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Multidimensional sustainability labels in the Swedish food sector

A study on consumer perception

IDA STENBERG FORSBERG

CAROLINA NORDSTRÖM

KTH ROYAL INSTITUTE OF TECHNOLOGY
SCHOOL OF INDUSTRIAL ENGINEERING AND MANAGEMENT

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by
Ida Stenberg Forsberg
Carolina Nordström

Master of Science Thesis TRITA-ITM-EX 2020:230
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Industrial Management
SE-100 44 STOCKHOLM

Flerdimensionella hållbarhetsmärkningar i den svenska livsmedelsindustrin

En studie om kunduppfattning

av
Ida Stenberg Forsberg
Carolina Nordström

Examensarbete TRITA-ITM-EX 2020:230
KTH Industriell teknik och management
Industriell ekonomi och organisation
SE-100 44 STOCKHOLM

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Approved	Examiner	Supervisor
2020-06-10	Frauke Urban	Staffan Laestadius
	Commissioner	Contact person

Abstract

Sustainability labels play an important role as information providers in the food sector. They serve consumers with information regarding a product's sustainability performance and shows whether the product is compliant with certain rules and regulations. Consumers of today do however find it difficult to orient among the multitude of label alternatives and there are difficulties knowing exactly what the labels stand for. Additionally, the complex concept of sustainability is not fully portrayed through existing labels, as they communicate a one-dimensional viewpoint and lack transparency regarding its sustainability assessment criteria of the product. This lack of transparency creates information asymmetry between consumers and producers, which in turn prevents consumers from making an informed choice. To decrease the prevailing information asymmetry, multidimensional sustainability labels can be an alternative. This since they communicate multiple dimensions of sustainability in a simplified and objective manner. The main aim of the study is to examine whether different consumer attributes correlate with the perception of a multidimensional label. Further, the study aims to evaluate a multidimensional label's potential to decrease the information asymmetry within the food sector. This was investigated through an online survey with 879 respondents. The results showed that (i) the only customer attribute that correlates with the perception of a multidimensional label is the respondent's sustainability profile, (ii) the multidimensional label is considered necessary and complementary to existing labels as it clarifies a product's sustainability performance, and (iii) further research is needed, e.g. regarding what design is easiest to comprehend, to successfully introduce it to the food sector.

Keywords: Sustainability labelling, Food sector, Sustainability, Multidimensionality, Consumer perception, Sustainable food consumption

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2020-06-10	Frauke Urban	Staffan Laestadius
	Uppdragsgivare	Kontaktperson

Sammanfattning

Hållbarhetsmärkningar utgör en viktig roll som informationsspridare inom livsmedelsindustrin. De förser konsumenter med information angående hur hållbar en produkt är samt visar huruvida produkten lever upp till vissa regler och förordningar. Dagens konsumenter upplever dock att det är svårt att orientera sig bland alla hållbarhetsmärkningar och att det är svårt att veta vad respektive märkning står för. Dessutom skildrar befintliga hållbarhetsmärkningar inte det komplexa begreppet hållbarhet på ett tillfredsställande sätt, då de kommunicerar en endimensionell bild där märkningens bedömningskriterier inte beskrivs. Denna avsaknad av transparens skapar informationsasymmetri mellan konsumenter och producenter, vilket i sin tur begränsar konsumenternas förmåga att göra ett informerat val. För att minska den rådande informationsasymmetrin kan multidimensionella hållbarhetsmärkningar vara ett alternativ. Detta då de kommunicerar flera dimensioner av hållbarhet på ett förenklat och objektivt sätt. Det huvudsakliga syftet för denna studie är att undersöka huruvida olika konsumenters egenskaper korrelerar med uppfattningen av en flerdimensionell hållbarhetsmärkning. Studien syftar även till att undersöka den flerdimensionella hållbarhetsmärkningens potential att bidra till en minskad informationsasymmetri inom livsmedelsindustrin. Detta undersöktes med hjälp av en nätbaserad enkät med 879 respondenter. Studiens resultat visade att (i) en konsuments hållbarhetsprofil påverkar uppfattningen av en flerdimensionell hållbarhetsmärkning, (ii) den flerdimensionella hållbarhetsmärkningen anses nödvändig och kompletterande till befintliga hållbarhetsmärkningar då den förtydligar hur hållbar en produkt är samt (iii) att vidare studier är nödvändiga för att framgångsrikt introducera hållbarhetsmärkningen till livsmedelsindustrin, exempelvis angående vilken design som är enklast att förstå.

Nyckelord: Hållbarhetsmärkning, Livsmedelsindustrin, Hållbarhet, Multidimensionalitet, Konsumentuppfattning, Hållbar matkonsumtion

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Introduction

In the following chapter the background to the area of sustainability labelling, problem statement and purpose will be presented. This will be followed by a description of the delimitations, key definitions and the outline of the thesis.

1.1 Background

In recent decades, the global society has agreed upon the need to address sustainable development through increased awareness of the impact from our consumption behaviour (Dubois et al., 2019). As a response, different actors of society have launched initiatives with the purpose of promoting sustainable consumption. Within the food sector the topic of sustainable consumption is well debated and a trend of increased consumer demand for information regarding products' sustainability performance has been identified (Annunziata et al., 2019). To meet this demand, companies are using strategic communication and information tools, including food labels, to nudge consumers towards more sustainable alternatives (Peschel et al., 2016; Nikolaou and Kazantzidis, 2016).

Food labels which seek to provide consumers with information regarding the product's impact from a sustainability perspective, with regards to environmental, economic and social factors, are often referred to as sustainability labels (Annunziata et al., 2019). Sustainability labels thus help the consumer to make informed purchasing decisions as more information regarding a product's sustainability performance is provided. However, the term sustainability is associated with multiple definitions and the meaning of the concept varies depending on how it is used and in what context. Common characteristics in the majority of the definitions is the importance of intergenerational resource management, which includes general consideration of the planet within the planetary boundaries (Gladwin et al., 1995). The uncertainty of the sustainability definition generates a complexity to the usage of sustainability labels as they can be interpreted in varying ways by different individuals (Rousseau and Vranken, 2013).

Further complexity in the area of sustainability labelling is generated by the prevailing information asymmetry in the food sector (O'Rourke and Ringer, 2016). Asymmetric information implies an uneven distribution of information among consumers and producers, which creates an information gap. In current conditions, producers hold the power of deciding what information to share about products' sustainability performance (Chang and Burke, 2007; Liljenstolpe and Elofsson, 2009). As a result, producers can selectively decide which information to share to their favour (Kocsis and Kuslits, 2019; Liljenstolpe and Elofsson, 2009). Considering these circumstances, consumers need to have confidence in labels' sustainability assessment without having access to the underlying information (Van Amstel et al., 2008; Chang and Burke, 2007). Despite the current shortcomings in the usage of sustainability labels, food labels are designed with the intention to decrease the information gap between consumers and producers if used efficiently (Galarraga Gallastegui, 2002).

The current usage of sustainability labels is well established on a national scale in Sweden. It is common to see labels such as Fairtrade, KRAV or Rainforest Alliance in the store while shopping for groceries. It has however gotten crowded amongst the labels on the grocery packages and this overload of information can create confusion for consumers (Hanss and Böhm, 2012; Liljenstolpe and Elofsson, 2009). Each label has different criteria, which the producer must fulfil in order to place the label on its product (Medveten Konsument, n.d.). These criteria are however not directly communicated to the consumer in the store and this simplification can be classified as a one-dimensional communication.

One-dimensionality in sustainability labelling can be said to be positive as it synthesises complicated information into a fast-interpreted design, which suits the limited time for decisions in a modern and rapidly moving society (Feunekes et al., 2008). However, this withholding of information from the consumer has negative implications as it prevents them from making an informed choice (Kocsis and Kuslits, 2019). According to the organisation "Sustainable Supply Chain for Food in Sweden", created by leading actors in the Swedish food sector, a sustainable food sector must consider ten different dimensions of sustainability, e.g. animal welfare, water usage and working conditions. There is a risk that one-dimensional labels miss to highlight multiple dimensions of sustainability, which could affect consumers' decisions (Weinrich and Spiller, 2016a).

A possible next step for the food sector and sustainability labelling can be to introduce multidimensional labels. As a complement to one-dimensional labels, multidimensional labels could communicate a more comprehensive picture of a product's sustainability performance as it illustrates several dimensions at once. They would further enable for a more nuanced assessment of the product's sustainability performance as some dimensions of sustainability, e.g. animal welfare, might not be appropriate to assess on a binary scale (Weinrich and Spiller, 2016a). Given the above, usage of multidimensional labels would allow consumers to base their decisions to a larger extent on transparent information from producers. Multidimensional labels can therefore be said to possess the potential of decreasing the information gap between consumers and producers.

1.2 Problem statement

Many sustainability labels that exist today only communicate a one-dimensional viewpoint and lack transparency regarding its sustainability assessment criteria of the product. This creates confusion amongst consumers, which partly can be linked to the multitude of existing labels, as it is difficult for consumers to understand what demands each label places on the producer (Hanss and Böhm, 2012). This raises the issue for consumers to by their own means find information regarding the product's impact on dimensions such as biodiversity, animal welfare or water usage. Additionally, most labels hold a binary nature, e.g. organic or non-organic, which falsely implies that there are merely two standards amongst product alternatives, when in reality the product heterogeneity is much larger (Kocsis and Kuslits, 2019; Weinrich and Spiller, 2016b).

The broad and complex concept of sustainability is not fully portrayed through existing one-dimensional labels and critique has been raised against (Grunert, 2011). It is arguable that the lack of multidimensionality on labels creates an information gap between consumers and producers since all information regarding the product's sustainability performance is not shared. This prevents consumers from making an informed choice (Kocsis and Kuslits, 2019) as it misses to highlight dimensions which could affect consumers' decisions (Grunert, 2011). In existing literature, it can be seen that there are contradictory

opinions regarding the effect sustainability labels have on consumer behaviour and how they are perceived. In addition, there is a lack of understanding as to whether visualisation of multiple sustainability dimensions on groceries can decrease the information gap between consumers and producers and thus help consumers make more informed decisions.

1.3 Purpose and Research question

In this study, a survey was conducted to clarify consumer perception of multidimensional sustainability labels. This was carried out to contribute to a wider understanding of multidimensional labels' ability to decrease the information gap between consumers and producers in the food sector through promotion of sustainable consumption. The main aim was to address the following research question (RQ).

RQ: *What is the relationship between different consumer attributes and perception of a multidimensional sustainability label in the food sector?*

To fulfil the purpose, hypothesis testing was executed, see section 3 for presentation of the hypotheses. The consumer attributes which were selected for testing were the socio-demographic characteristics: age, gender, income and educational level. The socio-demographic characteristics were chosen to enable for profiling of the dataset and since they are considered important factors impacting sustainable consumption (Park et al., 2012; Tripathi and Singh, 2016). It was further chosen to test the respondents' prior knowledge and satisfaction with existing labels as they have been identified as important determinants of sustainable consumption (Peschel et al., 2016).

1.4 Delimitations

The intention of the study is to deliver a contribution to the emerging and rather unexplored field of multidimensional labelling and thus pave the way for future research. Due to the broad nature of sustainable consumption, the area of study has been delimited to food consumption in Sweden. The focus of the study is sustainability labelling on food, and in particular how the concept of multidimensional labelling is perceived from a consumer perspective. The study will not consider labels with the intention of informing consumers regarding nutrition, quality nor health. Additionally, sustainability labels can have various formats and origins such as third-party certifications, self-regulated or industry initiatives. In this study, it was decided to focus on third-party certified labels since they are perceived as more trustworthy amongst consumers with their independent certificate systems (Horne, 2009). Furthermore, information regarding third-party labels is more accessible than for example internal company labels and the certification systems independent evaluation reduces undesirable biases to a greater extent.

The study was further conducted in collaboration with the grocery retailer Coop and the studied population was limited to their customer clientele. Despite this delimitation, the presented findings are still of value and a contribution to the research field, as Coop's customer base consist of 3.5 million members across Sweden which corresponds to about a third of the Swedish population (Coop, 2020). Another delimitation was the choice of not considering legislation nor regulations for sustainability labelling. This choice was made due to the unexplored nature of multidimensional labelling, which mainly exists as a concept today.

1.5 Key definitions

In the following section, the key definitions used in this study will be explained. These definitions will be valid throughout the thesis.

Sustainability

The concept of sustainability is associated with multiple definitions and the meaning alters depending on how it is used and in what context. Common characteristics in the majority of the definitions is the importance of intergenerational resource management, which includes general consideration of the planet within the planetary boundaries (Gladwin et al., 1995). In this study, actions, initiatives and operations will be categorised as sustainable in accordance with the definition stated in the Brundtland report:

"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (Brundtland, 1987, p.37).

Sustainable consumption

In this study, the following definition of sustainable consumption will be used:

"The use of services and related products, which respond to basic needs and bring a better quality of life while minimising the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardise the needs of future generations." (UN, n.d.).

Sustainability label

Refers to all labels aiming to display the sustainability performance of the product and its value-chain.

Multidimensional sustainability label

Refers to all labels that visualise several attributes to clearly communicate a product's sustainability performance.

Information gap

Refers to a state where information asymmetry prevails between consumers and producers and thus information is not exchanged transparently (Kolodinsky, 2012).

1.6 Structure of thesis

The remainder of this thesis is structured as follows. Chapter 2 presents the current state of knowledge. This chapter provides an overview of existing literature within the research field, where the purpose is to give an enhanced understanding of the investigated topic. In chapter 3, the hypothesis generation process is presented. Within this chapter the hypotheses are generated from existing literature and the conceptual framework is described. In chapter 4 the chosen method is presented, including motivation of research approach and design, survey process, data analysis and research quality standard. Following the method, chapter 5 presents the empirical results and analysis, which afterwards are discussed in chapter 6. Chapter 6 does further discuss a critical review of the study and its limitations. Lastly, chapter 7 presents conclusions, implications and gives suggestions for possible future work.

Current state of knowledge

In the following chapter, four main sections will be presented: Contextual complexity, Sustainability labels as an enabler for sustainable consumption, Strategic labelling and Transition to multidimensionality. The purpose of this chapter is to present the current state of knowledge within the area of study, both influenced by academic and non-academic literature. Each section starts with presenting the key findings within that area.

2.1 Contextual complexity

In the following section, the complexity of the research area is presented. The key findings are: (i) the definition of sustainability is complex and its meaning varies depending on in what context it is applied and by whom, and (ii) information asymmetry between producers and consumers, regarding a grocery's sustainability performance, creates an information gap, with various impact on different actors in the sector.

2.1.1 Sustainability definition

The usage of the buzzword "sustainability" is rapidly increasing, as it is often associated with a desired and promising outcome by institutions and individuals for development or environmental initiatives (Kamieniecki et al., 1997). The contemporary concept of sustainability arose during the 1990s, as an effect of the then ongoing debate about whether eternal economic growth would be possible or not (Vos, 2007). It was when the linkage between natural capital and the economy was made, the terminology was more and more included in the discipline of economics and thus further evaluated in the context of business (Morrison, 2003).

After its establishment, the concept of sustainability has been defined many times by several organisations and individuals. Examples for conceptions of sustainability have been summarised in table 2.1. The core of the concept, which often is presenting an environmental issue or situation, through the lens of economic and/or social aspects, tends to be seen in the majority of existing definitions (Vos, 2007). The most applied definition of sustainability is said to be the one stated in the Brundtland report, see the first row in table 2.1 (ibid.). This definition successfully conveys the essence of the concept, which is to focus on intergenerational equity management (Gladwin et al., 1995).

As sustainability has achieved a state of ubiquity, it is widely used in different contexts, e.g. "sustainable development", "sustainable buildings", "sustainable technology", etc. The concept can be argued to have varying, or even different, meanings depending on the setting it is applied in and if it planned to portray an economic, social or environmental perspective (Brown et al., 1987; Chang et al., 2017). Due to the uncertainty involved when applying a definition of sustainability, it is recommended to explicitly state assumptions such as contextual setting, time and place for an action to ease an observer's interpretation of the result (Clark, 1985).

Many argue that it is possible to achieve a state of sustainability, but others claim that the concept presents a non-fixed state and instead, an indefinite journey, where one must continuously adapt to the restrictions and limits of the changing environment (Harrison, 2000). This statement raises the question whether an action or an initiative can be classified as genuinely sustainable. For example, would the production of ecological poison which employs multiple individuals be considered socially and ecologically sustainable, despite the field of application and nature of the produced poison. It is of great importance to understand that the answer to that question lies in the construction of the concept and what sustainability means in that specific context (Brown et al., 1987).

Table 2.1: Examples of conceptions for Sustainability

Source	Definition
(Brundtland, 1987, p.37)	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
(Cambridge Dictionary, n.d)	The quality of causing little or no damage to the environment and therefore able to continue for a long time.
(The World Bank, 1994, p.1)	A requirement of our generation to manage the resource base such that the average quality of life that we ensure ourselves can potentially be shared by all future generations.

2.1.2 Information asymmetry in the food sector

Information provision is one of the primary strategies used by companies, governments and politicians when trying to reach consumers (O'Rourke and Ringer, 2016). The usage of sustainability labels entail transferring a message from producers to consumers regarding how sustainable a product is (de Boer, 2003; Nikolaou and Kazantzidis, 2016). There is an increased interest and awareness regarding sustainable consumption (Tully and Winer, 2014; Verbeke et al., 2007) and consumers are expressing an increased willingness to pay for products that are associated with a better sustainability footprint (Loureiro et al., 2002; de Pelsmacker et al., 2005; Tully and Winer, 2014).

Defining the information gap

Consumers find it difficult to determine whether a product is sustainable or not by simply looking at its label, as the information is not easily understood (Grunert et al., 2014; Liljenstolpe and Elofsson, 2009; Meise et al., 2014). To make an informed decision regarding a product's sustainability performance, consumers need satisfactory information which many producers today fail to deliver (Van Amstel et al., 2008; Meise et al., 2014). There is a lack of requirements regarding displaying information on how sustainable a product is, and there is no security in whether this information will be available to consumers in a retail environment (Chang and Burke, 2007). Therefore, the responsibility lies on the retailer or producer when it comes to sharing this information with consumers (Chang and Burke, 2007; Liljenstolpe and Elofsson, 2009). Luckily, the importance of showing a product's sustainability-related attributes rises as studies show that this transparency increases consumers' willingness to pay, which thus reveals a potential for increased business value and possible revenues (Meise et al., 2014; de Pelsmacker et al., 2005).

Similarly, as transparent information is not given from producer to consumer, the reverse can also be identified. There is an information gap from consumer to producer where the lack of information regarding consumer choices and preferences contributes to increased difficulty in meeting the right demand on the market. The area is well debated and research shows lacking evidence of which parameters affect decision-making the most and how and when these should be communicated to consumers to reach desired outcomes (O'Rourke and Ringer, 2016).

In addition, many labels that exist today tend to be in line with the current topics discussed in the public sphere and sustainability labels have therefore previously been associated with mainly environmental and ecological aspects (Choi and Ng, 2011; Grunert et al., 2014; Nikolaou and Kazantzidis, 2016; Peschel et al., 2016). Due to this societal reflection, many labels tend to lack focus on, for example, a product's economic or social impact, which further reinforces the information asymmetry (Horne, 2009; Nikolaou and Tsalis, 2018). This might correlate with the fact that environmental sustainability is one of the main concerns amongst consumers (Choi and Ng, 2011). Recently, the interest in social and ethical aspects have increased and research shows a growing willingness to pay for products that are socially responsible (Tully and Winer, 2014).

In this study, the previously presented information asymmetry between consumers and producers will be referred to as the "information gap", see figure 2.1 for visualisation.

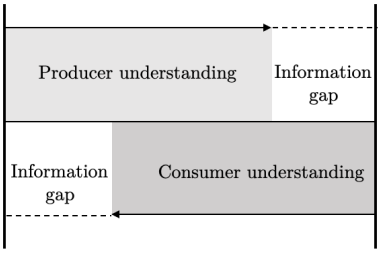

Figure 2.1: The information gap between consumers and producers.

Impact on different actors

In a business context, asymmetric information is commonly used to leverage one's position, often when one actor has more information regarding a situation or a product than another (Nayyar, 1990). This situation is also seen in the food sector and the usage of sustainability labels. Depending on from which actor's angle one is viewing the situation, the incentives to adjust the information asymmetry varies. From a consumer perspective, the asymmetric information situation, i.e. not being satisfactory informed about the production implications of the product, is perceived differently by different individuals (Rousseau and Vranken, 2013). Individuals with a greater interest in the sustainability debate will take labels into consideration to a larger extent than individuals with no interest, and thus experience the information asymmetry differently (ibid.). Consumers with a greater interest in sustainability, demand more information about their purchases and would therefore promote decreased information asymmetry in the food sector. Likewise, those without interest would find the issue irrelevant to consider (Kocsis and Kuslits, 2019).

Information asymmetry from a producer perspective stems from the producer's choice of not sharing extensive information regarding the sustainability performance of a product, but rather selectively choose what is communicated in its favour (Kocsis and Kuslits, 2019; Liljenstolpe and Elofsson, 2009). Producers of, for example, organic food will voluntarily place labels which promote the organic attributes on their products whereas a non-organic producer instead avoids sharing information which is disadvantageously. The organic production is often associated with higher costs, which the producer can cover through charging a premium price for an organic product. The producers of non-organic foods have in the past taken advantage of the premium product segment, through falsely claiming their products to be organic to increase their earnings (Giannakas, 2002). For example, the companies Glacial Ridge Foods and Petrou Foods Inc. were caught selling conventional products as organic (Choate, 2007).

This exploitation of labels has been misleading for consumers and has disturbed the trust in the labelling concept (Giannakas, 2002). This has further had the effect that company or industry labels are trusted the least and independent third-party labels are trusted the most (Horne, 2009). Thøgersen (2002) points out the importance of credibility in a label as he states that a consumer only utilises the information if the label is associated with reliability. Further research shows that lacking reliability in sustainability labels derives from absence of transparent information between consumers and producers (Van Amstel et al., 2008). The disclosure of additional information, i.e. information that is not normally shared with the consumer, could generate negative effects for producers if the new information is not associated with beneficial or appreciated product characteristics (Giannakas, 2002). On the other hand, it could be beneficial for producers of organic products since they would receive recognition for their work (ibid.).

The matter of information asymmetry does also have an impact on retailers. Studies show that the seller closest to the consumer in the value-chain possesses the most power in terms of ability to impact consumer purchasing decisions (Kähkönen and Tenkanen, 2010). This power could be utilised by retailers to affect their product range based on greater insight into the production of the products, e.g. setting restrictions regarding certain criteria such as the allowed amount of emissions or water usage. This could further enable retailers to attract customers that value having in-depth insight into the product's sustainability performance (Meise et al., 2014). It is also possible that decreased asymmetric information could have a dynamic effect in the supply chain since decreased demand on non-labelled foods places pressure on the supply of more sustainable alternatives (Chkanikova, 2016).

2.2 Labels as an enabler for sustainable consumption

In the following section, a deeper understanding of sustainability labels is presented. Key findings are: (i) sustainability labels are identified as an enabler for changing consumer attitude, but there is an uncertainty in regards to what extent, and (ii) the design of the label affects consumers differently depending on their prior knowledge.

2.2.1 Labels as attitude and behavioural changers

Enabling behavioural change using product labels on food is a well-debated area. It is a complex task, challenging humans' close relationship to material goods (Sustainable Consumption, 2006). Despite an increased interest in sustainability, it does not necessarily translate into an increased interest in the usage of sustainability labels (Thøgersen et al., 2010), and even though motivation to increase sustainable consumption is identified among many, there are difficulties in translating it into sustainable food choices (Bray et al., 2011). This gap between consumer attitude and behavioural intention is according to Vermeir and Verbeke (2006) one of the biggest challenges in the debate of sustainable consumption. Similarly, Grunert et al. (2014) claim that there is no strong evidence that sustainability labels affect consumers' food choices, until their environmental concern is seen in behaviour.

However, multiple recent findings show that it is possible to say that there is a positive correlation between consumer behaviour and sustainability labelling and that the general environmental awareness has increased as a consequence of label usage (Drexler et al., 2018; Grankvist et al., 2004; Vermeir and Verbeke, 2006). Sustainability labels are identified as useful tools when it comes to helping consumers make sustainable choices (Peschel et al., 2016; Nikolaou and Kazantzidis, 2016). This since additional information regarding a product's sustainability performance is a way to influence consumers to sustainable choices (Young et al., 2010). Especially in contexts where consumers have a general knowledge and understanding of the issue (Peschel et al., 2016). Through labels, sustainable products are promoted and findings show that customised communication for a specific target group entails a more widespread influence on behaviour (Vermeir and Verbeke, 2006). This is further reinforced when the individual feels that there is a possibility to personally make a difference. Labels also support social norms and affect consumer involvement, which can put pressure on consumers who already feel guilt regarding their unsustainable consumption (Young et al., 2010).

2.2.2 Design impact

According to Horne (2009) a strong sustainability label possesses four characteristics: broad coverage of environmental issues, the inclusion of stakeholder input, general acceptance and offers measured sustainable outcome, e.g. reduction of intergenerational resources. How these characteristics are presented most efficiently to convey the message to consumers is however an ongoing discussion. For example, there are today divided opinions regarding to what extent the layout and design of the label matters. Some studies show that consumers are not affected at all by labels' format (Tait et al., 2016) and others claim that it is possible to create standardized sustainability labels that nudge consumers purchasing decisions towards a more environmentally friendly decision (Engels et al., 2010). According to Lin et al. (2004) consumers only pay attention to labels if they can expect merits in terms of better food choice, if the label is easily understood and if they have confidence in the given information.

Consumer behaviour is furthermore affected by how information is displayed since it affects how it is processed (Grunert et al., 2014; Payne et al., 1991). It has been seen that consumers prefer and interpret numerical product information, e.g. intervals, better and with more ease than non-numerical, e.g. graphs or text, on labels (Cowburn and Stockley, 2005). If non-numerical labels are used, they are perceived as easier to understand when a benchmark of any kind is presented as well (Cowburn and Stockley, 2005; Rayner et al., 2004). Research further shows that consumers respond well to labels using colours. A study conducted by Biel et al. (2005) revealed that food labels using a spectrum system with red, orange and green can achieve a large behavioural impact.

The information displayed on sustainability labels can be divided into positive or negative information. It is not fully determined to what extent a positive label message, which shows positive information regarding how sustainable a product is, or a negative label message, which instead shows negative information, affects consumer perception (Borin et al., 2011). Both the negative and positive labelling tends to use a reference level, which enables for consumers to easily grasp and compare products' sustainability performance (Grankvist et al., 2004). The positive label would, for example, show a product's small carbon dioxide footprint, while a negative one could display a water usage larger than the reference level.

When it comes to food preferences, a study conducted by Grankvist et al. (2004) showed that individuals which consider environmental issues as important reacted to both positive and negative labels, whereas people with intermediate concern responded stronger to negative information. This can be due to a stronger psychological response to a negative event (Anderson, 1974) and that disagreement awakens stronger reactions than agreement does (Schwarz, 1990). The impact of a positive or negative label also correlates with an individual's own preferences and objectives (Annunziata et al., 2019; Galarraga Gallastegui, 2002). As most labels today display positive information, it can be interpreted as the current label market primarily addresses the already interested audience and thus not the majority. Through the provision of more transparent information about a product's sustainability performance, where both its strengths and weaknesses are shown, there is a chance that labels address a wider public which thus can make decisions that favour sustainable consumption.

2.3 Strategic labelling

In the following section, sustainability labels function as a strategic tool is discussed. Key findings are: (i) sustainability labels as a corporate strategy can be used to ensure a competitive market position through meeting customer demand and influencing supply, and (ii) they can further be used to strengthen a green product brand and affect consumer decision.

2.3.1 Labels as a corporate strategy

There are increasing requirements on retailers to reduce their external and internal environmental impact and to foster sustainable development. This can be achieved by implementing sustainability in their corporate strategy (Naidoo and Gasparatos, n.d.). Multiple studies have investigated the benefits of integrating sustainability concerns, mainly environmental, in a company's corporate strategy and uniformly identifies multiple advantages (Albino et al., 2009). The benefits from considering sustainability issues in a corporate strategy emanates from a constantly changing competitive scenario which is a consequence of pressure from different stakeholders, new regulations and technological innovations (ibid.). Through the usage of sustainability labels, a producer or retailer can affect their position on the market (de Boer, 2003).

For producers, it is possible to adapt their sustainability focus, and thus labelling, in accordance with what consumers are currently demanding to gain competitive advantages and market shares. Social pressure can strengthen a company's position on the market by attracting customers whose interests and concerns are in line with a company's corporate sustainability strategy (Górska-Warsewicz et al., 2018). Strategically, a company might react to public criticism against general sustainability issues by adding a label which demonstrates their sustainability efforts within the area of debate. Furthermore, usage of food labels can be translated into a strategic decision with the potential to affect both short- and long-term profitability (de Boer, 2003). Increased profit can be an outcome as labels provide customers with desirable information to differentiate the product from similar ones and thus affect purchase decisions (Golan et al., 2001). Furthermore, the usage of third-party certificates is according to Horne (2009) a collaborative strategy with the intention to share credible information regarding sustainability-related issues. This can be useful when a producer comes across difficulties or barriers to reach full credibility on their own, especially when consumers are informed on sustainability issues (Testa et al., 2015).

For retailers, the underlying strategy for promoting the use of sustainability labels may be governed by other factors. Retailers can use labels as management control tools, and thus influence how sustainable the overall supply is (Chkanikova and Mont, 2011; Ytterhus et al., 1999). This is mainly through promoting sustainable products in their assortment but also ultimately to be able to exclude products that are not considered sufficiently sustainable. Through these means, a grocery retailer can for example influence its position on the market by strengthening its brand's association with sustainability and nudge consumers towards more sustainable behaviour (ibid.).

2.3.2 Labels as a marketing strategy

Sustainability concerns are commonly integrated in the process of marketing strategies and the possibilities to affect decision making with the usage of external factors have been discussed for decades (Hart and Dowell, 2011; Hart, 1995). Food labels are an important mechanism of green marketing which enable for taking advantage of the growing mar-

ketplace for environmental and sustainability concerns (Rex and Baumann, 2007). Food labels function as a brand or as a trademark where consumers can associate the label with a certain validity of a product as well as desired or undesired characteristics (de Boer, 2003).

Sustainability labels on food is a marketing tool which promotes a more sustainable consumption, a highly topical undertaking in the ongoing trend of changing into a more sustainable lifestyle. Studies show that sustainability labels are an efficient tool to nudge consumers into purchasing sustainable products and thus increase the general sustainability awareness (de Boer, 2003). Many companies use sustainability labels as a part of their marketing strategy with the purpose of being socially and environmentally responsible, which might not influence the short-term profitability but is likely to bring a more long-term payoff (Golubevaitė, 2008). Additionally, consumers appreciate a more open communication regarding social and environmental impact of products as it increases their general awareness (Chkanikova et al., 2013). Other intentions are to position the company in accordance with other brands or products and through marketing strategies attain customers from competitors.

Customer recognition is a key factor for a label to be an efficient marketing tool (Lindgreen et al., 2016) and marketing strategies are therefore used to create increased brand association among consumers. A more well-known label is likely to be associated with credibility and to provide the consumer with trusted information which is important for a more successful field of application (Testa et al., 2015). It can be argued that third-party labels are an efficient way to cut marketing costs as the certification communicates sustainability aspects which are considered important for consumers with more established credibility (de Boer, 2003).

Retailers can use a different marketing strategy as they have the power to decide what products to promote on the shelves in their stores (Sengstschmid et al., 2011). Retailers can therefore pressure producers regarding the level of sustainability their products hold and affect the assortment on the market (Chkanikova and Mont, 2011). The field of application for labelling as a marketing strategy can thus affect both customer demand and producer supply and can therefore be considered a powerful tool in the field of green marketing.

2.4 Transition to multidimensionality

In the following section, the transition from usage of one-dimensional to multidimensional sustainability labels is presented. Key findings are: (i) to clarify what a sustainable food product is, the organisation "Sustainable Supply Chain for Food in Sweden" has developed ten dimensions to guide industry actors, (ii) commonly used sustainability labels in Sweden lacks comparable grading or scales, and thus aggravates for consumers to compare products with objective information, and (iii) multidimensional labels are a proposed tool to be applied for facing the issues with non-transparent information and information overload, but it is uncertain how well they will tackle challenges such as consumer confusion and altering preferences.

2.4.1 Dimensions of a sustainable food sector

In the year of 2015, ten leading Swedish grocery retailers, producers and the World Wide Fund for Nature (WWF) joined together and formed the organisation "Sustainable Supply Chain for Food in Sweden" (SSCFS). The organisation was created to increase the sustainability in production as well as in consumption within the Swedish food sector (SSCFS, 2019) (SSCFS, 2019). The initiative was based on the identified need of increasing awareness regarding food consumption impact on society. The organisation, which today has grown to 15 members, released in 2019 a report called "Sustainable Products". In the report, ten dimensions for measuring products' sustainability performance for some common product categories were presented (ibid.).

These ten dimensions, see table 2.2, aim to guide producers and retailers in the food chain on how to increase sustainability in their manufacturing, but also how to select which products to include in their assortment. A sustainable product can thus be identified according to this system as a product that has a minor impact in multiple dimensions, and not only one. This method of evaluating a product's sustainability performance allows for a more detailed understanding of its impact, e.g. a production with low carbon emissions does not directly classify as sustainable since it can have a negative impact in one of the other nine dimensions.

Table 2.2: Sustainable Supply Chain for Food in Sweden's dimensions for a sustainable product (SSCFS, 2019)

Dimension	**Description**
Biodiversity & ecosystems	Production that preserves/increases biological diversity, natural ecosystems and ecosystem services.
Climate & air	Production that minimises greenhouse gases and/or other harmful air emissions into the atmosphere.
Soil fertility	Production that promotes/retains soil fertility and an adequate soil structure.
Water	Production that uses water resources in a sustainable manner and secures adequate water quality in the surrounding environment as well.
Chemicals & pesticides	Production that does not have a negative impact on the surrounding environment and secures food safety.
Eutrophication	Production that minimises leakage of plant nutrients to the surrounding environment.
Animal welfare	Production that ensures the health and welfare of the animal.
Working conditions	Production that ensures sound and safe working conditions and a fair wage.
Local populations	Production that respects the ownership and traditional use of local populations; contributes to the local supply and development; and protects high cultural conservation values.
Legality & traceability	Production that meets applicable legislation and ensures transparency as well as traceability in the food chain.

2.4.2 One-dimensionality in Sweden

The area of sustainability labelling in Sweden includes various alternatives, where each label has its own attribute with the purpose of informing the consumer about the sustainability efforts associated with a product. Consumers must choose between labels with different focuses, e.g. quality assurance regarding production or a specific product attribute such as carbon dioxide footprint. Furthermore, consumers must consider whether the product with multiple labels is better than the product with a single label (Nikolaou and Kazantzidis, 2016) and weigh them against each other. Additionally, one must consider whether a certain label covers one or multiple sustainability dimensions and if it covers local or global issues (ibid.).

The focus for each sustainability label varies depending on its main aim, e.g. Fairtrade mainly focuses on working conditions while MSC and ASC are used in the fish industry (SSCFS, 2019). Many labels cover more than one out of the ten dimensions presented in section 2.4.1, which is in line with the confusion experienced by consumers while orienting among different label traits (Janßen and Langen, 2017). The numerous variations of labels reveal a great potential and as consumer demand for sustainable products increases, the number of labels follow. However, this abundance of labels, in combination with a lack of understanding regarding what they communicate, creates confusion among consumers (Van Amstel et al., 2008; Horne, 2009).

Additionally, sustainability labels are presented on products without the opportunity for consumers to compare them based on a common scale or grading. The lack of comparability among existing labels forces the consumer to trust the certification systems blindly without the ability to validate the product's attributes. The absence of sustainability-related attributes on labels and usage of simplified labels are partly derived from producers' commonly used argument that a simplified design increases consumers' incentive to purchase a product. This since it communicates a clear signal regarding how sustainable a product is (Nikolaou and Kazantzidis, 2016).

From a producer perspective, the current multitude of available sustainability labels have had both a positive and a negative impact. The demands set by various certification systems have encouraged improved performance in the production line and increased trade possibilities with access to high-value niche markets (Prag et al., 2016). The large spread of available labels have however made it more difficult for producers to identify which ones that are valued as most attractive by consumers and which ones that are suitable for different production conditions. It has also generated increased costs for producers, with certification fees and auditing (ibid.).

2.4.3 Multidimensional potential and barriers

The issue with existing labels can be tackled according to Weinrich and Spiller (2016a) Weinrich and Spiller (2016) with multi-level labelling. Multi-level, i.e. multidimensional, labels present complex, objective and differentiated information, e.g. different dimensions of sustainability, to consumers in a simplified matter (Kocsis and Kuslits, 2019; Weinrich and Spiller, 2016a). Multidimensional labels would further allow for a more nuanced assessment of the product's sustainability performance as some dimensions of sustainability, e.g. animal welfare, might not be appropriate to assess on a binary scale (Weinrich and Spiller, 2016a).

Despite the increased interest and higher willingness to pay for sustainable products (Engels et al., 2010; Muller et al., 2019), statistics show that only a small proportion act according to their preferences (Nikolaou and Kazantzidis, 2016; O'Rourke and Ringer, 2016). Some underlying causes are the lack of information and consideration of several sustainability dimensions as well as a lack of credibility or greenwashing phenomena, i.e. providing the consumer with a misleading picture regarding the level of sustainability a product holds (Vlaeminck et al., 2014).

The success of labelling is dependent on consumers trust and if it is compromised, e.g. by mislabelling of food-fraud, the entire system risks collapse (Charlebois et al., 2016; Giannakas, 2002). The lack of credibility partly explains the absence of actions from consumers as lacking trust in sustainability labels is identified amongst many (Nikolaou and Kazantzidis, 2016). In addition, the complexity of the assortment of sustainability labels is said to limit its function (Galarraga Gallastegui, 2002; Horne, 2009) and efficient communication regarding sustainability information is needed to motivate the public towards greener and more sustainable consumption (Leung and Rosenthal, 2019).

A potential issue with the usage of multidimensional labels is, however, the situation when too much information is presented to the consumer and thus creating confusion and failing to convey the message (Kolodinsky, 2012). It is also uncertain whether multidimensional sustainability labels can tackle the complexity with altering consumer preferences (Weinrich and Spiller, 2016a) since the consumer usage and demand is not uniform (Davies et al., 2010). The response to food labels varies as consumers' reference points and beliefs change over time (Chen et al., 2015; Davies et al., 2010). These variations can derive from multiple factors, such as the sustainability debate or key messages presented in marketing channels (Nikolaou and Kazantzidis, 2016; Peschel et al., 2016).

It can be debated whether a multidimensional sustainability label would influence consumers. The majority of our behaviour in the grocery store is based on existing habits and attitudes, and it is highly connected to generating as low effort cost as possible (Grankvist et al., 2004). It is therefore likely that many individuals would not take more information into consideration when purchasing groceries, if not their attitude and interest for sustainability is strong (Grunert, 2011). However, studies show that if a small group acknowledges the new information it is possible for them to spread it to less-interested by word of mouth advertising (Caswell and Padberg, 1992).

Hypotheses generation

In the following chapter the hypotheses used in this study will be presented. The hypotheses are based on existing literature regarding sustainability in relation to sustainability profile, prior knowledge and dissatisfaction regarding existing sustainability labels as well as socio-demographic characteristics. Subsequently, the conceptual framework is presented which builds on the generated hypotheses. The hypotheses and the conceptual framework allow for further analysis of the empirical data.

The aim of the hypotheses is to contribute with an answer to the research question *"What is the relationship between different consumer attributes and perception of a multidimensional sustainability label in the food sector?"*. The consumer attributes which were selected for testing were: *sustainability profile*, *prior knowledge about existing labels*, *dissatisfaction with existing labels* and *socio-demographic characteristics*. It was chosen to test the respondents' sustainability profile as well as prior knowledge and satisfaction with existing labels as they have been identified as important determinants of sustainable consumption (Peschel et al., 2016). The following socio-demographic characteristics were investigated: *educational level, income, gender* and *age*. The socio-demographic characteristics were chosen due to their ability of enabling for segmentation and profiling in the dataset and since they are considered important factors impacting sustainable consumption (Park et al., 2012; Tripathi and Singh, 2016).

Each hypothesis includes a prediction of positive or negative correlation. A positive correlation between two variables occurs when an increase in one variable results in an increase in the other and a negative correlation occurs when an increase in one variable results in a decrease in the other (Kremelberg, 2010).

3.1 Sustainability profile

The matter of sustainability is perceived differently by different individuals, and thus their experience with sustainability labels varies (Rousseau and Vranken, 2013). The extent to which a consumer is influenced by a sustainability label is closely linked to what sustainability profile the consumer holds (Young et al., 2010). A strong sustainability profile is said to build on an individual's knowledge, awareness and interest in the subject and it correlates with to what extent the individual possesses green values (ibid.). Consumers with a greater interest and engagement in sustainability related issues tend to consider sustainability labels to a greater extent when choosing groceries than consumers with less interest (Kocsis and Kuslits, 2019). This since a greater interest and engagement can be linked to a stronger sustainability consciousness, which often can be translated into a more sustainable behaviour (Gericke et al., 2019). It is furthermore enhanced by a stronger feeling of responsibility towards sustainability in general and as the feeling of having a positive impact on society increases, the likelihood of changing to a more sustainable behaviour follows (ibid.).

H1: *There is a positive correlation between a stronger sustainability profile and positive perception of a multidimensional sustainability label.*

3.2 Prior knowledge about existing sustainability labels

The individual preference and choice of a product correlates with a consumer's knowledge and preferences. Studies show that a greater sustainability knowledge increases the possibilities of making a sustainable choice, which partly can be described by a larger interest for sustainability issues (Nikolaou and Kazantzidis, 2016; Peschel et al., 2016). The degree of interest affects the extent to which consumers consider sustainability performance of a product when purchasing groceries. A consumer's previous knowledge about labels affects the amount of visual attention given to a product which can affect consumer choices (Samant and Seo, 2016). This since knowledge regarding labels affects how consumers perceive the quality and status of a product, thus affecting purchasing intent. Research indicates that the perceived quality of a product plays a vital role in purchase behaviour and consumers sometimes reject certain food products due to the idea of what quality it holds (ibid.). Hence, the knowledge about what a sustainability label communicates can be ruling in terms of what product a consumer chooses to purchase.

The understanding of a sustainability label correlates with the extent to which the label can affect purchase behaviour (Rousseau and Vranken, 2013). An absence of knowledge in terms of what is communicated through sustainability labels might thus lead to decisions based on incorrect information if the label is perceived wrongly. There is a risk that a sustainability label generates a feeling of confusion for consumers who lacks understanding of what the sustainability label represents. Consequently, consumers are likely to perceive other labels similarly and thus the overall attitude against labels might deteriorate as a result of lacking knowledge (Brécard, 2014). To this background, it can be motivated that the perception of a label depends and correlates with prior knowledge regarding both sustainability and existing labels. Hence the following hypothesis was formulated:

H2: *There is a positive correlation between a higher knowledge level about existing sustainability labels and positive perception of a multidimensional sustainability label.*

3.3 Dissatisfaction with existing sustainability labels

Whether a consumer will be satisfied or dissatisfied with a consumption experience is according to Oliver (1989) depending on the expected versus received value. Consumers' emotional status has been identified as an important determinant for satisfaction in numerous occasions (Mano and Oliver, 1993; Oliver, 2014; Westbrook and Oliver, 1991). According to Bougie et al. (2003) there is a strong correlation between negative emotional experience and dissatisfaction. However, consumer satisfaction cannot be decided solely based on emotional status as it is determined by a complex cognitive process (Moon et al., 2017). In a retail context, the cognitive process includes comparison with prior expectations of the product, brand or retail setting (Westbrook, 1980). The outcome is determined by individual preferences such as spending level, willingness to purchase, shopping habits (Machleit and Mantel, 2001) and emotional status (Lee et al., 2009).

Therefore, satisfaction is achieved when customer expectations are met or exceeded, while the opposite would result in dissatisfaction (Moon et al., 2017). Iglesias (2009) further states that customer satisfaction is caused by either internal or external attribution. Internal satisfaction is achieved when the positive outcome can be derived from the consumer's own actions, while external satisfaction originates from the acting of an external actor (ibid.). This suggests that a multidimensional label possesses the potential of generating both internal and external satisfaction. This as it evokes a positive emotional response when nudging a customer towards a more sustainable choice (internal), or when the label

is interpreted as a positive or appreciated action from, for example, a retailer (external). In the context of sustainability labelling, customer satisfaction is rather unexplored and therefore the hypothesis is based on these general findings. Therefore, it is assumed that consumers who are dissatisfied with the current usage of sustainability labelling would wish for an alteration, as this could generate positive emotional response and thus avoid dissatisfaction. Hence the third hypothesis is proposed:

H3: *There is a positive correlation between customer dissatisfaction regarding existing sustainability labels and positive perception of a multidimensional sustainability label.*

3.4 Socio-demographic characteristics

Recent findings suggest a possible association between consumers' socio-demographic characteristics, consumption patterns and pro-environmental behaviour, but to what extent these relationships can be proven is yet uncertain (Peattie, 2010). In general terms, the ethical and sustainable consumer is said to be above average educated, middle-aged with a higher income and who is well-informed regarding sustainability (Carrigan and Attalla, 2001; Maignan and Ferrell, 2001; Roberts, 1996). This generalisation will be elaborated on in the following section to formulate hypotheses about educational and income level as well as the consumer's age and gender.

Attention to sustainable development in higher educations has contributed to a growing societal awareness (Weissman, 2012) and higher educations are considered a significant actor in the transition to a sustainable future (Chalkley, 2006). Studies show a positive correlation between sustainable consumption and educational level (Chekima et al., 2016; Zimmer et al., 1994; Wang et al., 2014), and a higher level of education tends to correlate with a greater pro-sustainable behaviour, e.g. an increased probability to recycle or purchase green products (Meyer, 2015). This can be explained by the fact that a higher educational level often corresponds to a higher degree of knowledge regarding sustainability (Wang et al., 2014). Despite this, it is not possible to claim that higher educational levels directly translate into more sustainable consumption and evidence are lacking regarding the effects on food choices (Meyer, 2015). However, due to a consensus amongst a majority of the research, it is in this study assumed that a higher level of education corresponds to a greater likelihood of making sustainable choices, and thus to accept a multidimensional label to a greater extent. From this reasoning, the fourth hypothesis was formulated:

H4: *There is a positive correlation between a higher educational level and positive perception of a multidimensional sustainability label.*

Whether income is a crucial factor in the choice of purchasing sustainably produced groceries is a highly debated area. Some research indicates that an individual with a higher income will possess a more positive attitude towards sustainable products and thus sustainability labelling (Ross et al., 2000). Consumers' possibility to purchase sustainable products does also increase with a higher income, as sustainably produced products often are associated with a premium price. Others claim that the correlation between an individual's level of income and the choice of product cannot be proven (Robinson and Smith, 2002). It has however been identified, that a higher annual income is in general associated with a higher educational attainment (Carlson and McChesney, 2015), which in turn is associated with a greater knowledge regarding sustainability (Wang et al., 2014). In general, it is even stated by several findings that the ethical and sustainable consumer is middle-ages, has a higher income, is above average educated and is well-informed about sustainability (Carrigan and Attalla, 2001; Maignan and Ferrell, 2001; Roberts, 1996).

Based on this reasoning, it is likely to assume that an individual with a higher income will have a positive attitude towards a multidimensional label, which generates the fifth hypothesis:

H5: *There is a positive correlation between a higher income and a positive perception of a multidimensional sustainability label.*

Previous research has shown that individuals of different ages possess varying attitudes towards sustainability and to what degree their behaviour can be classified as environmentally friendly alters (Wiernik et al., 2013). These observed age-effects in different studies have been inconsistent and it is difficult to determine if factors such as sustainability concern, interest or individual preferences have a larger impact on consumer perception than age (ibid.). On one hand, it has been concluded in multiple studies that consumers belonging to an older age group tend to consider sustainability labels to a larger extent when choosing groceries and to be more dissatisfied with existing labels (Robinson and Smith, 2002). This can be explained by the fact that many elderly spend more time in the grocery store and have a larger concern for the environment than younger consumers (D'Souza et al., 2007).

On the contrary, multiple studies reveal findings which implicate the opposite. In a study conducted by Anderson et al. (2016), it was confirmed that age correlates with how quickly visual information can be processed. In general, elderly have historically adapted less fast to technological changes and have had a more negative attitude toward innovation (Gilly and Zeithaml, 1985). These findings in combination with a lack of belief amongst elderly that the employment of innovative tools and technologies will improve quality of life (Mostaghel, 2016) implies that a younger generation might be more appealed by the multidimensional sustainability label. However, these contradicting findings suggests that there is no evident correlation between age and the perception of a multidimensional label, and thus the sixth hypothesis was formulated:

H6: *There is no correlation between age and perception of a multidimensional sustainability label.*

There are contradicting findings in research regarding sustainable consumption and gender. Many argue for differences between the male and female gender and a majority of the research claims that women are more associated with making sustainable decisions (Bulut et al., 2017; Khan and Trivedi, 2015; Testa et al., 2015). Despite these claims, researchers mean that multiple other factors also influence consumer choices which creates difficulties when determining the degree of truth in this correlation (Meinzen-Dick et al., 2014). Even though women in many settings are perceived as the more ethical gender there is a discrepancy when it comes to converting an attitude into an action (Pudaruth et al., 2015). In the contrast of these conflicting empirical findings it is hard to determine an assured correlation between gender and sustainable labels, and thus the seventh hypothesis was formulated:

H7: *There is no correlation between gender and perception of a multidimensional sustainability label.*

3.5 Conceptual framework

A conceptual framework was developed to illustrate, in graphical and in narrative form, the main variables and key factors of the study (Miles and Huberman, 1994). The conceptual framework presented in figure 3.1, illustrates an overview of the seven independent variables as well as the dependent variable *perception of a multidimensional sustainability label*. To investigate the variables' correlation, seven hypotheses have been developed as previously presented.

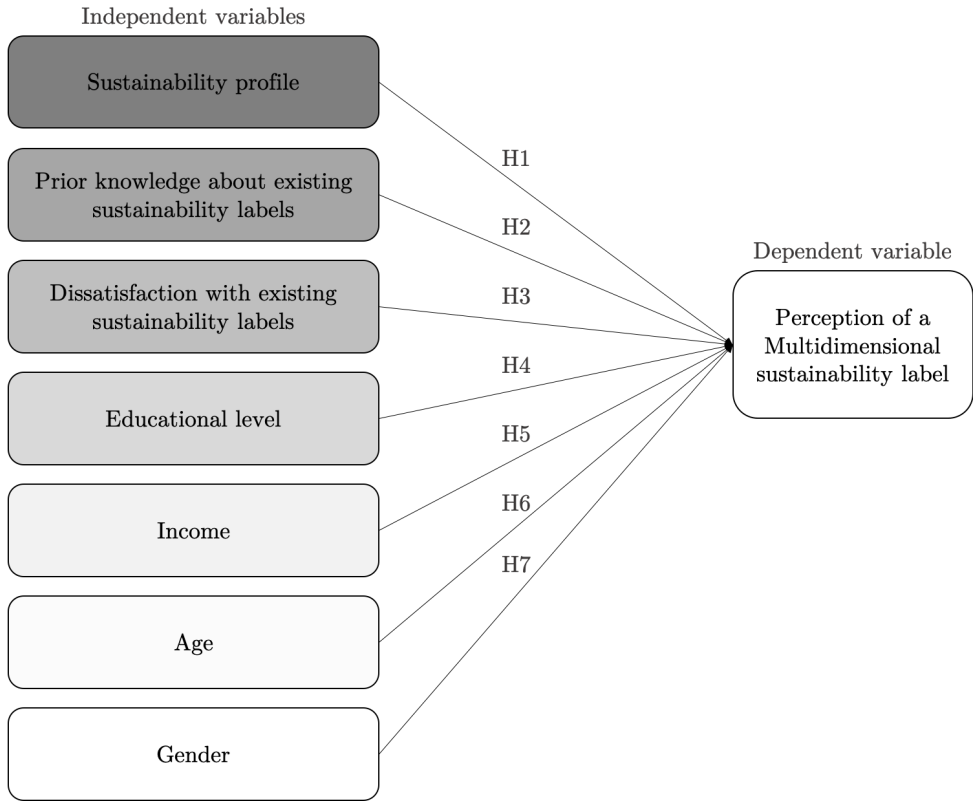

Figure 3.1: Conceptual framework

Method

In the following chapter, the method for the conducted study will be presented. The chosen research approach and design will be motivated and the procedure of creating the survey will be described. Further, the process of gathering data as well as its analysing process will be reasoned for. Lastly, the research quality standard will be discussed.

4.1 Research approach

To investigate how a multidimensional sustainability label is perceived by consumers the following objectives need to be achieved: (i) investigating the current state of knowledge, (ii) creating a survey, (iii) collecting data and (iv) analysing and presenting the data. The study has been conducted in an iterative manner, where new empirical findings and input from the literature have continuously contributed to improvements in the study.

For the method of this study, a mixture of quantitative and qualitative approach with deductive reasoning was used. The quantitative approach is suitable when analysing trends and discovering patterns in gathered numeric data (Saunders et al., 2015). The approach further enables efficient hypothesis testing, where variables can be assigned with numeric values and correlation analysis can be conducted (Creswell, 2014). This is further in line with the deductive reasoning, which tests general theory on specific cases through gathered data (Saunders et al., 2015). The qualitative approach is a suitable complement to the quantitative procedure as it allows for in-depth analysis of the gathered data. The qualitative approach is further considered useful when analysing consumer perception in regards to sustainability as it allows for nuanced interpretation (Creswell, 2014).

4.2 Research design

The study was structured to provide the research question with a satisfactory answer and to test the selected hypotheses. With the intent to utilise the previously presented mixed method approach, the study was designed to include a survey as the main data collection, see figure 4.1. It was chosen to use a survey since it is a preferred choice when determining a population's preferences and opinions and it is furthermore a commonly used tool when determining statistical correlations (Saunders et al., 2015). The survey process includes the three methodologies: sampling, questionnaire designing and data collection, and a well-reasoned combination of these are essential for a successful outcome (Fowler Jr, 2013).

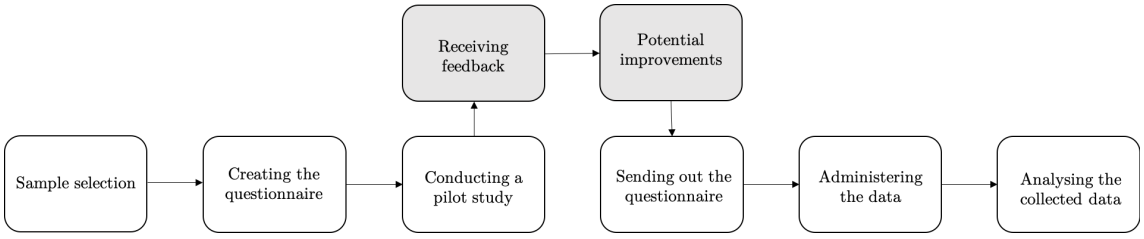

Figure 4.1: Flowchart over research design

4.3 Survey process

In the following section, the survey process three steps: sample selection, questionnaire design and data collection will be described.

4.3.1 Sample selection

To choose a representative sample from a larger population it is important to consider the three areas: sampling frame, method and size (Zikmund and Babin, 2006). For this study, the sampling frame, i.e. target population, constituted of the grocery retailer Coop's customer clientele. The selected respondents were further sampled from Coop's customer panel, which are customers who have voluntarily offered to assist in customer marketing tasks such as surveys. For an illustration of the sample selection see figure 4.2. The customer panel currently consists of 40,000 members and is considered representative for the larger population which enables for generalisation of the findings (Salaria, 2012). Thus, the customer panel is representative for Coop's customer clientele.

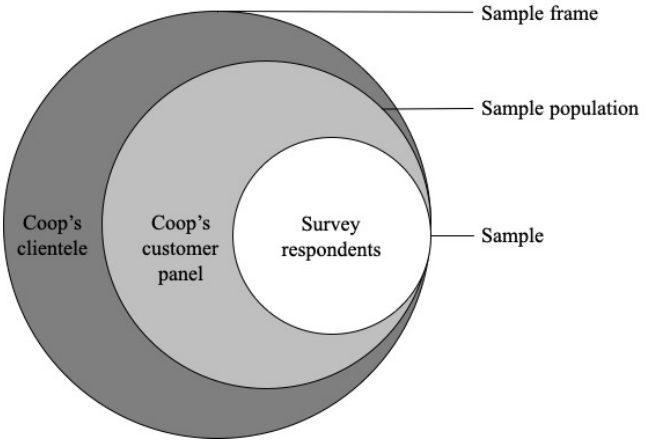

Figure 4.2: Illustration of sample selection

When deciding upon a sample method, there are two main categories to choose within: probability sampling or non-probability sampling. For this study, it was chosen to use probability sampling since the method increases the possibility of generalisability from the findings and due to its common association with surveys. It was further selected to use simple random sampling to choose respondents from the sample population. With regards to the importance of generalisability of the questionnaire result, it was important to have a sample size as large as possible. The larger sample size a study has, the lower the risk is for errors when generalising the result to the sample frame. The sample size of this study amounted to 2,580 recipients, which is considered large enough to achieve a 95% confidence level from a sample frame of 40,000 members. A confidence level of 95% is often stated as standard when gathering data through surveys. (Saunders et al., 2015)

4.3.2 Questionnaire design

When deciding what type of questionnaire to send out, and the design of it, several aspects were considered. It was chosen to use a self-completed questionnaire, where the respondent completed the survey without any interference from the authors. All respondents were given the same set of questions, which allows for efficient analysis of the survey outcome (Saunders et al., 2015). The questions were formulated to reflect the aim of the study, which was identified as an important part of achieving relevance of the questions asked (Zikmund and Babin, 2006). The questions held an investigative character to meet the objective of the study and to test the hypotheses (Saunders et al., 2015).

The questionnaire mainly gathered quantitative data using numerically rated items, where the respondents were asked to answer graded close-ended questions. Most questions provided the respondents with predetermined alternatives which they had to choose between, with exception for two questions where the respondents filled in their income and age. Additionally, an open-ended qualitative question was included to allow the respondents to speak freely about the topic. Open-ended questions are used to gather more in-depth information from the respondents than merely quantitative questions would (Creswell, 2014).

The commonly used Likert scale has been identified as a useful tool when mapping behaviour in social sciences due to its simple construct as well as reliability (Croasmun and Ostrom, 2011; Maurer and Andrews, 2000). It was therefore decided to use a five-point scale to measure the respondents' level of agreement in the questionnaire. The scale was designed as an uneven-point scale since an even-point scale would exclude a midpoint alternative, which would thus have forced the respondents to state their preferences (Croasmun and Ostrom, 2011). It was further decided to include a "I don't know" option for those who did not agree with any of the alternatives to eliminate forced standpoints and non-responses (Lam et al., 2002).

The survey was structured in five blocks, which are described in table 4.1. Each block was created with the purpose of gathering information associated with one variable.

Table 4.1: Description of survey outline

Block	Variable	Description and aim
I	Sustainability profile	Was determined by asking profiling questions about the respondents' sustainability consciousness and behaviour.
II	Perception of a multidimensional sustainability label	Was determined by asking questions regarding their perception of a multidimensional sustainability label.
III	Prior knowledge about existing sustainability labels	Was determined through a knowledge test about existing labels and what dimensions of sustainability they work with.
IV	Dissatisfaction with existing sustainability labels	Was determined by asking questions about their attitude and satisfaction with existing labels.
V	Socio-demographics	Was determined by asking questions regarding their educational level, age, gender and income.

Sustainability profile

In the first block, the questions were inspired by the profiling procedure for measuring sustainability consciousness presented by Gericke et al. (2019). In their article, the term sustainability consciousness is said to be constructed by an individual's attitude, behaviour and knowingness about sustainability, which in turn can be measured by asking questions regarding the three pillars of sustainability; economic, social and environmental aspects (ibid.). A similar approach was carried out when designing the questionnaire. For each pillar of sustainability, three questions were asked. Each question represented one of the three areas of sustainability consciousness i.e. attitude, behaviour and knowingness. This was done as self-assessments regarding sustainability in questionnaires tend to generate answers where the individual overestimates themselves as being more sustainably oriented (Bergquist, 2020).

Perception of a multidimensional sustainability label

In the second block, the respondent's perception of a multidimensional sustainability label was evaluated. To visualise the concept of multidimensionality, two research stimuli were created to evoke reactions from the participants in the study. The stimuli portray two different products with various sustainability performance in relation to five different dimensions of sustainability. This was visualised in the format of radar chart, see appendix I. After discussions with Coop, it was decided to use radar charts to illustrate the product's sustainability performance. This since it is considered an efficient method for communicating a complex matter (Kaczynski et al., 2008). The respondent answered questions regarding how they experienced the stimuli.

Prior knowledge about existing sustainability labels

To test the knowledge about existing sustainability labels, the respondents were asked to evaluate existing labels sustainability work in relation to the ten dimensions of sustainability developed by "Sustainable Supply Chain for Food in Sweden" (SSCFS). For a description of the procedure and evaluation of existing labels see appendix II and III.

Dissatisfaction with existing sustainability labels

The questions in block four asks the respondents to evaluate their level of satisfaction with existing labels. The questions regard both the number of labels on the market as well as general satisfaction with the information the labels show, both in relation to its comprehensibility and whether they cover all aspects of sustainability.

Socio-demographics

In the fifth block, data regarding the respondent's demographics was gathered. The questions asked about the respondent's age, gender, highest level of education as well as monthly gross salary.

4.3.3 Data collection

In the following section the procedure for collecting data will be described, which was done through a pilot study as well as a questionnaire.

Pilot study

Before sending out the questionnaire to the respondents, a pilot study was carried out. The purpose was to test the designed questionnaire through a small-scale study before it was sent out to the full sample. Through a pilot study, potential weaknesses, issues and needs for refinement could be identified. Additionally, feedback regarding the questionnaire design, question formulation and order could be collected. The pilot study was tested by respondents who provided feedback orally or in writing, after which adjustments were done to improve the questionnaire. The questionnaire had been thoroughly worked through in an iterative manner with supervisors from KTH and Coop, and therefore the pilot study only resulted in minor adjustments before the final questionnaire was finalised.

Main data collection

The questionnaire was sent out through email due to it being the most practical and suitable method when the sample size is large. This was done in collaboration with the grocery retailer Coop and a third-party actor. Usage of internet-questionnaire was further motivated as appropriate as all individuals in the sample population have access to the internet and are normally contacted through emails, which offers a greater control for the authors. In addition, the outcome from a self-completed questionnaire is less likely to be affected by social desire on which a certain answer is considered correct to please the receiving audience, in comparison to for example real-life interviews. This entails for a greater avoidance of contamination of the answers unless the respondents discussed the answers with each other. It is important to remember that self-completed internet-questionnaires are associated with low response frequency. However, if a large enough sample size is studied, generalisation of the responses can still be achieved. The questionnaire was open for the respondents during nine days and during this period 879 responses were collected. (Saunders et al., 2015)

4.4 Data analysis

In this section, the quantitative and qualitative analysis procedure will be presented.

4.4.1 Quantitative analysis

The quantitative analysis was conducted in four steps: (i) data reduction, (ii) quantifying variables, (iii) compilation of descriptive statistics and (iv) Pearson correlation and Spearman rank correlation. Each step will be described below.

Data reduction

The gathered data was reduced to create a more organised, focused and united data set (Miles and Huberman, 1994). In the process, deviating data for the demographic variables were discarded, e.g. unrealistic values for income or age. The procedure was not found necessary for other variables as they were constructed in a way that forced the respondents to choose between predetermined answers and did not allow them to write an answer freely. The purpose of these adjustments was to exclude invalid data to remain as high quality as possible in the data set (ibid.).

Quantifying variables

To enable quantitative analysis, the gathered data needed to be translated into single numeric values for the variables *sustainability profile, prior knowledge about existing sustainability labels, dissatisfaction with existing sustainability labels* and *perception of a multidimensional sustainability label.* As seen in figure 4.3, the variables are constructed by a block of questions where each question corresponds to a numeric value depending on the respondent's answer.

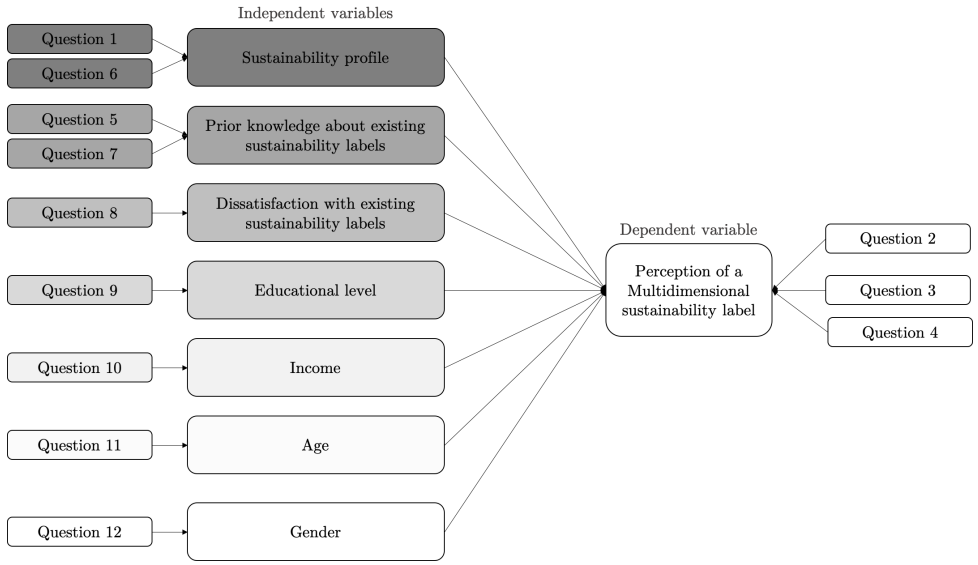

Figure 4.3: Visualization of variable construction

The majority of the questions asked the respondent to choose one answer from an ordinal scale, which is non-continuous. To allow for numerical analysis, each response on the ordinal scale was translated to an assigned value from a defined scale, see table 4.2. The numerical value generated by each question within a block was summarised to represent the respondent's final value for the corresponding variable. Through this process the data was converted from non-continuous to continuous. See appendix IV, for detailed description of the quantification for each variable.

Table 4.2: Example of numeric translation

Ordinal scale	**I don't know**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
Numerical translation	0	1	2	3	4	5

Descriptive statistics

Descriptive statistics were used to describe and summarise the variables in a perspicuous manner to entail for a deeper analysis of the data set. The following descriptive statistics were identified as relevant to the study:

- *Number* represent the simple count of the respondents
- *Maximum value* corresponds to the highest value of the variable
- *Minimum value* corresponds to the lowest value of the variable
- *Mean value* presents the average value in the set of data
- *Standard deviation (Std. deviation)* measures how spread out the data is
- *Skewness* measures the asymmetry in the data, both in terms of degree and direction
- *Kurtosis* describes the degree to which data clusters in the tails or peak

When interpreting the skewness and kurtosis it is possible to assess whether the data has a normal distribution. Values between -2 and 2 reveals that the data can be considered as adequately normally distributed (Field, 2013).

Correlation analysis

To test the formulated hypotheses, correlation analysis was performed using the statistical software SPSS statistics. It was decided to use two different correlation methodologies as the variables were of both continuous and non-continuous character. The Pearson correlation is a useful tool when determining correlation between continuous variables and to illustrate the relationship between them (Kremelberg, 2010). Similarly, Spearman rank correlation can be used to estimate the correlation between variables where one or both are non-continuous (ibid.). To conduct a Pearson correlation analysis the data should be normally distributed. This is not a requirement for Spearman rank correlation as the analysis can consider both continuous and non-continuous data (Saunders et al., 2015).

Even though most questions in the questionnaire held an ordinal character, the categorisation in blocks and summation of numerical values entailed for usage of Pearson correlation. For the variables age and income, which were continuous by default, no adjustments of the data were necessary. However, to test the fourth and seventh hypothesis, regarding correlation between educational level, gender and perception of a multidimensional label, it was decided to conduct Spearman rank correlation analysis. This was found necessary as the variables were constructed without sub-questions, hence only generated one value and therefore translation into a continuous variable was not possible.

Pearson correlation analysis and Spearman rank correlation analysis generate a number between -1 and 1, which indicates the strength of the correlation between the variables. A value of 1 indicates a perfect positive correlation, saying that as one variable increases the other one increases as well. The value -1 indicates a perfect negative correlation, meaning that as one variable increases the corresponding one decreases. A value of 0 denotes that there is no correlation, neither negative nor positive, between the variables (Saunders et al., 2015). When determining the strength of the correlation between two variables, Pallant (2011) guidelines were applied. A value for the correlation coefficient between 0.1 to 0.29 implies a weak correlation, 0.3 to 0.49 a medium and a value between 0.5 to 1 a strong correlation. In this study it was decided that the strength of correlation had to be at least medium to gain empirical support.

To determine whether a correlation between two variables was random or not, statistical significance was tested. The significance indicates the probability of claiming that correlation is systematic and truthful for the population, and not a temporary and unsystematic result. The correlation is commonly considered to be systematic if the significance value, also referred to as p-value, is below 0.05 (Saunders et al., 2015). This corresponds to a 95% confidence level.

4.4.2 Qualitative analysis

To analyse the open-ended question in the questionnaire, it was chosen to conduct a thematic coding procedure with analytic codes to extract insights from the respondents. This procedure was chosen due to its ability of discovering patterns and themes via the authors' interpretation of the data (Alhojailan, 2012; Gibbs, 2007). The coding process was executed in three steps: (i) reading the respondents' answers, (ii) identifying suitable themes and codes, and (iii) lastly analysing the result. The identified themes were created with

the intention to allow for one response to be categorised in several themes. In parallel to the coding process, irrelevant and incomplete answers were excluded from the analysis.

4.5 Research quality standard

In the following section, the quality of the conducted study will be discussed. Firstly, the reliability and validity of the study will be presented. This will be followed by a discussion regarding the participation bias and response rate of the survey.

4.5.1 Reliability

The reliability describes the extent to which the same result would be obtained if the study was replicated (Saunders et al., 2015). To interpret the quality of the study and thus measure the reliability, the accuracy of the survey instrument, in this study the questionnaire, had to be assessed (Litwin, 1995). To generate a more accurate reflection of reality, it is important to minimise the amount of error as much as possible. Random errors, e.g. that a respondent misread questions, can be found in most research due to their unpredictability and randomness as of why and how they occur. In this study a larger sample size was chosen, which is said to lower the risk of random errors (ibid.). Additionally, the statistical significance was tested to determine whether the findings were systematic or random (Kremelberg, 2010).

There are multiple methods to determine reliability (Saunders et al., 2015). By asking the respondent the same set of questions on more than one occasion, a so-called test-retest, one can determine the stability of the responses. This through ensuring that there are no major variations between the results. Due to a limited amount of time a test-retest was not performed in this study. Instead, the internal consistency of the survey was tested through Cronbach's alpha. It measures to what extent a scale is homogenous and thus reflects how items in a multi-item construct, in this study each question, measure different aspects of one variable (Heale and Twycross, 2015; Litwin, 1995). This provides a quantified measure of how accurately the survey measures the variable of interest and thus determines whether the scale can be considered reliable. Cronbach's alpha generates a value between 0 and 1, where a higher value corresponds to higher internal reliability.

In this study, a value above 0.7 corresponded to an accepted level. The internal consistency was tested for the variables which were constructed with multiple sub-questions using Likert scale, i.e. sustainability profile, perception of a multidimensional sustainability label and dissatisfaction with existing sustainability labels. The internal consistency of the variables age, income, educational level, gender and prior knowledge about existing sustainability labels was not measured through Cronbach's alpha as they were not constructed with Likert scale. As seen in table 4.3, Cronbach's alpha was above 0.7 for all tested variables. Through the actions taken to minimise errors and randomness in the data, together with Cronbach's alpha, the overall reliability of this study can be considered good.

Table 4.3: Summary of Cronbach's alpha analysis

Variable	Number of sub-questions	Cronbach's alpha
Sustainability profile	12	0.792
Perception of a multidimensional sustainability label	7	0.916
Dissatisfaction with existing sustainability labels	5	0.719

4.5.2 Validity

The validity of a quantitative research corresponds to what extent the study measures what it is intended to and how accurately the investigated concept is measured (Gibbert et al., 2008). To assess the validity of this study and its data collection, the three most common types of validity for quantitative studies were considered: content, construct and criterion validity (Heale and Twycross, 2015). This was further combined with the concept of face validity, since it is considered important for evaluation of survey research (Litwin, 1995).

Content validity refers to how accurately a research instrument, i.e. a survey, covers all aspects necessary to construct the variables (Heale and Twycross, 2015). It can further be said to include a subjective assessment by trained reviewers with knowledge within the area of research (Litwin, 1995). To ensure a high validity from this perspective, the questionnaire was constructed based on the current state of knowledge within the research field. This was combined with continuous discussions with proficient supervisors in sustainability at KTH as well as Coop, to secure an adequate quality of content. Similarly to the content validity, face validity does also portray the subjective assessment by individuals, but from untrained groups (Holden, 2010). Face validity can further be explained as an evaluation of the appropriateness, sensibility and relevance of the questionnaire by untrained judges (ibid.). This was covered by in the execution of the pilot study, when a limited number of respondents were asked to test the questionnaire, as well as through discussions with peer students during seminars at KTH.

The term construct validity, refers to the extent used research instruments measures the intended construct and how possible it is to draw conclusions between measurement and result (Heale and Twycross, 2015). For example, if an individual receives a high score on a test that measures sustainability interest, is the person truly interested in sustainability? Construct validity further presents a theoretical evaluation of how meaningful the survey is in practical settings (Litwin, 1995). To increase the construct validity of this study, it was for example chosen to use already tested and evaluated questions for sustainability profiling to construct as representative variable as possible. Whether a study possesses a high construct validity is however difficult to determine and it often demands evaluation by several investigators with years of experience (ibid.)

Criterion validity corresponds to how well the research instrument measures variables in comparison to standard assessments in the research field. To determine the level of criterion validity, correlation analysis can be conducted to compare how different instruments, e.g. different surveys, measure the same variable (Heale and Twycross, 2015). Since the research area of multidimensional labels is rather unexplored without established standard procedures, no tests similar to the previous description were executed.

To conclude, it is difficult to state a level of quality in terms of construct and criterion validity since they are more challenging to evaluate. It can however be said that the study has a high face and content validity, which ensures relevance and coverage of the investigated concept. Hence, the overall validity in this study can be identified as good.

4.5.3 Participation bias and response rate

The outcome of survey research is highly influenced by non-responses (Van Loon et al., 2003). This since the individuals who do not respond or finish the questionnaire could have varying opinions of those who answer or they could even have misunderstood the questions and therefore chosen not completed the questionnaire (Saunders et al., 2015). To reduce this impact on the gathered data the questions used in the questionnaire were carefully formulated and tested through a pilot study to avoid misinterpretations.

The study was further affected by participation bias, i.e. patterns among the respondents who choose to participate or abstain (Saunders et al., 2015). This could have an impact on the findings if the sample population's characteristics are not carefully considered and certain respondent groups are thus underrepresented (Berg, 2005). For this study in particular, it is probable that the respondents from Coop's customer panel by nature are more engaged customers who find it interesting and important to share their opinions. Coop as a store brand has in the past been, and is still today, strongly associated with green and sustainable consumerism. In 2019 Coop was named Sweden's most sustainable grocery retailer (Sustainable Brand Index, 2019), hence the consumers are likely to share those values. This potential bias will be taken into consideration when analysing the result.

To reduce the risk of participation bias compromising the findings, it is important to have as high a rate of return as possible (Groves and Peytcheva, 2008). In this study, 879 responses were gathered from a total of 2,580 survey submissions. This represents a response rate of about 34%, which can be considered as adequate for an email survey (Zikmund and Babin, 2006).

Empirical results and analysis

In the following chapter the gathered data from the questionnaire will be presented and analysed. Firstly, the questionnaire result will be presented. Secondly, the quantitative results, including the findings from quantification of variables and hypothesis testing, will be described. This will be followed by the qualitative result, which includes the findings from the open-ended question in the questionnaire. Key findings are: (i) all variables could be assumed normally distributed and thus correlation analysis could be performed, (ii) hypothesis 1 and 6 gained empirical support, and (iii) five themes: general perception, comprehensibility, relevance, barriers and potential, could be identified in the respondents' answer to the open-ended question.

5.1 Questionnaire results

In the respondents' self-assessment of their own sustainability profile it could be seen that many agreed or strongly agreed to the sub-questions, see figure 5.1 and 5.2. This implies that the general respondent perceives themselves as sustainably conscious. A majority highlights a unified opinion of ensuring high quality of life for people in the future, avoiding companies with bad reputation in regards to working conditions and environmental impact, and respecting human rights in order to foster sustainable development.

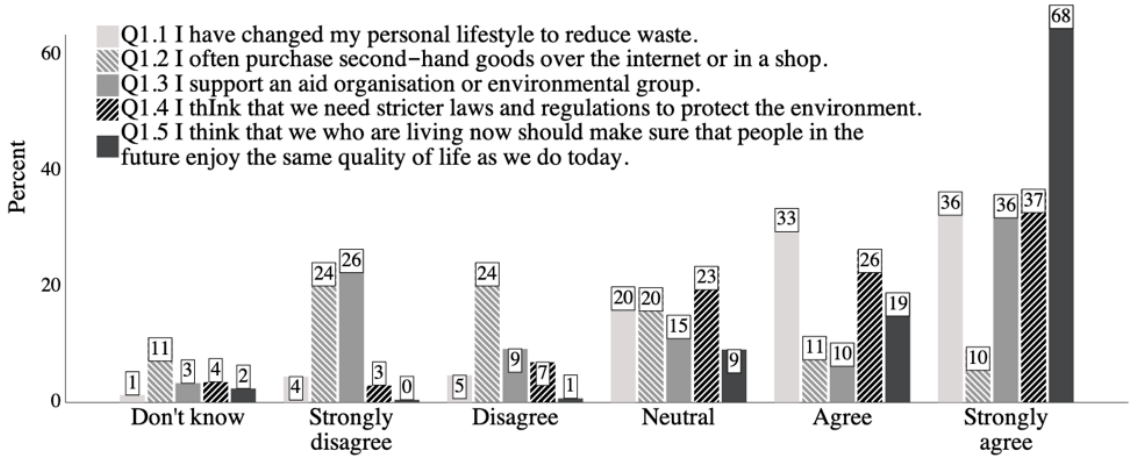

Figure 5.1: Result Q1.1-Q1.5: To what extent do you agree with the following statements?

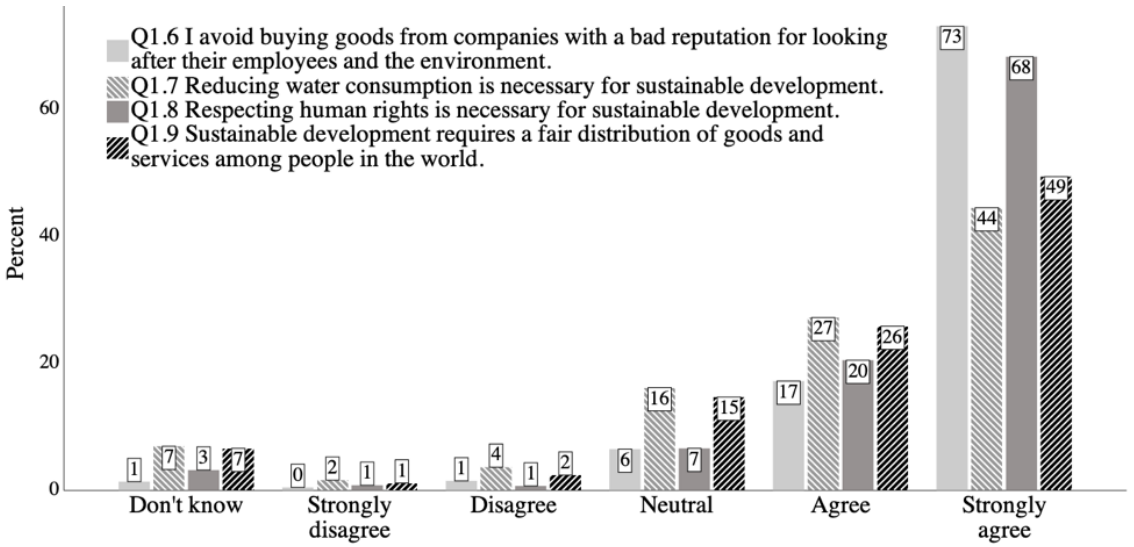

Figure 5.2: Result question 1.6-1.9: To what extent do you agree with the following statements?

The result from the evaluation of the multidimensional sustainability label did not reveal any strong trends among the respondents' answers, as the level of agreement was relatively spread out, see figure 5.3. The largest levels of agreement were identified for sub-question 2.3 and 2.4, indicating that the multidimensional label could increase knowledge about sustainability and provide information which is normally not shared.

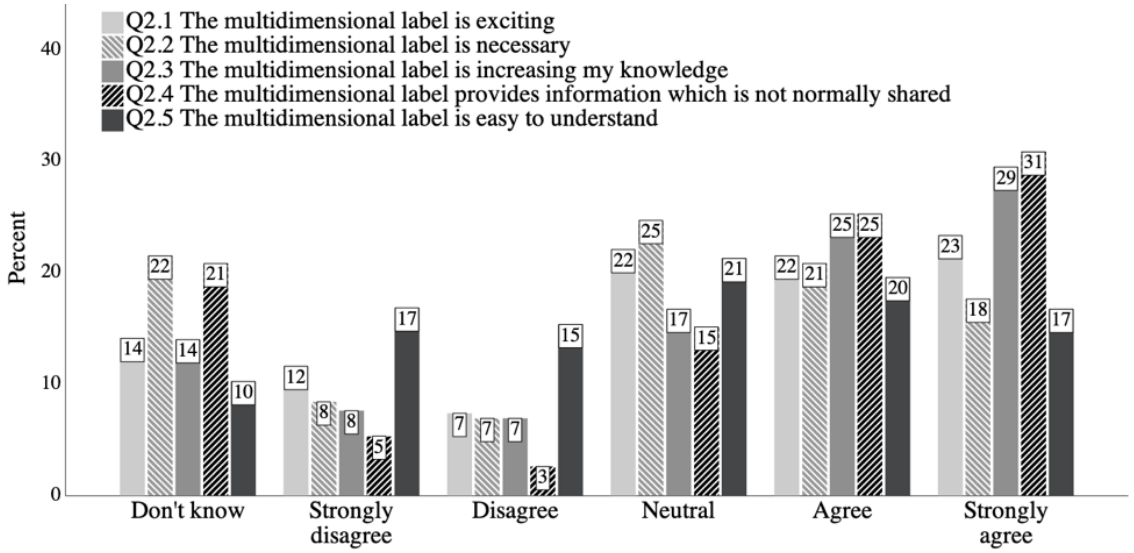

Figure 5.3: Result Q2: How well do you agree with the following statements?

As seen in figure 5.4, a strong majority in question 3 expressed a need for a label that displays multiple sustainability dimensions and communicates clearly what it covers.

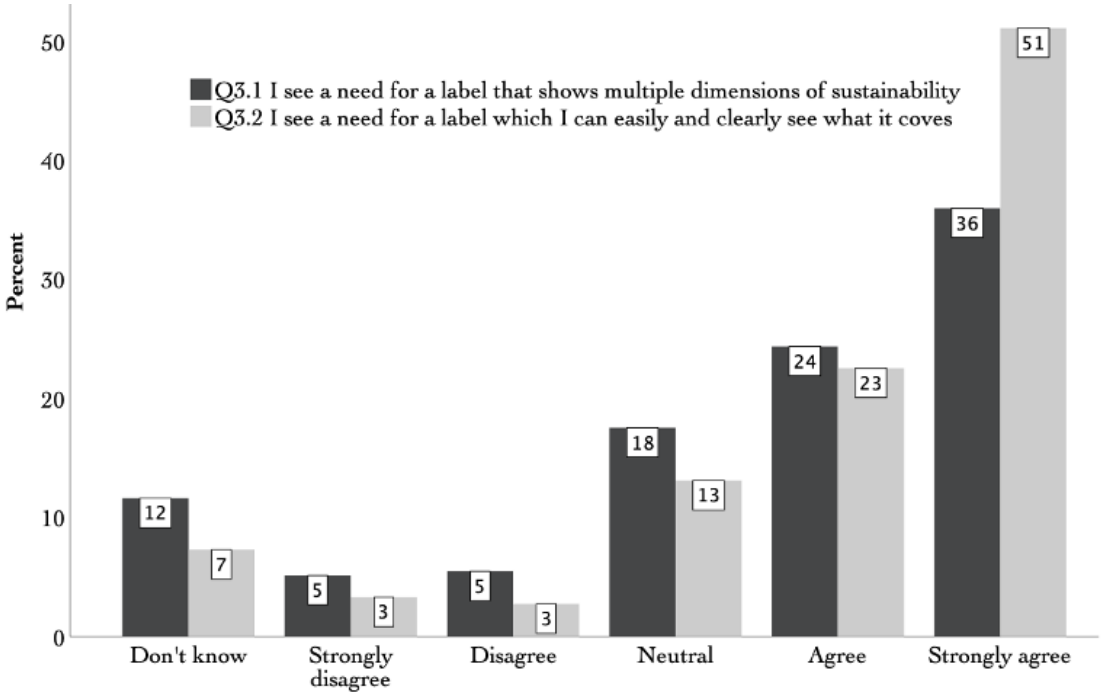

Figure 5.4: Result Q3: How well do you agree with the following statements?

When it comes to recognition of existing sustainability labels on the market, 99% were familiar with at least one label, see figure 5.5. It was seen for all labels, except Rainforest alliance and ASC, that there were more respondents that answered that they are familiar with them than not.

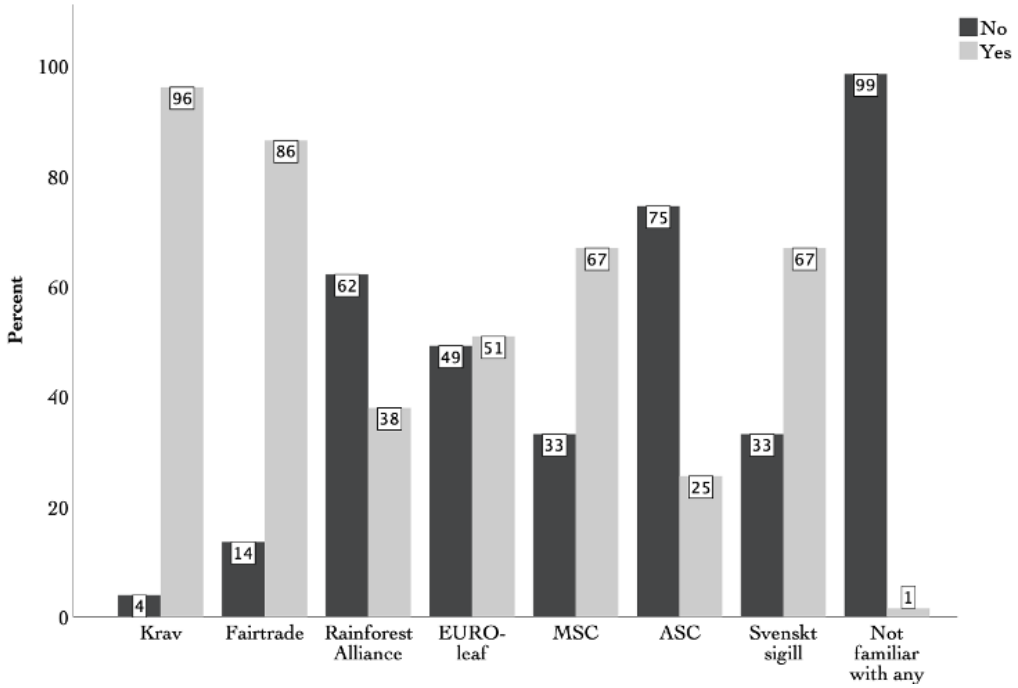

Figure 5.5: Result Q5: Which out of these labels are you familiar with?

As displayed in figure 5.6 it was seen that many respondents agreed that labels are important and that they to some extent consider labels when they purchase groceries. However, the attitude towards choosing products without labels was relatively neutral.

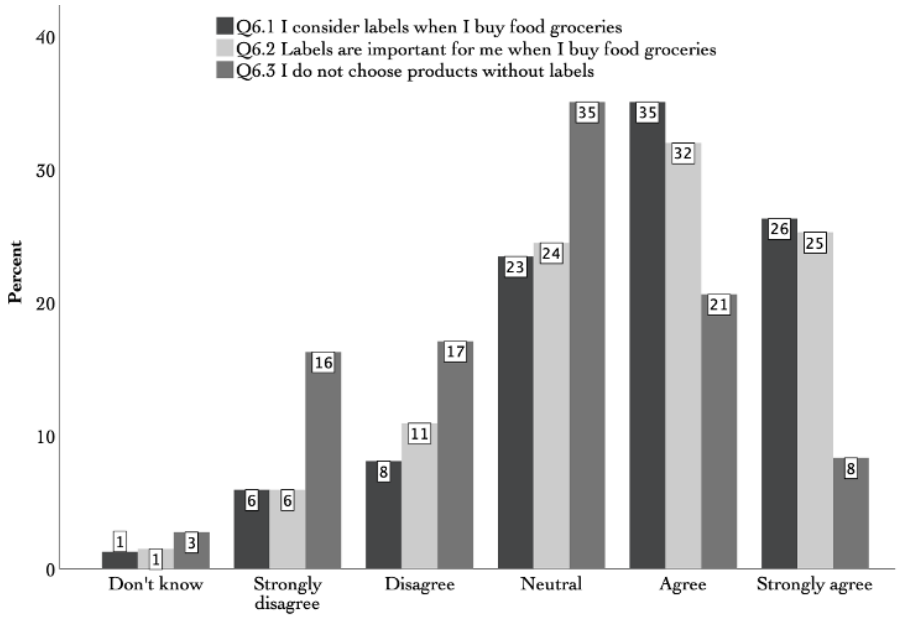

Figure 5.6: Result Q6: How well do you agree with the following statements?

It was chosen to divide the results for question 7 into multiple figures to ease the interpretation. In figure 5.7-5.16 , the respondents' evaluation of the sustainability labels in regards to each sustainability dimension defined by the Sustainable Supply Chain for Food in Sweden is presented.

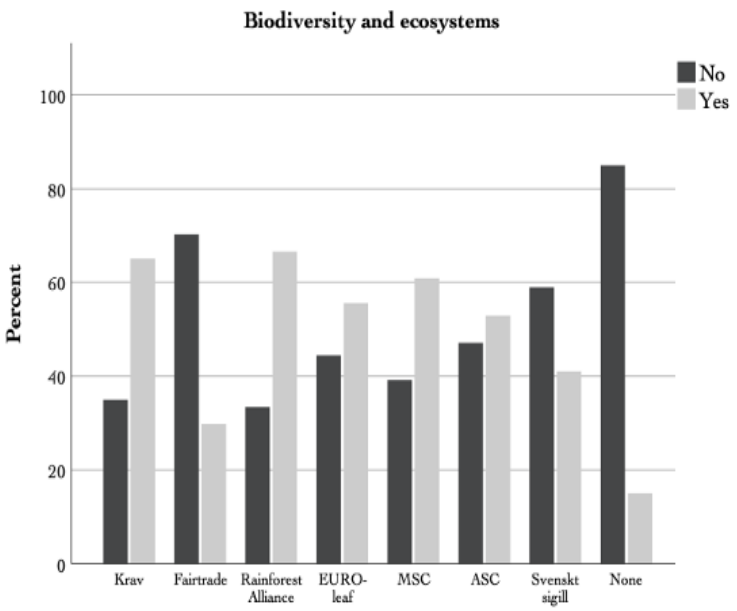

Figure 5.7: Result Q7.1: Which of these labels work with the dimension Biodiversity and ecosystems?

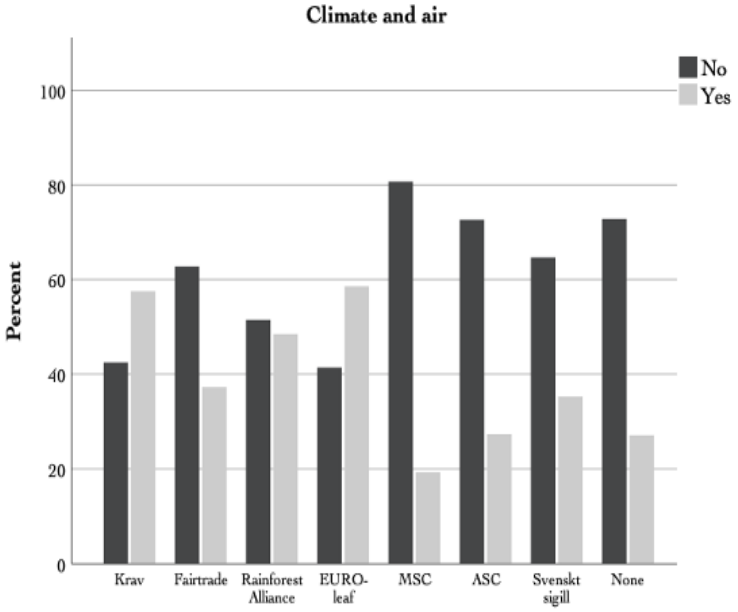

Figure 5.8: Result Q7.2: Which of these labels work with the dimension Climate and air?

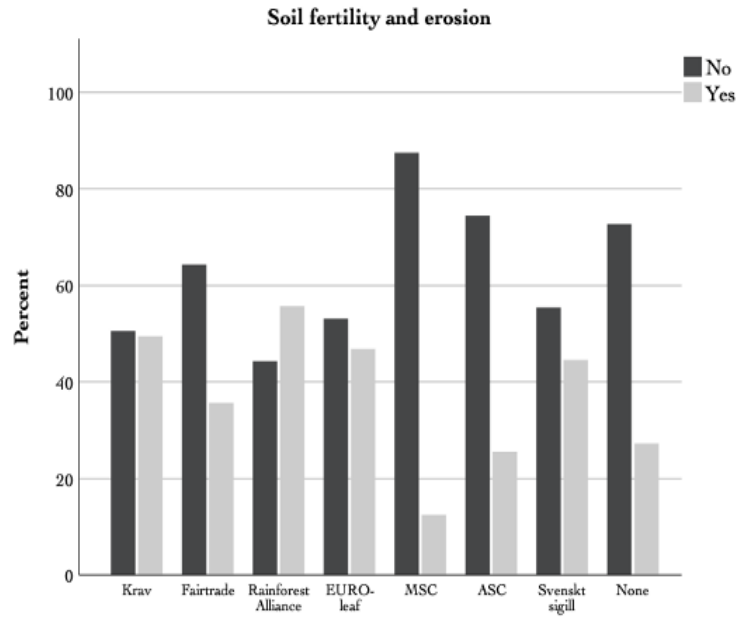

Figure 5.9: Result Q7.3: Which of these labels work with the dimension Soil fertility and erosion?

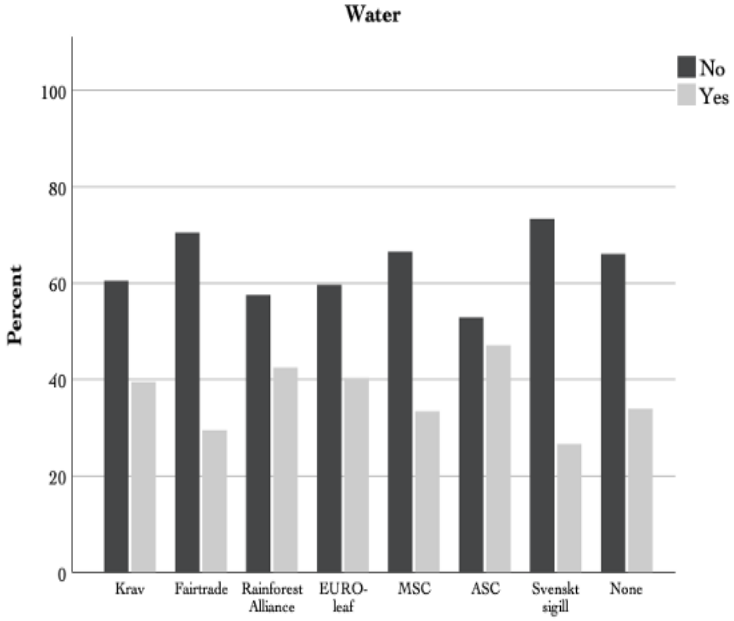

Figure 5.10: Result Q7.4: Which of these labels work with the dimension Water?

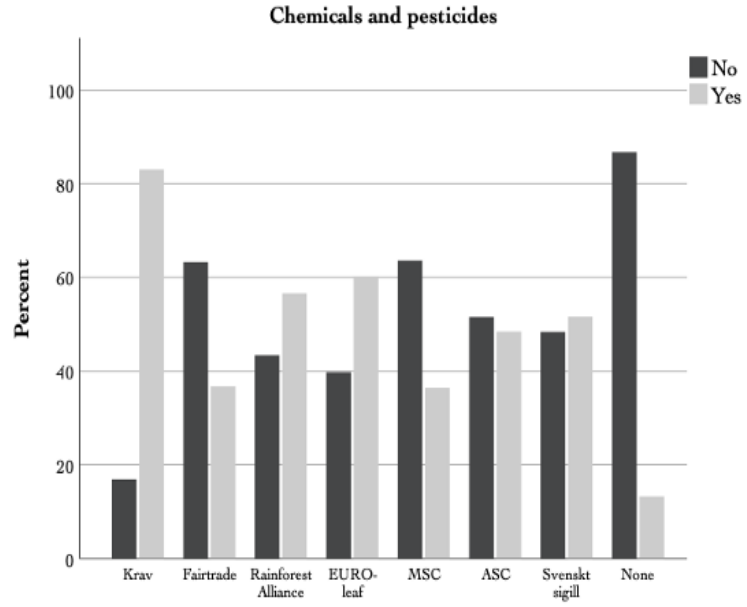

Figure 5.11: Result Q7.5: Which of these labels work with the dimension Chemicals and pesticides?

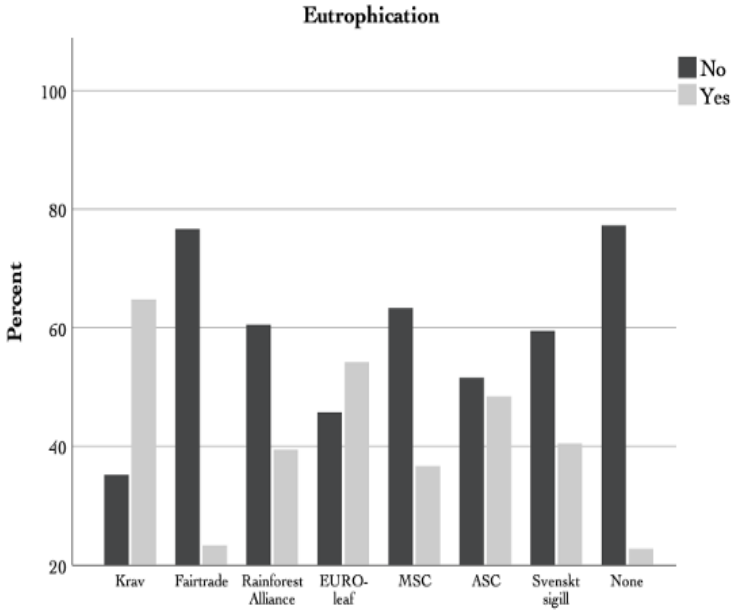

Figure 5.12: Result Q7.6: Which of these labels work with the dimension Eutrophication?

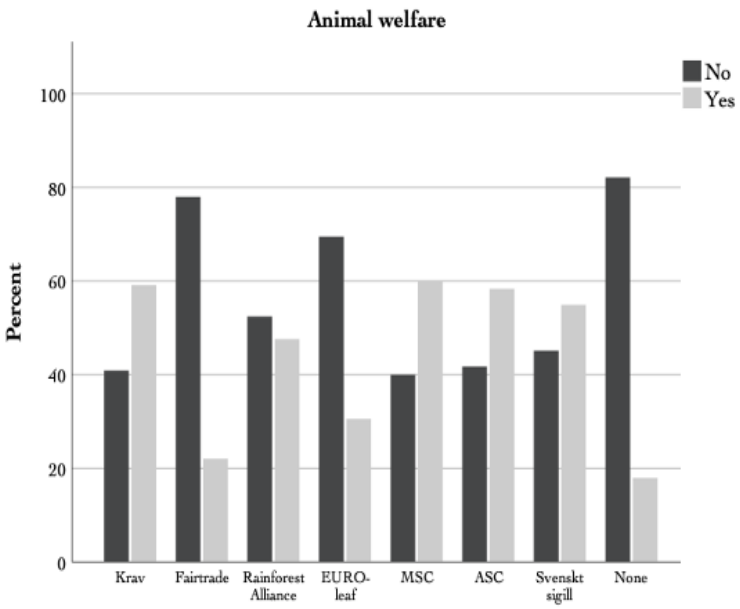

Figure 5.13: Result Q7.7: Which of these labels work with the dimension Animal welfare?

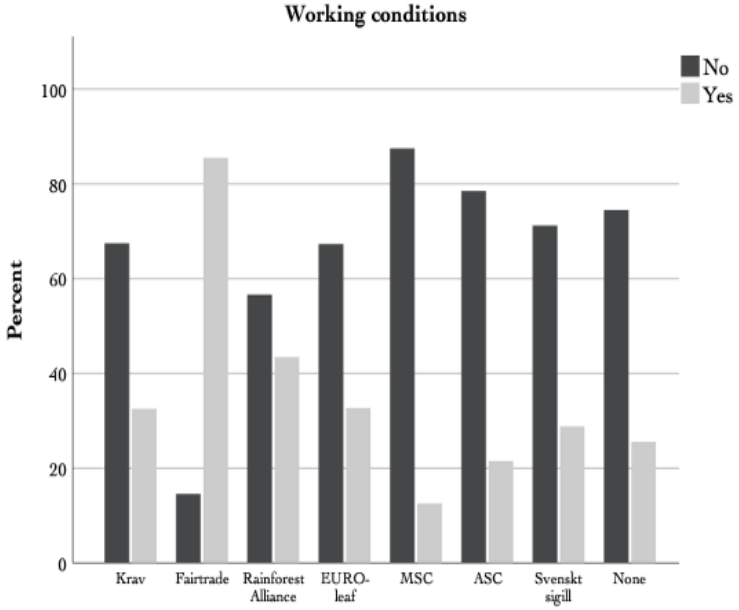

Figure 5.14: Result Q7.8: Which of these labels work with the dimension Working conditions?

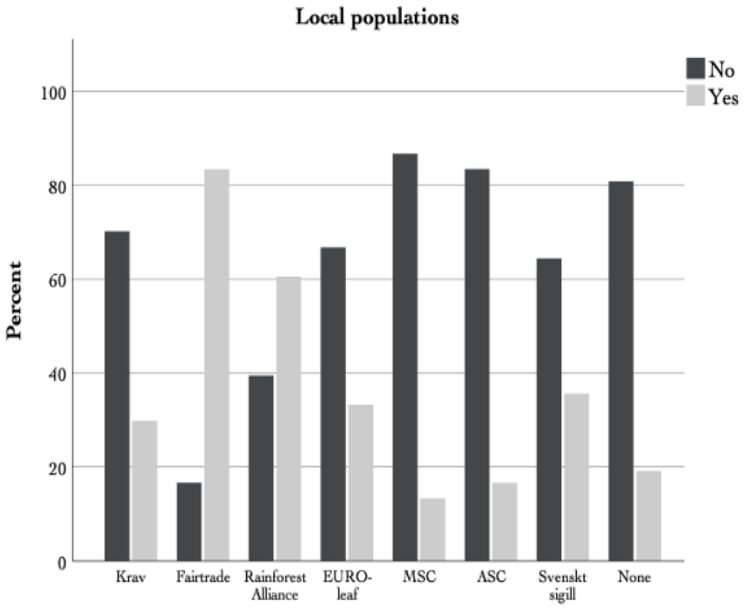

Figure 5.15: Result Q7.9: Which of these labels work with the dimension Local populations?

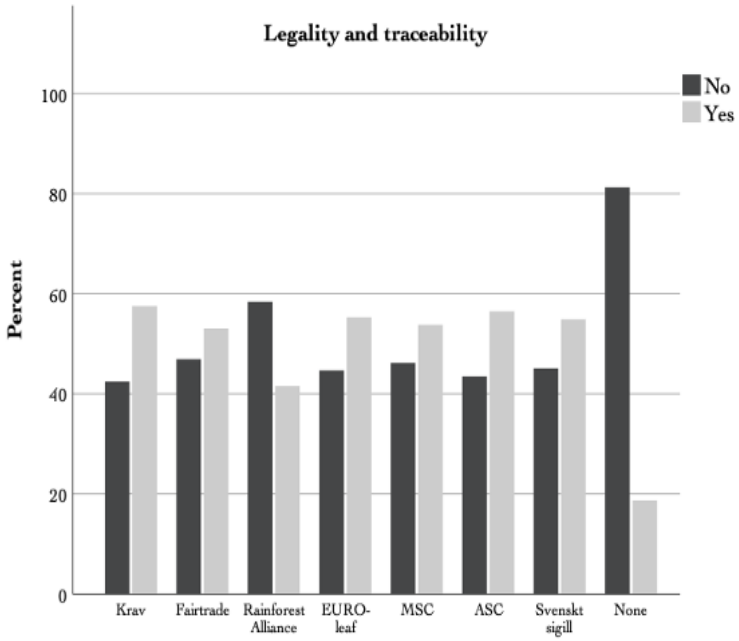

Figure 5.16: Result Q7.10: Which of these labels work with the dimension Legality & traceability?

The general satisfaction with existing sustainability labels is relatively neutral, see figure 5.17. However, it could be seen in sub-question 8.2 and 8.3 that many respondents agree that there are too many labels today and that they provide insufficient information. The result from sub-question 8.4 and 8.5 also implied that many find it difficult to know what the labels represent and how to obtain information about them.

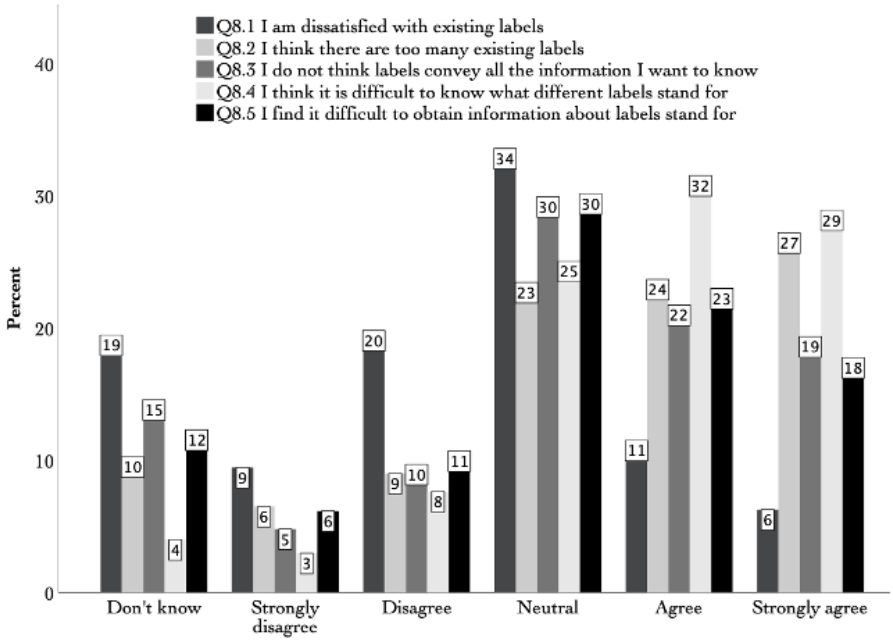

Figure 5.17: Result Q8: How well do you agree with the following statements?

When reviewing the result from question 9-12 it could be seen that a majority of the respondents are females of an older age and possess a high level of education, see figure 5.18 and 5.20. Furthermore, as seen in figure 5.19, the gross income is varying in a large span, which is further explained in section 3.4.

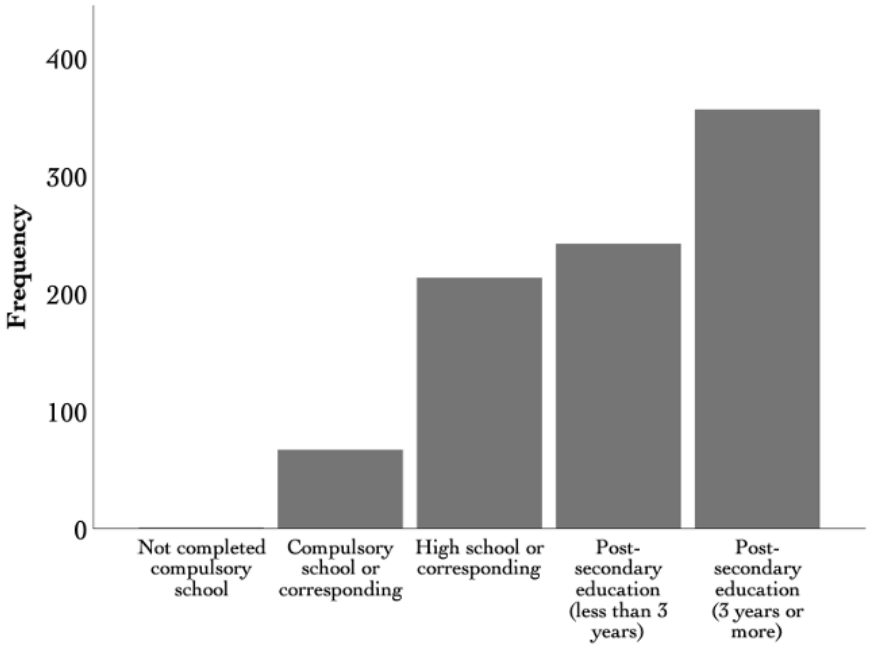

Figure 5.18: Result Q9: What is your highest completed education?

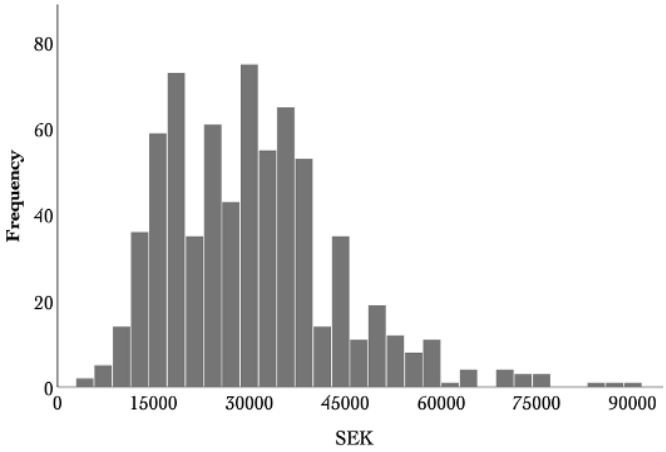

Figure 5.19: Result Q10: What is your salary?

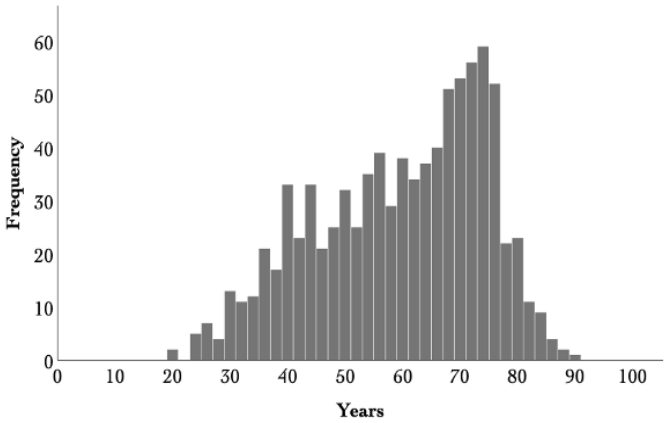

Figure 5.20: Result Q11: How old are you?

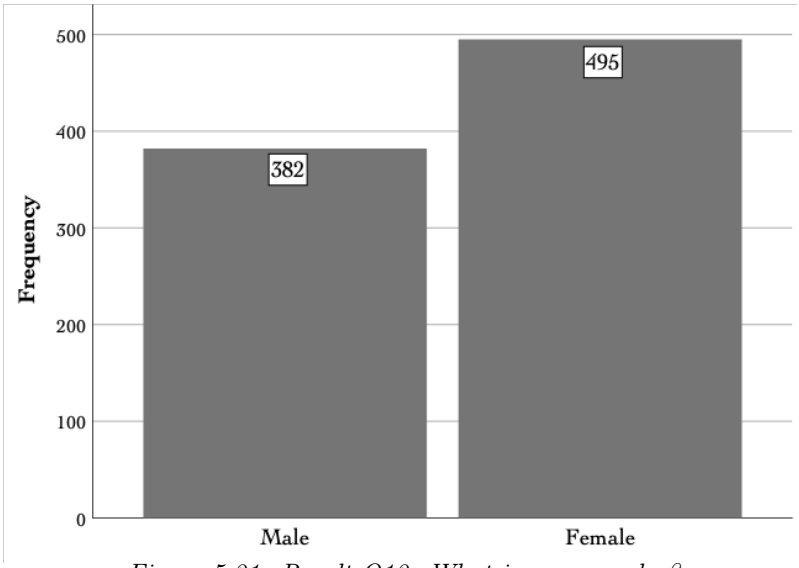

Figure 5.21: Result Q12: What is your gender?

5.2 Quantitative analysis

This section contains the quantitative findings. Firstly, the result from the quantification for the dependent variable *perception of a multidimensional sustainability label* is presented. This is followed by the result from the quantification of the seven independent variables *sustainability profile, prior knowledge about existing sustainability labels, dissatisfaction with existing sustainability labels, income, age, gender* and *educational level*. For details regarding the quantification procedure see appendix IV. For each independent variable, the result from the hypothesis testing and correlation analysis is included and explained. The confidence level for this study was set to 95% and this was accomplished for all variables, except for the variable *gender*. The values for skewness and kurtosis for all continuous variables were confirmed in the interval -2 and 2 and thus adequate normal distribution could be proven (Field, 2013).

5.2.1 Perception of a multidimensional sustainability label

For the dependent variable *perception of a multidimensional sustainability label*, 879 values were constructed based on the respondent's answers to questions 2 and 3. As figure 5.22 illustrates, the variable's values were ranging between 0 and 35 with a mean value of 22.07 and a standard deviation of 9.71. The skewness was calculated to a value of -0.62 and the kurtosis to a value of -0.59. These values indicate a clustering of data towards higher scores as well as more deviating scores around the distribution tails than in the case of perfect normal distribution.

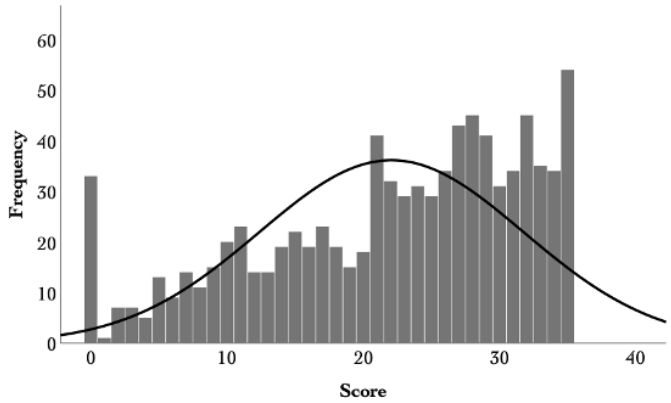

Figure 5.22: Variable illustration: Perception of a multidimensional sustainability label

5.2.2 Sustainability profile

For the variable sustainability profile, 879 values were constructed based on the respondent's answers to question 1 and 6. As seen in figure 5.23, the variable has scores ranging between 0 and 60 with a mean value of 44.37 and a standard deviation of 8.43. The data was further tested for symmetry of normality by calculating the skewness, which revealed a value of -0.94. This negative skewness indicates that the data is clustered towards the higher scores of the sustainability profile. The heaviness of the tails distribution was also tested by calculating the kurtosis, which was determined to 1.7. This positive value of kurtosis reveals that the data contains more extreme values clustered around the mean value than a perfect normal distribution.

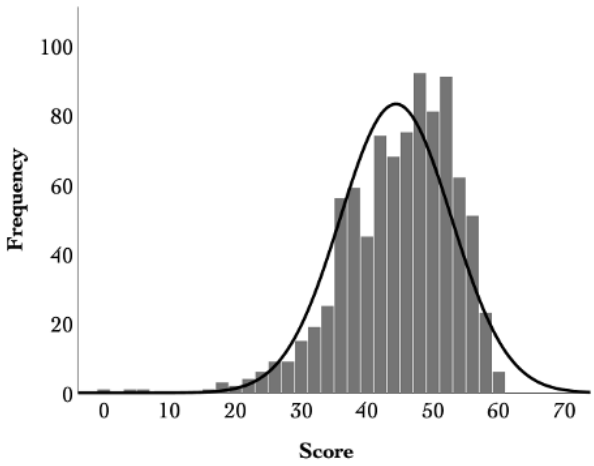

Figure 5.23: Variable illustration: Sustainability profile

To investigate the relationship between the consumer attribute *sustainability profile* and the *perception of a multidimensional sustainability label* the following hypothesis was tested with Pearson correlation.

H1: *There is a positive correlation between a stronger sustainability profile and positive perception of a multidimensional sustainability label.*

For the variables *sustainability profile* and *perception of a multidimensional sustainability label*, a positive correlation could be identified with a strength of 0.470 as seen in table 5.1. This corresponds to a medium strength level, i.e. medium correlation. This means that H1 gained empirical support.

Table 5.1: Result for Hypothesis 1

	Pearson coefficient	**P-value**
Sustainability profile	0.470	0.00**

**p<0.01 *p<0.05

5.2.3 Prior knowledge about existing sustainability labels

For the variable *prior knowledge about existing sustainability labels*, 879 values were constructed based on the respondent's answers to question 5 and 7. As seen in figure 5.24, the variable has scores ranging between 0 and 26 with a mean value of 15.75 and a standard deviation of 4.76. The skewness of the data was calculated to -0.86, which indicates that the data is more clustered towards the higher scores. The kurtosis of the data was calculated to 0.98 which means that there are more deviating scores around the mean value than in the case of perfect normal distribution.

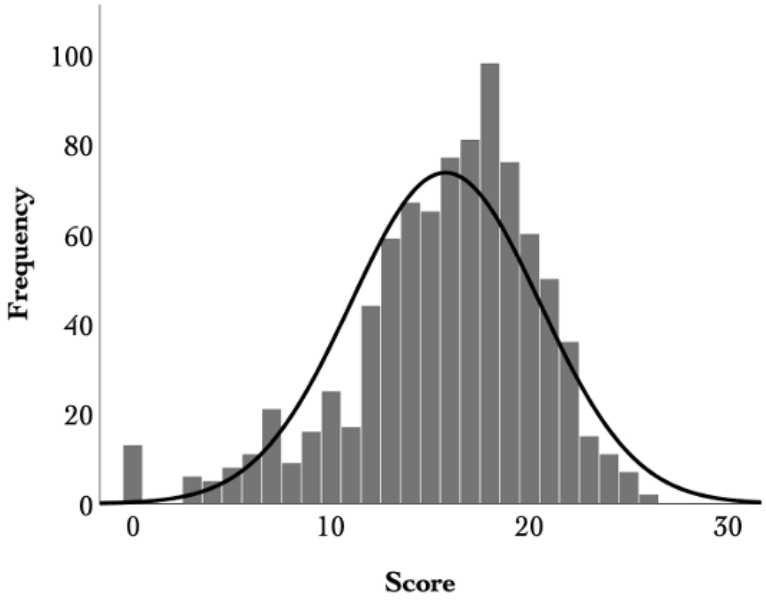

Figure 5.24: Variable illustration: Prior knowledge about existing sustainability labels

To investigate the relationship between the consumer attribute *prior knowledge about sustainability labels* and the *perception of a multidimensional sustainability label* the following hypothesis was tested with Pearson correlation.

H2: *There is a positive correlation between a higher knowledge level about existing sustainability labels and positive perception of a multidimensional sustainability label.*

For the variables *prior knowledge about sustainability labels* and *perception of a multidimensional sustainability label*, a positive correlation could be identified with a strength of 0.288 as seen in table 5.2. The result implies that there is weak correlation between an individual's prior knowledge regarding sustainability labels and how a multidimensional label is perceived.

Table 5.2: Result for Hypothesis 2

	Pearson coefficient	**P-value**
Prior knowledge about existing sustainability labels	0.288	0.00**

**p<0.01 *p<0.05

5.2.4 Dissatisfaction with existing sustainability labels

For the variable dissatisfaction with existing sustainability labels, 879 values were constructed based on the respondent's answers to question 8. As figure 5.25 illustrates, the variable has scores ranging between 0 and 25 with a mean value of 15.12 and a standard deviation of 5.16. The skewness of the data was calculated to -0.54 and the kurtosis to 0.52. These values indicate a clustering of data towards the higher scores as well as more deviating scores around the mean value than in the case of perfect normal distribution.

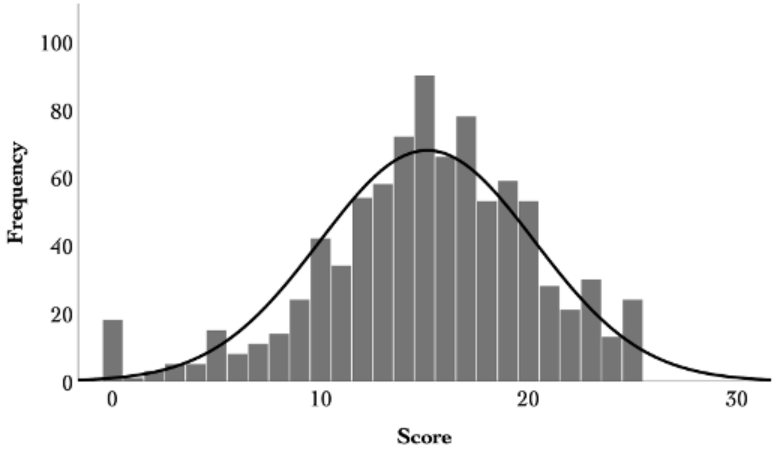

Figure 5.25: Variable illustration: Dissatisfaction with existing sustainability labels

To investigate the relationship between the consumer attribute *dissatisfaction with existing sustainability labels* and the *perception of a multidimensional sustainability label* the following hypothesis was tested with Pearson correlation.

H3: *There is a positive correlation between customer dissatisfaction regarding existing sustainability labels and positive perception of a multidimensional sustainability label.*

For the variables *dissatisfaction with existing sustainability labels* and *perception of a multidimensional sustainability label*, a positive correlation could be identified with a strength of 0.187 as seen in table 5.3. The result implies that there is weak correlation between an individual's dissatisfaction with existing sustainability labels and how a multidimensional label is perceived.

Table 5.3: Result for Hypothesis 3

	Pearson coefficient	**P-value**
Dissatisfaction with existing sustainability labels	0.187	0.00**

**p<0.01 *p<0.05

5.2.5 Socio-demographic characteristics

Below follows a description of the characteristics for the socio-demographic variables *educational level, income, age* and *gender*. This is followed by the results from the hypothesis testing for each variable.

For the variable *educational level*, 879 answers were gathered from the respondent's answers to question 9. As seen in figure 5.26, the average respondent holds a post-secondary education (less than 3 years).

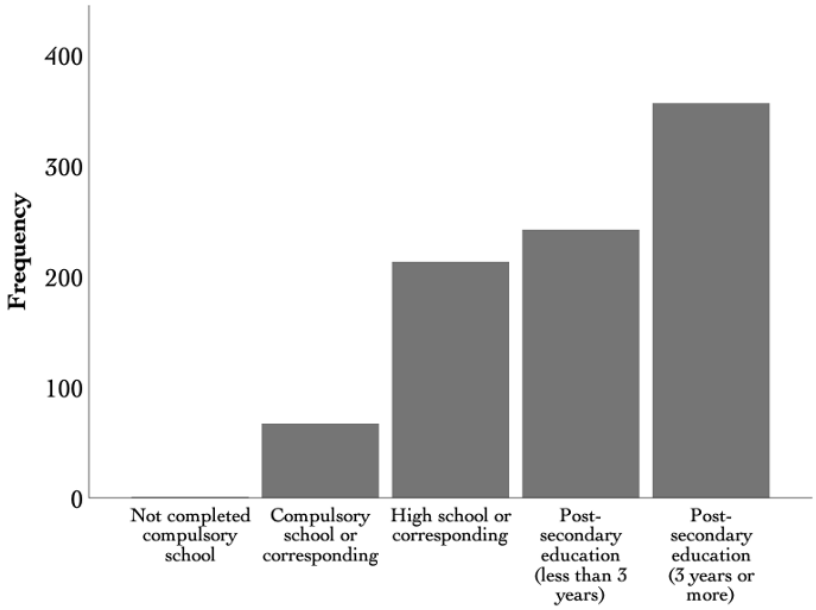

Figure 5.26: Variable illustration: Educational level

For the variable *income*, 704 answers were gathered from the respondent's answers to question 10. As figure 5.27 illustrates, the income was ranging between 5,000 and 90,000 with a mean value of 31,000 and a standard deviation of 13,400. The skewness of the data was calculated to 0.94 and the kurtosis to 1.45. These values indicate a clustering of data towards lower levels of income as well as more deviating values of income around the mean value than in the case of perfect normal distribution.

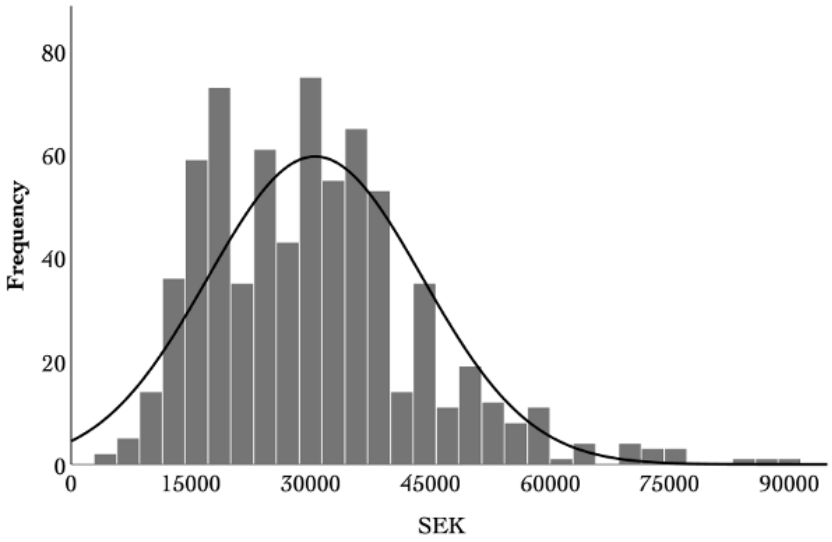

Figure 5.27: Variable illustration: Income

For the variable *age*, 879 values were gathered from the respondent's answers to question 11. As figure 5.28 illustrates, the ages were ranging between 20 and 89 with a mean value of 59.07 and a standard deviation of 14.7. The skewness of the data was calculated to -0.43, which indicates a clustering of data towards the higher scores. The kurtosis was calculated to -0.73, which indicates more deviating scores around the distribution tails than in the case of perfect normal distribution.

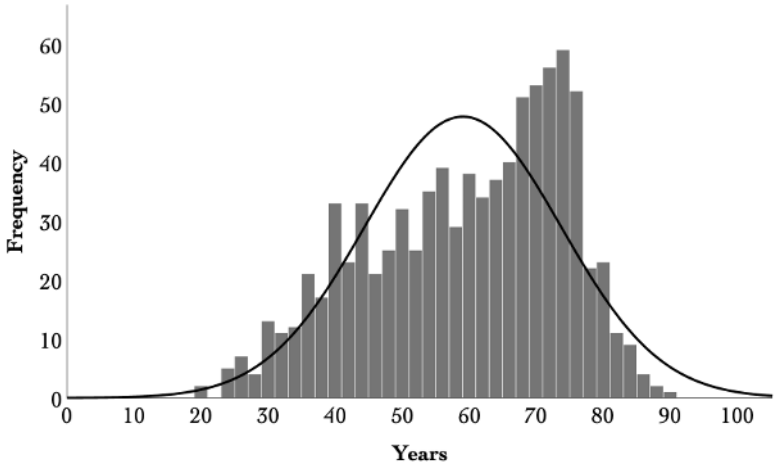

Figure 5.28: Variable illustration: Age

For the variable *gender*, 877 answers were gathered from the respondent's answers to question 12. As seen in figure 5.29, 495 of the respondents were female and 382 were male.

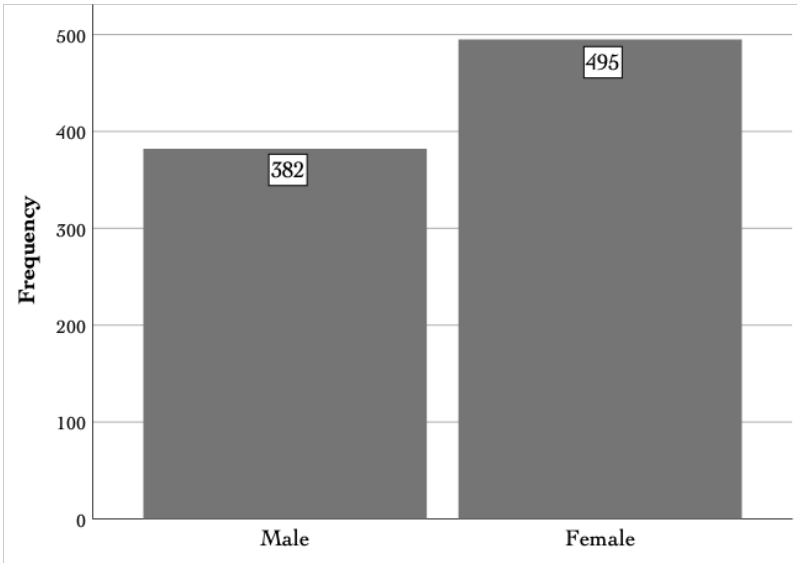

Figure 5.29: Variable illustration: Gender

To investigate the relationship between the consumer attributes *educational level, income, age, gender* and the *perception of a multidimensional sustainability label* the following hypotheses were tested with Pearson or Spearman correlation.

H4: *There is a positive correlation between a higher educational level and positive perception of a multidimensional sustainability label.*

H5: *There is a positive correlation between a higher income and a positive perception of a multidimensional sustainability label.*

H6: *There is no correlation between age and perception of a multidimensional sustainability label*

H7: *There is no correlation between gender and perception of a multidimensional sustainability label*

As seen in table 5.4 only a weak or negligible relationship between the socio-demographic variables and the dependent variable *perception of a multidimensional sustainability label* was detected. For the variables *age* and *perception of a multidimensional sustainability label* a negative correlation with a strength of -0.076 was found. As the strength of this correlation is very close to zero, it can be said to be negligibly small and thus no relation could be detected. This means that H6 gained empirical support. For the variables *educational level* and *income*, a positive correlation could be identified with a strength of 0.195 and 0.114 respectively. This implies that there is a weak correlation between an individual's level of education as well as income and how a multidimensional label is perceived. For the variable *gender*, no correlation within the set confidence level of 95% could be detected and thus the hypothesis could neither be rejected nor proven. The high p-value of 0.854 indicates that the result lack evidence in regards to determining a relationship between gender and the perception of a multidimensional sustainability label.

Table 5.4: Results for Hypothesis 4,5, 6 and 7

	Pearson coefficient	**Spearman coefficient**	**P-value**
Educational level	n/a	0.195	0.00**
Income	0.114	n/a	0.002**
Age	-0.076	n/a	0.025*
Gender	n/a	-0.006	0.854

**p<0.01 *p<0.05

5.2.6 Summary of quantitative findings

In table 5.5, the descriptive statistics for all variables are summarised.

Table 5.5: Summary of descriptive statistics

	Number	Minimum Value	Maximum Value	Mean Value	Std. deviation	Skewness	Kurtosis
Sustainability profile	879	0	60	44.37	8.43	-0.94	1.7
Prior knowledge about existing sustainability labels	879	0	26	15.75	4.76	-0.86	0.98
Dissatisfaction with existing sustainability labels	879	0	25	15.12	5.16	-0.54	0.52
Educational level	879	n/a	n/a	n/a	n/a	n/a	n/a
Income	704	5,000	90,000	31,000	13,400	0.94	1.45
Age	879	20	89	59.07	14.70	-0.43	-0.73
Gender	877	n/a	n/a	n/a	n/a	n/a	n/a
Perception of a multidimensional sustainability label	879	0	35	22.07	9.71	-0.62	-0.59

In table 5.6, the result regarding empirical support is summarised. It could be seen that two hypotheses, H1 and H6, gained empirical support, while the remaining did not.

Table 5.6: Summary of results for hypothesis testing

	Hypothesis	Empirical support
H1	There is a positive correlation between a stronger sustainability profile and positive perception of a multidimensional sustainability label	Yes
H2	There is a positive correlation between a higher knowledge level about existing sustainability labels and positive perception of a multidimensional sustainability label	No
H3	There is a positive correlation between customer dissatisfaction regarding existing sustainability labels and positive perception of a multidimensional sustainability label	No
H4	There is a positive correlation between a higher educational level and positive perception of a multidimensional sustainability label	No
H5	There is a positive correlation between a higher income and a positive perception of a multidimensional sustainability label	No
H6	There is no correlation between age and perception of a multidimensional sustainability label	Yes
H7	There is no correlation between gender and perception of a multidimensional sustainability label	n/a

5.3 Qualitative analysis

In total, 649 respondents chose to leave an answer to the open-ended question *"Describe with your own words your impression of the multidimensional sustainability label"* in the questionnaire. The analysis of the quantitative data allowed for identification of five common themes among the answers.

From the total number of responses, 217 respondents clearly expressed an opinion regarding the theme *general perception*. Within the theme *general perception*, 77% of the respondents perceived the multidimensional label as positive and described it as good, clever, exciting/interesting and innovative. Remaining 23% held a more negative perception and described the multidimensional label as bad, cluttered and boring. See table 5.7 for an overview of the frequency and percent distribution.

Table 5.7: Coding summary - General perception

Identified theme	Analytic code	Frequency	Percent
General perception	Good	96	44
	Exciting/Interesting	49	23
	Cluttered	29	13
	Innovative	18	8
	Bad	16	7
	Boring	5	2
	Clever	4	2
	Identified answers	**217**	**100**

Within the theme of *comprehensibility*, 334 responses were identified. Among the responses, 25% experienced the multidimensional label as easy to understand/interpret, while 75% expressed an ambiguity in regards to comprehensibility, see table 5.8. It was identified that 60% found the multidimensional label as hard to understand/interpret, 8% wished for further explanation, 4% experienced it as illogical and 2% expressed that it did not portray sustainability sufficiently.

Table 5.8: Coding summary - Comprehensability

Identified theme	Analytic code	Frequency	Percent
Comprehensibility	Hard to understand/interpret	203	61
	Easy to understand/interpret	82	25
	Needs further explanation	28	83
	Illogical	15	4
	Sustainability not portrayed sufficient	6	2
	Identified answers	**334**	**100**

Within the theme of *relevance*, 102 responses were identified. Among these responses, 65% found the multidimensional label relevant and described it as important/necessary. In the remaining 35%, 28% described the multidimensional label as redundant and 7% expressed that the purpose of the label was unclear. See table 5.9 for an overview of the frequency and percent distribution.

Table 5.9: Coding summary - Relevance

Identified theme	Analytic code	Frequency	Percent
Relevance	Important/Necessary	66	65
	Redundant	29	28
	Unclear purpose	7	7
	Identified answers	**102**	**100**

Within the theme *barriers*, 78 responses were identified. As seen in table 5.10, 55% expressed the multidimensional label as time consuming to get familiar with, 10% expressed that too much information was presented and 35% highlighted the importance of scientific ground to gain credibility.

Table 5.10: Coding summary - Barriers

Identified theme	Analytic code	Frequency	Percent
Barriers	Requires time to get familiar with	43	55
	Scientific ground important for credibility	27	35
	Too much information	8	10
	Identified answers	**78**	**100**

Within the theme *potential*, 133 responses were identified. Among these responses, 33% expressed that the multidimensional label has the potential to clarify a product's sustainability performance. Furthermore, 26% respectively 14% mentioned the possibility to increase awareness/interest and knowledge regarding sustainability through usage of the multidimensional label. Additionally, 12% found that the multidimensional label simplifies the comparison of products, 10% found it complementary to existing labels and 5% expressed the potential for it to increase pressure on producers regarding products' sustainability performance. See table 5.11 for an overview of the frequency and percent distribution.

Table 5.11: Coding summary - Potential

Identified theme	Analytic code	Frequency	Percent
Potential	Clarifies products' sustainability performance	44	33
	Increases sustainability awareness/interest	35	26
	Increases knowledge about sustainability	19	14
	Simplifies the comparison of products	16	12
	Complements existing labels	13	10
	Increases pressure on producers	6	5
	Identified answers	**133**	**100**

Discussion

In the following chapter the empirical findings will be discussed in relation to the current state of knowledge to answer the research question: What is the relationship between different consumer attributes and perception of a multidimensional sustainability label in the food sector? This is followed by an elaboration on the limitations of the study.

6.1 Sustainability profile

When examining the relationship between the variables *sustainability profile* and the *perception of a multidimensional sustainability label* a medium positive correlation could be identified and thus H1 gained empirical support. This result is in accordance with previous findings where Kocsis and Kuslits (2019) as well as Rousseau and Vranken (2013) argue that individuals with a greater interest in sustainability seek more extensive information about the products they purchase and therefore consider sustainability labels to a greater extent. An individual with a strong sustainability profile furthermore possesses a greater ability to evaluate the information on the label (Walters and Long, 2012), which can be seen as an explanation to a more positive perception of the multidimensional label.

Nevertheless, the accuracy of the sustainability profile is fairly uncertain as it builds on questions characterised by self-assessment. There are reasons to be sceptical to the variable's result as exaggerated self-estimations are commonly seen in survey research (Bergquist, 2020). Furthermore, Coop's customer clientele is likely to be biased by the company's green and sustainable values. Therefore the outcome from this study might have generated a stronger correlation between the variables *sustainability profile* and *perception of a multidimensional sustainability label* than if the sample was representative for the Swedish population.

As seen in figure 5.1 and 5.2 illustrating the result from question 1, the sustainability profile is consistently strong for most questions with a predominant level of agreement in sub-questions 1.5-1.9. This indicates a shared feeling that companies as well as individuals are responsible for fostering sustainability, and the responses mutually emphasises the importance of ensuring a high quality of life for future generations. This feeling of responsibility towards sustainability increases the likelihood of acting more sustainably (Gericke et al., 2019), which further promotes usage of sustainability labels.

It is interesting to note that the respondents held a higher level of disagreement against two of the sub-questions. These regards whether the respondent often purchases second-hand or supports an aid organisation. This indicates that, despite the sense of responsibility towards sustainability, the average respondent has not fully undertaken measures to change his or her behaviour. This implies according to Grunert et al. (2014) that there is reason to be sceptical towards to what extent sustainability labels will affect these individuals, as their environmental concern has not yet been translated into behavioural changes.

According to a study by Nikolaou and Kazantzidis (2016), an individual's sustainability behaviour tends to be in line with what is being discussed in society and therefore it is reasonable to expect that a larger proportion would claim to purchase second-hand. However, it can be speculated that this outcome depends on the demographic characteristics of the respondents, where for example, the average respondent's age is relatively high and the discussion of purchasing second-hand may have a greater impact in younger target groups. Nevertheless, it can be seen that at least one third of the respondents state that they have changed their lifestyle to reduce the amount of waste produced.

6.2 Prior knowledge about existing sustainability labels

An important finding obtained when reviewing the results from question 5 and 7, which corresponds to the variable *prior knowledge about existing sustainability labels*, was the clear majority of respondents who were familiar with the presented labels. As seen in figure 5.5, about 99% were familiar with at least one label. Other studies have shown that high levels of customer recognition are often associated with high credibility for the label, but it does not reveal anything regarding the knowledge level (Testa et al., 2015). The obtained result was in line with the previously mentioned observation, as the second hypothesis (H2), which investigated the correlation with the dependent variable *perception of a multidimensional sustainability label*, did not gain empirical support. This despite the respondents' high level of familiarity with the existing labels.

A potential explanation to the outcome can be seen in figure 5.24, where the variable scores are illustrated. The scores from the knowledge test varied between 0 to 26 points, out of a theoretical maximum of 30 points, with a mean value of 15.75 points, see table 5.5. This reveals a relatively low knowledge level amongst the respondents regarding the evaluated labels' coverage of sustainability. It can be speculated if this non-existing relationship between *prior knowledge about existing sustainability labels* and *perception of a multidimensional sustainability label* could be explained by the amount of visual attention given by the respondent. According to Samant and Seo (2016) as well as Peschel et al. (2016), the consumer's knowledge about labels affects to what extent the label is given visual attention and thus its possibility to impact the purchasing decision. This suggests that an individual with greater knowledge about labels would give a label more attention before deciding if the product is interesting to purchase or not Rousseau and Vranken (2013). The result from the knowledge test revealed that many respondents did not hold a high knowledge level, which in turn could lead to them not giving the multidimensional label enough visual attention to be fairly assessed.

6.3 Dissatisfaction with existing sustainability labels

When examining the variable *dissatisfaction with existing sustainability labels*, relation to the dependent variable *perception of a multidimensional sustainability label* merely a weak positive correlation could be identified and thus H3 did not gain empirical support. This result implies that there is no evident relationship between the variables.

One potential explanation for this outcome could lie in the survey's ability to take the respondents' emotional status into account when answering the questions. According to studies conducted by Oliver (2014), Lee et al. (2009) as well as Mano and Oliver (1993), emotional status is an important factor in customer satisfaction and must be carefully considered. For example, if the respondent held a negative emotional status when answering the questionnaire, this could have generated more dissatisfied answers according to Bougie et al. (2003). There are however reasons to doubt this explanation, as emotional status cannot be considered as a sole determinant of satisfaction according to Moon et al. (2017).

In line with Moon et al. (2017) findings, Westbrook (1980) suggests that individual preferences such as prior expectations of the product, brand or retail setting also impacts the level of satisfaction. Since the research stimuli used in this study represented a hypothetical label, see appendix I for illustration, neither of these factors could be assessed. An established third-party label is furthermore often associated with credibility (Horne, 2009), which the hypothetical one has not yet achieved. It can therefore be speculated whether it was reasonable to set the level of satisfaction with existing labels in relation to the perception of the hypothetical one, as the possibility for comparison of important factors was limited.

Nevertheless, when the variable's component, i.e. question 8, was reviewed it could be seen in sub-question 8.1 that the general respondent held a relatively neutral level of satisfaction with existing labels. It is furthermore notable in sub-question 8.2-8.5 that a predominant share either agreed or strongly agreed upon that there are too many existing labels (51%), existing labels do not convey all the desired information (41%), it is difficult to know what each label stands for (61%) and that it is difficult to obtain information about them (41%). This result ties well with previous findings by Horne (2009) and Van Amstel et al. (2008) stating that consumers experience confusion due to the abundance of labels and that adequate information about products' sustainability performance is not available to enable informed decisions.

Lastly, an additional explanation to the obtained result regarding the correlation between *dissatisfaction with existing sustainability labels* and *perception of a multidimensional sustainability label* can be found in insights from previous studies. Rousseau and Vranken (2013) contend that the state of not being satisfactory informed varies and it is perceived differently by different individuals. This in turn, could explain why it is difficult to find correlation within this context as the level of satisfaction might not be a ruling factor in the perception of multidimensionality but instead individual preferences might be.

6.4 Socio-demographic characteristics

When examining the socio-demographic variables *educational level*, *income, gender* and *age* relation to the dependent variable *perception of a multidimensional sustainability label* merely a weak correlation could be identified for all variables. This implies that neither of H4 or H5 gained empirical support whereas H6 did. This result suggests that there is no evident relationship between a higher level of education or higher level of income and a positive perception of a multidimensional sustainability label. As the correlation between gender and perception of a multidimensional sustainability label was not significant, H7 could neither be rejected nor supported. Furthermore, age does not seem to impact the perception of the multidimensional label.

When observing the results from question 9, 10 and 11 it can be concluded that the average respondent is 59 years old, has finished up to 3 years of post-secondary education and with a monthly gross income of SEK 31,000. This result corresponds to a middle-aged, highly educated individual with a relatively high income. Even though the average respondent is in line with Roberts (1996), Carrigan and Attalla (2001) as well as Maignan and Ferrell (2001) definition of the average sustainable consumer, this study does not support their claims. In fact, this study does not support the notion that the perception of the multidimensional sustainability label is influenced by the customer attributes educational level, income or age.

A potential explanation might be found in the literature that underlies the construction of the hypotheses. Chekima et al. (2016), Wang et al. (2014) and Zimmer et al. (1994) claims that a higher educational level corresponds to a greater interest in and knowledge about sustainability. In line with these findings Ross et al. (2000) contend that an individual with a higher income possesses a more positive attitude towards sustainability labelling. These researchers do not elucidate the additional factors that can influence how one perceives different types of labels, such as the multidimensional label used as stimuli in the study. Instead Annunziata et al. (2019) and Galarraga Gallastegui (2002) highlight how the individual preferences and objectives affect label perception. Presumably, the unexpectedly weak relationship between educational level, income and perception of the multidimensional label can be derived from the fact that other aspects such as sustainability concern or individual preferences have a larger impact on perception than the socio-demographic variables have alone Wiernik et al. (2013).

It was also hypothesised that an individual's age would not correlate with the perception of the multidimensional label. The results from the correlation confirmed the conjecture. This apparent lack of correlation can be attributed to some of the contradicting findings in the area where some contend that elderly consider sustainability labels to a larger extent (Robinson and Smith, 2002) and that they spend more time selecting groceries (D'Souza et al., 2007). On the contrary, Gilly and Zeithaml (1985) claim that elderly tend to adapt less fast towards changes and Mostaghel (2016) mean that elderly lack belief in improving quality of life through innovative tools and technologies.

Even though the result from the correlation analysis between gender and perception of a multidimensional sustainability level failed to live up to the requested level of significance, tendencies which supported the hypothesis were identified. It was hypothesized that no such correlation would be detected due to the contradicting findings between gender and sustainable consumption. Despite common claims that women often are considered the more ethical gender (Pudaruth et al., 2015) which is more likely to make sustainable choices (Bulut et al., 2017), it is important to consider other factors which influence consumer deci-

sions and preferences (Meinzen-Dick et al., 2014). Even though existing literature to some extent arrive at conclusions regarding the relationship between gender and sustainable consumption patterns and decisions, there is a lack of research in regards to the understanding of how the perception of sustainability labels is affected by gender. However, due to the lack of significance in the results, there is no certainty and credible evidence as to whether the above arguments can be applied on the results in this study.

Based on the results, it is difficult to draw conclusions in relation to the research concerning socio-demographic characteristics and sustainability. However, in line with the ideas of Peattie (2010), it can be concluded that the extent to which the relationship between consumers' socio-demographic characteristics and consumer perception can be proven is yet uncertain.

6.5 Overarching discussion

The result from the qualitative analysis confirmed Annunziata et al. (2019) findings stating an increased consumer demand for more transparent information regarding a product's sustainability performance. As seen in table 5.7, the general perception of the hypothetical label was mainly positive and a majority of the respondents' described the label as a good, exciting/interesting, clever and innovative initiative, and a small share described the label as bad, cluttered or boring. These altering and contradicting answers confirm the often expressed confusion associated with sustainability labels (Hanss and Böhm, 2012; Liljenstolpe and Elofsson, 2009) and in particular the multidimensional label's challenges of communicating relevant information and not too much (Kolodinsky, 2012).

Despite the conflicting answers within the theme general perception, many respondents expressed that there is a need for a multidimensional label and that it is an important/necessary next step within the food sector, see table 5.9. Nevertheless, some respondents did not find the multidimensional label relevant but instead redundant. Previous work within the field of sustainability labels have made the same observation in which consumers experience that there are too many existing labels to orient among (Horne, 2009; Van Amstel et al., 2008; Weinrich and Spiller, 2016b).

The sense of redundancy among sustainability labels in general, is often derived from the difficulty of not easily interpreting the information (Hanss and Böhm, 2012). As seen in table 5.8, this was confirmed by this study as a majority of the respondents expressed that it was difficult to interpret and understand the stimulus which were presented in the questionnaire. It can be speculated whether this confusion could have been avoided or minimised if a benchmark was included in the stimulus, as it according to Rayner et al. (2004) as well as Cowburn and Stockley (2005) eases the interpretation of a non-numeric label. It can further be discussed whether the utilisation of radar charts is the most efficient way to communicate multidimensionality as its success depends on the interpreting individual's prior experience with the format. In addition to this speculation, some respondents described the design of the stimulus as illogical as they expected the inverse interpretation of the label, i.e. larger surface corresponding to a more sustainable product and not the opposite.

Additional barriers identified in this study revolve around time and its possibility of being accepted by consumers. As seen in table 5.10, many respondents expressed that they would need time to get familiar with a multidimensional label and to trust the presented information on the label scientific ground is necessary. These findings are interesting for

a potential user of a multidimensional label to have in mind when developing a new label and it can for example be necessary to educate the consumer on how to interpret the information. To satisfy the requirement of anchoring the information in scientific ground, which can be derived from distrust caused by exploitation of labels (Giannakas, 2002), assumptions made when developing the label should preferably be shared transparently. This would create reliability for the presented information, which is important for the label to gain credibility (Thøgersen, 2002).

In addition to the above-mentioned barriers, it can be discussed to what extent the selected sustainability definition, which forms the foundation for the label, affects the possible use and success of a multidimensional label. As Harrison (2000) claims, it is difficult to create a genuine sustainable action or initiative as the needs of our environment and society is constantly changing. It can however be argued that a multidimensional label is more fit to tackle this challenge than a one-dimensional label, as it can communicate various dimensions of sustainability simultaneously. An additional strength for the multidimensional label lies in its ability of acting as both a positive and a negative label, which according to Grankvist et al. (2004) can lead to greater acceptance by individuals with varying interest for sustainability.

Beyond the barriers that were identified, there is great potential for the multidimensional label as well. In table 5.11 it can be seen that many respondents expressed that the hypothetical label clarifies products' sustainability performance, simplified the comparison of products and that it could increase pressure on producers to share transparent information. Additionally, it can be argued that the multidimensional label is complementary to existing labels as it displays a more accurate and truthful picture of sustainability and thus increases sustainability awareness and knowledge. These findings reveal a potential for the multidimensional sustainability label to contribute to decreasing the information gap between consumers and producers.

However, as Feunekes et al. (2008) and Grankvist et al. (2004) mentions, many customers prefer the existing labelling assortment, where they do not have to spend time searching for information but instead can trust that the label represents sustainable products and thus having a low effort cost. The multidimensionality can however, as previously mentioned, function as a complement to these labels, as the multidimensionality allows for verification of the information presented by the label. This in turn can provide labels with enhanced credibility as the multidimensional label would confirm their sustainability work. It is therefore important when promoting multidimensional labels to highlight that they are a complement to existing labels and not a competitor, as the two label types have complementary functions.

If a multidimensional label was to be introduced to the food sector, it can be speculated that this would open up for attractive business opportunities as disclosure of sustainability related attributes increases consumers' willingness to pay (Meise et al., 2014; de Pelsmacker et al., 2005). The utilisation of a multidimensional sustainability label would further signal to consumers that promotion of sustainable consumption is a priority in the corporate strategy and thus attract consumers who place great value in this when choosing a product (Górska-Warsewicz et al., 2018). Sharing transparent information could therefore have positive implications for the producer, if the disclosure of information is in their favour. It should however be acknowledged that many producers are not pro decreasing the information gap, as the asymmetric information plays a vital role in their business strategy. For example, a product's low carbon dioxide emission is favourably displayed while the same product's unsustainable water usage is not.

However, to what extent it is possible to decrease the information gap between consumers and producers through the utilisation of a multidimensional label remains relatively uncertain. This mostly due to the often-occurring contradictions within the research field of sustainability labelling, e.g. Tait et al. (2016)claim that consumers are not affected at all by labels, while Engels et al. (2010) suggest they have a large impact on consumers' decisions. This example reveals the uncertainty, complexity and the difficulty of conducting research within this area. This in turn, could explain why it is difficult to find correlation within this context as the studied consumer attributes might not be a ruling factor in the perception of multidimensionality, but instead individual preferences, objectives and expectations might be.

6.6 Limitations and critical review

When critically reviewing the work conducted in this study three apparent limitations could be identified: (i) sample selection, (ii) the questionnaire design and (iii) data analysis procedures.

The usage of a mixed method approach, with both quantitative and qualitative procedures, did both enrichen the study with multiple perspectives on the obtained result but it did also contribute with methodological limitations. It was further chosen to conduct a survey, including a sample selection and creation of a questionnaire. The study was limited by the sample selection, even though the sampling frame, method and size were carefully considered. This due to the non-representative characteristics of the selected sample, i.e. Coop's customer panel. The sample selection was intentional, but nonetheless a limitation to the study, as the result is merely generalisable for populations within the same context, i.e. Coop customer clientele.

The questionnaire used in the study can additionally be considered a limitation as its design, length and stimulus material affected the entire data gathering process. Despite the author's attempt to minimise potential undesired impacts, by carefully formulating the questions and testing them in a pilot study, it is possible that some respondents still misinterpreted the questions.

Another limitation to the study was the approach utilised when quantifying the variables. This procedure was constructed solely by the authors, which did at the time lack experience within the area. It is possible that another quantification procedure, with other scales or point systems, could have generated other outcomes for the variables and thus other results in the correlation analysis. An additional limitation within the data analysis was the coding of the qualitative data. As the coding was carried out by the two authors, the result was inevitably biased by their own interpretation of the gathered answers from the questionnaire's open-ended question. It is possible that another result could have been obtained if the coding was conducted by other individuals with different worldviews.

Conclusions, implications & future work

In the following chapter the research question is provided with an answer and the conclusion of the study is presented. This will be followed by a discussion regarding the study's implications and possible future work within the field of multidimensional sustainability labelling.

7.1 Conclusions

Sustainability labels on food products have the potential to enable behavioural change as they nudge consumers into making sustainable decisions. To what extent labels can utilise this potential is however uncertain, as many consumers experience confusion and dissatisfaction when orienting among the multitude of existing labels. Existing labels on the marker lack transparency regarding a products sustainability assessment criteria and communicate a foremost one-dimensional viewpoint. It is arguable that these shortcomings create an information gap between consumers and producers since transparent information about the product's sustainability performance is not shared. To supplement existing sustainability labels, and thus increase transparency regarding sustainability within the food sector a multidimensional sustainability label can be an option.

Through quantitative and qualitative analysis, this study empirically investigated whether there is a relationship between different consumer attributes and how a multidimensional sustainability label is perceived. This to provide the research question with an answer and thus contribute to a wider understanding of multidimensional labels' ability to decrease the information gap between consumers and producers in the Swedish food sector. Through a hypothesis testing procedure, this study examines how seven consumer attributes relate to the perception of a multidimensional label. The investigated attributes are sustainability profile, dissatisfaction and prior knowledge about existing labels as well as the sociodemographic characteristics: age, gender, income and educational level. Based on the findings from the questionnaire data, it can be concluded that merely a weak or non-existent relationship could be detected. The findings highlight the complexity that consumer perceptions often are associated with and the difficulties in identifying relationships may partly be due to this. However, despite absence of strong relationships there are implications that suggest that this study contributes to existing literature.

The findings indicate that a strong sustainability profile correlates with a positive perception of a multidimensional sustainability label. More specifically, an individual who holds a greater interest and feeling of responsibility towards sustainability is more likely to possess a positive attitude towards the multidimensional label. This derives from a motivation to behave more sustainably and seek more extensive information regarding the sustainability performance of a product as well as a greater ability to evaluate the information shown on the label. Our findings further address whether prior knowledge regarding existing sustainability labels and dissatisfaction with them affect the perception of the multidimensional label and the results reveals that no such correlation could be identified.

Similarly, the socio-demographic characteristics educational level, income, gender and age did not affect how the multidimensional label was perceived. Despite the lack of correlation, our findings show a noticeable interest in the multidimensional label, both as a concept and in regards to the radar chart used as stimuli in our questionnaire. Although the result showed partially contradictory opinions regarding the multidimensional label, some common opinions could be recognised. The multidimensional label was described as a necessary initiative within the food sector and as complementary to existing labels with the potential to clarify products' sustainability performance in regards to multiple dimensions of sustainability. Many also expressed a positive attitude towards the label and wordings like "good" and "interesting" was frequently seen in the result. However, it was commonly expressed that the multidimensional label used as stimuli in this study was difficult to understand and interpret.

In regards to answering the research question and determining what the relationship between different consumer attributes and the perception of a multidimensional sustainability label is, this study suggests that merely one medium relationship could be identified. Consumers' sustainability profile is the only attribute that correlates to how the multidimensional sustainability label is perceived. In line with existing literature, there are contradictory findings in the area of sustainability labelling and the findings of this study are therefore consistent with previous research. Even though it is difficult to arrive at any conclusions regarding the relationship between the consumer attributes investigated in this study, it can be concluded that the concept of multidimensional sustainability labels represents an initiative towards a more transparent exchange of information between actors within the food sector. Our findings reveal that a multidimensional label possesses the potential of helping consumers make more informative decisions and thus decrease the prevailing information asymmetry between consumers and producers. However, it is important to further elaborate the concept of multidimensional sustainability labelling to create a well-structured, easy-to-understand and commonly accepted label, thereby enabling its full potential.

7.2 Implications

The findings of this study address the prevailing information gap between consumers and producers in the food sector through investigating consumer perception of multidimensional labels. By doing so, the theoretical understanding within the rather unexplored field of multidimensional sustainability labelling is expanded with in-depth insights regarding consumer perception. The findings from this study can therefore function as a basis for future research regarding multidimensional sustainability labelling within the Swedish food sector.

From a managerial perspective, the findings and conclusions of this study contributes with clarifying insights on what, for example, producers or retailers must consider regarding consumer needs and label design when implementing multidimensional labels on their food products. Actors within the Swedish food sector can furthermore use this study as a guiding tool when developing a multidimensional sustainability label. The research stimuli used in this study furthermore serves as a first step towards a transparent and easily comprehensible multidimensional sustainability label.

7.3 Future work

To develop the understanding and utilisation of multidimensional sustainability labelling, further research is necessary. By further exploring the area prerequisites for generalisation and theory building can be created. To broaden the knowledge regarding how customers perceive multidimensionality, studies similar to this one could be carried out. By testing different customer attributes such as shopping habits, brand preferences or willingness to pay, broader understanding of consumer perception can be obtained. By cross-examining how these attributes affect and correlate with the perception of a multidimensional sustainability label, it is possible to further explore the labels potential on the market. Further research on how the multidimensional sustainability label functions in a real-life setting might extend the understanding of how it is perceived even more truthfully since this aspect was not examined in this study.

It would further be of great interest to investigate what kind of design and format that is most appreciated and easiest to interpret by consumers. This is of utmost importance in future attempts to achieve a successful implementation of a multidimensional sustainability label as the interpretation of the label relies much on these aspects. Apart from investigating what design and format is the most successful, it is suggested that future research examine how to transparently share the underlying data the label is based on, to create credibility among customers. Furthermore, to enable usage outside of Coop's clientele and to achieve more generalisable results, the perception should advantageously be tested on a different sample group, consisting of a more representative sample of for example Sweden's population.

Expanding the knowledge within these above-mentioned areas would ease the transition to multidimensionality for producers and retailers in the food sector.

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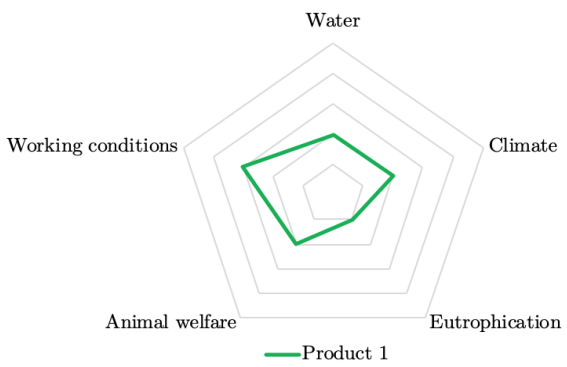
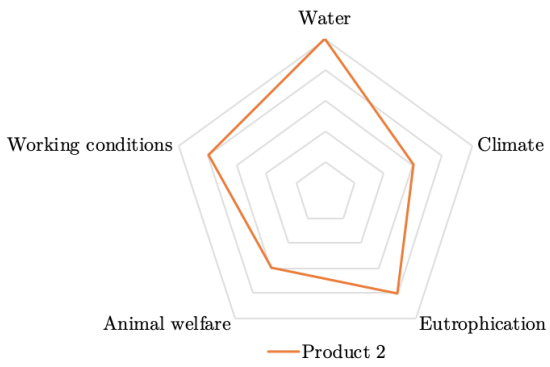
Appendices

Appendix I - Stimulus material

In the figures below, a hypothetical illustration of a multidimensional label is presented. Each corner in the radar chart represents one dimension of sustainability and the coloured line represents what level of sustainability the product holds. A smaller area of the coloured figure corresponds to a more sustainable product, while a larger area corresponds to a less sustainable product.





Appendix II - Survey questions

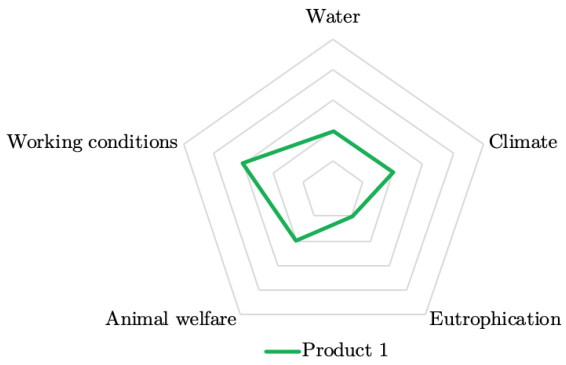
Question 1. How well do you agree with the following statements?

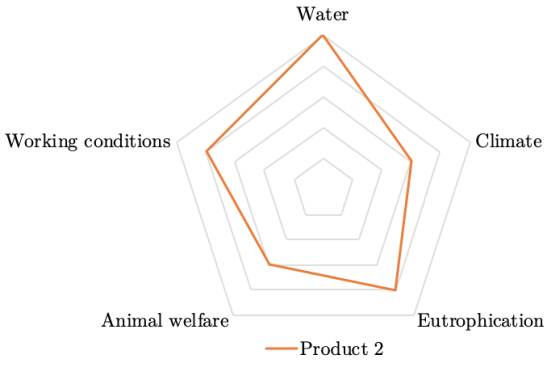
	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**I don't know**
I have changed my personal lifestyle to reduce waste (e.g., throwing away less food or not wasting materials).						
I often purchase second-hand goods over the internet or in a shop.						
I support an aid organization or environmental group.						
I think we need stricter laws and regulations to protect the environment.						
I think that we who are living now should make sure that people in the future enjoy the same quality of life as we do today.						
I avoid purchasing goods from companies with a bad reputation for looking after their employees and the environment.						
Reducing water consumption is necessary for sustainable development.						
Respecting human rights is necessary for sustainable development.						
Sustainable development requires a fair distribution of goods and services among people in the world.						

A food label is a symbol found on some products which shows whether the product is compliant with certain rules and regulations. In this questionnaire, food labels will be called labels.

The questions that follow are about a hypothetical label - a multidimensional label. A multidimensional label can evaluate and illustrate if a product is sustainable or not in relation to several dimensions. Examples of dimensions could be: water usage, climate, animal welfare, eutrophication or working conditions.

In the figures below, you see an example of how a multidimensional label can look like for two different products. Each corner in the figure represents one dimension of sustainability and the coloured line represents how sustainable the product is. A smaller area of the coloured figure corresponds to a more sustainable product, while a larger area corresponds to a less sustainable product. The closer to the centre the coloured line is, the more sustainable the product is within that specific dimension.





Question 2. How well do you agree with the following statements?

	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**I don't know**
The multidimensional label is exciting						
The multidimensional label is necessary						
The multidimensional label is increasing my knowledge						
The multidimensional label provides information which is not normally shared						
The multidimensional label is easy to understand						

Question 3. How well do you agree with the following statements?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I don't know
I see a need for a label that shows multiple dimensions of sustainability						
I see a need for a label which I can easily and clearly see what it covers						

Question 4. Describe with your own words your impression of the multidimensional label.

Question 5. Which out of these labels are you familiar with?

							I am not familiar with any of the labels

Question 6. How well do you agree with the following statements?

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I don't know
I consider labels when I purchase food groceries						
Labels are important for me when I purchase food groceries						
I do not choose products without labels						

Question 7. Which out of these ten dimensions do you think the following labels work with?

Dimensions of sustainability	KRAV	FAIRTRADE			CERTIFIERAT HÅLLBART FISKE MSC www.msc.org/se	asc	SVENSKT SIGILL	Neither
Biodiversity & ecosystems - Production that preserves biological diversity, natural ecosystems and ecosystem services.								
Climate & air - Production that minimizes greenhouse gases and other harmful air emissions into the atmosphere.								
Soil fertility & erosion - Production that retains soil fertility and an adequate soil structure.								
Water - Production that uses water resources sustainably and secures adequate water quality in the surrounding environment.								
Chemicals & pesticides - Production that does not have a negative impact on the surrounding environment and secures food safety.								
Eutrophication - Production that minimizes leakage of plant nutrients to the surrounding environment.								
Animal welfare - Production that ensures the health and welfare of the animal.								
Working conditions - Production that ensures sound and safe working conditions and a fair wage.								
Local populations - Production that respects local populations; contributes to the local supply and development; and protects cultural conservation values.								
Legality & traceability - Production that meets applicable legislation and ensures transparency and traceability in the food chain.								

Question 8. How well do you agree with the following statements?

	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**I don't know**
I am dissatisfied with existing labels						
I think there are too many existing labels						
I do not think labels convey all the information I want to know						
I think it is difficult to know what different labels stand for						
I find it difficult to obtain information about what the labels stand for						

Question 9. What is your highest completed education

Not completed compulsory school	
Compulsory school or corresponding	
High school or corresponding	
Post-secondary education (less than 3 years)	
Post-secondary education (3 years or more)	

Question 10. What is your monthly income? (before taxes)

Question 11. How old are you?

Question 12. What is your gender?

Female	
Male	
Do not want to say	

Appendix III - Label evaluation

In the table below, each dimension considered by one of the labels is marked with a tick. Each label has different demands and criteria on the producers, and only significant measures have been rewarded with a tick in the evaluation below. To clarify, just mentioning the dimension has not been considered enough, but instead significant measures and explicit criteria in their certification are demanded. The sustainability labels were evaluated based on Sustainable Supply Chain for Food in Sweden (SSCFS) ten dimensions of a sustainable product, see section 2.4.1 for a description of the dimensions. The information regarding the different certificate systems have been collected on their official websites (ASC, n.d.; EU, n.d.; Fairtrade, n.d.; Krav, 2018; MSC, 2018; Rainforest Alliance, 2017; Svenskt Sigill, 2019). This evaluation was later used as the correct answer to question 7 in the questionnaire.

	KRAV	FAIRTRADE			SVENSKT SIGILL	MSC	asc
Biodiversity & ecosystems	✓	✓	✓	✓	✓	✓	✓
Climate & air							
Soil fertility & erosion	✓	✓	✓	✓	✓		
Water		✓					
Chemicals & pesticides	✓	✓	✓	✓	✓		
Eutrophication	✓		✓		✓		
Animal welfare	✓		✓		✓		
Working conditions	✓	✓		✓	✓		
Local populations		✓					
Legality & traceability	✓	✓	✓	✓	✓	✓	✓

Appendix IV - Quantifying variables

In the following section, the construction of the variables *sustainability profile, perception of a multidimensional sustainability label, prior knowledge about existing sustainability labels* and *dissatisfaction with existing sustainability labels* will be presented. Each variable will be clarified with an example of a fictive respondent's answer.

Sustainability profile

The variable was constructed based on the respondent's answer on question 1 and 6. The theoretical value range is between 0 and 60 points.

Question 1. How well do you agree with the following statements?

	Strongly disagree [1]	**Disagree [2]**	**Neutral [3]**	**Agree [4]**	**Strongly agree [5]**	**I don't know [0]**
I have changed my personal lifestyle in order to reduce waste (e.g., throwing away less food or not wasting materials).			X			
I often purchase second-hand goods over the internet or in a shop.				X		
I support an aid organisation or environmental group.					X	
I think that we need stricter laws and regulations to protect the environment.		X				
I think that we who are living now should make sure that people in the future enjoy the same quality of life as we do today.				X		
I avoid buying goods from companies with a bad reputation for looking after their employees and the environment.				X		
Reducing water consumption is necessary for sustainable development.			X			
Respecting human rights is necessary for sustainable development.					X	
Sustainable development requires a fair distribution of goods and services among people in the world.		X				

Question 6. How well do you agree with the following statements?

	Strongly disagree [1]	**Disagree [2]**	**Neutral [3]**	**Agree [4]**	**Strongly agree [5]**	**I don't know [0]**
I consider labels when I purchase food groceries				X		
Labels are important for me when I purchase food groceries					X	
I do not choose products without labels				X		

In the table below, the numeric values from question 1 is summarised and the value of the variable can be determined.

	Question 1	**Question 6**	**Sustainability profile**
Numeric value	3+4+5+2+4+4+3+5+2	4+5+4	32

Perception of a multidimensional sustainability label

The variable was constructed based on the respondent's answers on question 2 and 3. The theoretical value range is between 0 and 35.

Question 2. How well do you agree with the following statements?

	Strongly disagree [1]	**Disagree [2]**	**Neutral [3]**	**Agree [4]**	**Strongly agree [5]**	**I don't know [0]**
The multidimensional label is exciting				X		
The multidimensional label is necessary			X			
The multidimensional label provides information which is not normally shared					X	
The multidimensional label is easy to understand			X			

Question 3. How well do you agree with the following statements?

	Strongly disagree [1]	**Disagree [2]**	**Neutral [3]**	**Agree [4]**	**Strongly agree [5]**	**I don't know [0]**
I see a need for a label that shows multiple dimensions of sustainability				X		
I see a need for a label which I can easily and clearly see what it covers					X	

In the table below, the numeric values from question 2 and 3 are summarised and the value for the variable can be determined.

	Question 2	**Question 3**	**Sustainability profile**
Numeric value	4+3+2+5+3	4+5	26

Prior knowledge about existing sustainability labels

The variable was constructed based on the respondent's answer on question 5 and 7. The theoretical value range is between 0 and 30 points.

Question 5. Which out of these labels are you familiar with?

KRAV	FAIRTRADE			MSC	ASC	SVENSKT SIGILL	I am not familiar with any of the labels
	X			X			

Based on the labels the respondent states as familiar in question 5, the corresponding labels will be evaluated in question 7. To avoid that the knowledge test became too time consuming or complex, a maximum of 3 labels could be evaluated by a respondent even if the respondent recognised several labels. The labels which the respondent was allowed to evaluate were randomly selected from the chosen labels in question 5, to ensure that all labels were evaluated a similar amount of times.

Question 7. Which out of these ten dimensions do you think the following labels work with?

Dimensions of sustainability	FAIRTRADE	MSC	Neither
Biodiversity & ecosystems - Production that preserves biological diversity, natural ecosystems and ecosystem services.	X		
Climate & air - Production that minimizes greenhouse gases and other harmful air emissions into the atmosphere.	X	X	
Soil fertility & erosion - Production that retains soil fertility and an adequate soil structure.			X
Water - Production that uses water resources sustainably and secures adequate water quality in the surrounding environment.		X	
Chemicals & pesticides - Production that does not have a negative impact on the surrounding environment and secures food safety.	X	X	
Eutrophication - Production that minimizes leakage of plant nutrients to the surrounding environment.			X
Animal welfare - Production that ensures the health and welfare of the animal.			X
Working conditions - Production that ensures sound and safe working conditions and a fair wage.	X		
Local populations - Production that respects local populations; contributes to the local supply and development; and protects cultural conservation values.	X	X	
Legality & traceability - Production that meets applicable legislation and ensures transparency and traceability in the food chain.			X

In the table below, the numeric value from question 7 is summarised and the variable value for the prior knowledge about existing sustainability labels can be determined. The respondent's answers on question 7 are compared with the correct evaluation, see appendix II. Each correct answer rewards the respondent with one point.

Dimension	**Question 7** *Correct answers [points]*
Biodiversity and ecosystems	1
Climate and air	0
Soil fertility and erosion	1
Water	0
Chemicals and pesticides	1
Eutrophication	2
Animal welfare	2
Working conditions	2
Local populations	1
Legality and traceability	0
Total numeric value	**10**

Dissatisfaction with existing sustainability labels

The variable was constructed based on the respondent's answer on question 8. The theoretical value range is between 0 and 25.

Question 8. How well do you agree with the following statements?

	Strongly disagree [1]	**Disagree [2]**	**Neutral [3]**	**Agree [4]**	**Strongly agree [5]**	**I don't know [0]**
I am dissatisfied with existing labels				X		
I think there are too many existing labels			X			
I do not think labels convey all the information I want to know					X	
I think it is difficult to know what different labels stand for	X					
I find it difficult to obtain information about what the labels stand for		X				

In the table below, the numeric values from question 8 is summarised and the value for the variable can be determined.

	Question 8	**Dissatisfaction with existing sustainability labels**
Numeric value	4+3+5+1+2	15