished buyers differ in terms of their level of customer satisfaction. Using ANOVA, it was shown that this was not the case. This is a really interesting finding, because it points out that new and refurbished smartphones buyers do not differ significantly in their levels of customer satisfaction. Both groups had an average satisfaction score of around 5 (expressed on a 7-point scale). The comparable level of customer satisfaction is good news for the refurbished smartphone market. As explained before, customer satisfaction has been described to be of vital importance for the survival of organizations. The reason for this being that high customer satisfaction is associated with many benefits for a firm, such as increased consumer loyalty, lower costs of future transactions, reduced price elasticities and a better firm reputation (Chan et al., 2003). In addition, having loyal customers is assumed to create steady future cash flows, and requires less costs than attracting new customers. Moreover, satisfied consumers are more likely to talk positively about the product to others than unsatisfied customers (Kotler, 2002; Sivadas & Baker-Prewitt, 2000). Thus, the reasonable level of customer satisfaction is a positive indicator for the future. The refurbished buyers might rebuy a such a device or might convince new buyers to buy a refurbished phone. Once more consumers are demanding a refurbished smartphone, conventional smartphone dealers might eventually also start to offer more refurbished devices.

6.1 Theoretical contributions

This research has contributed to the post-purchase product evaluation literature, and specifically in the context of customer satisfaction of new and refurbished smartphones. To the researcher's best knowledge, this study was the first to apply the expectancy-disconfirmation model in the context of (refurbished) smartphones. It can be confirmed that in the context of (refurbished) smartphones, disconfirmation also has a positive effect on customer satisfaction.

Moreover, in accordance with previous research, disconfirmation was found to be positively influenced by perceived performance.

The study has confirmed that customer satisfaction is indeed determined by disconfirmation, which, in turn, is positively influenced by perceived performance. Moreover, it was found that aspects with low and high evaluability have significantly different effects on customer satisfaction. Finally, statistical analyses showed that new and refurbished smartphone buyers do not differ significantly with regard to their (average) level of customer satisfaction.

Moreover, literature on customer satisfaction with (refurbished) smartphones is rather scarce to date, so the current study has contributed to more knowledge on the factors that determine customer satisfaction of (refurbished) smartphone buyers. In addition, the influence of evaluability on customer satisfaction had not been researched before in the field of new consumer technologies.

6.2 Practical contributions

The current research has showed that disconfirmation has a positive and significant effect on customer satisfaction. Moreover, disconfirmation was found to be positively and significantly influenced by perceived performance. This signifies the need for smartphone dealers to focus on products with excellent performance. Their offerings should not only perform well, but attention should also be paid to the information provided to customers, on the basis of which they form their expectations. Creating expectations that are too high might result in negative disconfirmation, whereas low expectations will probably lead to positive disconfirmation, although it is questioned whether the latter situation is favourable. Customers might not be willing to buy a product of which they do not expect much, especially if it concerns a durable product like a smartphone.

In addition, smartphone dealers might have to distinguish their offer based on characteristics of the customer and/or the device. It was shown, for instance, that males were associated with a lower level of customer satisfaction than females. Hence, in order to enhance the satisfaction of male customers, it might be the case that their expectations have to be lowered, although further research is needed to confirm this. Moreover, having a mid-priced phone was also shown to have a positive influence on customer satisfaction, but having a high-priced phone was not a significant predictor of customer satisfaction. Hence, to improve satisfaction of consumers buying a high-priced phone, it might the case that either their expectations have to be lowered, or that the performance of these devices has to be enhanced. But again, this matter should be investigated further to confirm this.

Another remarkable finding of this study was that new and refurbished smartphone buyers do not have significantly different (average) levels of customer satisfaction. This indicates that for smartphone dealers, it might be worthwhile to not only sell new devices but also refurbished phones in order to serve a larger audience.

Another implication relates to the customer satisfaction score. Both new and refurbished smartphone buyers had an average customer satisfaction score of around 5-7. Although this

score indicates that customers are moderately satisfied with their smartphones, this leaves substantial space for improvement. Hence, for (refurbished) smartphone dealers it is advised to further investigate what drives their customers, what makes them satisfied, and how the company could address that.

Finally, the current study has pointed out that evaluability has different effects on disconfirmation and customer satisfaction. For disconfirmation, aspects with low evaluability have a larger effect than aspects with high evaluability. On the other hand, aspects with high evaluability have a larger effect on customer satisfaction than aspects with low evaluability. This indicates that (refurbished) smartphone dealers might have to address the information provided with the smartphones. Providing warranty and service probably costs a company a substantial amount of money, but (on average) it affects customer satisfaction less than easy-to-evaluate aspects. On the basis of the current study, it cannot be stated that providing more information on an aspect might make it easier to evaluate and/or might increase its effect on customer satisfaction. However, it seems to be worth trying whether providing more and better information about the difficult-to-evaluate aspects might enhance customers' satisfaction.

6.3 Limitations and future research

This research has several limitations, which will be discussed in the current section. First of all, the research has been conducted on the basis of a survey. The aim was to find as many refurbished as new smartphone buyers, but since not many consumers own a refurbished smartphone yet, it was decided to collaborate with a refurbished smartphone company. However, this means that the findings concerning the refurbished smartphone buyers may not be representative for all refurbished smartphone buyers in the Netherlands. It was attempted to control for as many intervening variables as possible, such as the duration of ownership and price of the smartphone. However, the provided services of this company may, for instance, still have influenced the level of customer satisfaction of the refurbished buyers. For future research, it is therefore advised to investigate the satisfaction of a diverse group of refurbished buyers, i.e. customers of multiple refurbished smartphone dealers.

In addition, the use of a survey has more limitations. The aim of the survey that was used in the current study was to measure how satisfied consumers are with their (refurbished) smartphones), and to find out how smartphones are being evaluated. Which aspects of the phones are easy or difficult to evaluate, and how does this influence customers' level of satisfaction? Although the survey questions have been carefully worded and were based on results from previous research, it might have been possible that the questions did not precisely measure "evaluability" or "customer satisfaction." The concept of customer satisfaction, for instance, cannot be directly measured, and therefore it had to be inferred using a combination of questions. Although reliability analyses pointed out that the combination of questions resulted in a scale with high reliability, it remains possible that customer satisfaction has not been accurately measured. Therefore, in future research, it would be interesting to further investigate the concept customer satisfaction in relation to (refurbished) smartphones. It is possible that refurbished and new smartphone buyers differ with regard to their definition of customer satisfaction. Moreover, there might be are even more factors that influence their customer

satisfaction, and that have not been taken into account in the current study. Therefore, it is advised to dedicate more research to customer satisfaction of new and refurbished smartphone buyers.

In addition, although the survey was anonymous and was answered online without the presence of a researcher, respondents might have given socially desirable answers, or they might have given answers that did not accurately reflect their opinion. It has been tried to control for this possible effect, by eliminating outliers and checking the dispersion of people's answers, but unfortunately it is not possible to totally eliminate it. But, as suggested before, it is still considered interesting to re-perform the current study with a different sample.

The last limitation of the current study concerns the time span of the research. For researching expectations, for instance, researchers are advised to measure both *predictive* (before consumption) and *retrospective* expectations (recalled after consumption). However, since the current study was performed in only six months, it was decided to research actual buyers instead of potential buyers, and therefore measuring predictive expectations was not possible. But, for future research, it would be interesting to follow a group of potential (refurbished) smartphone buyers and measure their expectations at different points in time. Moreover, it would also be interesting to measure customer satisfaction at fixed points in time, e.g. right after purchase, three months after moment of purchase and a year after purchase. Although duration of ownership was controlled for, measuring customer satisfaction and expectations at multiple points in time will contribute to a more holistic view of customers' satisfaction formation process.

Another topic for future research is the issue of the information that is being provided with a smartphone. If "better" or more information on difficult-to-evaluate aspects is given, does this lead to a larger effect of difficult-to-evaluate aspects on customer satisfaction? Or is it impossible to enhance the evaluability of difficult-to-evaluate aspects? Moreover, as addressed before, customers form their expectations (amongst other things) on the information that is provided with the offer. Hence, creating expectations that are too high might result in negative disconfirmation, whereas low expectations will probably lead to positive disconfirmation. However, is the latter situation more favourable? Will consumers buy a product of which they have low expectations, especially in case of a durable product like a smartphone? Hence, what is the right balance between promises and delivered performance?

Finally, for further research it would be interesting to further test evaluability in the context other consumer technologies. The results of the current study indicate that evaluability might have different effects on disconfirmation and customer satisfaction in the context of (refurbished) smartphones, but this cannot be generalized to all consumer technologies, since this research has focused on only one product. However, as earlier research has pointed out, evaluability also influences customer satisfaction in the health care (e.g. Hibbard, Slovic, Peters & Finucane, 2002; Hibbard & Peters, 2003) and service quality domains (e.g. Dagger & Sweeney, 2007). Therefore, it would be interesting to find out whether evaluability also has an effect on customer satisfaction in the context of, for instance, laptops, cameras, or smartwatches.

Chapter 7 Conclusion

The aim of the current study was to identify which factors determine customer satisfaction of new and refurbished smartphone buyers in the Netherlands. A combination of qualitative and quantitative research was used to answer this question.

First of all, the conducted interviews (n = 10) pointed out nine aspects on which customers evaluate (refurbished) smartphones. These aspects could be subdivided into *easy-to-evaluate aspects* (features of the phone, battery, capacity, availability, design, and price) and *difficult-to-evaluate aspects* (warranty, durability and service).

Quantitative analysis of the survey (n = 205) showed that disconfirmation had a positive effect on customer satisfaction, which was in accordance with previous research. Disconfirmation, in turn, was found to be positively influenced by perceived performance. However, it could not be confirmed that retrospective expectations have a negative effect on disconfirmation.

Regarding evaluability, disconfirmation concerning the easy-to-evaluate attributes was shown to have a significantly larger effect on customer satisfaction than disconfirmation regarding the difficult-to-evaluate attributes. Hence, the aspects with high evaluability seem to be more prominent in respondents' customer satisfaction formation. This indicates that the easy-to-evaluate aspects might be more important for people's "daily contentment." However, for perceived performance and retrospective expectations, it was the other way around. The perceived performance of difficult-to-evaluate aspects was shown to have a larger effect on disconfirmation than perceived performance of the easy-to-evaluate aspects, which was contrary to the expectations. However, the effects of these predictors did not differ significantly. Hence, the results indicate that evaluability might have different effects on disconfirmation and customer satisfaction. However, further research is needed to confirm this, since the effects of the two perceived performance variables did not differ significantly.

Finally, it was found that new and refurbished buyers do not differ significantly in terms of their level of customer satisfaction. Both groups had an average satisfaction score of around 5 (expressed on a 7-point scale). This is an interesting finding, because it indicates that (for certain customer segments) refurbished smartphones might indeed be a promising alternative for their brand-new equivalents.

All in all, this research has provided more insight into the satisfaction formation of new and refurbished smartphones buyers. Hopefully, this contributes to the development of more sustainable consumption and production patterns in the field of consumer technologies.

Appendix

Appendix I: Qualitative research

The respondents were asked the following question: *Imagine that you are asked to evaluate a smartphone. Which attributes of the phone are most important to you in evaluating the quality of the phone? Please list these attributes, and afterwards, rate them from 1: most important to* n*: least important.*

The results are listed below.

Respondent 1 (female, 23 years old)

1. Operating system
2. Ease of use
3. Price
4. Quality of the camera
5. Battery
6. Storage capacity
7. Design
8. Robustness

Respondent 2 (male, 28 years old)

1. Price
2. Size
3. Screen
4. Battery
5. Performance
6. Brand
7. Storage capacity

Respondent 3 (female, 23 years old)

1. Price
2. Quality of the camera
3. Storage capacity
4. Battery
5. Design

Respondent 4 (female, 59 years old)

1. Price
2. User system
3. Brand
4. Battery
5. Size
6. Ease of use

Respondent 5 (male, 26)

1. Brand
2. Price
3. Functionalities
4. Design
5. (costs of) Service

Respondent 6 (male, 32)

1. Price
2. Operating system
3. Storage capacity
4. Durability
5. (costs of) service
6. Camera
7. Availability

Respondent 7 (female, 35)

1. Brand/operating system
2. Price
3. Camera
4. Functionalities
5. Durability

Respondent 8 (male, 24)

1. Price
2. Camera
3. Durability
4. Operating system
5. (other) Functionalities
6. Availability

Respondent 9 (male, 62)

1. Size
2. Operating system
3. Price
4. Storage capacity
5. Camera
6. Battery
7. (other) Functionalities

Respondent 10 (female, 23)

1. Price
2. Speed processor
3. Storage capacity
4. Size
5. Camera

Combined list of features

From the answers above, the nine most mentioned items were selected. Some answers were merged into one aspect (i.e. “size” was considered to be part of “design/appearance of the phone”). “Brand” and “operating system” were not included in the list of aspects that respondents had to evaluate, since a separate question was dedicated to the brand of the respondents’ phones in order to be able to correct for this in the regression.

This resulted in the following list of features:

- Price
- Features of the phone
- Battery
- Storage capacity
- Availability (ease of purchasing the phone)
- Service
- Warranty
- Durability
- Design/appearance of the phone
- Refurbishment

Appendix II: Questionnaire

Hartelijk dank voor uw deelname aan deze enqûete.

De vragenlijst is onderdeel van een master scriptie over klantevaluaties van (refurbished) smartphones. De gegevens zullen uitsluitend voor dit onderzoek worden gebruikt en zullen anoniem worden verwerkt. De enquête duurt naar verwachting 5-10 minuten. Voor vragen kunt u mailen naar lies.hovestadt@wur.nl. Alvast bedankt voor uw bijdrage!

Q1 Wanneer heeft u uw huidige telefoon gekocht?

- ○ Minder dan 6 maanden geleden (1)
- ○ 6-12 maanden geleden (2)
- ○ Meer dan 12 maanden geleden (3)

Q2 Van welk merk is uw huidige telefoon?

- ○ Apple (1)
- ○ Samsung (2)
- ○ Sony (3)
- ○ Anders, namelijk: (4) _____

Q3 Bent u bekend met refurbished telefoons?

- ○ Ja (1)
- ○ Nee (2)

Q4 *Refurbishment* is een proces een professioneel bedrijf oude telefoons verzamelt en hergebruikt. (Onderdelen van) de telefoons worden hersteld zodat zij weer in een

functionele en goede staat verkeren, waarna deze telefoons verkocht kunnen worden aan nieuwe klanten. Wat voor soort telefoon heeft u gekocht?

- ○ Een nieuwe, niet-refurbished telefoon (1)
- ○ Een refurbished telefoon (2)
- ○ Weet ik niet (3)

If answer Q4 = "Een nieuwe, niet re-furbished telefoon" ==> Q4b Heeft u eerder een refurbished telefoon gekocht?

- ○ Ja (1)
- ○ Nee (2)
- ○ Weet ik niet (3)

Q5 Wat was ongeveer de (refurbished) prijs toen u uw huidige telefoon kocht?

- ○ €0-300 (1)
- ○ €300-600 (2)
- ○ Meer dan €600 (3)

Q6 Hoe belangrijk zijn de volgende aspecten van een telefoon voor u?

	Erg onbelangrijk 1 (1)	Onbelangrijk 2 (2)	Enigszins onbelangrijk 3 (3)	Niet onbelangrijk, niet belangrijk 4 (4)	Enigszins belangrijk 5 (5)	Belangrijk 6 (6)	Erg belangrijk 7 (7)
Prijs (1)	○	○	○	○	○	○	○
Features van de telefoon (bijvoorbeeld camera, waterbestendigheid, etc.) (2)	○	○	○	○	○	○	○
Batterij (3)	○	○	○	○	○	○	○
Opslag/geheugen (4)	○	○	○	○	○	○	○
Verkrijgbaarheid (5)	○	○	○	○	○	○	○
Service (6)	○	○	○	○	○	○	○
Garantie (7)	○	○	○	○	○	○	○
Levensduur (8)	○	○	○	○	○	○	○
Design/uiterlijk (9)	○	○	○	○	○	○	○
Refurbished staat (10)	○	○	○	○	○	○	○

Q7 Voordat u uw huidige telefoon kocht, had u mogelijk verwachtingen over de prijs van deze telefoon. Wat waren toen uw verwachtingen?

	Zeer laag 1 (1)	Laag 2 (2)	Enigszins laag 3 (3)	Niet laag, niet hoog 4 (4)	Enigszins hoog 5 (5)	Hoog 6 (6)	Zeer hoog 7 (7)	Weet ik niet 99 (8)
Ik verwachtte dat de prijs van deze telefoon ... was (1)	○	○	○	○	○	○	○	○

Q8 Voordat u uw huidige telefoon kocht, had u mogelijk verwachtingen over de volgende aspecten van deze telefoon. Wat waren toen uw verwachtingen?

	Zeer slecht 1 (1)	Slecht 2 (2)	Enigszins slecht 3 (3)	Niet slecht, niet goed 4 (4)	Enigszins goed 5 (5)	Goed 6 (6)	Zeer goed 7 (7)	Weet ik niet 99 (8)
Features van de telefoon (1)	○	○	○	○	○	○	○	○
Batterij (2)	○	○	○	○	○	○	○	○
Opslag/geheugen (3)	○	○	○	○	○	○	○	○
Verkrijgbaarheid (4)	○	○	○	○	○	○	○	○
Service (5)	○	○	○	○	○	○	○	○
Garantie (6)	○	○	○	○	○	○	○	○
Levensduur (7)	○	○	○	○	○	○	○	○
Design/uiterlijk (8)	○	○	○	○	○	○	○	○
Refurbished staat (9)	○	○	○	○	○	○	○	○

Q9 Hoe zou u op dit moment de prijs van uw telefoon beoordelen? Het gaat hierbij om de prijs die u voor de telefoon betaald heeft.

	Zeer laag 1 (1)	Laag 2 (2)	Enigszins laag 3 (3)	Niet laag, niet hoog 4 (4)	Enigszins hoog 5 (5)	Hoog 6 (6)	Zeer hoog 7 (7)	Weet ik niet 99 (8)
De prijs van deze telefoon vind ik... (1)	○	○	○	○	○	○	○	○

Q10 Hoe zou u op dit moment de volgende aspecten van uw telefoon beoordelen?

	Zeer slecht 1 (1)	Slecht 2 (2)	Enigszins slecht 3 (3)	Niet goed, niet slecht 4 (4)	Enigszins goed 5 (5)	Goed 6 (6)	Zeer goed 7 (7)	Weet ik niet 99 (8)
Features van de telefoon (1)	○	○	○	○	○	○	○	○
Batterij (2)	○	○	○	○	○	○	○	○
Opslag/geheugen (3)	○	○	○	○	○	○	○	○
Verkrijgbaarheid (4)	○	○	○	○	○	○	○	○
Service (5)	○	○	○	○	○	○	○	○
Garantie (6)	○	○	○	○	○	○	○	○
Levensduur (7)	○	○	○	○	○	○	○	○
Design/uiterlijk (8)	○	○	○	○	○	○	○	○
Refurbished staat (9)	○	○	○	○	○	○	○	○

Q11 Hoe hebben de volgende aspecten van uw telefoon gepresteerd, wanneer u deze vergelijkt met uw verwachtingen?

	Veel slechter dan verwacht 1 (1)	Slechter dan verwacht 2 (2)	Enigszins slechter dan verwacht 3 (3)	Geheel zoals verwacht 4 (4)	Enigszins beter dan verwacht 5 (5)	Beter dan verwacht 6 (6)	Veel beter dan verwacht 7 (7)	Weet ik niet 99 (8)
Prijs (1)	○	○	○	○	○	○	○	○
Features van de telefoon (2)	○	○	○	○	○	○	○	○
Batterij (3)	○	○	○	○	○	○	○	○
Opslag/geheugen (4)	○	○	○	○	○	○	○	○
Verkrijgbaarheid (5)	○	○	○	○	○	○	○	○
Service (6)	○	○	○	○	○	○	○	○
Garantie (7)	○	○	○	○	○	○	○	○
Levensduur (8)	○	○	○	○	○	○	○	○
Design/uiterlijk (9)	○	○	○	○	○	○	○	○
Refurbished staat (10)	○	○	○	○	○	○	○	○

Q12 Hoe was het voor u om de volgende aspecten van uw telefoon te beoordelen?

	Zeer moeilijk 1 (1)	Moeilijk 2 (2)	Enigszins moeilijk 3 (3)	Niet moeilijk, niet eenvoudig 4 (4)	Enigszins eenvoudig 5 (5)	Eenvoudig 6 (6)	Zeer eenvoudig 7 (7)	Weet ik niet 99 (8)
Prijs (1)	○	○	○	○	○	○	○	○
Features van de telefoon (2)	○	○	○	○	○	○	○	○
Batterij (3)	○	○	○	○	○	○	○	○
Opslag/geheugen (4)	○	○	○	○	○	○	○	○
Verkrijgbaarheid (5)	○	○	○	○	○	○	○	○
Service (6)	○	○	○	○	○	○	○	○
Garantie (7)	○	○	○	○	○	○	○	○
Levensduur (8)	○	○	○	○	○	○	○	○
Design/uiterlijk (9)	○	○	○	○	○	○	○	○
Refurbished staat (10)	○	○	○	○	○	○	○	○

Q13 Hoe heeft uw huidige telefoon, over het algemeen, gepresteerd?

	Zeer slecht geprestee rd 1 (1)	Slecht geprestee rd 2 (2)	Enigszins slecht geprestee rd 3 (3)	Niet goed, niet slecht geprestee rd 4 (4)	Enigszins goed geprestee rd 5 (5)	Goed geprestee rd 6 (6)	Zeer goed geprestee rd 7 (7)
Naar mijn mening heeft deze telefoo n... (1)	○	○	○	○	○	○	○

Q14 In hoeverre heeft uw huidige telefoon aan uw verwachtingen voldaan?

	Totaal niet aan mijn verwachti ngen voldaan 1 (1)	Niet aan mijn verwachti ngen voldaan 2 (2)	Enigszins aan mijn verwachti ngen voldaan 3 (3)	Aan mijn verwachti ngen voldaan 4 (4)	Mijn verwachti ngen enigszins overtroffe n 5 (5)	Mijn verwachti ngen erg overtroffe n 6 (6)	Mijn verwachti ngen totaal overtroffe n 7 (7)
Deze telef oon heeft. .. (1)	○	○	○	○	○	○	○

Q15 In hoeverre bent u tevreden met uw telefoon?

	Helemaa l niet tevreden 1 (1)	Niet tevrede n 2 (2)	Enigszins ontevrede n 3 (3)	Niet ontevreden , niet tevreden 4 (4)	Enigszin s tevreden 5 (5)	Erg tevrede n 6 (6)	Helemaa l tevreden 7 (7)
Met mijn telefoo n ben ik... (1)	○	○	○	○	○	○	○

Q16 In welk jaar bent u geboren?

_____

Q17 Wat is uw geslacht?

- ○ Man (1)
- ○ Vrouw (2)

Q18 Wat is uw hoogst voltooide opleiding?

- ○ Basisonderwijs (1)
- ○ Lager/voorbereidend beroepsonderwijs (lbo/vmbo) (2)
- ○ Middelbaar algemeen voortgezet onderwijs (mavo) (3)
- ○ Middelbaar beroepsonderwijs (mbo) (4)
- ○ Hoger algemeen voortgezet onderwijs (havo) (5)
- ○ Voorbereidend wetenschappelijk onderwijs (vwo) (6)
- ○ Hoger beroepsonderwijs (hbo) (7)
- ○ Wetenschappelijk onderwijs (wo) (8)
- ○ Geen antwoord (9)

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