An Innovation Resistance Theory Perspective on Sustainable Fashion

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Abstract:

The aim of this thesis is to explore the relative importance of the eight psychological Active Innovation Resistance (AIR) barriers, from the new typology of AIR barriers developed from Talke and Heidenreich in 2014, on the consumer's intention to adopt or buy circular fashion products. Moreover, this thesis examines whether the socio-demographic factors of age, employment status, and educational level have an influence on the adoption process. A quantitative analysis is applied through the issuance of an online questionnaire in order to collect the data with the help of the Typeform survey tool. 79 respondents' data is analyzed. The findings of this study reveal that the economic risk barrier along with the functional risk and usage barriers exhibit the most significant influence on the consumer's reluctance to adopt circular fashion. The aforementioned barriers, which lead the way for the rest, are accompanied by the personal risk, image and information barriers, and last but not the least, the norm barrier. The social risk barrier has the least impact on consumers' intention to adopt circular fashion. The results of this study suggest that entrepreneurs who are interested in starting a business within the circular fashion industry and the marketing strategists in fashion companies should focus on showing the maximum value and the functionality of the circular fashion products during their marketing campaigns. It is also suggested for the marketers to initially target generation Z but when targeting the more Innovation resistant generation Y it is of absolute importance to include adequate information about the circular fashion product in the marketing campaigns. Additionally, the present thesis explores the socio-demographic factors in the socio-psychological theories of Ram and Seth, and Rogers. A further implication is that further studies will focus on the socio-demographic factors, since the socio-demographic factors have been neglected in the study field of socio-psychological theories.

Key Words: Active Innovation Resistance barriers, Talke & Heidenreich, Innovation Resistance theory, Ram & Seth, Diffusion of Innovations Theory, Rogers, Socio-psychological Theories, Consumer Reluctance to Innovations, Circular Economy, Fast Fashion, Sustainable Fashion, Fashion Industry, Innovation, Innovative Products, Socio-demographic Factors, Circular Fast Fashion, Fast Fashion Market, Virgin Fashion.

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1. Introduction

1.1 Circular economy and the Fashion industry

The concept of the Circular Economy is getting growing attention from more and more governments within the European Union and around the world (Korhonen, Honkasalo & Seppälä, 2018; Julian, Denise & Marko, 2017). The circular economy can be defined as the process of switching from the "end life concept" to reducing, reusing, and recycling both in production and consumption lines (Julian, Denise & Marko, 2017). Research has proven that applying the circular economy concept could lead to an emissions reduction of 48% by 2030, and 83% by 2050 (Rizos et al. 2016).

Due to the increasing climate change awareness and its environmental effects, sustainable innovation has become one of the main ways for differentiation among many companies (Lin and Ho, 2011, cited in Chu, Wang, & Lai, 2019). This fact helped many companies to create a competitive advantage and enhance the company's image (Chen et al. 2006, cited in Chu, Wang, and Lai, 2019). Research consistently demonstrates that the more the company adopts a circular economy concept, the more profitable it becomes, and the better the effect on the environment it leaves (Sariatli, 2017).

According to Sariatli (2017), applying the circular economy concept not only has a positive effect on the environment, in terms of emissions reduction and the support of using clean technology but also a positive social and economic effect. As the circular economy is a scalable concept, it attracts different investment opportunities for the company (Sariatli, 2017). Moreover, the circular economy model helps in providing cheaper access to materials through the efficient use of resources by following the resource leveraging concept (Morris & LaForge, 2002). The circular model saves high material costs and costs linked to externalities, for instance, the health impact from air pollution (Rizos et al. 2016), as well as promoting innovativeness and productivity in the company (Sariatli, 2017).

Unfortunately, "less than 1% of clothing materials are recycled". On the other hand, "1.2 billion tons of greenhouse gas emissions and 20% of industrial water pollution are generated solely from textile production annually" (EMF, 2017, cited in Ki et al. 2020, p. 2402). According to Statista

(2020), the fashion industry is a growing industry. In 2019 the fashion industry sales were 1.9 trillion US dollars, and by 2030 they are expected to reach 3.3 trillion US dollars. These are some of the statistics, which provide information about the effect that the fashion industry leaves on the environment, and highlight the importance of switching to a circular economy in such a growing industry.

1.2 Consumer Reluctance to Innovations

The companies face a challenge in getting the consumers on board, especially if the product is innovative or entails an innovative process of production. In many cases, innovative products get rejected by consumers before the product's functionality or quality is even checked (Bagozzi & Lee, 1999). The innovative products are undoubtedly connected to change and newness, and thus the consumers tend to resist innovations. This is considered as one of the main reasons for different startup failures (Buehrer 2013; Stanley 2014, cited in Ju & Lee, 2020). Ram and Sheth (1989) have introduced five main challenges-barriers that arise within the consumption patterns when an innovative product is produced and released in the market. It is these barriers that the companies need to overcome to gain the consumer. For example, there is a barrier that rises when the consumer will have to change their habits or another barrier that emerges when the innovation is conflicting with the consumer's tradition or family values. The five main barriers of Ram and Seth were further developed in 2014 by Talke and Heidenreich to a more detailed typology of 17 Active Innovation Resistance barriers (AIR barriers), (Talke & Heidenreich, 2014).

There is a certain amount of previous research within the circular economy that has addressed the concept from the company's perspective. For example, Caniato et al. (2012), mentioned the main drivers that lead different companies to shift to a circular business model. It is also highlighted that small companies use the circular economy as a way to survive and differentiate themselves from their competitors. Van Loon and Van Wassenhove (2020), explain the challenges confronted by companies during the process of implementing the circular business model while holding on to the current profit levels. It is evident through their research, that transitioning to a circular business model from a linear one is not an easy or harmonic transition to make, no matter the sustainable benefits a company gets by doing so. However, according to

Ki, Chong, and Ha-Brookshire (2020), very limited research focuses on the consumer side of the circular economy.

Previous research has applied the innovation resistance theory in different industries. For example, mobile payment (Kaur et al. 2020) and online shopping (Lian & Yen, 2013). Here it is worth mentioning that each study got different results. The contribution of this research to the previous ones lies in the fact that this study focuses on the consumer resistance theory by applying it to the circular fashion industry. In addition, the innovation resistance theory has been applied to many industries already, but there is not already a study that has applied it in the circular fashion industry. Furthermore, very limited research has applied the updated framework with the developed active innovation resistance barriers, as they are to be found in Talke and Heidenreich (2014).

In this study, the innovation resistance theory is applied to the sustainable fashion industry with a focus on the eight psychological barriers as they are found and explained by Talke and Heidenreich (2014). In their paper, they describe in detail the eight psychological barriers that arise when the consumer confronts an innovative product or an innovative manufacturing process. The eight psychological barriers faced by the consumer are the following: the functional risk barrier, the personal risk barrier, the economic risk barrier, the social risk barrier, the information barrier, the norm barrier, the image barrier, and the usage barrier.

Mori and Mlabiti (2019) examined the influence of the demographic factors on the adoption of innovative mobile banking services. In their article, they explain that they conducted a survey in order to ascertain the importance of the demographic factors while focusing on Roger's theory diffusion of innovation. The study further argues that capturing the demographic profile of the consumer gives a clear image of the strategies that can be developed in order to encourage innovation adoption. The socio-demographic factors examined are the income level, gender, education, and age of the participants.

Based on the innovation resistance theory and the new typology of the active innovation resistance barriers as described and analyzed by Talke and Heidenreich (2014), but also the socio-demographic factors, the following research questions were formed:

Q1: What is the relative importance of the psychological barriers affecting the customer´s intention to adopt/buy innovative-sustainable fast fashion products?

Q2: What is the influence of the socio-demographic factors on consumer's intention to adopt/buy innovative-sustainable fast fashion products?

According to Heidenreich and Kraemer (2015), 40% of successful companies face the challenge of innovation failure. Joachim et al. (2018), argue that understanding the consumers who resist adopting an innovation is considered equally important to understanding the people who choose to adopt. Another aim this research has is to help the fashion industry companies decrease the innovation failure rate by providing a better understanding of the customer by highlighting the importance of the socio-demographic factors. This research can also be of help to the fashion companies which can tailor and develop their future products to attract customers who are actively resisting innovation. Attempting to clarify the consumer resistance to innovation, this research focuses on identifying the key psychological barriers and the socio-demographic factors that hinder consumers from switching to circular fashion items.

2.Theoretical framework

2.1 Circular Economy

Most of the companies are following a linear economic model of take-make-dispose practices. The main focus of the linear economic model is to deliver cheap products, while at the same time supporting a short lifetime of the garment. This consequently results in being indifferent about the process that follows after the product is being disposed of (Patwa et al. 2021). On the other hand, the adoption of the circular economy model results in the minimization of resources and the reduction of pollution and waste (Patwa et al. 2021). As the circular economy model is relatively new, a specific definition is still in the making. However, there are many commonalities between the different definitions and theories to be found. Generally, the circular economy underlines and promotes the importance of sustainable practices in production and consumption (Lernborg, 2021).

The circular economy as a concept is a win-win way of thinking through creating shared value for all the stakeholders. The concept of creating shared value means creating societal and environmental value while creating economic value and improving the company's competitiveness according to Porter and Kramer (2011). In their article, they are taking into consideration both the societal and environmental factors, which create a definite positive impact on the company's economic value. One way of applying the circular economy model, while creating shared value, is to apply the resource leveraging concept. (Morris, Schindehutte & LaForge, 2002). This can be achieved by making the most out of the use of the resources already in use, resources which others failed to use, or using people's resources through borrowing or renting, for example.

2.2 Fast fashion and Sustainable fashion

The fashion industry is one of the most fast-changing industries in the world. The usage lifespan of clothing items has decreased by 36% in comparison to fifteen years ago (Rathinamoorthy, 2019). However, it's expected to grow from 1.5 trillion U.S. dollars in 2020 to around 2.25 trillion dollars by the year 2025 (Statista, 2021). The fast fashion industry mainly focuses on encouraging the consumers to buy more at low prices and discard their clothes season-wise while ignoring the negative effect this policy leaves on the environment (Rathinamoorthy, 2019). Recent research shows that the annual garments waste reaches 460 billion while some of the garments are disposed of already after just 10 times of use (Circular Fibres, 2016, cited in Rathinamoorthy, 2019).

One of the main negative impacts that the fast fashion industry has is on the environment. The cheap and low-quality fabrics that originate from the fast fashion industry require the usage of some materials which have been proven to harm the environment. For instance, the polyester material, which is one of the major fabric materials and takes decades to dissolve, produces about three times more carbon dioxide in comparison to cotton fabric (Rathinamoorthy, 2019).

The circular fashion model focuses on increasing the lifespan of any piece of clothing. The take-make-dispose practices do not have any place in the circular fashion model where other strategies like reuse, recycle, repair, or remanufacture take place. It can be defined after Dr. Brismar's suggestion:

"Circular fashion can be defined as clothes, shoes or accessories that are designed, sourced, produced and provided with the intention to be used and circulate responsibly and effectively in society for as long as possible in their most valuable form, and hereafter return safely to the biosphere when no longer of human use" (Origin of the Concept Circular Fashion, 2015, cited in Rathinamoorthy, 2019)

The new approach of a circular fashion model is indeed the core of many businesses and their activities create positive impacts and reduce the negative ones on the environment and the society. Marques et al. (2019), suggest that organizing and conducting events like sustainability fashion design contests lead to forming a wider environmental consciousness and to raising awareness on the importance of the circular economy and its application to the fashion industry and upcycling. If the circular model logic applies to other types of industries that could contribute to a more sustainable future.

Shirvanimoghaddam, Motamed, Ramakrishna, and Naebe (2020) discuss the reasons that make circular fashion in the textile industry important. In their paper, they are examining the different methods of reuse, recycle and repurposing of textile waste, presenting the twelve principles of circular economy in the fashion industry, and they finally suggest a Cleaner Production Scenario and Fashion Foresight. By presenting data on the devastating impact that the fast fashion industry and throw-away culture have on the environment, society, and the economy, the authors highlight the importance of applying the circular economy model.

Furthermore, Shirvanimoghaddama et al. (2020), present the textile waste impacts regarding energy use, water waste, water pollution, solid waste, and use of toxic chemicals. The authors explain the concept of circular economy and how it applies to the fashion industry through the twelve principles of the circular fashion industry introduced by Anna Bismar. Since the article dates to 2020, it makes evident the importance of bringing up the issue of textile recycling nowadays. "The field of waste management and recycling, especially in textile recycling, has gained lots of interest in recent years…", the authors write (Shirvanimoghaddama et al. 2020, p. 4). The textile industry is facing massive challenges in terms of environment and resources and infers to the sustainable solution of reuse and recycling, that will lead to the reduction of the production of virgin materials, energy consumption, and environmental footprint, Shirvanimoghaddama et al. (2020), assert.

Within the circular economy, it is important to consider the different stakeholders. For example, in their paper, Hvaas and Pederssen (2019), studied the different stakeholder perspectives to see the value they can get in order to be part of the take-back system. Consumers need to find value in returning their clothes instead of giving them to charity. The researcher faced many challenges while realizing their study. Some of them were, for instance, the awareness of the consumers about the importance of the take-back system, the adequate information the consumers get during the first steps a company is taking to switch to a more circular model, and the way to encourage the consumers to be part of this new system and be more engaging and supporting.

2.3 The consumer in the context of Circular Economy

According to Ki, Chong, and Ha-Brookshire (2020), most of the research is covering the circular economy from the company's perspective and a limited research paper addresses the concept from the consumer side. Loon and Wassenhove (2020) suggest that more research needs to be done concerning the reaction of the consumers to remanufactured products and the disgust defining the consumer segment that refuses to touch products that have been used before and are recirculated.

Boyer, Hunka, Linder, Whalen, and Habibi (2021), in their study, focus on whether the consumers are willing to pay more for products with a high, multi-level circular economy score. There is no extensive or significant research concerning the consumer responses to products that come from recycling or reuse. For instance, Boyer et al. (2021), support that there is not enough evidence to how the consumer responds to circular economy product labels or if their willingness to pay more is affected by the circularity level of the product.

While Boyer et al. (2021) investigate how a hypothetical Circular Economy (CE) Score affects the consumer's preferences and Willingness To Pay (WTP) when the consumers purchase recirculated mobile phones and recirculated vacuum cleaners, their findings suggest that the product´s level of circularity was a moderately important feature. Furthermore, while keeping the rest of the features stable the consumers show a preference for products that entail some level of recycled components compared to virgin products. This implies that the consumers are willing to buy recirculated products not necessarily according to their level of circularity and show at the same time preference in products that combine recycled and virgin materials.

Other findings show that the participants displayed a consistency of willingness to pay more for products that had a low level of circularity and less for the products that over time had become increasingly circular. Boyer et al. (2021) state that the Willingness To Pay attribute is a significant indicator for the companies that produce virgin materials and want to turn to a more circular model. They also question the value of informing the consumers about the product's alignment to the CE paradigm.

The consumer being the guiding force of the market as a trendsetter and a primary stakeholder is one of the main forces that drive the companies to adopt the CSR strategies. The companies make an effort to incorporate the “eco”, “green” or “ethical” marketing strategies, in order to approach and satisfy the consumer (Kazlowski et al. 2012). Since the contemporary consumer receives more and more information about the environmental and social impact of clothing and textile products, the companies constantly seek ways of implementing sustainability strategies that are appealing to the consumers. (Henriques and Richardson, 2004 cited in Kazlowski et al., 2012). Innovation is the key that opens the door of sustainability for businesses, according to Loon and Wassenhove (2020). Nevertheless, in Laukkanen (2016), it is asserted that several innovations fail because they are being rejected by the consumer.

2.4 Consumer decision buying process on innovative products

With the consumer being the moderator and main trendsetter in the market, but also the main subject of many psychological theories, it is most imperative to consider the adoption behavior when it comes to innovation. According to Rogers (2003) the consumer may reject an innovation, but according to Greenleaf and Lehmann (1995) the consumer might face procrastination when they have to make a buying decision. Several researchers focused on the different stages the consumer goes through when they are engaged in buying an innovation. There are two main decision-making approaches when it comes to buying an innovation, passive innovation resistance, and active innovation resistance. According to Heidenreich and Kraemer (2015) when the consumer rejects the innovation before even evaluating the innovative product or service, then the consumer experiences passive innovation resistance. During the passive innovation resistance phase, the customer misses out on the persuasion phase and thus there is a conscious decision-making decision procedure.

During the active innovation resistance phase to buying an innovation, the consumer first enters the persuasion stage. During the persuasion stage, according to Laukkanen et al. (2008), the consumer is prepared mentally to evaluate the innovation. The persuasion phase is the precedent of the attitude formation stage. According to Bagozzi (1986), during the attitude formation stage, the consumer primarily evaluates the innovation building positive or negative arguments to either adopt or not the innovation. The attitude formation stage is a necessary stage that can lead to two results. Either the consumer forms positive arguments or negative arguments, which are directly connected to Active Innovation Acceptance or Active Innovation Resistance respectively, according to Bagozzi and Lee (1999). While the consumer is in the attitude formation stage, they shape the intention to either adopt or reject the innovation, which consequently leads to the decision-making stage, as specified by Kuisma, Laukkanen, and Hiltunen (2007). Finally, after the decision stage, the consumer enters the implementation stage, as found in Bagozzi (1992).

2.5 Consumer Resistance to Innovations

The thesis at hand is based on the Innovation Resistance theory (Ram & Sheth, 1989). Consumer resistance is defined as the consumer's reluctance to adopt different innovations (Ma & Lee, 2018; Seth et al. 2020, cited in Kaur, et al. 2020). Consumer resistance is one of the main variables that affect the success or failure of any innovation in the market.

The Innovation Resistance theory mainly helps to understand the consumer's different stances towards innovations by giving a detailed description and explanation of the different types of barriers (Kaur et al. 2020). According to the Innovation Resistance theory of Ram and Seth, adoption barriers are classified into two types; functional barriers (value, risk, and usage) and psychological barriers (image and tradition) (Ram and Sheth, 1989, cited in Sadiq, Adil, & Paul, 2021). The functional barriers are mainly focusing on the value that the innovation offers and the risk the consumer takes for using innovation. The psychological barriers are mainly focusing on how difficult the customers think they can adopt the innovation or change their traditional habits for it (Ram and Sheth, 1989, cited in Sadiq, Adil, & Paul, 2021).

According to Danneels (2003, cited in Kleijnen, Lee, & Wetzels, 2009), despite the efforts being made by different companies to improve consumer's diffusion to innovations, the consumer's resistance to innovations is considered to reach a high level. To understand the reasons behind

this fact, Ram and Sheth (1989, cited in Kleijnen, Lee, & Wetzels, 2009), divided consumer behavior while resisting an innovation into three types, rejection, postponement, and opposition. The rejection behavior emerges when the consumer knows about the innovation but lacks the desire to try it. The postponement behavior is obvious when the consumer believes in the innovation but postpones the time they will start using it until better circumstances appear. The opposition behavior becomes apparent when the consumer is against the innovation to the level that they can launch an attack against it. Consumers normally resist innovations due to two reasons; either the innovation requires the consumer to change their existing norms and habits, or the innovation causes psychological problems to the consumer (Herbig & Day, 1992, cited in Kleijnen, Lee & Wetzels, 2009).

In Canada, a team of researchers studied the factors influencing the adoption of an innovative health kit for the heart, called the Heart Health Kit (HHK). Scott, Plotnikoff, Karunamuni, Bize, and Rodgers (2008), found out that even though the validity and utility of the HHK had before been studied, the factors affecting the adoption of the innovative health kit and the attitude of the physicians towards it were never studied. Having a sample of 153 physicians, the researchers discovered that the use of the kit showed a positive correlation to the intention to use in terms of relative advantage and years of experience. The intention to use the kit was also significantly related to the observability and the relative advantage of the kit´s benefits. Finally, the study showed that the physicians that work solo are more likely to experience individual and environmental barriers. The findings of this study indicate not only that the future innovations should exhibit an advantage compared to the current products, but also that the innovation adoption process has a social character, showing that the interactions and discussions play an important role in the innovation adoption process.

The Innovation Resistance theory acts as a base for the thesis at hand since according to Ray et al. (2020), the Innovation Resistance theory is a valid research framework for any research that aims to test the consumer's resistance responses. The Innovation Resistance theory has also been applied by many researchers in different industries. Some examples of industries that applied the Innovation Resistance theory are the following; the eco-cosmetic industry (Sadiq, Adil & Paul, 2021), the food delivery applications (Ray et al. 2020), the mobile payment solutions (Kaur et al. 2020), the internet banking (Laukkanen, Sinkkonen & Laukkanen, 2008), and the hospitality

industry (Talwar et al. 2020). However, very few researchers applied the Innovation Resistance theory to the fashion industry. For the reasons above, the Innovation Resistance theory constitutes a solid base for the thesis at hand with the perspective to apply it to the circular fashion industry.

For example, Kaur et al. (2020) investigate which barrier directly infers to the consumer resistance theory in the mobile payment solution. The results display a negative correlation between the usage barrier and the consumer's intention to use, while other researches in food delivery solutions found a positive relationship between those two variables (Ray et al. 2020). Furthermore, the online shopping industry (Lian & Yen, 2014 cited in Kaur et al. 2020), the e-commerce industry (Moorthy et al. 2017, cited in Kaur et al. 2020), and the mobile payment solution (Kaur et al. 2020) found a negative correlation between the risk barrier and the consumer's intention to use, the food delivery applications found no correlation at all (Ray et al. 2020).

2.6 Diffusion of Innovations

Rogers' Diffusion of Innovations theory (Rogers, 2003) classifies the adoption process of the consumers to innovation into five categories; innovators, early adopters, early majority, late majority, and laggards. Innovators are mainly the consumers who are more likely to enjoy the experience of new ideas and the uncertainty of the innovations. According to Rogers (2003, cited in Sahin, 2006), the innovators are the ones who spread the word among others about the innovations and who help the innovations to be diffused among the population. This implies that the success of any new business is relying on the behavior of the innovators. Yolanda and Michelle (2006), stated that customers tend to be innovators for different products in different industries. According to previous research, consumer innovativeness has proven to be an effective way of predicting different consumer adoption behavior patterns (Klink & Athaide, 2010, cited in Paparoidamis & Huong, 2019).

Eco-innovation entails the new products or the modified products which take into consideration environmental aspects intending to reduce environmental harms (Halila & Rundquist, 2011, cited in Paparoidamis & Tran, 2019). Due to the increasing awareness towards the environment and

global warming, sustainable innovation has become one of the main ways for differentiation among many companies (Lin & Ho, 2011, cited in Chu, Wang & Lai, 2019). This helped many companies to create a competitive advantage and enhance their company's image (Chen et al. 2006, cited in Chu, Wang & Lai, 2019).

Consumers normally face different tradeoffs while purchasing new eco-friendly products in terms of product functionality or price (Luchs et al. 2012; Olsen et al. 2014, cited in Paparoidamis & Tran, 2019), which affects consumer diffusion processes negatively (Bamberg, 2003; Carrington et al. 2014; Olson, 2013, cited in Paparoidamis & Tran, 2019). By understanding those tradeoffs and barriers the thesis at hand will provide different entrepreneurs and marketers with a better understanding of the consumer. As a result, more successful targeting of the tradeoffs will be achieved at their messages (Paparoidamis & Tran, 2019).

Circular fashion is a complex industry (Kaisa et al. 2018), and consumer's diffusion to the sustainable innovations in the fashion industry is considered to have a high rate. According to Harris et al. (2016, cited in Kaisa et al., 2018) in the fashion industry, consumers do not prioritize sustainability while making their buying decision. This comes in addition to the fact that the fashion industry, unlike other industries, is fast-paced, which results in affecting the consumer's consumption habits and their overall consumer equilibrium. For the aforementioned reasons, the fashion industry is considered an attractive area for consumer diffusion in innovation studies.

The research questions were developed around the topic of Circular Economy in the fast fashion industry from the consumer perspective. The research framework of this study is developed upon Ram and Seth's Innovation Resistance theory, Rogers' Diffusion of Innovations theory, and Talke and Heidenreich's Active Innovation Resistance typology of 17 barriers, eight psychological and nine functional and the socio-demographic characteristics of the consumer. For the purposes of this thesis, the researchers decided to focus upon the eight psychological barriers of the Active Innovation Resistance typology as it was developed from Talk and Heidenreich (2014). The reasons behind this decision were the time restriction of the study and the fact that the researchers wanted to mainly focus on investigating the level of difficulty the consumers have

when adopting an innovative circular fashion product or when they are forced to change their traditional habits.

2.7 Research Variables

According to the identified Active Innovation Resistance (AIR) barriers of Talke and Heidenreich (2014), the research at hand examines the eight psychological barriers that apply to innovative circular fast fashion products (figure 1).

Talke and Heidenreich (2014) identify eight psychological barriers which emerge when the innovative product is incompatible with "the consumer´s values, norms, and individual usage patterns or if its usage is perceived as being too risky". (Talke & Heidenreich, 2014, p.6). The psychological barriers are considered to be activated when the innovative product opposes the consumer's beliefs. If a consumer has concerns about the innovative product being dysfunctional or malfunctional, the functional risk barrier emerges. Furthermore, when the innovative product is considered to threaten the physical condition of the consumer the personal risk barrier arises. The economic risk barrier applies when the consumer believes that the cost of the innovative product is too high resulting in wasting the financial resources. The social risk barrier appears when the consumer fears that the innovative product will not be approved by a social group. When the information about the innovative product or service is unclear and causes uncertainty about undesired results, then the information barrier rises. The image barrier surfaces when the innovation gets connected to a less popular link, for example, the brand or the origin country, or the manufacturer. The moment the innovation is considered to break certain group norms or values (social, family) then the norm barrier appears. Finally, when the innovation is perceived as a threat to previous, established usage patterns, the usage barrier surfaces. In their study, Talke and Heidenreich found that the psychological barriers display a more important role within the different relative importance of the AIR barriers.

Gender, age, employment status, and highest qualification are the background variables of this study. The reason these specific socio-demographic variables will act as background variables is that they will give a perspective of a moderate or no correlation with the eight main variables (the eight psychological barriers) and their effect upon the buying intention. The socio-demographic variables are the background variables in many research papers whose target

is to examine social phenomena. For the purposes of this research, the particular socio-demographic variables are being employed in order to investigate if and how they affect the findings of the survey. Furthermore, in their article Mori and Mlambiti (2019) stress the importance of understanding the socio-demographic factors as moderators of the adoption process. The authors highlight the fact that the dominant socio-psychological theories often neglect the importance of socio-demographic factors.

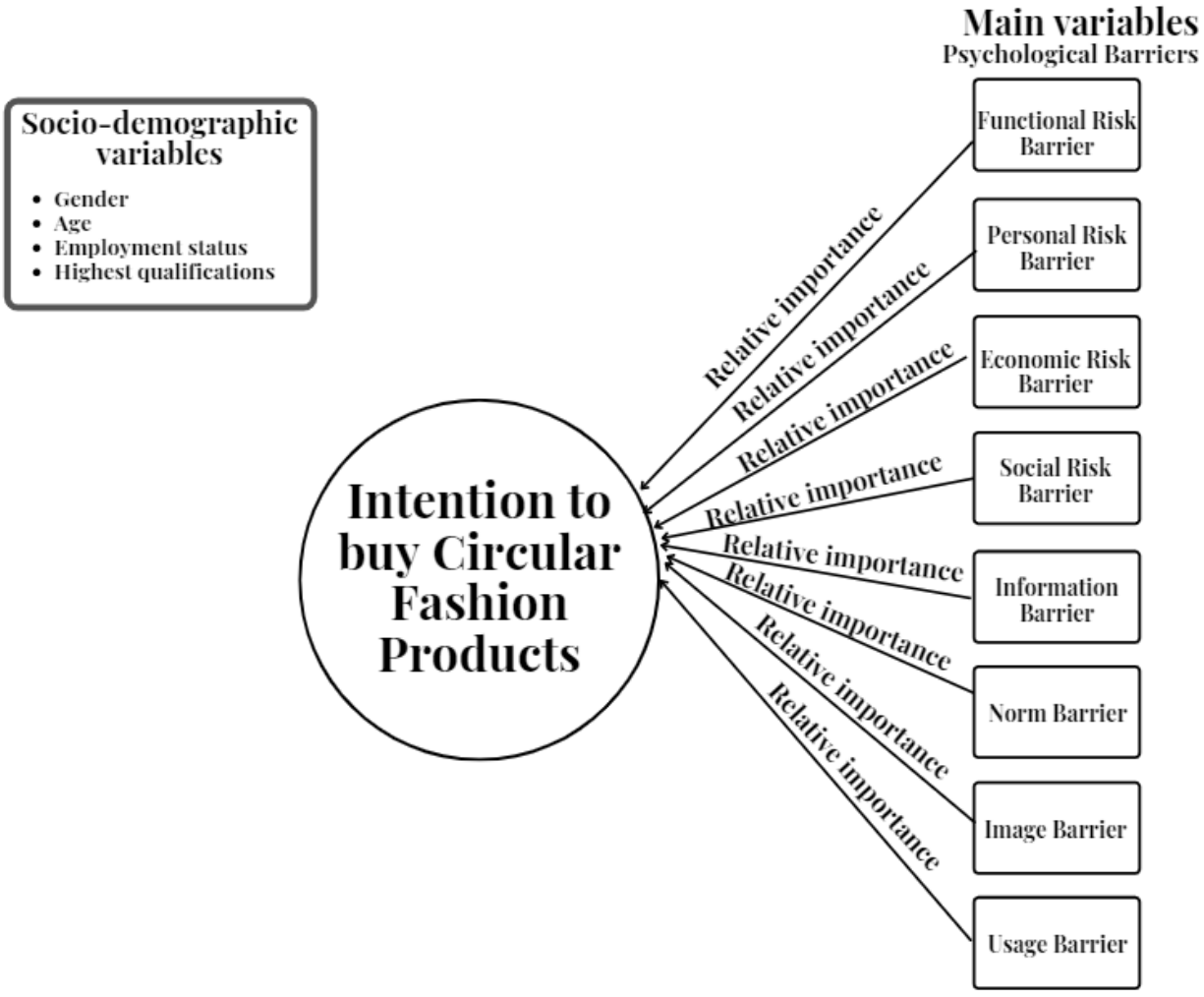

Figure 1: Research Variables

Functional Risk Barrier

According to Laukkanen (2016), the value risk refers to the performance and the value of the innovation when it is compared to its predecessor. Laukkanen (2016) breaks the value barrier into two: the performance and the value of the innovation. Furthermore, Talke and Heidenreich

(2014) interpret the functional risk barrier as being the barrier to be confronted by the consumer when the innovation might be dysfunctional or malfunctional. The recirculated clothing items having been reprocessed and retailored could grow the perception that they could not perform as the fashion items that are created from virgin materials.

Personal Risk Barrier

In Joachim et al. (2018) the personal risk barrier appears to be the fourth most significant barrier that prevents the intention to adopt an innovation. Laukkanen (2016) analyses the risk barrier saying that the consumer always considers different types of risk when confronted with adopting an innovation. While breaking down the risk barrier Laukkanen (2016) refers to the quality of the product and the potential of a fraud extending the list of potential risks including the physical risk. What is more, Talke and Heidenreich (2014) translate the personal risk barrier to the fear the consumer might experience when the innovation could be of harm to the physical condition of the consumer. The recirculated clothing items coming from chemically reprocessed materials can create the perception that they could be hazardous to the consumer´s health.

Economic Risk Barrier

According to Kushwah et al. (2019) the eco-friendly products, for instance, organic food, appear to have a low rate of acceptance because of the financial risk and the trust issue connected to them. In Laukkanen (2016) the risk barrier is dissolved into the risks of fraud and or the product quality followed by several risks including the financial risk the consumer takes when purchasing an innovative product or service. In addition, Talke and Heidenreich (2014) are shaping the economic barrier by mentioning that the consumer might perceive the cost of innovation as too high. In the fashion industry, the recycled clothing items have higher prices than virgin-origin items, since the cost of production is high and the consumers are called to pay the higher price.

Social Risk Barrier

Laukkanen (2016) decomposes the tradition barrier by expanding the meaning of tradition and what it entails. While the tradition barrier entails the routines and habits the consumer forms over time while using the products or services, it also translates into social values, norms, and social

compatibility. In Talke and Heidenreich the social risk barrier occurs when the consumer fears that the planned innovation adoption will not be approved by a social group. The fast fashion industry is rapidly adapting to the CSR strategies and adopts sustainable business models (Kazlowski et al. 2012), resulting in the production of recirculated clothing products that might not be approved by numerous social groups in the customer's environment.

Information Barrier

The information barrier mainly occurs when the customers receive asymmetric information which affects their willingness to adopt and results in consumer's hesitation to buy the product (Talke & Heidenreich, 2014). According to Joachim, Spietha, and Heidenreich (2018), the information barrier is one of the three most critical psychological barriers. The thesis at hand examines how the asymmetric information problem affects the consumer's intention to adopt circular fashion products.

Image Barrier

The image Barrier occurs when the consumer is having a negative impression about the innovation (Joachim, Spietha & Heidenreich, 2018). Previous research has proved that the image barrier is affecting consumer intention to adopt in the eco-cosmetic industry (Sadiq, Adil & Paul, 2021), while it has no effect in the mobile payment industry (Kaur, 2020), and online shopping (Lian, David & Yen, 2013). In the thesis at hand, the image barrier refers to the feeling of fear and uncertainty the consumers might develop from the chemicals used in the production process of circular-recycled clothes, or if they feel disgusted to wear the recycled or second-hand clothes.

Norm Barrier

The norm barrier occurs when the innovation is creating conflict with the consumers' traditions and norms (Ram & Sheth, 1989), or changes in consumer's habits or routines (Elbadrawy et al. 2012, cited in Kaur, 2020), which can result in a reluctance of this innovation. In previous research, researchers revealed that the norm barrier has different effects in different industries on the consumer's intention to adopt. For example, in the food delivery application (Ray, 2020) and online self-service (Lian, David & Yen, 2013), they found that the norm barrier has a big effect on consumer's intention to adopt, while in mobile payment (Kaur et al. 2020) they found that it

has no effect. The present thesis tests the role of the norm barrier as an important factor that affects the consumer's intention to adopt in the circular fashion industry.

Usage Barrier

Usage barrier refers to the challenges that occur from using the new innovation in comparison with the traditional products that the consumers are used to (Ram & Sheth, 1989). According to (Sadiq, Adil & Paul, 2021) the usage barrier is considered to be one of the main barriers that affect the consumers' adoption of innovations, and its importance increases if the innovation is unfamiliar to the consumer, for example, the sustainable or eco-friendly innovations. The fast fashion industry is considered a fast-paced industry that affects the consumer's consumption habits (Kaisa et al. 2018). In previous studies, the eco-cosmetics industry (Sadiq, Adil, & Paul, 2021) and the mobile payment service (Kaur, 2020) were affected by the usage barrier, while the mobile banking (Laukkanen, 2016) and online shopping industry (Lian & Yen, 2013) were not affected.

Based on the previous discussion of the eight different psychological barriers, this thesis aims to explore the relative importance of the eight psychological barriers on the consumer's intention to adopt or buy circular fashion products and examine whether the socio-demographic factors of age, employment status, and educational level have an influence on the adoption process.

3. Methodology

This chapter starts by presenting the research questions, the main variables, and the socio-demographic variables. Then there is a focus on the research design, the sample of the study, the data collection, and the data analysis.

3.1 Research questions

Q1: What is the relative importance of the psychological barriers affecting the customer´s intention to adopt/buy innovative-sustainable fast fashion products?

Q2: What is the influence of the socio-demographic factors on consumer's intention to adopt/buy innovative-sustainable fast fashion products?

3.2 Research Design

Our research questions are deductive since we are aiming to test the AIR (Active Innovation Resistance) barriers theory and Rogers' Diffusion of Innovations theory and how those apply within the fast fashion industry. These theories have been tested before within other industries. We are choosing a cross-sectional design since we are interested in a variation, our data will be collected almost simultaneously, the data we will collect are quantifiable and we want to examine the relationship between the variables. According to Bell, Bryman and Harley (2018), "survey research comprises a cross-sectional design in relation to which data are collected predominantly by questionnaire or by a structured interview on more than one case (...) and at a single point of time in order to collect a body of quantitative or quantifiable data in connection with two or more variables (...) which are then examined to detect patterns of association." (Bell, Bryman & Harley, 2018, p. 60) In the same page Bell, Bryman and Harley (2018) refer to the term “survey” and they support that surveys appoint to the cross-sectional research design while the data are gathered through questionnaires or structured interviews. While being in the process of choosing between research tools to conduct the social survey it became evident that the most appropriate tool for conducting our research is the self-completion questionnaire with closed type questions or the Likert-scale type of questions. The self-completion questionnaire has certain advantages and disadvantages compared to the structured interview. For example, the self-completion questionnaire is cheaper to hand out, quicker, more convenient, the questions are concrete and are not affected by the interviewers´ personality or social bias or how and in which order the interviewer asks the questions.

3.3 Sample of the study

In order to realize this research a sample of random people based in Sweden will be used, which will be called to participate in a social survey. The data will be gathered by conducting a large-scale web survey that will involve structured questionnaires. The research population targeted is young and middle-aged male and female adults living in Sweden, aged between 18 years old and 41 years old. According to Paul et al. (Paul et al. 2016, cited in Sadiq, Adil & Paul, 2021), the concept of green consumption is complex to be understood by people aged below 18 years old. On the other hand, the age limit of 41 years old would help the current survey to set an age limit to the older participants since the target is generation Y which includes people that are

up to 41 years old. A representative subset of the population will be assigned the questionnaire through different social media platforms and emails. Although the response rate for online questionnaires is decreasing (Sheehan 2001, cited in Bell, Bryman & Harley, 2018) the plan is to boost the response rate by contacting participants before sourcing the questionnaire, by having a follow up with the participants who did not respond and by using the closed type of questions. According to Hogg, Tanis, and Zimmerman (1977), a sample size should be above 25-30 people, therefore the overall aim is to exceed 30 participants.

In 1952 Karl Mannheim developed the main principles of the theory of the generation which states that the people who belong to the same generation or age group share the same historical and social context and their experiences are limited due to that specific social and historical context making them display a certain way of thought and action, (Mannheim, 1952). Mannheim's theory is relevant until today since contemporary literature uses it as a basis to develop. For example, Pendergast (2009) in his paper says that the theory of the generation is important in helping us acknowledge the ways the historical and social context are able to generate homogeneity traits among the people that belong to a certain generation. This way the theory of generations gives the researchers the opportunity to study the phenomena in a broader socio-cultural context than to focus on the consumer individually. (Appendix 7.1)

3.4 Data Collection

This thesis falls into quantitative research where the data is collected through an online survey questionnaire. The theoretical framework was developed based on the data collected from academic articles, books, and statistics. A pilot test was conducted on 7 individuals before starting the data collection phase, through which we received feedback and developed the questionnaire further. As the online questionnaires are challenging in terms of response rates, the Typeform platform formed the most appropriate tool to approach respondents. Typeform is a platform for conducting online surveys and is well known for its interactive and engaging designs. Moreover, the Typeform platform provides a summary of the different findings-data in an easy and visualized way that a non-statistician or professional researcher can understand and process. The survey questionnaire can be found in the Appendix section 7.5 of the thesis at hand. The survey questions were developed in the English language and were sourced between the

12th of April 2021 as a starting date, and the 6th of May 2021 as a closing date. Furthermore, the survey questionnaire was sourced through different social media platforms such as LinkedIn, Facebook, and Whatsapp. A number of 93 responses was received out of which a number of 79 responses constituted the final sample of the research. The data were filtered based upon the selection criteria, for example, the age limit.

3.5 Operationalisation

In the operationalization section, the aim is to clarify the way the relative importance of the eight psychological barriers upon the buying intention and their relationship to the socio-demographic factors is going to be measured through the medium of the questionnaire, in this case. The questionnaire becomes the formal instrument that will be used to record all the responses of the people participating in the survey. The questions' purpose is to capture the main variables, that is the psychological barriers and the background variables' (socio-demographic factors) different dimensions, where that is possible, and turn them into measurable units so that an analysis can be performed.

The questionnaire is divided into two parts, where the first part aims to gather the socio-demographic information, that is to define the background variables and to answer-measure their effect on the consumers' intention to buy. The second part contains questions that capture and measure the eight psychological barriers, that is the main variables, as they were defined by Talke and Heidenreich (2014). For each barrier, a set of questions is developed in order to measure the different dimensions of each barrier and their influence upon the buying intention. The questionnaire was consciously kept short in order to achieve low dropout rates and high response rates accordingly.

3.6 Data Analysis

For the data analysis and the data collection phase, the Typeform platform is operated. This quantitative tool presents some basic histograms about the results. The data is extracted in a CSV format before importing it to the R programming tool. Furthermore, the data is sorted and coded according to each variable after excluding the data that does not fall within the targeted age limit. A number of 93 responses has been received, which afterward was reduced to 79 responses to

better serve the purposes of the research. First, a general descriptive data analysis is performed where the mean, median, standard deviation, and minimum and maximum values are presented. Subsequently, a Cronbach's Alpha test for the variables is carried out to measure the internal reliability and consistency of the data. A Kolmogorov-Smirnov test is the next step in this thesis to measure the normality of the data distribution. In addition, an exploratory data analysis is conducted using the box-plot statistical technique to visualize a summary of the data findings. Furthermore, the ANOVA test is used to verify the significant level of the box plot findings, but since not all of the variables are normally distributed, the Kruskal-Wallis rank-sum test and the Wilcoxon rank-sum test are employed in order to give the researchers reliable and comparable findings.

4. Empirical data and findings:

4.1 Descriptive statistics

The overview empirical data, that is the data that was used in the analysis, are displayed in the descriptive statistics. According to Holcomb (2017), descriptive statistics organize and summarize, in an effective way, the large quantity of collected data that will consequently be interpreted. Descriptive statistics is therefore a useful tool for the researcher for sharing the data collected and presenting the data in a clear and simple way through graphs, percentages, and averages. This thesis' objects are humans and the descriptive statistics will provide the important information of the statistical values in order to give the researchers the advantage of control of the study. The descriptive statistics introduced in the table in table 1 contain the main variables, and the socio-demographic variables along with the mean, the median, the standard deviation, and the minimum and maximum values.

	Mean	Median	Standard deviation	Min	Max
Main variables					
Functional risk barrier	4.00	4.00	0.82	1	5
Personal risk barrier	3.53	3.33	0.93	1	5
Economic Risk barrier	4.22	5.00	0.91	1	5
Social Risk barrier	2.49	2.00	1.14	1	5
Information barrier	3.18	3.00	1.11	1	5
Norm barrier	2.79	3.00	1.49	1	5
Image barrier	3.40	3.00	1.03	1	5
Usage barrier	3.92	4.00	0.84	1	5
Socio-demographic variables					
Age	29	30	-	19	41
Gender	**Females** 59.6%	**Males** 40.4%	-	-	-
Employment status	-	-	-	-	-
Highest qualifications	-	-	-	-	-

Table 1: General descriptive statistics

In Holcomb (2017) the standard deviation is humoristically called the first cousin of the mean. The standard deviation shows the spread of the data from the mean. According to Holcomb (2017) a standard deviation above or equal to 2, indicates that there is high variability and that the data is spread away from the mean. While a standard deviation value below 2 indicates that the values are close to the mean value. The standard deviations of the main variables are between 0.82 and 1.49 and below the deviation value of 2. This finding suggests that the variation of the data is low and that the values are close to the mean value.

The economic risk barrier has the highest mean value of 4.22 which indicates that the participants take into consideration the price of the circular fashion items when they are in the decision buying process phase The functional risk, personal risk, information, and usage barriers come next with mean values above 3, which is considered high. This finding suggests that the participants of this study are also considering the above-mentioned barriers when they think of buying circular fashion products. The social risk and norm barriers are represented in the least number of the mean reaching the values of 2.49 and 2.72 respectively. This finding implies that the social consideration and tradition of the respondents are the barriers that least affect their intention to buy different circular fashion products.

4.1.1 Cronbach's Alpha

The Cronbach's Alpha Test is a tool that helps the researcher measure the internal reliability and consistency of a set of items as a group. This way the researcher is in the advantageous place of controlling which of the items used for measuring a variable are in accordance with each other or not (Mokkink et al. 2017). The use of Cronbach Alpha is imperative as it is a measure of scale reliability. Thus, Cronbach's Alpha is a coefficient of reliability. The Cronbach Alpha test exhibits a computed alpha coefficient, which is between 1 and 0. When the value is 1 it translates as perfect internal reliability and when the value is 0 it translates to no internal reliability. The custom rule says that when the Alpha values are equal or above 0.7, they are considered sufficient for internal reliability.

There is extended literature that argues about the sufficiency of the Alpha values. According to Griethuijsen et al. (2014, cited in Taber, 2018), a Cronbach's alpha of 0.6 and above is an acceptable and satisfactory level of reliability, however, many researchers agree that a Cronbach's alpha of 0.7 and above is the acceptable value for internal reliability. In the thesis at hand, the main variables have different Cronbach's alpha values. The functional risk barrier and the information barrier have Cronbach's alpha values of 0.7. The personal risk and image barriers have a Cronbach's alpha of 0.6, and the social risk and usage barriers have a Cronbach's alpha value of 0.5. The Cronbach's alpha is not applicable to the economic risk and norm barriers as they have been measured using one question in the survey questionnaire.

The initial questionnaire was measuring the relative importance of the eight psychological barriers on the consumer's intention to adopt/buy innovative-circular fast fashion products. In order to determine if the eight psychological barriers have an effect upon the adoption of the clothing innovation, and in order to capture the different dimensions of each barrier several questions were developed for each barrier. Since the Cronbach's Alpha test resulted in low values for many of the psychological barriers, the logic dictated the removal of several questions from the questionnaire and therefore measured each barrier with a respective number of questions that would lead to valid results. In this manner, internal consistency is promoted and the tests that would follow would provide clear and consistent results and answers to the research questions. Similarly, the questionnaire developed by Laukkanen and Cruz (2008) examined five

in total barriers both functional and psychological, by a different number of questions that measure each barrier, employing the different dimensions of each barrier.

Cronbach's alpha

Main variables	Cronbach's alpha
Functional Risk	0.7
Personal Risk	0.6
Economic Risk	NA
Social Risk	0.5
Information	0.7
Norm	NA
Image	0.6
Usage	0.5

Table 2: Cronbach's Alpha results

4.1.2 Kolmogorov-Smirnov Test

Ostle (1963, p. 471) examines the Kolmogorov-Smirnov test as a more powerful alternative to the chi-square test of goodness of fit. The Kolmogorov-Smirnov test explores whether the variables follow some distribution in some populations. The displayed variable distribution can be normal or not normal, that is why the test is commonly called the Kolmogorov-Smirnov normality test. When the significance value is $p > 0.05$ the variable is normally distributed, while when the significance value $p<0.05$ the variable is not normally distributed. Since half of the variables after the test show no normal distribution. Ghasemi and Zahediasl (2012) refer to the limitation of the Kolmogorov-Smirnov test, which performs high sensitivity to extreme values.

In the thesis at hand, there are eight main variables from which four of the variables are normally distributed and four are not normally distributed.

Kolmogorov-Smirnov Test		
Main variables	**P-value**	**Distribution**
Functional Risk	0.05997	Normal
Personal Risk	0.1405	Normal
Economic Risk	0.000000004523	Not normal
Social Risk	0.000933	Not normal
Information	0.09691	Normal
Norm	0.001344	Not normal
Image	0.01842	Not normal
Usage	0.2352	Normal

Table 3:Kolmogorov-Smirnov test results

4.1.3 Box Plot

In their article, Williamson, Parker, and Kendrick (1989) identify and explore the Box Plot as a statistical technique. More specifically, it is argued that in order to identify patterns that are not directly visible in the exploratory data analysis the statisticians are equipped with the statistical technique of Box Plot. What the box plot does is use the approximate quartiles (the upper and lower hinges), the lowest and highest data points to show the level, symmetry, and spread of a distribution, and finally the median of the data values. The Box Plot is a statistical technique that can be easily processed in order to identify outlier data values.

McGill, Tukey, and Larsen (1978) mention that the Box plots present clusters of data. The Box Plots make use of five values from a data set, namely the median, the quartiles, and the extremes. The Box Plots is a popular tool and provides visual summaries. Being a visual method, "it is more than a substitute for a table: It is a tool that can improve our reasoning about quantitative information". (McGill, Tukey & Larsen, 1978, p. 916)

The research questions that this thesis attempts to answer are the following:
"*Q1: What is the relative importance of the psychological barriers affecting the customer´s intention to adopt/buy innovative-sustainable fast fashion products?*
Q2: What is the influence of the socio-demographic factors on consumer's intention to adopt/buy innovative-sustainable fast fashion products?".

In other words, this thesis is examining the barriers and their relative importance when the consumer is buying circular fashion items, but also the role of the socio-demographic elements on the consumer's buying intention. The responses from the survey participants are being used for each barrier after averaging out the questions for the same barrier when they display a high Cronbach's Alpha value. A Box Plot analysis is applied since it will visually summarize the data and thus it will make the comparison and the interpretation of the data uncomplicated. The Box Plot is not dependent on the mean but the median, which is not affected by outliers. This thesis has five main findings which will be presented with an explanation for each finding.

1) Finding one: *Different psychological barriers are affecting the respondent's adoption and intention to buy circular fashion items differently*

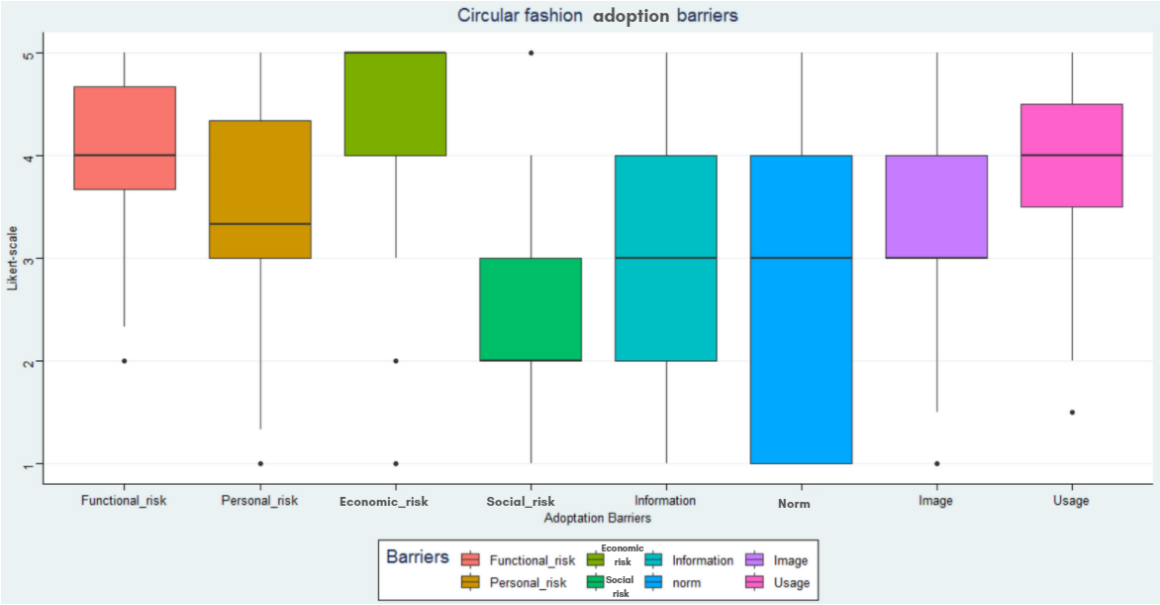

Figure 2: Psychological barriers' different effect on the consumer intention to buy

According to figure 2, the respondents face the economic risk barrier the most when thinking of buying circular fashion products. The functional risk barrier appears to be the next more influential barrier, followed by the personal risk, and the usage barriers, with the rest of the barriers completing the general image of the most influential psychological barriers (social risk, information, norm, and image). To know if those results are statistically significant or not, the one-way analysis of variance (ANOVA test) is the next analysis in focus.

2) Finding two: *The image barrier has a higher effect on the females' intention to buy circular fashion products more than the males'*

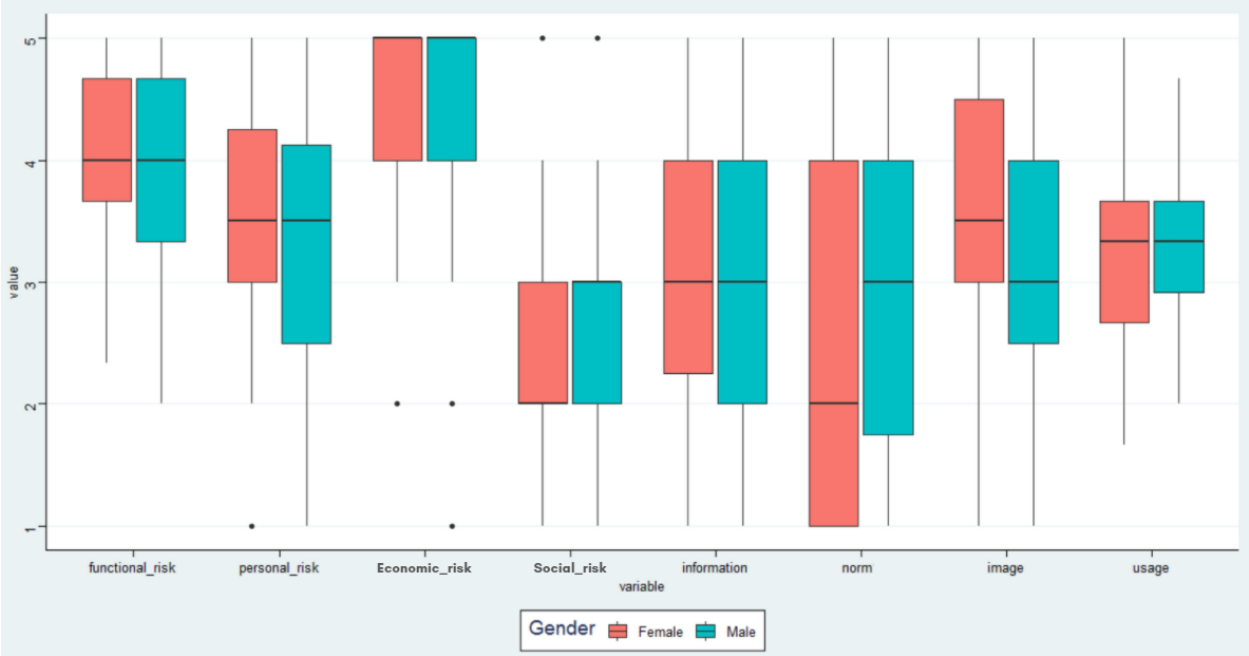

Figure 3: Psychological barriers' effect per gender

When comparing different barriers in terms of gender, the finding implies that there is no difference for all the adoption barriers between males and females, except for the image barrier. According to Figure 3, the female participants tend to have a higher image barrier than the male participants.

3) Finding three: *The functional risk barrier, the personal risk barrier, and the information barrier have more effect on generation Y than on generation Z*

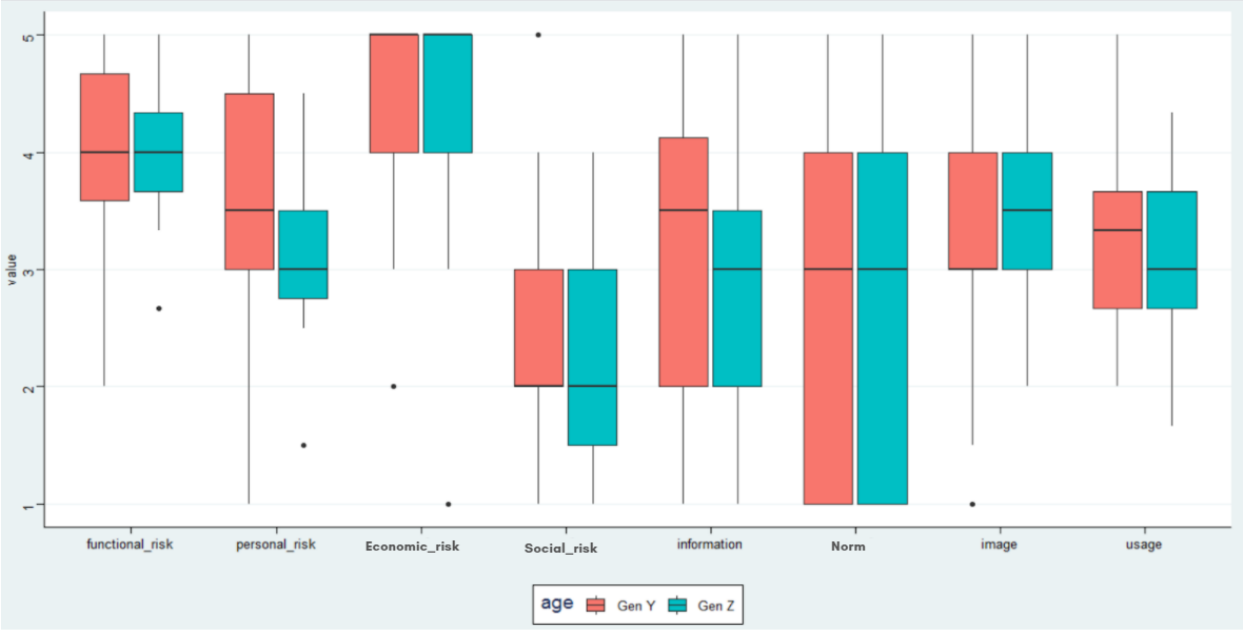

Figure 4: Psychological barriers' effect per generation

The results presented in figure 4 show that five of the psychological barriers for adoption have the same effect on both generation Y, aged between 18 - 26, and generation Z, aged between 27-41. Each of the functional risk, personal risk, and information barriers seem to differ between generation Y and Z. Generation Y's intention to buy circular fashion products seems to be affected more than generation Z, by the three aforementioned barriers.

4) Finding four: *The social risk barrier, the information barrier, and the norm barrier are affecting the participants with full-time employment more than the students*

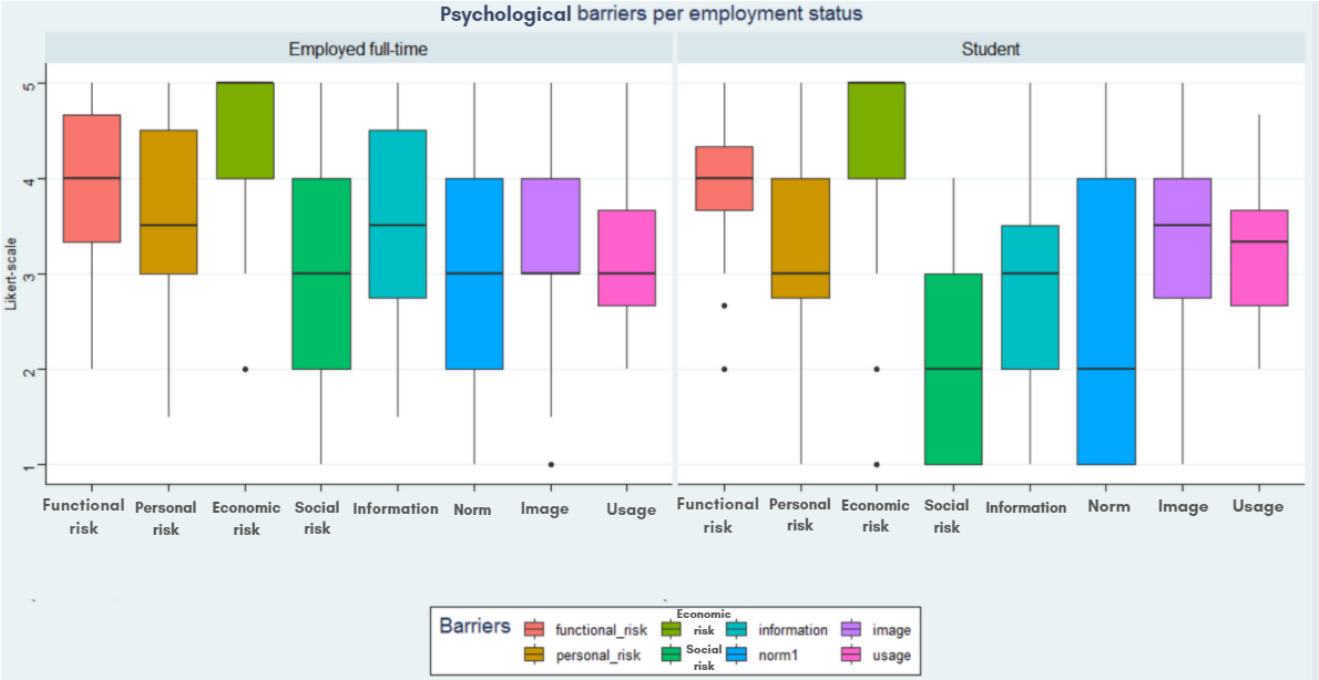

Figure 5: Psychological barriers' effect per employment status

According to figure 5, the participants who have a full-time occupation are more affected than the student participants by the social risk, the information, and the norm barriers.

5) Finding five: *The social risk barrier, the information barrier, the norm barrier, and the image barrier are affecting the master and the graduate students' intention to buy circular fashion items more than the undergraduate students*

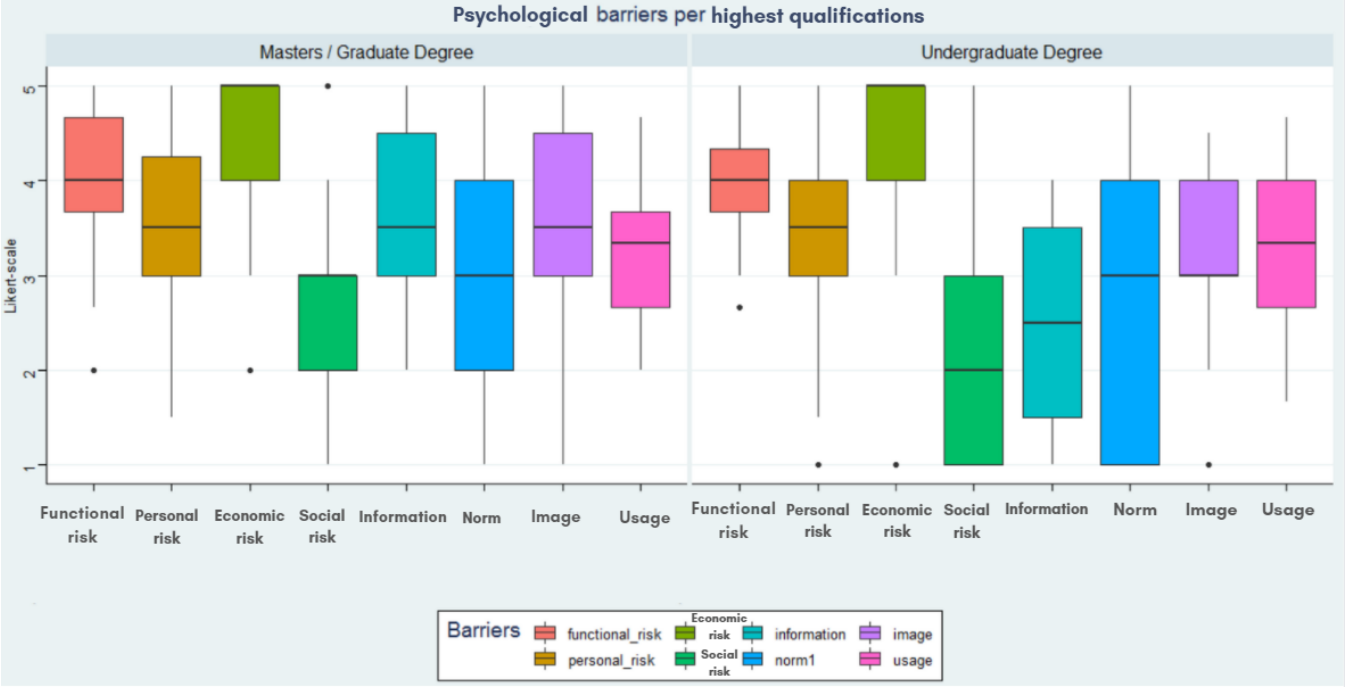

Figure 6: Psychological barriers' effect per highest qualifications

According to figure 6, each of the social-risk, the information, the norm, and the image barriers are affecting the master and graduate students more than the undergraduate students' intention to buy circular fashion products.

4.2 ANOVA test

In Hesamian (2016) there is a clear description of the ANOVA statistical technique and the classical one-way ANOVA. According to Hesamian (2016), the "analysis of variance (ANOVA) is an important method in exploratory and confirmatory data analysis" (Hesamian, 2016, p. 2682). Thus, the ANOVA allows the researcher or statistician to test if the means of three or more populations are equal or not. Furthermore, the one-way ANOVA is the most simple ANOVA model that allows the comparison of the means of numeral populations. After reaching specific basic assumptions about the population under the research scope, the classical one-way ANOVA is introduced. The ANOVA technique enables the researcher to test the hypothesis by testing the equality of the means for two or more populations by studying the variance of the

samples. The prerequisite assumptions for applying the ANOVA are that all the study populations have the same variance (standard deviation), they follow a normal distribution, and that the samples follow a random selection and thus, they are not dependent on one another. ANOVA is a hypothesis test belonging to the family of parametric tests. Hesamian (2016) clarifies that "the null hypothesis for a one-way ANOVA always assumes that the population means are equal". (Hesamian, 2016, p. 2684) Even though the one-way ANOVA might present that a group differentiates from the others, it will not point out which group it is. The ANOVA technique is usually complemented by comparisons between the means, which reveal the pattern behind the difference among the means.

In order to find the statistical inference, a one-way ANOVA test has been used to evaluate the null hypothesis. The null hypothesis is that there is no difference among the barriers' means. If there is a statistically significant difference between the barriers' means, ANOVA will report a statistically significant result. The alternative hypothesis is that the different barriers means are not equal.

$$H_0 : \mu_1 = \cdots = \mu_k$$

Null hypothesis

$$H_A : \exists\, i, j : \mu_i \neq \mu_j.$$

Alternative hypothesis

When conducting the ANOVA test, the P-value was found to be very small, which consequently leads to the assumption of the rejection of the null hypothesis.

	Df	Sum Sq	Mean Sq	F value	Pr(>F)	
Barrier	7	218.2	31.173	28.2	<2e-16	***
Residuals	624	689.9	1.106			

ANOVA test's P-value

In order to trust this result, there are three checkpoints of the ANOVA about the data at hand to be met (Moder, 2010). The three checkpoints are formulated as follows:

1. *Check the independent samples*.
2. *Check the normality plot of residuals*
3. *Check the homogeneity of variances*

4.2.1 Testing assumptions:

1. Check the independent samples:

Since this thesis' online questionnaire is conducted based on a random sample selection, it is assumed that this assumption is met.

2. Check the normality plot of residuals:

According to Marden (1998), and Ghasemi and Zahediasl (2012), the QQ-plots appear to be a useful and popular diagnostic and visual tool when the researcher attempts a univariate data analysis and wants to check the normality visually. Ghasemi and Zahediasl (2012) state that given the fact that the reader has a visual representation of the data they have the advantage to decide upon the normality of the distribution. The QQ-plots tool bestows a “graphical assessment of the fidelity of a sample to a particular distribution F, or of the differences between two independent samples” (Ghasemi and Zahediasl, 2012, p. 813) .

The QQ-plots match a set of quantiles, then make a comparison between the quantile of the distribution F and the quantile of the current sample. Another comparison that can be useful is between the quantiles of two different samples. If the plotted point appears to be closer to the 45◦-line, the two distributions are close to each other. Marden (2004) mentions that the QQ-plots are also used to acknowledge the outliers and the differences in scale and location among other differences. One application of the QQ-plots tool is to compare the residuals to the normal distribution in linear regression. In order to be led to an acceptable estimation of the residuals, the researcher should have a solid estimate of the regression line.

To test the assumption, a quantile-quantile (QQ) diagnostic plot is being used. The normal probability plot of residuals is used to check the assumption that the residuals are normally

distributed. It should approximately follow a straight line. In the plot below, the quantiles of the residuals are plotted against the quantiles of the normal distribution. A 45◦-line reference is also plotted.

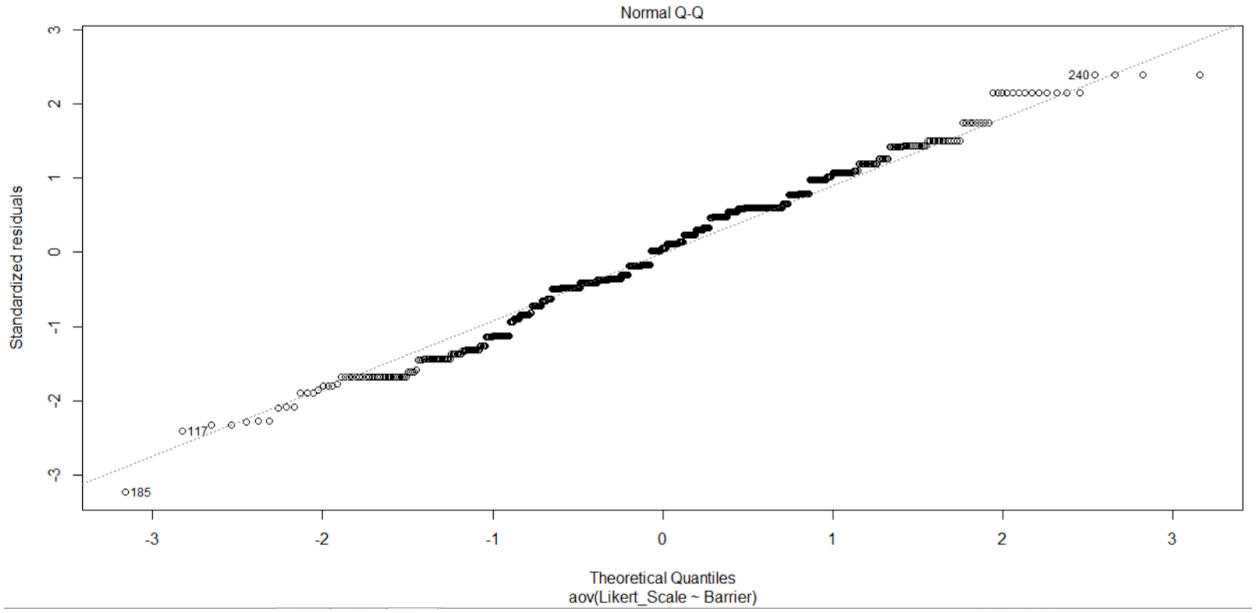

Figure 7: QQ plot for normality testing

The QQ diagnostic plot shows that the data does not meet the normality of residuals assumption, but since looking at the charts can be subjective, a Shapiro-Wilk normality test is performed to test the normality of the data (see appendix 7.3).

According to Fisher (1999), the data is considered normally distributed if the P-value is greater than or equal to 0.05, and a P-value of less than 0.05 is not normally distributed. The P-value for this study is below 0.05 which agrees with what we found in the QQ plot and also rejects the normality assumption.

3. Check the homogeneity of variances

Since the ANOVA test can be trusted with small departures from normality, the second assumption is tested by using the homogeneity of variances. Levene's test is employed to check

the homogeneity of variances in the eight barriers (see appendix 7.4). The null hypothesis of this test is that the variances of the groups are homogeneous.

After running Levene's test for homogeneity of variance, the P-value is found to be much smaller than 0.05. The low score means that the data does not meet this assumption.

Since the data does not meet the 2 assumptions of *the normality plot of residuals* and *the homogeneity of variances*, the results of the ANOVA test cannot be trusted and a non-parametric test is needed (no generation of assumptions from the data). In the thesis at hand, we will rely on the Kruskal-Wallis rank-sum test, which is a non-parametric test, as the ANOVA assumptions are not met by 2/3.

4.3 Kruskal-Wallis rank-sum test

Chan and Walmsley (1997) describe the Kruskal-Wallis rank-sum test as a one-way analysis of variance by ranks. The Kruskal-Wallis or H test is useful to the researcher or the statistician when one or more independent groups present similarities or differentiate regarding the variable in focus when there is available a ratio or ordinal or interval level of data.
Similarly, Vargha and Delaney (1998) argue that the Kruskal-Wallis test is the most appropriate formula when the researcher aims to compare three or more independent samples. Nevertheless, the weakness of the H test lies in the fact that the assumptions and the alternative hypotheses lack clarity and the results are occasionally controversial and inconsistent. In addition, the Kruskal-Wallis test exhibits a weakness when it comes to revealing with consistency alternative hypotheses, but successfully reveals the exceptions to stochastic homogeneity. In order to test the null hypothesis of stochastic homogeneity the researcher can instead perform a Wilcoxon rank-sum test, that is similar to the H test.

The null hypothesis for the Kruskal-Wallis test is that the distribution of the responses is the same in all the barriers. The alternative hypothesis is that responses are consistently larger in some populations compared to others.

The test results are the following:

```
        Kruskal-Wallis rank sum test

data:  Likert_Scale by Barrier
Kruskal-Wallis chi-squared = 143.57, df = 7, p-value < 2.2e-16
```

After conducting this test, the P-value of the Kruskal-Wallis rank-sum test appeared to be very small. The finding suggests that the null hypothesis is being rejected, and thus the assumption is that the distribution of the participants' responses is not the same in all the barriers. Although the results show that the distribution of all barriers is not the same, this test does not show the exact differences between different independent variables. Based on that, a pairwise comparison has been employed using the Wilcoxon rank-sum test.

4.4 Wilcoxon rank-sum test

Rosner et al. (2003) mention that the Wilcoxon rank-sum test is a test that the researcher runs when the acquired distributions are not normal or unknown and the comparison of measures of location is desired. Furthermore, in Natarajan et al. (2012) it is supported when the researcher faces a complex survey sampling, the solution is to sample a fraction of a finite population. The authors then place a solid argument about the complex surveys that need to entail clustering and stratification. In order for the researcher to generalize the sample to the finite population the stratification and the clustering are integrated into the analysis. The Wilcoxon rank-sum test is a statistical tool that makes a comparison between the ordinal outcome of two groups. Thus, the Wilcoxon test helps compare ordinal variables in bivariate analyses.

The Wilcoxon rank-sum test is a non-parametric test that compares two independent variables and shows if there is a statistically significant difference between both of their medians. It’s used when the data is not normally distributed. The P-value has been adjusted based on BH correction which is recommended based on Benjamini and Hochberg (1995) as they mentioned that it’s a very powerful tool when comparing it to other correction tools. According to Fisher (1999), if the P-value is less than 0.05, the difference median value is considered statistically significant while it is considered not statistically significant if the P-value is less than 0.05.

In the next five sections, the five box plot findings are tested using the Wilcoxon rank-sum test. A null hypothesis and an alternative hypothesis are presented for each finding and a comparison between different P-values is targeted. The result of each finding is presented at the end of each section, and the significance level of each finding is also taking place.

4.4.1 Testing finding one: *Different psychological barriers are affecting the participants' adoption- intention to buy circular fashion items differently*

To measure if finding one is providing a statistically significant result, a Wilcoxon rank-sum test is run. The null hypothesis for this test is that all median values for the different eight barriers are equal. The alternative hypothesis is that the different barriers have different median values.

	Functional Risk	Personal Risk	Economic Risk	Social Risk	Information	Norm	Image
Personal Risk	0.00152	-	-	-	-	-	-
Economic Risk	0.00177	5.2e-07	-	-	-	-	-
Social Risk	8.1e-14	4.9e-09	7.8e-16	-	-	-	-
Information	3.3e-05	0.12529	1.1e-08	4.6e-05	-	-	-
Norm	2.0e-07	0.00023	1.0e-10	0.44559	0.01144	-	-
Image	0.00198	0.74293	8.5e-07	1.3e-07	0.17894	0.00076	-
Usage	0.52677	0.00650	0.00099	4.9e-13	0.00023	5.2e-07	0.00954

P value adjustment method: BH

Table 4: Pairwise comparisons using the Wilcoxon rank-sum test with continuity correction

According to the results presented in table 5, the image barrier in relation to the personal risk and the information barriers have P-values above 0.05, which implies that the three barriers share the same median values, and seem to have the same effect on the participants' intention to buy different circular fashion products. The usage and functional risk barriers presented a P-value of 0.52677 which is above 0.05. This finding suggests that their effect on the respondents' intent to buy is similar. Furthermore, the norm barrier, social risk barrier, and economic risk barrier show a P-value below 0.05 in relation to the rest of the barriers. This result indicates that the barriers of

the norm, social risk, and economic risk are uniquely affecting the participants' intention to buy. The economic risk barrier is considered the most important barrier that affects the intention to buy circular fashion products, while the social risk barrier has the smallest impact.

4.4.2 Testing finding two: *The image barrier has a higher effect on the females' intention to buy circular fashion products more than the males'*

For this finding, the null hypothesis is that the difference between the median of the image barrier variable for males and females is equal to zero. The alternative hypothesis is that there is a significant difference between the median of the image barrier variable for males and females.

```
        Wilcoxon rank sum test with continuity correction

data:  df_box_male$image and df_box_female$image
W = 578.5, p-value = 0.07843
alternative hypothesis: true location shift is not equal to 0
```

The P-value for the Wilcoxon rank-sum test - Finding no. 2

As the P-value is equal to 0.07843 which is > 0.05, the null hypothesis is accepted and the alternative hypothesis is rejected. This finding suggests that the difference between the image barrier's effect on males and females, visualized in the box plot, is not statistically significant and could have happened by chance.

4.4.3 Testing finding three: *The functional risk barrier, the personal risk barrier, and the information barrier have more effect on generation Y than on generation Z*

	P-value	Statistically segnificant
Functional risk barrier	0.5224	No
Personal risk barrier	0.5568	No
Information barrier	0.0442	**Yes**

Table 5: The P-value for the Wilcoxon rank-sum test - Finding no. 3

When testing finding three, the P-value for the functional risk barrier and the personal risk barrier are found to be more than 0.05, while the information barrier is found to be less than 0.05. The low P-value indicates that the finding is not statistically significant.

4.4.4 Testing finding four: *The social risk barrier, the information barrier, and the norm barrier are affecting the participants with full-time employment more than the students*

	P-value	Statistically segnificant
Social risk barrier	0.1111	No
Information barrier	0.009545	**Yes**
Norm barrier	0.4367	No

Table 6: The P-value for the Wilcoxon rank-sum test - Finding no. 4

The social risk and the norm barriers have a P-value of more than 0.05. This subsequently implies that they are not statistically significant. However, the information barrier is having a P-value of 0.009, which is less than 0.05. The null hypothesis is that the mean difference between full-employed participants and students is equal to zero. The alternative hypothesis is that there is a big difference between the mean of the full-employed participants and students. Therefore, in this case the null hypothesis is declined while the alternative hypothesis is welcome. Finally, this finding proves that the results in the box plot are statistically significant and reliable.

4.4.5 Testing finding five: The *social risk barrier, the information barrier, the norm barrier, and the image barrier are affecting the master and graduate students' intention to buy circular fashion items more than the undergraduate students*

	P-value	Statistically segnificant
Social risk barrier	0.2881	No
Information barrier	0.0021	**Yes**
Norm barrier	0.8838	No
Image barrier	0.3008	No

Table 7: The P-value for the Wilcoxon rank-sum test - Finding no. 5

The social risk, the norm, and the image barriers have a P-value of more than 0.05 while the information barrier has a P-value of 0.0021, which is below 0.05. The null hypothesis here is that the mean difference between the graduate and the undergraduate students in relation to the social risk, the information barrier, and the norm barriers is equal to zero. The alternative hypothesis is that there is a big mean difference between them. Based on the finding, the null hypothesis is rejected and the alternative hypothesis is accepted.

4.5 Summary of the analysis:

In the thesis at hand, a descriptive statistical analysis is carried out where the mean, median, standard deviation, minimum and maximum values for the main and socio-demographic variables are presented. A Cronbach's Alpha test is used to measure the internal reliability of the variables before conducting a Kolmogorov-Smirnov Test to discover if the data is normally or not normally distributed. Different Box Plots are employed in order to present different findings of the respondents' intention to buy different circular fashion products. The next imperative step is to run the ANOVA test to discover if these results are statistically significant or not. As the ANOVA test meets one of the three imperatively needed assumptions, consequently, a Kruskal-Wallis rank sum test and Wilcoxon rank-sum test are employed. Both the Kruskal-Wallis rank-sum test and the Wilcoxon rank-sum are non-parametric tests.

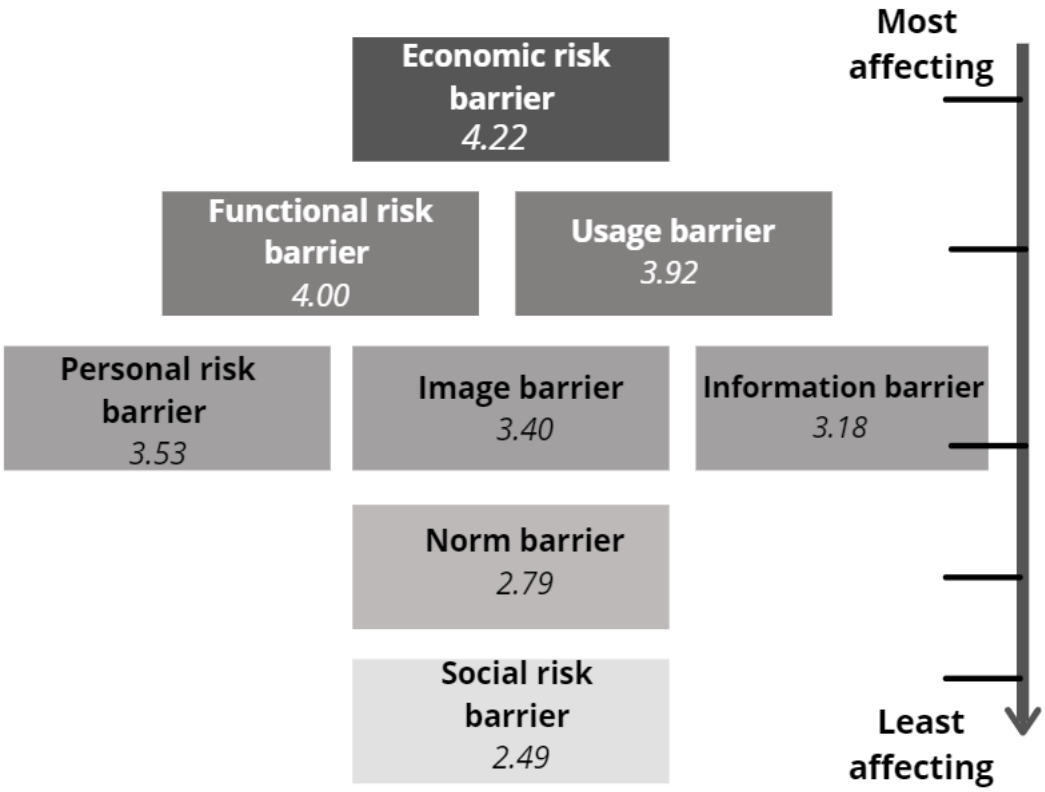

Figure 8: Barriers' order with the mean value for each barrier: From the most affecting to the least affecting barrier to the consumer intention to adopt innovative circular fashion products - Finding no.1 (Box Plot)

5. Discussion and implications

5.1 Discussion

The aim of this thesis is to explore the eight psychological barriers that affect the consumer's intention to adopt or buy circular fashion products and further examine whether age, employment status, and educational level have an influence on the adoption process of innovative circular fashion products. The previous research based on the innovation resistance theory includes many industries, but this is the first research that attempts to approach the circular fashion industry. The results of this research reveal several findings. In order to validate these findings, different tests have been conducted to disclose the level of significance of the results.

The first finding exposes that the economic risk barrier has the highest effect on the consumer's intention to adopt circular fashion items compared to the rest of the eight psychological barriers. The economic risk barrier is followed by the functional risk and usage barriers, the personal risk, image and information barriers, and finally by the norm barrier, in consecutive order. The barrier that appears to be the least effective is the social risk barrier. Following the formulation of the question that refers to the economic risk barrier, the finding suggests that the respondents are considering the price of the circular item compared to the price of a similar virgin fashion item during the decision-making process.

Additionally, this finding suggests that the high price of a circular fashion item can increase the reluctance to the circular fashion innovation. This finding agrees with Liao and Cheung (2001) who studied the consumer's buying attitude in the e-shopping industry. Their findings reveal that the consumer's willingness to adopt e-shopping services is affected negatively by the significantly increased price. The economic risk barrier finding also agrees with Song and Chintagunta's (2003) findings. The study unveils that the price of different innovations has a strong influence on the consumers' adoption process (Song & Chintagunta, 2003, cited in Antioco & Kleijnen, 2010). One explanation for this finding can be that since the consumer has less pricey and functional options for similar products, the consumer is more inclined to purchase the product that has the most value for money.

At the same time, the functional risk barrier and the usage barrier appear to have a considerable effect on the respondent's adoption process for the circular fashion innovation products. This finding suggests that the participants value the proper fitting of the circular fashion items they intend to buy. In addition, the respondents take under consideration the durability and convenience that the circular fashion items' daily use offers when compared to the respective virgin fashion items.

The personal risk and information barriers present a neutral effect on the respondents' intention to adopt. The finding proposes that the consumer, when in the decision-making process, does not consider if the manufacturer follows the universal health guidelines or if the circular fashion item will cause allergic reactions. Furthermore, the consumer seems not to be affected by not getting adequate information about the origin or the manufacturing process of the circular fashion item they intend to buy. This finding contradicts the Pasquinelli and Ravasio (2013, cited in Sandvik, 2017) finding. The researchers mention that the customers in the Scandinavian countries are increasingly aware of the importance of getting more information about the product they are going to purchase and the company behind it.

The social risk and norm barriers appear to have the least effect on the consumer's adoption process to circular fashion innovation items. The finding reflects that the consumer is less affected by societal perceptions. An explanation to this finding can be that this research is conducted in Sweden which is considered to be an individualized country. Sweden and other Scandinavian countries are regarded as anti-traditional value countries, according to Westerlund (2012). Since the Scandinavian countries do not comply with the norms and the traditions, this finding aligns with the following statement. The Scandinavian consumers are less affected by the country's norms and traditions when they decide to purchase innovative products.

The second finding suggests that there is no statistically significant difference between the males and the females in the adoption process of circular fashion items. An interpretation of the finding can be that both males and females are equally affected by the eight psychological barriers when they intend to purchase circular fashion products. The result agrees with the Mori and Mlambiti

research (2020) that focused on the internet banking industry. The researchers exposed that there is a difference between the genders but not statistically significant. Similarly, Kuntadi et al. (2020) report that gender does not have an influence on the innovation adoption process. However, this finding contradicts the research finding of Mamonov and Benbunan-Fich (2021). The researchers in this case suggest that women are better than men when it comes to adopting the smart lock innovation with a statistically significant difference. This result can be due to a balance between two facts. On one hand, women are more likely to shop and buy different clothing items in general (Peters, 1989). On the other hand, men are more risk-takers than women (Harris & Jenkins-Guarnieri, 2006), which means that they are more likely to try new innovations.

The third finding implies that the functional, personal, and information barriers seem to affect the buying decision on circular fashion products of generation Y rather than generation Z. The generation Y includes the people aged between 27-41 years old, while the generation Z includes people aged between 18-26 years old. Thus, the finding suggests that the older participants of the survey displayed a higher sensitivity to the psychological barriers studied than the younger ones. This finding does not contradict the finding of Gusel (2020), since in her study the younger participants were more inclined to adopt eco-friendly design and products. In their study, Ruggeri et al. (2018) present an important finding that is in accordance with the third finding of this study. More specifically, the researchers focused on three age groups and measured the technology adoption rates of self-driving vehicles. The study suggests that the older participants are, the more likely they are to resist the innovative vehicles and their innovative technology.

Similarly, the study of Kopaničová and Klepochová (2016) which examines the usage of new technologies in the purchasing process of the generations X, Y, and Z spotted significant generational differences. The findings of their study prove that the younger respondents are openly adopting the new technologies, while the middle-aged respondents resist the innovations proportionally. One reason behind the finding that the younger group of participants are less likely to be affected by the functional, personal, and information barriers might be that the younger population is consistently exposed to innovative products. Another reason for this result can be that the younger population disregards the fit and the lasting performance, the health

hazards, and the information about the production process of the circular fashion products increasing the positive intention to purchase them.

The information barrier appears to have a significant effect on the circular fashion products adoption process for the full-time employed respondents when compared with the students. Meanwhile, the social risk and norm barriers do not present a statistically significant difference for any of the groups. This finding implies that the full-time employed participants consider getting adequate information about the circular fashion item when thinking of buying circular fashion items more than the students' group. Furthermore, an interpretation of the finding can be that the students normally focus on the functionality of the circular fashion item as well as the price of it, since they operate with a limited budget.

Simultaneously the employees obtain financial means which enable them to consider other aspects of the products they intend to buy. The social risk barrier and norm barrier do not appear to have the same effect on both full-time employed participants and students, and thus the effect is not statistically significant. A potential explanation of this finding can be that the full-time employed source confidence from their employment status, and thus they are setting the norms and the societal perceptions for the rest. This finding contradicts Khan et al. 's study (2021) which displays no statistically significant difference between the employment status and the consumer adoption of the hybrid fuel-cell vehicle innovation.

The information barrier has a significant influence on the master and the graduate participant's intention to adopt circular fashion products compared to the undergraduate participants. This finding is coherent with Hungund, Sumukh, and Venkatesh's (2019) who's findings suggest that the educational level has a negative influence on the adoption of innovations. What is more, the finding also agrees with Wandji et al. (2012) study on farmers' adoption of new adequate technologies. This can be due to the fact that the higher the level of education, the more aware the individual can be. The comparison of those groups suggests that the educated individuals are more inclined to be satisfied by getting adequate information about different items more than undergraduate students. The social risk, the norm, and the image barriers are also affecting

masters/graduate student groups differently, however, this difference is not statistically significant.

The identification of the eight psychological barriers that mostly affect the consumer's intention to buy innovative circular fashion products is an important process not only for the companies that try to understand the consumer but also for the environment. This thesis by identifying the psychological barriers that arise when the consumer intends to buy circular fashion items can be a useful compass for the new circular fashion era which aims to erase the vast textile production and get rid of the take-make-dispose practices. Furthermore, the fashion industry companies strive to apply the circular economy model by promoting circular fashion products that often get rejected by the consumers. Understanding the different barriers that lead to innovation resistance can lead to building the 21st-century consumer profile. This subsequently helps the companies to adopt a circular business model, adopt environmentally friendly practices, and finally promote healthy consumption habits to the consumer. The circular economy model creates economic value for the companies, the society, and the environment as different stakeholders.

This study focuses on the consumer perspective in the circular economy model and practices unlike the majority of studies that focus upon the company's perspective. So how is the consumer responding to circular economy products and are they willing to pay for them? The consumers that took part in this survey that concern circular fashion products answered that the price of the circular product is of high importance, implying that the consumer makes the buying decision depending on the price of the object. The consumer is also highly sensitive to the usage barrier that stands for the established usage pattern and the functional barrier that emerges when the consumer is doubting about the functionality of the product, the comfort it offers and the lasting performance. At the same time, the consumer is highly affected by the functional barrier which rises when the consumer is concerned about the dysfunctionality of the circular product, the comfort it can offer, and the lasting performance it can have. The next moderately ranked barrier is the personal barrier which stands for the quality of the product and how dangerous it can be for the health of the consumer. Apparently, the consumers feel neutral about the danger a circular fashion item might entail.

The image barrier refers to the brand, the manufacturer, and the country of origin of the product, and thus the consumer would display slight reluctance to buy the circular product if it would come from a non-trustworthy manufacturer, a not well-known brand, or a developing country. This finding is in accordance with Boyer et al. 's (2021) finding, which questions the value of informing the consumers about the product's alignment to the CE paradigm. The information barrier that stands for the information about the circular product seems to be of quite moderate frequency implying that giving the consumer adequate information about the product is not very significant. The norm barrier seems to be troubling the consumer but not enough. The consumer by adopting the circular fashion object would face a challenge in changing their habits or routines according to the norm barrier. This suggests that the consumers would be indifferent or even willing to make changes, or are open to changes that would disturb their habits. The social barrier is a barrier with the least frequency and implies that the consumer often regards what the society approves or the circular products that are in accordance with the social values or norms.

Furthermore, this study suggests that the consumer categories suggested by Rogers Diffusion of Innovations theory can be in relevance with the socio-demographic factors' results. For instance, the male and female respondents of the survey seemed equally affected by the Active Innovation Resistance barriers. An implication of this result and a generalization can be that the genders can be equally distributed in the adoption scale of Rogers (innovators, early adopters, early majority, late majority, laggards). On the other hand, the generation the consumer belongs to, and thus the age seems to play a significant role in the adoption process, since generation Z was more openly and positively disposed than generation Y, to the innovative circular fashion products. This result could suggest that generation Z could belong to the innovators, early adopters, and early majority, while generation Y would probably belong to the late majority and laggards.

Furthermore, the employment status seems to affect the probability of adoption of innovative fashion products, since the full-time employed consumers appear to be more resistant than the students. Therefore, a probable assumption and generalization of this finding could be that the fully-employed consumers are more likely to belong in the late majority and laggards, while the students seem to belong to the innovators, early adopters, and early majority. Finally, the highest qualification appears to have a strong effect on the reluctance to adopt circular fashion products,

with the master holders and graduates resisting more innovative products than the undergraduates. If this result transfers to the Rogers Diffusion of Innovations theory, then the graduate students seem to belong to the innovators, early adopters, and early majority, while the master holders and graduates could belong to the late majority and laggards.

5.2 Implications (bridge, connect the research with the next chapter)

An implication of this thesis is that it can serve as a guide for entrepreneurs who want to start a business within the circular fashion industry or a guide for the marketing department in fashion companies. The findings of this thesis give different insights about circular fashion consumers. Marketers and entrepreneurs in the fashion industry can use those findings to adjust their marketing campaigns based on the interpretation of the findings on the psychological barriers that appear to be more relatively important on the consumers' buying intentions. As the findings reveal that the economic risk barrier has a strong influence on the consumers' adoption intention to circular fashion products, it seems that the consumers consider buying the circular fashion item that has the highest value for money. Based on that, marketers should focus on showing the maximum value of the circular fashion products during their marketing campaigns.

Since the functional risk barrier and the usage barrier show a significant importance level for the consumers, it is suggested that marketers should focus their marketing efforts on showing the functionality of the circular fashion objects and the convenience of the circular fashion product to daily use. Moreover, less attention should be paid to consumer’s social perceptions and norms, since the social risk and the norm barriers represent the least affecting barriers to the consumer's intention to adopt a circular fashion product. Furthermore, more attention should be given by the marketing department to generation Z as they are less affected by the eight psychological barriers compared to generation Y. Generation Y should also be considered, however, the marketing campaigns should include more information about the circular fashion items as the information barrier appears to have an influence on generation Y. This research can also be used from fellow researchers that would like to investigate the relative importance of the eight psychological barriers to the consumer's intention to adopt innovative products. The study can be transferred to other industries and contribute further to the dominant socio-psychological theories and research.

6. Conclusion, research limitations, and future work

6.1 Conclusion

The present thesis investigates the psychological barriers and their relative importance to the consumer's intention to adopt or buy innovative circular fashion products. It further examines whether the socio-demographic factors of age, employment status, and educational level have an influence on the adoption process of innovative circular fashion objects. The Innovation Resistance theory by Ram and Sheth (1989) is the cornerstone of the theories used to develop the theoretical framework and the research base. Even though the previous research based on the Innovation Resistance theory of Ram and Sheth (1989), included many industries, a limited share of research applied the innovation resistance theory in the circular fashion industry with a socio-demographic perspective. The current thesis is also based upon the new typology of Active Innovation Resistance barriers (AIR barriers) as developed and studied by Talke and Heidenrreich (2014).

The findings reveal that the economic risk barrier along with the functional risk and usage barriers exhibit the most significant influence on the consumer's reluctance to adopt circular fashion. These barriers, which lead the way, are accompanied by the personal risk, image and information barriers, and last but not the least, the norm barrier. The social risk barrier has the least impact on consumers' intention to adopt circular fashion. Moreover, the information barrier appears to have a higher effect on full-time employees, compared to students. The rule applies for generation Y compared to generation Z, and for master and graduate participants compared to undergraduate students. A more detailed analysis of the findings in this thesis is presented in the discussion section. All the findings have been validated using different tests to disclose the level of significance of the results.

6.2 Research limitations

Although this thesis presents interesting findings, there are some limitations that should be highlighted. The study has taken place in Sweden, a Scandinavian country, which implies that the results could be different if applied to other countries inside or outside Scandinavia. Another limitation is that the questionnaire for this study was focusing on generation Y, that is people

aged between 27-41 years old, and generation Z, that is people aged between 18-26 years old. The thesis at hand does not cover other generations, for example, generation X and baby boomers' generation. In addition, the questionnaire used for this study was conducted online through different social media channels. This hindered the researchers from having direct contact with the questionnaire participants for further discussing and understanding of the respondent's answers. Furthermore, this study covered the eight psychological barriers of the Innovation Resistance theory leaving the nine functional barriers outside the scope of this thesis.

6.3 Future work

Future researchers can overcome the limitations mentioned above by applying the same study to different Scandinavian regions or countries worldwide. The fact that this study was conducted in Sweden within a serious time limit suggests that future researchers could apply the same study to other countries and compare the results. In addition, as this study only covered the eight psychological barriers of the Innovation Resistance theory, a future study could focus on the role of the functional barriers on the adoption of innovative circular fashion products. Furthermore, it is recommended that future researchers apply the same study to other generations, for instance, generation X, and compare the results of different generations for the production of more insights. Future research can also extend this thesis' findings by exploring in greater depth the reasons and causes behind each barrier affecting the consumer's adoption of circular fashion innovations and use the extended typology version of the seventeen Active Innovation Resistance barriers as they are developed by Talke and Heidenreich.

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7. Appendix:

7.1 Additional theoretical framework on the survey sample: Generations X, Y and Z

Adriana Grenčíková and Sergej Vojtovič focused their study upon three generations, X, Y, and Z in order to find their relationship to innovations within communication technologies. Generation X includes the people born between 1961-1981, Generation Y (or Millenials) includes the people born between 1982-1996 and Generation Z includes the people born between 1997-2020. Grenčíková and Vojtovič found that the generations Y and Z show a stronger interest in the technical innovations than the generation X. In her research about the generation Z and the attitudes and preferences of eco-friendly furniture and furnishings Tugba Andac Guzel (Guzel, 2020) explored individuals aged between 14-25, the so-called generation Z. Guzel revealed that the generation Z displays knowledge on the eco-friendly design and products, which is mostly gained through social media and the internet.

Pauliene and Sedneva (2019) focused their research on exploring if the recommendations of social media have an impact on the intention to buy on the generations Y and Z. The findings of Pauliene and Sedneva (2019) suggest that the intention to buy is controlled by the social media recommendations. More precisely, generation Y seems to be more influenced by the e-WOM (the recommendations made by followers) than the online reviews. Mónika Garai-Fodor and Ágnes Csiszárik-Kocsir in their paper studied the individual value orientation in relation to specific consumer choices among the generations Y and Z. They found out that the values and the mindset differ from generation to generation because of the influence of different means on their financial and value decisions.

7.2 Descriptive statistics

The main variables in relation to how often the participants are buying circular fashion products on a likert-scale from 1 to 5.

	1 (N=23)	2 (N=26)	3 (N=21)	4 (N=15)	5 (N=8)	Overall (N=93)
Age						
Mean (SD)	31.6 (8.61)	32.6 (10.9)	31.3 (8.44)	35.4 (8.89)	40.9 (16.8)	33.2 (10.3)
Median [Min, Max]	30.0 [23.0, 64.0]	30.0 [21.0, 65.0]	29.0 [19.0, 50.0]	34.0 [21.0, 56.0]	35.5 [27.0, 80.0]	31.0 [19.0, 80.0]
Main variables						
Economic Risk						
Mean	3.96 (1.26)	4.27 (0.962)	4.29 (0.902)	4.53 (0.915)	4.00 (1.51)	4.22 (1.07)
Median [Min, Max]	4.00 [1.00, 5.00]	5.00 [2.00, 5.00]	5.00 [2.00, 5.00]	5.00 [2.00, 5.00]	5.00 [1.00, 5.00]	5.00 [1.00, 5.00]
Norm						
Mean	3.65 (1.40)	2.96 (1.46)	2.38 (1.24)	1.60 (0.828)	2.25 (1.83)	2.72 (1.49)
Median [Min, Max]	4.00 [1.00, 5.00]	3.00 [1.00, 5.00]	2.00 [1.00, 5.00]	1.00 [1.00, 3.00]	1.00 [1.00, 5.00]	3.00 [1.00, 5.00]
Social Risk						
Mean (SD)	2.35 (0.982)	2.62 (1.36)	2.43 (0.978)	2.53 (1.13)	2.63 (1.60)	2.49 (1.16)
Median [Min, Max]	2.00 [1.00, 4.00]	2.50 [1.00, 5.00]	2.00 [1.00, 4.00]	2.00 [1.00, 4.00]	2.00 [1.00, 5.00]	2.00 [1.00, 5.00]
functional_risk						
Mean	3.81 (1.09)	3.96 (0.695)	4.10 (0.579)	3.91 (0.707)	3.71 (1.40)	3.92 (0.853)
Median [Min, Max]	4.00 [2.00, 5.00]	4.00 [2.33, 5.00]	4.00 [3.00, 5.00]	4.00 [2.67, 5.00]	4.17 [1.00, 5.00]	4.00 [1.00, 5.00]
personal_risk						
Mean	3.55 (1.14)	3.33 (0.938)	3.78 (0.669)	3.36 (0.636)	3.42 (1.19)	3.50 (0.920)
Median [Min, Max]	3.67 [1.33, 5.00]	3.33 [1.00, 5.00]	3.67 [2.33, 5.00]	3.33 [2.33, 4.67]	3.67 [1.67, 5.00]	3.33 [1.00, 5.00]
info						
Mean	3.22 (1.25)	3.17 (1.06)	3.43 (0.965)	3.07 (1.05)	3.38 (1.43)	3.24 (1.10)
Median [Min, Max]	3.00 [1.00, 5.00]	3.00 [1.00, 5.00]	3.50 [2.00, 5.00]	3.00 [1.50, 4.50]	3.00 [2.00, 5.00]	3.00 [1.00, 5.00]
image						
Mean (SD)	3.33 (0.912)	3.42 (1.25)	3.62 (0.757)	3.43 (1.05)	3.69 (1.33)	3.47 (1.03)
Median [Min, Max]	3.00 [2.00, 5.00]	3.25 [1.00, 5.00]	3.50 [2.00, 5.00]	3.00 [1.50, 5.00]	4.00 [2.00, 5.00]	3.50 [1.00, 5.00]
usage						
Mean	3.96 (0.767)	3.81 (0.861)	3.98 (0.782)	3.63 (0.935)	3.81 (1.36)	3.85 (0.874)
Median [Min, Max]	4.00 [2.50, 5.00]	4.00 [2.00, 5.00]	4.00 [2.50, 5.00]	3.50 [1.50, 5.00]	4.25 [2.00, 5.00]	4.00 [1.50, 5.00]

7.3 Shapiro-Wilk normality test

```
        Shapiro-Wilk normality test

data:  aov_residuals
W = 0.98868, p-value = 8.446e-05
```

In their article Ghasemi and Zahediasl (2012), state that the normality tests are executed as part of the graphical assessment of normality. In the thesis at hand, two normality tests are conducted: the Kolmogorov-Smirnov test and the Shapiro-Wilk test. The normality tests draw a comparison between the scores in the sample and a set of scores that present the same standard deviation and mean and are normally distributed. Therefore, “the sample distribution is normal” becomes the

null hypothesis, which helps the researcher reach the desired conclusions. In case that the normality test proves to be significant, the researcher's findings show that the distribution is abnormal. The sample size plays a major role in the rejection or not of the null hypothesis. This means that when the sample size is small the normality tests do not affect the null hypothesis and the research with small samples usually succeeds in the normality tests. On the other hand, when the sample size is large the researcher should expect significant results even if the deviation is small, but in any case, it will not affect the result of the parametric test.

The Shapiro-Wilk test is based on the correlation between the data and the corresponding normal scores (10) and provides better power than the K-S test even after the Lilliefors correction (12). Power is the most frequent measure of the value of a test for normality—the ability to detect whether a sample comes from a non-normal distribution (11). Some researchers recommend the Shapiro-Wilk test as the best choice for testing the normality of data.

7.4 Levene's Test for Homogeneity of Variance

```
Levene's Test for Homogeneity of Variance (center = median)
       Df F value    Pr(>F)
group   7  7.5115 9.362e-09 ***
      736
```

Glass (1966) refers to Levene's test, which was designed by Levene in 1960. The Levene test is formidable if the researcher aims to test the null hypothesis, where the samples studied come from populations that exhibit the same variance. It is important to test the population for heterogeneity in three cases. One case is when the researcher wants to generate conclusions on the population variances out of scientific interest. Another case is when the researcher reckons that there is the heterogeneity of variances but not all the factors involved have fixed effects. And finally, when the researcher reckons that there is the heterogeneity of variance, when it comes to fixed effects analyses of variance and the observations in the groups are extremely heterogeneous. Levene's test is a simple test to run and is not sensitive to the violation of the normality assumption. It is "a one-way analysis of variance on the absolute values of the differences between each observation and the mean of its group" (p.188).

O'Neill and Mathews (2000) refer to the procedure that Levene proposed. "1. Obtain mean-based residuals (rij) from an ANOVA of the data. 2. Form absolute values (dij = |rij |) of these residuals. 3. Re-analyse these absolute values using the same ANOVA procedure that generated the rij". (p. 82)

7.5 Questionnaire questions and guide:

In this section we will go through the questionnaire description and the questions developed after the hypothesis. The questions are divided into two sections, that is the demographic questions and the variable-related questions. Under the variable-related questions section we list under each of the variables the questions that are going to measure the variables. Those questions are a Likert-scale type of questions on a scale from 1 to 5 where 1 is "completely disagree" and 5 is "completely agree". Each barrier variable is measured in relation to consumer intention to buy/adopt sustainable fashion innovation.

7.5.1 Questionnaire Description:

This is Anthi and Rewan and we are master students at the MSc in Entrepreneurship and Innovation program at Lund University. We are now working on a project investigating different consumer behaviors toward sustainable fashion and the reasons why the consumers do not switch to sustainable fashion products.

This survey will take approximately 5 minutes of your time. The answers will stay anonymous and confidential.

Some definitions:

Sustainable/circular fashion: The act of increasing the lifetime of different fashion products through for example, second hand purchase or buying recycled clothes.

Virgin fashion products: The first hand fashion products that come from processed virgin materials. (new cotton, wool etc. material)

Please feel free to contact us if you have any questions.
Thanks a lot for your time. We look forward to your answers!

re4458kh-s@student.lu.se
sfs14atr@student.lu.se

Best regards,
Anthi & Rewan

Please fill in the following information

- Demographic information:
    1) Gender
       (female - Male - Other)

    2) Age
       (Open answer)

    3) Location
       (drop down menu of Swedish areas like skåne län)
    4) Employment status
       (Full-time employed - Part-time employed - Self employed - Job seeker - Student - Other)

    5) Highest qualification

(Less than a highschool diploma - High school diploma or equivalent degree - No degree - Bachelor's degree - Master's degree - PHD degree - Other)

6) How often do you buy circular clothing (for example second hand clothing, recycled clothes etc.)
(on a scale from 1 to 5 where 1 is never and 5 is very often)

7) Which of the following circular fashion items do you buy more often?
(clothes - Accessories - Bags - Shoes - Nothing - Other)

- Questions:
  1) Functional Risk Barrier *(dysfunctional or malfunctional product, comfort, fit, lasting performance)*

- When thinking of buying a circular fashion item instead of virgin fashion item it's important to me that this item will last as long as a virgin one

- When thinking of buying a circular fashion item instead of a virgin fashion item it's important to me that this item will feel as comfortable as the virgin one.

- When thinking of buying a circular fashion item instead of a virgin fashion item it's important to me that this item will fit as well as the virgin one.

2) Personal Risk Barrier *(health, fraud, quality)*

- When thinking of buying a circular fashion item instead of a virgin fashion item it concerns me that the chemicals used for the circular fashion items might cause me allergies.

- When thinking of buying a circular fashion item instead of a virgin fashion item it's important to me that this item will be trustable as a virgin one.

- When thinking of buying a circular fashion item instead of a virgin fashion item it's important to me that this item's manufacturers conform with the universal health guidelines.

3) Economic Risk Barrier *(bad value for money, high pricing)*

- When thinking of buying a circular fashion item instead of a virgin fashion item it's important to me that this item's price is more affordable compared to the virgin one.

4) Social Risk Barrier *(disapproval from relevant social groups, social values, norms and the social compatibility)*

- When thinking of buying a circular fashion item instead of a virgin fashion item I take under consideration the societal perception (friends, family, colleges, etc.)

5) Information Barrier *(don't have enough information about the circular products)*

- When thinking of buying a circular fashion item instead of a virgin fashion item it's important to me that the companies provide me with enough information about the production process.

- When thinking of buying a circular fashion item instead of a virgin fashion item it's important to me to feel secure by getting adequate information (label) as I would get for a virgin one.

6) Norm Barrier *(change in habits and routine)*

- I avoid buying a lot of sustainable fashion products as I'm not as used to them as I am used to the virgin fashion products.

7) Image Barrier *(unfavorable associations attributed to an innovation, such as its brand, manufacturer, or country of origin)*

- When thinking of buying a circular fashion item instead of a virgin fashion item it's important to me to know that this item is NOT manufactured in impoverished countries.

- When thinking of buying a circular fashion item instead of a virgin fashion item it's important to me to know that this item is NOT produced by underaged workers in developing countries.

8) Usage Barrier *(disturbed established usage pattern)*

- Unlike my experience buying virgin fashion items, I have a bad experience in buying sustainable fashion products which makes me avoid buying them.

- When thinking of buying a circular fashion item instead of virgin fashion item it's important to me that this item will be as convenient as the virgin one

- When thinking of buying a circular fashion item instead of a virgin fashion item it's important to me that this item is as easy to find as the virgin one.