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Nudging: Strategies and sustainability-label signifiers to influence potential sustainable food consumer behavior.

Master's thesis

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Abstract

Food production and consumer consumption are one of the main drivers and important contributors to environmental damage today. To protect nature's assets and the needs of future generations, our eating habits, food choices and purchasing decisions should be sharply adjusted towards sustainable diets. The important responsibility consumers have to achieve this is undeniable, but every day they are faced with many complex choices which often need to be addressed quickly due to lack of time. Some decisions they make are good, some accidental and some poor in terms of their own health and the well-being of the environment and society. They are also based on individual motivations. Behavior of consumers are not one and the same and motivation for purchasing decisions are triggered by many different factors. Everyone in the world uses the insight they have to make choices and decisions. Opportunities to help the consumer in making better decisions for themselves, society and the environment lie in knowledge about this insight.

Existing theory and work on consumer segmentation, and the many motivational factors for food purchasing behavior, decision-making and drivers for potential sustainable consumption in different consumers have been investigated in this master thesis. Additionally, it investigates how nudge design may be utilized to motivate and inspire more sustainable food purchasing behavior in the context of online grocery stores. Insight and data from this research have been analyzed, extracted and used to answer my research questions and to create a segmentation model, consumer segment profiles, nudge strategies and design suggestions.

A proposed segmentation model for potential sustainable behavior in this thesis is based on five fundamental drivers of behavior: Socio-demographics, Psychographics, Consumer Sustainability Consciousness, Food-Related Lifestyle and Heuristics. Three potential sustainable consumer segments are distinguished: "Explorer", "Likely consumer" and "Occasional byer". This segmentation model is further used to develop nudge strategies and sustainability label designs and highlights how these may be effective to use to motivate consumers in the different segments. The strategies are constructed by three components: 1) The level of motivation for purchasing behavior based on values, attitudes and food-related lifestyle, 2) How consumers think, their processing style for decision-making and triggers, and 3) Types of nudge mechanisms used to influence food consumption. Why these strategies and interventions potentially may be stronger in promoting food sustainability than existing systems of sustainability labels are discussed and argued.

This master's thesis provides a consumer segmentation model and framework for developing potential sustainable consumer segments. In addition, it provides insights about the potential sustainable food consumer's values, needs, motivations and decision-making processes. Based on differences in the consumer segments behavior, tailored nudge strategies and design are proposed as an instrument in "sustainability-label signifiers" as guides to influence consumers' choices towards a sustainable food consumption.

Sammendrag

Matproduksjon og forbruk er en av de viktigste drivkreftene og bidragsyterne til miljøskader i dag. For å beskytte naturens ressurser og behovene til fremtidige generasjoner, bør våre spisevaner, valg av mat og kjøpsbeslutninger snarlig tilpasses til et bærekraftig kosthold. Det viktige ansvaret forbrukerne har for å oppnå dette er ubestridelig, men hver dag står de overfor mange komplekse valg, som kanskje må løses raskt i en travel hverdag. Noen beslutninger de tar er gode, noen tilfeldige og noen dårlige med tanke på deres egen helse og trivsel for miljøet og samfunnet. De er også basert på individuelle motivasjoner. Forbrukernes atferd er ikke den samme og motivasjonen for kjøpsbeslutninger utløses av mange forskjellige faktorer. Alle i verden bruker den innsikten de har for å ta valg og beslutninger. Muligheter for å hjelpe forbrukeren med å ta bedre beslutninger for seg selv, samfunnet og miljøet ligger i kunnskap om denne innsikten.

Eksisterende teori og arbeid som omhandler segmentering av forbrukere og de mange motivasjonsfaktorene for kjøpsatferd for mat, beslutningstaking og drivere for potensielt bærekraftig forbruk hos forskjellige forbrukere, er studert i denne masteroppgaven. I tillegg tar den for seg hvordan nudge-design kan brukes til å motivere og inspirere til mer bærekraftig kjøpsatferd av mat i digitale dagligvarebutikker. Innsikt og data fra denne forskningen har blitt analysert, hentet ut og brukt til å svare på mine forskningsspørsmål og for å utvikle en segmenteringsmodell, forbrukersegmentprofiler, nudge-strategier og designforslag.

En foreslått segmenteringsmodell for potensiell bærekraftig atferd i denne masteroppgaven er basert på fem grunnleggende drivere for atferd: Sosialdemografi, psykografi, forbrukernes bærekraftsbevissthet, matrelatert livsstil og heuristikk. Tre potensielle bærekraftige forbrukersegmenter utmerker seg: "Utforsker", "Sannsynlig forbruker" og "Tilfeldig kjøper". Segmenteringsmodellen blir deretter brukt til å utvikle nudge-strategier og bærekraftsdesign og belyser hvordan disse kan være effektive å bruke for å motivere forbrukere i de forskjellige segmentene. Strategiene er konstruert av tre komponenter: 1) Motivasjonsnivået for kjøpsatferd basert på verdier, holdninger og matrelatert livsstil, 2) Hvordan forbrukere tenker, deres behandlingsstil for beslutningstaking og utløsere, og 3) Typer av nudge-mekanismer som brukes til påvirke matforbruket. Hvorfor disse strategiene og intervensjonene potensielt kan fungere bedre enn eksisterende systemer for bærekraftsmerker blir diskutert og argumentert for.

Bidraget i denne masteroppgaven er en forbrukersegmenteringsmodell og et rammeverk for å utvikle potensielle bærekraftige forbrukersegmenter. I tillegg gir oppgaven innsikt i den potensielle bærekraftige matvareforbrukerens verdier, behov, motivasjoner og beslutningsprosesser. Basert på forskjeller i forbrukersegmentenes atferd, foreslås tilpassede nudge-strategier og design som et instrument i "sustainability-label signifiers", som veiledning for å påvirke forbrukernes valg mot et bærekraftig matforbruk.

Preface

This master's thesis is the final project of the Master's in Interaction Design from NTNU in Gjøvik. Conversations with friends about their needs, as well as personal interest for better visibility of different aspects of sustainability in food products, inspired me to investigate existing sustainability labelling schemes, relevant topics on consumer behavior, sustainable food consumption and theory of nudging, which finally led to this master's thesis project. This report is mainly written for those who work in the fields of design, advertising and marketing.

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Mona Christin Loftum Hellstrøm

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Without their advice and contribution this master's thesis project would not have been completed.

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I also want to thank my family and friends for the many contributions I have received throughout my master study in Interaction Design.

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S	Socio-demographics
P	Psychographics
CSC	Consumer Sustainability Consciousness
FRL	Food-Related Lifestyle
H	Heuristics

1 Introduction

Our world is facing four major crises: Economic, inequality, resource and environment (Bjonnes and Hargreaves, 2016). If we do not act fast and prioritize to adapt towards a sustainable economy, our civilization is threatened to end and nature, society and the economy are in the worst scenario predicted to break down. We see abuse of nature's resources and exploitation of people and violation of animal welfare and human rights. We overproduce food and businesses are far from operating and producing ethically and sustainably. The methods we use to produce and distribute food today are a "sign" of our unsustainable planet.

In recent years consumers have lost confidence in producers and the food supply chain, after several incidents and scandals have taken place. The quality and safety of food production systems are questioned after crises such as dioxin pollution, swine fever and bird flu. The virus COVID-19, and the Corona Pandemic we currently experience, where the origin of the virus is unknown, add to the fear. Reliable sources such as who.int states that Wuhan City in China was the source of this outbreak and suggest that it originates from wild animals sold as food at a Chinese market free from control systems and restrictions.

The book "An Inconvenient Truth" by Al Gore contributed to raise massive consumer sustainability awareness in 2006 (De Carvalho, Salgueiro and Rita, 2015). This growing awareness of sustainability issues cause consumers to question their own unsustainable habits and how they affect environmental and social issues (Maiteny, 2002). This create anxiety and the author suggests three main responses to that "call for action": "denial"; "do your bit" and feeling of "connectedness" in a sense of responsibility (De Carvalho, Salgueiro and Rita, 2015).

Many variables and ethical dilemmas will arise in any purchasing situation, making it a challenge to decide "right" from "wrong". In purchasing decisions people may emphasize factors such as "naturalness", safety and environmental conformity. Consumers use different methods in their search for reliable information about the food they plan to eat, and there is a growing demand for food with characteristics of sustainability. Consumers are different individuals which each have individual needs and are motivated by a number of different factors. Consumer decision making processes are driven by internal variables such as personality, values, attitudes and emotions, and external factors such as upbringing, culture, social norms, habits and situations or context.

This spiral of exploitation can only be reversed by raising consumer awareness – more transparency is called for. Time is up for change, a change in food purchasing behavior and consumption. A friendly, proper designed nudge to guide in the right direction might be one key to a solution.

1.1 Keywords

Segmentation, Consumer behavior and motivation, Consumer purchase decision-making processes, Sustainable food consumption, Consumer Sustainability Consciousness, Food-Related Lifestyle, Heuristics, Nudging, Ethics.

1.2 Justification, Motivation, Benefits

One of the main drivers and important contributors to environmental damage today is food production and consumer consumption (Notarnicola *et al.*, 2017). Consumer behavior is the main reason for society's impact on the environment, and actions and choices people make to consume food products and live their lives have direct impact on the environment as well as on personal or collective welfare (Jackson et al., 2005). Our eating habits, food choices and purchasing decisions should be sharply adjusted to protect nature's assets and the needs of future generations.

People have been encouraged to support a more sustainable consumption through a variation of activities such as financial incentives, laws, education and communication campaigns (Vandenbroele *et al.*, 2019). Despite these efforts, people still struggle to change their eating habits or consume to support sustainability.

On the contrary, trends show that consumers wish to consume more sustainable food but there are some challenges for consumers in knowing whether products are truly sustainable, why and how they are sustainable and limited availability to some consumers due to its high price. These may be symptoms of multiple problems or needs. This could mean that consumers lack an interest or distrust the sustainability in food, that they lack knowledge about the benefits and properties of food sustainability in products or that they lack an effective and user-friendly guide to sustainability. Further encouragement is thus needed to support and inspire to a sustainable food consumption.

Conversations with friends and acquaintances about their need for salience of sustainable aspects in food products visible and conversations with employees in grocery stores responsible for the store's selection of fish, shellfish and meat products and the lack of visibility of these sustainability concepts in those, the seed for this master's thesis project was sown. The need for simplified information and desire for knowledge about additives, nutrients, how food have been produced and where is present.

The food industry has understood that there is much to be gained financially by branding their products as ethical, sustainable and environmentally friendly towards consumers. What this really means and to what extent the products are sustainable are still not clear to all. However, a number of brands are striving to support goals relative to sustainable consumption and production. The Danish company Danske Carlsberg Beer is aiming for a zero-carbon footprint by 2030, and American Ben and Jerry's seeks to educate visitors on climate change and have run climate change advocacy projects since 2007 (Ruggeri, 2017). Sustainability also includes human working conditions. An important focus and company goal of Whole Foods is to only sell sustainably caught fish. Through this, they ensure that working conditions for fishermen are worthy and in this way fight slave labor (Ruggeri, 2017). Norwegian "Stølsvidda" is a family business and a mountain farm in Valdres which breeds pigs. Their business model is to produce pork meat with a mode of operation that is best suited to the animals, nature and food quality (*Stølsvidda*, no date).

There are international and Norwegian approved labelling brands designed to guide consumers to choose what they believe is best for themselves or the environment. They hold a variety of information i.e., about the origin of food products, questionable chemicals, nutritional content, climate imprint and ethical aspects of food production.

"The Norwegian Food Safety Authority" (Mattilsynet) is a governmental agency and supervisory authority, which mission is to help ensure safe food for consumers and

promote public, plant, fish and animal health, as well as environmentally friendly production and ethically sound fish and animal behavior (*Merking av matvarer*, 2019).

"BRCGS Global Standard for Food Safety" is a global standard based on updated safe food standards and methods and one of the most commonly used tools for due diligence and supplier approval. It helps companies select and qualify their suppliers, thus reducing the overall costs in the supply chain and increasing the security of suppliers and consumers (BRC, 2019).

"Framtiden i våre hender", an idealistic organization that advocates green consumption and resource justice, provides a brand guide. The purpose is to provide information on who is behind the label, and criteria for control, transparency and cost of using the label (Thoring, 2017).

Further, there are over a hundred eco-labels for the environment, social conditions and animal welfare on products exists in the Norwegian market (Forbrukerrådet, no date). Attempts to convey what these brands stand for to consumers in an easy-to-understand and informative way have been made through various solutions.

"The Norwegian Consumer Council" offers a brand overview with simplified information about branding schemes. However, as they state themselves, some labels are informative, while others are confusing.

Whether these existing eco-labels attempted to use are effective, trusted or matter to consumers in a food purchasing context is a big question. To navigate the jungle of such labels in a hasty day-to-day life and different situations is time-consuming and complex. Precisely in such a scenario, lies opportunities to help the consumer to make decisions that are better for themselves, society and the environment.

The biggest void with existing sustainability-labels is that they represent one dimension of sustainability and leave much of the responsibility to the consumer to understand their purpose of use. In addition, these labels also lack the "smartness" needed to succeed as an effective label or nudge, meaning to tailor the nudge through personalization and context-awareness (Karlsen and Andersen, 2019a).

One idea is to use principles from nudge theory (Thaler and Sunstein, 2009) and mechanisms to make complicated or hidden information more accessible in an attempt to utterly raise awareness and knowledge about the sustainability benefits of consuming sustainable food products. "Nudging" is a term from behavioral science used to influence behavior and decision making of groups or individuals using suggestions and positive reinforcement in a non-intrusive way.

A possible solution is to use a nudge strategy that promotes the sustainability benefits of a food product and thus try to encourage and help people make conscious, healthy, safe and sustainable choices and decisions. Another is to provide consumers with a color management system for food sustainability to be used as a tool aimed at making decision-making processes easier.

A nudge mechanism such as "Language and signage design" - 'stimulus response compatibility' is a potentially useful tool to employ to meet consumer's growing need for simplified information to comprehend the sustainability aspect of food products.

A labelling system in the form of a traffic-light metaphor using the well-established colors green, yellow and red where green represents "most" sustainable, yellow "partly" sustainable and red "least" sustainable, could be implemented as a food sustainability guide.

Descriptive labels may additionally be used in conjunction with each color and each example communicate three aspects of sustainability: environmental welfare, animal welfare and social justice. Such an "easy to understand" food sustainability purchasing decision-making guide may benefit consumers who want to obtain a sustainable diet, who want to make "right choices" to obtain emotional balance in one's life, or even inspire "potentially green" consumers to a sustainable food consumption.

Nudging used to influence sustainable behavior is a relatively new concept. Literature on the theory of Nudging have existed for some time, but the most referred to is the book "Nudge – Improving Decisions About Health, Wealth and Happiness", by Thaler and Sunstein (2009). The number of scientific studies which discuss possible solutions for effective nudge strategies and interventions to influence sustainable consumption and behavior are substantial.

Theory on the topics of segmentation, consumer behavior and consumer decision-making processes was surveyed in online articles, research articles and books in this master's thesis. These insights about methods and strategies for segmentation, consumer behavior and consumer decision-making processes and the works of Thaler and Sunstein, Kahneman and Fogg, made the theoretical foundation for creating a segmentation model for potential sustainable consumer behavior which provided the tool needed to defend and develop nudge strategies and design in this project.

Would it be possible to consume sustainable food and beverages alone, probably not yet, prices are still high and product offerings limited. However, by using "nudging" as an instrument to make complex information informative and easy to understand for the consumer, we may be able to enlighten and thus help to alter the consumer's perspective from "cheapest" to "ethical" and influence people's purchasing behavior into a sustainable one. The question is how nudging may be applied as an instrument to improve food purchasing experience for consumer segments in an online environment.

This master's thesis aims to create a model for defining potential sustainable consumer segments based on different personality characteristics and motivation for food purchasing behavior. Next, defended by insight from the segmentation model, develop strategies and design of sustainability labels which thus provide the consumers segments with the support they need to make conscious choices in a food decision-making process.

1.3 Research questions

Research questions to be addressed and answered in the master's thesis project are:

1. What consumer segmentation variables and factors for decision-making should to be included in a segmentation model as determinants for defining potential sustainable consumer segments and purchasing behavior?

2. Which components of consumer purchasing behavior is most beneficial to use to develop effective nudge strategies to these segments?

3. Which nudge mechanisms may be used in the strategies, and how do we make "food sustainability-calls" relevant to these segments?

4. How do we frame and present information to provide the consumer segments with the support they need to go through a decision-making process?

1.4 Contribution

This master's thesis provides a segmentation model and framework for developing potential sustainable consumers segments. In addition, this master's thesis provides insights about the potential sustainable food consumer's values, needs and motivations. Based on differences in consumer segment behavior, tailored nudge strategies and design applied as an instrument in a "sustainability guide" to inspire and influence consumers choices towards a sustainable food consumption is proposed.

In this master thesis, three potential sustainable food consumer segments are defined: the "Explorer", the "Likely consumer" and the "Occasional buyer". The characteristics of these segments was based on consumer behavior defined by the results provided by employing the segmentation model.

The purpose of the "sustainability guide" is to raise consumer awareness and knowledge about sustainability in food products, and thus make it easier for potential sustainable food consumers to make conscious decisions and choices in line with their personal values, needs and beliefs.

In addition, the goal is make sustainability attributes about food and availability in the market more prominent or salient to consumers, as well as to establish trust, security and inspire to commitment. This can be achieved through the use of targeted strategies to different potential segments with the use of proper nudge mechanisms such as "Language and signage design" and "Simplification and framing of information implemented in a sustainability label-signifier design.

How to develop fundamentally different hypothetical strategies to different consumer segments based on their motivation and food-related behavior, and how to design sustainability label-signifiers framed to reflect these strategies and provide the different consumers with the support they need in their food decision-making process, defended by a generic segmentation model for sustainable food behavior, is my contribution.

2 Theory, Background, Existing literature

2.1 Consumer behavior theory

A consumer is an individual who identify and try to fulfill a personal need or desire through buying and consuming a product.

Consumer behavior is "*the study of the processes involved when individuals or groups select, purchase, use or dispose of products, services, ideas or experiences to satisfy needs and desires."* (Solomon, Russell-Bennett and Previtte, 2013)*.*

Consumer behavior is about understanding the processes which motivate and drive people to make purchasing decisions. In the 1940s and 1950s consumer behavior developed into a separate discipline of marketing, which later became an interdisciplinary social science, combining elements from various fields such as psychology, sociology, social anthropology, anthropology, ethnography, marketing and notably, behavioral economics (Consumer behaviour, no date).

Consumer behavior is defined as *"the dynamic interaction of affect and cognition, behavior, and environmental events by which human beings conduct the exchange aspects of their lives."* (Bennet, 1995)*.*

Consumers behavior is influenced by a wide range of internal and external factors. Research on consumer behavior properly examines personality traits such as demographics, lifestyle, and behavioral variables (e.g., level of use, use cases, loyalty, brand promotion, and referral) to understand desires and human consumption. Additionally, examined is the impact on behavior of groups such as family, friends, co-workers, clubs and associations, politics, culture, society or other brand influencers (Consumer behaviour, no date).

Knowledge about consumer behavior provides a fundamental foundation for understanding the processes involved when individuals or groups select, purchase, use or dispose of products, services, ideas or experiences to satisfy needs and desires (Solomon, Russell-Bennett and Previtte, 2013).

2.1.1 What is consumer food purchasing behavior?

The processes that drive people to make purchasing decisions are important to explore and understand, and consumer behavior enclose the disciplines psychology, sociology and economics. That consumption is a process is important to understand in order to influence consumer behavior. The consumption process consists of the three stages pre-consumption, consumption and post-consumption. Pre-consumption refers to how and why consumers first decide they need a product. Consumption refers to the experience of buying the product, consumer roles being played and how the purchase reflects their own identity. Post-consumption refers to the consumer's judgement of whether a product delivered and was as expected, and how the product is disposed (Solomon et al. 2013). (Lawley, 2011).

In the literature several models of determinants of food consumption behavior have been proposed. Pilgrim (1957) proposed one of the earliest and most influential models

(Pilgrim, 1957). In his model, food consumption depends on perception (E.M. Steenkamp, 1993). Pilgrim talked about accepting food instead of eating food. However, he recognized that the operational definition of food acceptance is food consumption. Further Pilgrim state that the perception of food is a function of three factors: 1) physiological effects of the food, 2) perception of sensory attributes, and 3) influences from the environment (E.M. Steenkamp, 1993). Pilgrim hypothesized that these determinants could influence food consumption, however failed to explore these interrelationships.

2.1.2 Food consumption behavior taxonomy

There are a number of factors that influence people's food purchases. Three types of determinants generally distinguish food consumption behavior; 1) properties of the food, 2) factors related to the person involved in food consumption and 3) environmental factors (E.M. Steenkamp, 1993).
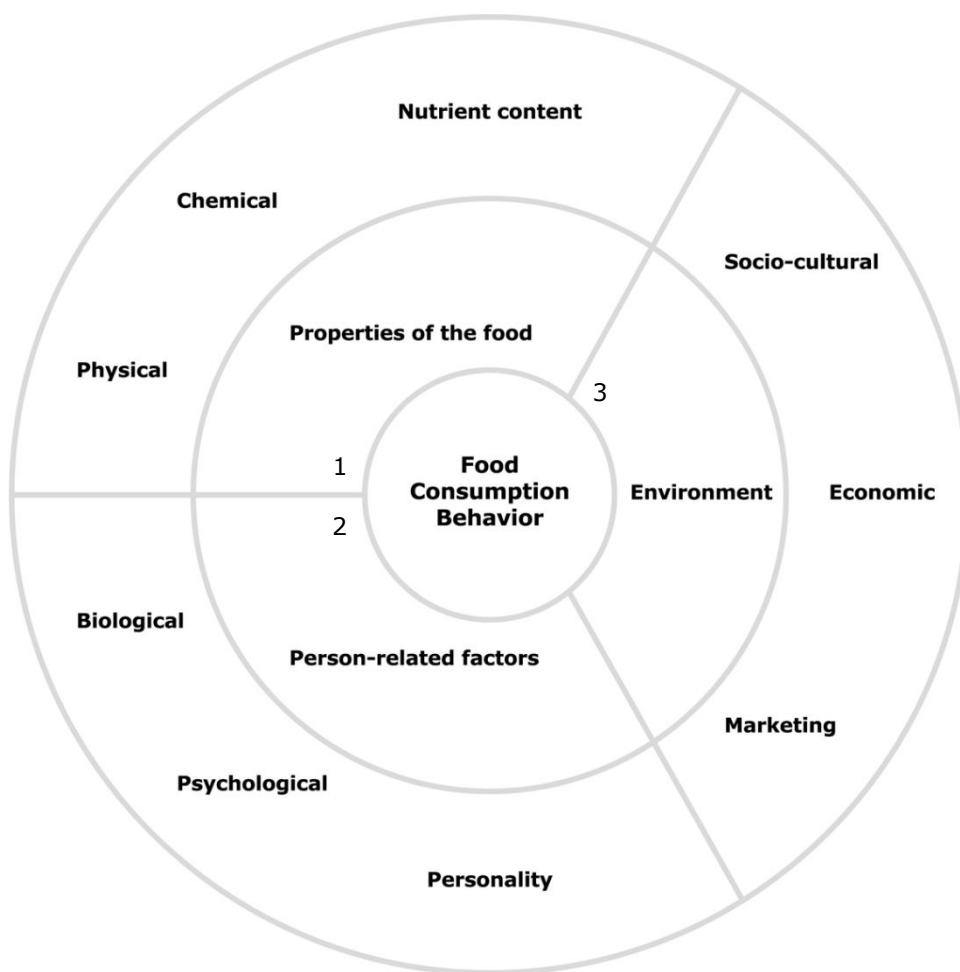
Figure 2.1: Determinants of food consumption behavior (Steenkamp, 1993)

The borders in between these three key determinants are not clear and mutual influence is possible. This means that all three types of determinants must be taken into account when analyzing food consumption behavior. In addition, the taxonomy shows that there are many specific factors associated with each type of determinant. Food properties include physical and chemical properties and nutrient content like physical form, macronutrient ratios, fiber, energy, and the number of certain substances such as sugar,

salt and spices. Properties like these influence the eating behavior of foods through their physiological effects (e.g., hunger, boredom, appetite) and feelings. Personality factors include biological factors (age, sex, body weight), psychological factors and personality. Environmental factors include sociocultural, economic, and marketing factors (E.M. Steenkamp, 1993).

2.1.3 Consumer behavior models sustainable consumption

Consumer behavior is at the core of how society affects the environment. Individual actions and choices to consume products, how much people consume or choices of lifestyles directly affect the environment, in addition to personal and collective welfare (Jackson *et al.*, 2005). Food consumption is no exception.

Motivating more sustainable behaviors is not a straightforward task. People make choices that lead to action, but how and why they make their choices are important to answer to understand consumers motivation and behavior. Why people consume the way they do and what factors trigger or limit their choices and actions are also relevant questions. Finally, questions such as why and when people behave in an environmental or prosocial way (Jackson *et al.*, 2005) need to be answered in order to encourage, motivate and facilitate more sustainable attitudes, behaviors and lifestyles in terms of food consumption.

Several models of consumer behavior and of behavioral change has been developed over the course of years. The role of models serves two important purposes for understanding the motives and driving forces behind consumer behavior and behavior change. One purpose is that they provide the necessary heuristic framework needed to explore and conceptualize consumer behavior. In the work of understanding the social and psychological influence on both ordinary behavior and pro-environmental (social) consumer behavior, they are particularly useful. Some models provide conceptual insight into the psychological causes of behavior, others show how social norms affect behavior while others emphasize how different values affect behavior. Heuristic understandings as such are helpful for identifying points of nudge interventions. Another purpose is that these models can be used as a basis for conceptual structure to test empirical strength between relationships such as values and behavior under different phenomena.

In other words, some models work better for heuristic understanding internal (cognitive) aspects of individual decisions and focus on the prerequisites and stimuli of behavior such as values, attitudes, and intentions. Other focus more on external stimuli such as family, friends, culture, social class, incentives, habits and situational determinants which work better for empirical testing. A good conceptual model requires a balance between parsimony *(tight number of parameters to explain a given phenomenon)* and descriptive completeness. To understand behavior a multi-dimensional view which incorporates both internal and external elements is this required.

According to Stern (2000), an effective model in terms of sustainable behavior must pay special attention to the following factors (Stern, 2000):

- motivations, attitudes and values
- contextual or situational factors
- social influences
- personal capabilities
- habits

In his book "Thinking, Fast and Slow", Daniel Kahneman refer to research performed by himself and Amos Tversky, and discuss human decision-making and how the mind are operated by two systems called system 1 and system 2, and how these two systems work together and influence human decision-making (Kahneman, 2011).

As described by the author, system 1 works automatically and quickly, without effort or feeling of voluntary control. System 2 allocates resources to more strenuous mental activities, including complex calculations that require a lot of effort and are linked to the subjective experience of choice and concentration.

Most of what our system 2 think and do comes from system 1 and is passed on to system 2 when things get challenging. System 2 usually has the last word, and this makes the distribution of work between the two is very efficient. What it means for decision-making and behavior is that the effort is minimized and the performance is optimized (Kahneman, 2011), and thus makes decision-making for behavior more effective.

B. J. Fogg, Director of the Stanford Behavior Design Lab, developed The Fogg Behavior Model (FMB), a framework or model to make it easier to understand behavior (Fogg, 2019). Included in this model B=MAT, are the three variables: Motivation, Ability, Trigger. Fogg suggests that these three elements must converge for behavior to happen, and without one it will not.

Further, Fogg outlines three types of motivational triggers: Facilitator, Signal and Spark. The first trigger Facilitator is used to make behavior easier aimed at people who are motivated but not responding because something seems hard (perceived lack of ability). The second trigger Signal is used to indicate or remind someone to perform a behavior. When a person is both motivated and have the ability to do something, all needed is a straightforward "signal". The third trigger is Spark which aims to motivate behavior in someone which is capable of doing a task (has the ability), but not motivated.

A trigger can be of an external (sensory stimuli) or internal (in your mind) nature (Eyal, 2014). External triggers are something in your environment that tells or reminds you to do something. It could be the sound of your growling stomach, a post-it-note, or the opening of the fridge due to habit. Something external (all around you) is nudging you to do something. Internal triggers are any feeling or emotion that reminds or tells you to do something. This could be the feelings of hunger, craving or thirst, and emotions such as happiness, sadness or boredom. Some internal signal nudges you to do something.

2.2 Motivation and decision-making processes

Everybody in the world use the insight they have to make choices and decisions.
The consumer decision-making process (problem-solving) may seem standardized, but no two people make decisions in exactly the same way. As previously described, factors that motivate and affect the consumer's problem-solving process are multiple and complex. Consumers may have similar needs, but how they want to satisfy their needs differ (Kass and Clark, 1959), (Lawley, 2011).

Thus, we can say that people experience different types of decision-making processes when they decide how the needs should be satisfied in the best possible way (Lawley, 2011). Sometimes we eat the first thing we see; the choice is quick (automatic and intuitive) and satisfies the need "hunger". Other times we might be hungry but awaits to satisfy the hunger to find food with a functional benefit that can provide a more

enjoyable experience. In decision-making situations as such (analytical and reflective) the factor risk is all of a sudden involved as well as a number of other influencing factors. "Risk" in relation to purchase of food may mean the belief that the purchase of the product does not live up to expectations or have negative consequences. Generally, there is a low risk associated with food products, but this is related to the consumer. If a person has diabetes the risk of buying sugar rich food may be considerable. This provide an explanation for how consumer decision-making approaches may be very simplistic or very complicated and are stimulated by many factors.

2.2.1 Factors influencing decision-making in food purchases

The psychology of choice and decision making is relative to how people make choices in their lives in any situation. Suggested by theory, decision-making may be organized into three main types referred to as habitual, limited and extended (Solomon et al. 2013). These represent the types of decision-making processes consumers go through to make a purchase.

Routine respons behavior	Limited problem solving	Extensive problem solving
Low-cost products.		More expencive products.
Frequent purchasing.		Infrequent purchasing.
Low consumer involvement.		High consumer involment.
Familiar product class and brands.		Unfamiliar product class and brands.
Little thought, search or time given to purchase.		Extensive thought, search or time given to purchase.

Figure 2.2: Continuum of buying decision behavior (Lawley, 2011)

Some decisions are routine and require little or no thought effort. These types of purchasing decisions are called habitual and are characterized as automatic and intuitive in nature (Solomon et al. 2013). Habitual decisions are considered to be more challenging to approach and influence.

Other decisions, and the most commonly used, are decisions made with some minimal thought. This type of purchase decision-making is called limited and is characterized by how consumers typically rely on heuristics or simple rules of thumb to make decisions (Solomon et al. 2013). The use of heuristics within limited decision-making is often based but how a product makes us feel, not only what it does. Examples of such heuristics are price, brand and place of origin. Illustrative of a limited purchase decision is e.g., to buy organic turkey because you feel it is both superior in taste and is healthier to eat.

A third type of purchase decision-making, and the most complex process is called extensive. This type of process requires higher cognitive attention and is characterized by consumers going through a series of steps to make a purchasing decision. Purchases of this kind typically require higher attention, research and evaluation because they are more expensive to buy, or have higher social visibility such as fashion, a car, a house or certain food.

Unlike habitual or limited types of food purchase decision-making processes, the growing consumer awareness of food trends and sustainability demand more extensive decision-making. There are potentially many opportunities for stimulating the consumer into making sustainable food purchases during this extensive decision-making process. This

by nudge interventions designed to help to confirm or deny risk, support or affect emotions or meet or clarify heuristic preconceptions.

Essential to acknowledge is that consumers are triggered by different motivational factors and use different methods and processes to make decisions. One type of decision-making process that is habitual for one may be of limited decision-making for another, or complex decision-making for a third.

Decision-making purchasing processes and problem-solving is stimulated by a wide range of internal and external factors (Solomon et al. 2014). While internal factors influence the psychology of consumers from within, external factors influence psychology internally. Internal influences refer to demographics, psychographics, personality, motivation, attitudes, lifestyle, learning, perception and feelings (Solomon et al. 2014). Hunger is an example of internal stimuli (motivation) driving the consumer to satisfy their need. External influences refer to social and situational factors and may represent culture, subcultures, social class, group membership, knowledge or situation (Solomon et al. 2014). Repetitive social gatherings (rituals) are a type of social influence that is specifically related to how and why consumers buy food.

2.3 Segmentation theory

2.3.1 What is segmentation?

Segmentation is a marketing strategy and the process of breaking down a heterogeneous and broad consumer or business market into sub-groups of consumers (segments) based on some type of shared characteristics and who have common needs and priorities and use this information to develop and implement strategies for communication and influence (Pride *et al.*, 2018).

Segmentation is about dividing the market into small groups of consumers who share similar characteristics. Since all consumers within the same group have a common profile, marketing strategies or other strategies for influencing and call-to-action, can be tailored to target a specific type of consumer. The goal of segmentation is to identify the segments that are likely to be most profitable or have growth potential so that they can become target markets (*Market segmentation*, no date).

Four basic criteria for market segmentation are set by Paul Green and Donald Tull in their 1978 book Research for Marketing Decisions (Green and Tull, 1978):

1. The segments must exist in the environment (and not be a figment of the researcher's imagination).
2. The segments must be identifiable (repeatedly and consistently).
3. The segments must be reasonable stable over time.
4. One must be able to efficiently reach segments (through specifically targeted distribution and communication initiatives).

Traditionally, marketers aim for a process that minimize differences between members of a segment and maximize differences between each segment, and to choose the right base requires proper planning, and insight and understanding of the market to be segmented (*Market segmentation*, no date).

According to Gavett, G. (2014), any base or variable may be used in segmenting a market provided that it is identifiable, substantial, responsive, actionable and stable

(Gavett, 2014). Five characteristics. In sum, identifiable refer to the degree to which different groups within the market can be identified. Substantial refers to the extent to which a segment or group of customers represents a sufficient size to be profitable. Sustainability refers to whether a segment represents a profitable sufficient size. Responsive refer to what degree consumers in a defined segment will respond to marketing offers aimed at them. Actionable refer to when segments are accessible and provide aid for marketing strategies. Stable refer to a segment being stable enough for a long enough period of time to be marketed to strategically (Gavett, 2014).

The most common bases for segmenting consumer markets include the four key types of segmentation variables geographics, demographics, psychographics, and behavior (*Market segmentation*, no date). Many subcategories can be used to identify different markets, but they are placed under each of these four types of segmentation.

Geographical segmentation is based on where people live, and typical segmentation variables may include country, region, city and climate zone etc. Demographic segmentation classifies consumers by demographic characteristics such as age, ethnicity, gender, family structure and income (Reid and Bojanic, 2009), and to assume that consumers similarity between demographic profiles and buying patterns, motivations, interests and lifestyles is a prerequisite for demographic segmentation in order to be able create effective and appealing promotions.

Demographic segmentation may also include characteristics based on generation. Traditionally generation is divided into four categories. Generation Z (millennials (1995 plus), Generation Y (1980- 1994), Generation X (1965- 1980) and Baby Boomers (1946-1964). Generation Z is referred to as the persuasive force in the economy, the "child pester power" (Solomon, Russell-Bennett and Previtte, 2013) a term used to describe children's negative influence in their parents' buying habits. Generation Y is referred to as challenging to reach through traditional marketing efforts. Generation X is referred to as individualistic, opinionated and a group not seeing themselves as a target market. Baby Boomers are referred to as big spenders, approaching retirement, big market.

When promoting sustainable food to influence food purchases, relevant to consider is also how each generation might consume food (Lawley, 2011). Generation Z is growing up with "access to everything" through internet and influenced by social media, and thus would likely be open to food-trends such as healthy, quick and easy street-food in pop-up restaurants or from food trucks. Generations Y and X grew up being exposed to various cuisines from all corners of the world and would and this, with access to wider range of untraditional food in grocery stores, likely be more open to a wider variety of food than previous generations. Contemporary specialized restaurants serving locally produced or food directly harvested from nature would most likely be on their radar. Baby boomers often has the most discretionary income to spend on food purchases due to the fact that children usually have left home. This generation may have the ability to shop more expensive foods. However, taken into account that this generation grew up at a conservative time when a meal "should consist of one type of meat and four vegetables", not necessarily mean that they shop more expensive protein nor buy vegetables which have beneficial sustainability attributes.

2.3.2 Segmenting the sustainable food consumer

Having a general understanding of consumer behavior related to food purchases is valuable when segmenting in terms of sustainable food consumption. Segmenting to point out which type of consumer are likely to purchase certain types of food products and develop nudge strategies and design is essential. Many research articles and reports are written on the subject sustainable food consumer and how to define this segment. Questions are which segmentation framework works best to define the sustainable consumer, and which measurable variables are the most effective parameters for segmenting and identifying similar and different characteristics.

The research report *"Segments of sustainable food consumers: a literature review"*, Verain, et. al (2012) provide insights from published studies that have segmented consumers with a view to sustainable food consumption. They state that to explain the sustainable food consumer and behavior would be to challenging by using just the traditional socio-demographic factors alone (Verain *et al.*, 2012). They found that segmentation and profiling variables used in differentiating consumer segments in terms of sustainability, was categorized into the three levels of abstraction. These are personality characteristics, food-related lifestyles and behavior (Verain et al., 2012). Further, socio-demographic variables was frequently used for profiling and thus considered relevant to classify sustainable food consumption (Verain et al., 2012). Behavior variables such as price and health was also recognized as variables, despite these just relate to sustainability indirectly (Verain et al., 2012).

Food-Related Lifestyle (FRL) is a frequently used classification variable as basis for segmentation (Fraj and Martinez, 2006). Food-Related Lifestyle is an instrument which make use of and builds on previous work on lifestyle in marketing, as well as cognitive approaches to the analysis of consumer behavior such as goal hierarchies and cognitive structural research, first defined by Grunert et al. in 1993. Food-Related Lifestyle include of five components: Higher order food product attributes, consequences of consumption, ways of shopping and ways of preparing food and use situations. The instrument is designed to be able to measure to detect trends among consumers over a period of time, which also go across cultures (Grunert, Brunso and Bisp, 1993).

Consumer Sustainability Consciousness (CSC) is a highly relevant classification variable and is an instrument designed for segmentation of the sustainable consumer (De Carvalho, Salgueiro and Rita, 2015). In their paper "Consumer Sustainability Consciousness: A five dimensional construct" the authors found that triggers for sustainable decision-making are influenced by various perspectives but narrows down to five dimensions of consumer's sustainability consciousness. The first dimension is "Sense of Retribution" which refer to how increased awareness of sustainability issues make people question their own unsustainable habits and how they negatively affect these environmental and social problems (Maiteny, 2002). The second is "Access to Information" which refer to the relationship between knowledge and availability of information and how it may affect motivation for sustainable purchases. The third is "Labelling and Peer Pressure" which refers to how environmental-labels and «social proof" may act as motivational guides to sustainable consumption. The fourth is "Health Issues" which refer to how a growing awareness of chemicals in food and interest in wellness and personal health may affect purchase decisions. Fifth is "Crisis Scenario" which refer to how people may re-evaluate their consumption behavior in i.e., economic crises and only purchase wat is necessary.

2.4 Nudge theory

2.4.1 What is nudging?

The definition of the word "nudge" is *"to push something or someone gently"* (NUDGE | meaning in the Cambridge English Dictionary, 2020).

"Nudging" is a term from Behavioral Science, Economics, and Political theory used to influence the behavior and decision making of groups or individuals using suggestions and positive reinforcement in a non-intrusive way.

Nudge means carefully guiding people behavior in desirable direction without using either carrot or whip. Instead, when nudging one arranges the choice situation in a way that makes desirable outcome the easiest or the most attractive option. Further, nudging is an umbrella term for deliberate and predictable methods to influence or change human behavior by modifying the choice context. Central to behavior is decision-making from the available choices.

"Nudges" are small measures that aim to influence people's actions in the desired direction without the use of coercion, punishment or financial reward. Nudges do not try to change one's value system or increase information provision, instead they focus on enabling behaviors and private decisions that are good for the individuals and often for the society as well.

Richard H. Thaler and Cass R. Sunstein are mainly given the credit for the Nudge theory, which was strongly based on the Nobel prize-winning «heuristic» work of the psychologists Daniel Kahneman and Amos Tversky in the 1970s. The concept "Nudge" was made available to everyone through the international bestseller from 2008, "Nudge – Improving Decisions About Health, Wealth and Happiness". Kahneman's 2012 book Thinking, Fast and Slow covers much of the basic Kahneman-Tversky theory on which the Thaler-Sunstein "Nudge" theory is founded.

In their book, Thaler and Sunstein defined their concept as this: *"A Nudge is any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates. Putting fruit at eye level counts as a nudge. Banning junk food does not."* (Thaler and Sunstein, 2009).

However, their definition has been discussed as too broad and inaccurate in scientific circles. The Danish leading behavior researchers Hansen and Jespersen (2013) proposed an alternative definition: *"A nudge is any attempt to influence people's judgment, choice or behavior in a predictable way (1) made possible due to cognitive disturbances in the individual and social decision-making which constitute barriers for people to perform rationally in their own interest, and (2) work by making use of these biases as an integral part of such attempts."* (Hansen and Jespersen, 2013). Nudge theory seeks to understand the "heuristic" influences on human behavior.

A heuristic is a mental process people use to solve problems and make judgments quickly and efficiently. Heuristic rule-of-thumb strategies are used to speed up the process of finding a satisfactory solution referred to as "mental shortcuts" that ease the cognitive load of making a decision (Kahneman, 2011). Heuristics are helpful in many situations, but they can also lead to cognitive biases. Daniel Kahneman and Amos Tversky, the "fathers" of behavioral economics, developed the first theories of heuristics and cognitive

biases (Kahneman and Tversky, 2017). Cognitive biases, a term introduced in 1972 by them, are the systematic errors that occur as a result of our heuristics. A cognitive bias is a systematic error in thinking that occurs when people process and interpret external information (not in their minds) and influence people's decisions and assessments. Our brain is powerful but has limitations. Cognitive biases are often the result of the brain's attempts to simplify information processing. Biases – just like heuristics – act as mental shortcuts that help people understand and make decisions faster. Some of these biases are related to memory, while others to attention problems (Cherry and Gans, 2020).

To understand and utilize these Human heuristics is important and central to changing behavior. Designers or choice architects must take into account basic human instincts, shortcomings and habits to design effective solutions for changing behavior. Central to behavior is decision-making from the available choices.

The Nudge theory is referred to as "a more sophisticated" approach aiming to achieve behavior change in humans. Nudging is based on indirect encouragement and activation as opposed to traditional methods of direct instruction, enforcement or punishment. Nudges can be used in different areas of life and often used to encourage people to choose the healthiest or most environmentally friendly options.

Nudge theory is a rather modern and adaptable concept and BusinessBalls.com (2017) summarizes what Nudging is and what it can be used for as follows:

1. Understanding how people think, make decisions and behave.
2. Help people improve their thinking and decisions.
3. Manage change of all types, as well identify and change existing negative impacts on humans.

A well-known effective example of a nudge, that took place in the 1990s, is the etching of a fly inside the urinal at Schiphol Airport in Amsterdam which resulted in a reduced spillage by 80% (Thaler and Sunstein, 2009). This example follows the below four important rules of behavioral design and is thus successful as a nudge (Mitchell, 2019):

1. Align incentives with desired behaviors.
2. Provide clear, visible, and immediate feedback to reinforce desired
3. Simplify and structure choices when decision-making parameters are complex
4. Make goals and performance status clearly visible.

Another simple and experimental proof of effective nudging to prevent people from overeating is to introduce smaller plates (Varakli, 2018). By reducing the size of a serving fewer calories are consumed.

There is a distinct difference between influencing nudging and traditional marketing or and advertising. Nudging is about influencing people's behavior and decision making without them knowing it by using suggestions and positive reinforcement in a non-intrusive way. Traditional marketing and advertising are about persuading and convincing people to buy things through direct instruction and enforcement, often in an intrusive way (Panousis, 2016).

Table 2.1 illustrate these differences between traditional forced change and nudge techniques.

Enforced change	Nudge techniques
Instructing people to wear a facemask (COVID-19) Warning signs of fines if littering. Joining a gym. Counting calories. Weekly food shop budgeting.	Recommending people to wear a facemask (COVID-19) Improving the availability and visibility of litter bins. Riding your bike to work. Smaller plate. Use a basket instead of a shopping cart.

Table 2.1: The difference between traditional forced change and nudge techniques.

Many factors affect behavior, and commonly used are "Framing", "Relevance" and "Mood-change". Knowledge about these Nudge techniques are used by the advertising industry consciously in their attempt to influence customers emotionally to buy their product. What separates nudging and advertising is whether the goal of the Nudge design or intervention is to positively reinforce people make a decision to buy in a non-intrusive way or convince them through direct instruction and enforcement.

2.4.2 How we think – two systems of the mind

Our brain works in an incredible way, but "fools itself" or operates "biased" (Thaler and Sunstein, 2009) and causes humans to fail all the time, intentionally or unintentionally. The intention may be not to overconsume; however, it happens every day. People have a hard time following their good intentions and their everyday behavior creates problems for them or the environment. According to Krukow, (2013) this is the biggest threat to mankind today (Krukow, 2013). Why this happens can be explained by the fact that people have limited time, motivation or resources to consciously reflect on choices and instead use automatic processes as the "rules of thumb" previously explained, which are prone to biases and therefore may lead to poor decisions.

Daniel Kahneman proved in his work and research about decision making that our brain is operating two systems (Kahneman, 2011). Human behavior is driven by these two systems and the two modes of thought operate differently. System 1, also referred to as the Automatic system, works unconsciously, intuitively and automatically, and System 2 referred to as the Reflective system works consciously, reflective and rationally (Kahneman, 2011). System 1 automatically assesses a situation and delivers updates and suggestions to system 2 who consciously turns them into beliefs which may trigger a decision to take action.

The differences and characteristics of the two cognitive systems are illustrated in table 2.2.

System 1 – the Automatic system	System 2 – the Reflective system
Uncontrolled Effortless Associative Fast Unconscious Skilled	Controlled Effortful Deductive Slow Self-aware Rule-following

Table 2.2: Characteristics of the two cognitive systems (Kahneman, 2011).

Because decision-making is driven by the mental shortcuts (heuristics) our automatic brain uses to conserve mental energy for our reflective brain which contribute to reduce the cognitive strain of making a decision (Kahneman, 2011). Therefore, heuristics affect our decision-making and subsequently also consumer behavior. The challenge with heuristics is that they may be wrong or biased and are only mental shortcuts which usually involve focusing on one aspect of a complex problem and ignoring other. Humans are biased by many aspects such as our imaginations, memories and how choices are worded. The Automatic system is most vulnerable to biases, temptation, and risk-related behavior. Choice architects can take into account system one's vulnerability, and support rational decision making or behavior by helping the Reflective system 1 override the Automatic system 2.

Evans et. al, explain how the theory of system 1 and 2 works as follows relative to nudging: *"System 1 nudges" influence behavior by "re-biasing" an individual, i.e., exploiting biases such as the propensity to stick with the status quo. Conversely, "System 2 nudges" generally "de-bias" the individual, thereby facilitating active thinking"* (Evans, 2017). Effective design solutions for changing human behavior needs to take basic human instincts, flaws, and habits into consideration. An example is the basic instincts "pack mentality". Humans mirror people around them which overrules our good intentions and knowledge. Another example is "human flaws" such as limited attention. People live in the now.

Thaler and Sunstein's theory of Nudging builds on Kahneman's theory and seeks to support or prevent people from making poor choices based on individual heuristics and cognitive biases which arise as a result of humans' decision-making processing. According to them there are three main categories of human heuristics and cognitive biases (Thaler and Sunstein, 2009): "Rules of Thumb", "Resisting temptation" and "Following the herd".

In table 2.3 the main human heuristics and cognitive biases presented by Thaler and Sunstein is explained.

Rules of Thumb (mental shortcuts)

Anchoring	Anchoring means to use comparable experience, knowledge or facts and use it as a basis for deciding on something unknown.
Availability	Availability is a heuristic that is our perception of how to present, usual or visual something is. If we easily can relate to a dangerous situation or incident, we are more likely to be concerned that such a situation will occur again. If we are heavily exposed to a message (orally or visually), the greater are the chances of trusting that to be true.
Representativeness	The representativeness heuristic is about comparing or assuming how similar something is to an assumption or perceived stereotype.
Optimism/ overconfidence	This heuristic means to have an unrealistic and overly optimistic relationship to reality. This may mean that the ability to see risk or outcome of a thing is impaired and underestimated and that the outcome of something (gain) and the ability to master unknown things is overestimated.
Gains and losses / loss aversion	Loss aversion is a heuristic that operates in a way that makes us not do changes even if they might benefit us.
Status quo bias and inertia	This heuristic relates to when people stick to a "safe" situation they know rather than giving up something for the unknown. The status quo bias is often due to laziness, aversion to the unknown and to get involved in something that is perceived as complicated or unnatural like reading small print in agreements, etc.
Framing	Framing is a powerful nudge that must be used with caution. People may respond differently to the same question depending on how it is formulated and presented. The nature of the question changes and can lead to positive or negative perceptions, different associations or ways of distorting to what extent something is unattractive or attractive.

Resisting temptation

Temptation	This heuristic refers to people's greed, inability to resist temptation, the urge to satisfy the ego, needs, etc. Issues related to the lack of self-control is a result of underestimating the effect or arousal that we experience when satisfying our needs. Most people know that temptation exists and take precaution against it.
Mindlessness	This is about people's tendency to form spontaneous, unconcentrated views and decisions without considering that the decision negatively affects them.

Self-control strategies	These are techniques people use to counter their own heuristic weaknesses, which thus become heuristics. People are described as "Planners", steered by the Reflective system and "Doers", heavily influenced by the Automatic system. From time to time our two parts of our brain (that) we use are in conflict and battles over the right decision. When a lack of self-control and mindlessness combine, the outcome for "Doers" are crucial. By knowing this, we see that a number of people could benefit from a friendly nudge in a safe and healthy direction. To practice internal control-systems or "mental accounting" is another way to prevent bad outcomes or i.e., stay on budget.

Follow the herd

Conforming – following the herd and social influences.	This refers to the "fact" that people are easily affected by what other people do. Conformity and to follow the herd relate to people's need for affirmation and belonging, on top of the fear of isolation and exclusion from the group. The effect is further enhanced through social media and the internet, as well as by cultural factors. Social influences are divided into two groups. The first is information. If many believe the same about that information, it conveys that this is correct and what one should consider, do or think. The others include peer pressure and whether you care about what people think about you. In a case like this, you might "go with the crowd" to "avoid their wrath or curry their favor" (Thaler and Sunstein, 2009).
Spotlight effect	This heuristic is about thinking that your actions and presence are interesting to other people. This produces nothing but stresses on thinking and decision-making. Because people tend to think like this, they conform to what they think are their expectations.
Priming	Priming is the manner in which people are prepared when introduced to a situation or option is introduced. Priming refers to the workings of the Automatic system and research shows that subtle influences can make it easier to recall certain information. Just a hint of an idea or concept could trigger an association that can stimulate action, and it occurs in social situations. Priming is the third social influence Thaler and Sunstein refer to in their book "Nudge".
Language and signage design - 'stimulus-response compatibility' - or 'choice architecture'	This term refers to the degree to which something is designed effectively so that the design helps to understand and respond to it in the best possible way. A classic example is how traffic lights are designed where red represents 'stop' and green 'walk'. It is important to have a good understanding and include human factors in design whether we design products or choice architecture exactly because they are human. In the book Nudge the authors Thaler and Sunstein (2009) aimed to develop the same idea for choice architecture.

Table 2.3: An overview of heuristics and cognitive biases (Thaler and Sunstein, 2009).

Further, many different techniques to support, minimize or eliminate human heuristics or biases exist for nudging and three nudge strategies often referred to are "Defaults", "Social proof heuristics", and "Emphasize or Increase the salience of the desired option" (*Nudge theory*, no date).

"Default" relates to making the most favorable alternative standard. Examples are software providing helpful defaults relative to a type of installation regular, type of insurance policy presented as standard or product positioning in a supermarket.

"Social proof heuristics" relates to making visible that other people have made the most favorable choice. A widely cited example is that when stating the fact that "nine out of ten have paid the tax on time", the proportion of people who pay their taxes within the deadline will increase.

"Emphasize or Increase the salience of the desired option" relates to the most socially favorable choices in a situation where a choice is to be made (Thaler and Sunstein, 2009).

Another seven interesting nudges are "Sympathy", "Accessibility", "Likability", "Relevance", "Sensory", "Mood-changers" and "Facilitation" (Performance and Theory, 2020).

"Sympathy" refers to designing choices that are 'sympathetic' to people's preferences and habits or choices that "follow humans natural flow" (the path of least resistance) or ordinary behavior.

"Accessibility" refers to optimizing how people will see, receive, experience, understand and be influenced by a nudge i.e., signal or communication from the messenger (sender/giver).

"Likability" refers to trust, reputation and credibility. This heuristic factor is related to 'priming' because it affects people's openness or willingness to be "nudged".

"Relevance" refers to how well the respondent's personal needs, situation and self-image correspond to an intervention. Instinctively, people judge whether they feel comfortable or whether it is appropriate when given a signal and ask if it is relevant to them. If it is not perceived as relevant, they will probably not act on it. Whether the communication's framework fits or is personal must be considered by the "choice architect".

"Sensory" refers to sensory stimulants like color, sounds, music, smells or touch and may be a powerful tool for influencing people's thoughts and decisions. Smells are known to trigger memories, and if a "sensory nudge" triggers a positive memory in a person, it can be very influential.

"Mood-changers" refers to several heuristics like inspiration, passion, flair, intrigue and humor, and connects to people's emotions and how they feel.

"Facilitation" refers to guiding individuals in comprehending and concluding, as per their own needs, manners of thinking and responses. As the authors describe themselves (Performance and Theory, 2020), a "facilitation nudge" is a "very sophisticated" type potentially a powerful part of choice architecture and might increasingly become popular within "artificial intelligence" through technical solutions and systems humans use.

2.4.3 Choice architecture

The nudge theory is mainly about the design of choices, which influences the decisions we make. The nudge theory suggests that the design of choices should be based on how

individuals actually think and make decisions such as instinctively and irrationally (*Nudge Theory - BusinessBalls.com*, 2017).

In Behavioral Science the context in which individuals make choices and decisions is significant and is referred to as "choice architecture" by Sunstein and Thaler (2009). According to them, choice architecture is the primary tool in Behavioral Economics. Behavioral Economics studies the effect of psychological, cognitive, emotional, cultural and social factors on individuals, and can explain why people make their choices (*Behavioral economics*, no date).

Choice architecture is the design of how information is framed and presented to people, and the impact it has on the people's decision-making. The goal is to provide people with the support they need to go through a decision-making process by presenting information that they understand (Thaler and Sunstein, 2009).

Jameson et al., (2013) suggest that effective choice architecture in environments must be based on substantial knowledge of two main topics (1) the psychology of choice and decision making and 2) strategies for supporting their everyday choice (Jameson *et al.*, 2013). The psychology of choice and decision making is relative to how people make choices in their lives in any situation. Strategies and potential technologies for supporting their everyday choice are relative to what general ways may be used to help people make better choices and how they can be applied in the context they are in.

As previously mentioned, people are prone to predictable biases that can cause decision errors. Choice architecture aims to reduce these predictable biases to support the user experience.

Examples of predictable biases are:

1. Reducing choice overload
2. Defaults (pre-selected choice)
3. Choice over time
4. Partitioning options and attributes
5. Avoiding attribute overload
6. Translating attributes

The main goal of choice architecture is to help individuals make appropriate choices in the environment they are in, and choice architects use the full range of heuristics to design choices for people (Thomadsen *et al.*, 2017). People make choices, while the choice architects are responsible for organizing the context so that people easily can make pleasing choices, and at the same time safeguard people's right to choose. People's goals and how to get there may be clear, but also in a system designed for "easy navigation", they must make detailed choices such as analyzing which of the suggested roads they should take. An effective way to improve people's experience is to help them make these detailed choices (Thomadsen *et al.*, 2017)

Factors that may influence the people's choices are the number of choices presented, the way the properties are described, and the existence of a "default". Another factor is individual characteristics that can cause people to react differently to information.

Thaler and Sunstein (2009) state that the outcome for users can be enhanced if six principles or "tools" for choice architecture are kept in mind by designers of such architecture. These six principles are: "iNcentives", "Understanding mappings", "Default", "Give feedback", "Expect error" and "Structure of complex choices".

iNcentives	Humans respond positively to Incentives. choice architects should consider incentives and people when designing a system and customize incentives to create good decision-making processes. Four questions are relevant when planning incentives: Who uses? Who chooses? Who pays and Who profits?
Understand mappings	There are easy tasks like selecting a flavor of soda, and harder tasks like selecting a retirement plan. "Understanding mapping" is about how people can more easily relate to the consequences of different decision-making paths. RECAP: Record, Evaluate, and Compare Alternative prices on a service or product is one such approach.
Defaults	Defaults are "ubiquitous and powerful" and it means that people will take "a heuristic from folk physics", the least resistant path (Path of least resistance, 2020). An example of this is the "regular" or "custom" installation of software. Another example is using defaults to nudge people to act. Online platforms like Facebook, LinkedIn and Google do it, and defaults they use are pre-written scripts and prompts triggered by algorithms that are powered by Artificial Intelligence (AI) engines.
Give feedback	Providing feedback is helping humans improve their performance in the best way. An example is when our laptops warn us when the battery is about to run out and tell us to either plug in the charger or shut down.
Expect error	Humans are not flawless, we make mistakes. In order to prevent a disaster from happening, the design should take into account that people make mistakes. A good example of this is birth control pills. There, patients are instructed to take one pill every day, 28 pills. What they don't know is that seven of those pills (number 22-28) are placebo.
Structure of complex choices	We make choices every day. If the information presented to us is too complex, we try to simplify and break down (analyze) the information to make choices easier. A goal in interaction design or choice architecture is to support and reduce this challenge and simplify complex structures of information. A company such as Netflix is successful in part just because of their helpful choice architecture.

Table 2.4: Six principles in choice architecture; NUDGES (Thaler and Sunstein, 2009)

2.4.4 Ethical nudges

For digital nudges to work, they have to appeal to the feeling of "freedom of choice" ("libertarian paternalism")(Thaler and Sunstein, 2009), as well as to operate within the frames of Ethics within nudging.

For nudges to be ethical, requirements are to 1) preserve individuals' privacy and freedom, and 2) support transparency (Lembcke *et al.*, 2019). Ethics in Nudging are supported when a nudge is easily identified. It must also be recognizable when and where a person is nudged and what purpose it has. This is important to protect people from manipulation and nudges that undermine people's best interests.

In their article "To Nudge or Not To Nudge: Ethical Considerations of Digital Nudging Based on Its Behavioral Economics Roots", Lembcke et al. (2019) discuss the ethical considerations raised in Behavioral economy (BE) related to nudges in a digital context. Three imperative ethical contemplations for digital nudges were examined; "preserving individuals' freedom of choice, transparent disclosure of nudges and individual and societal goal-oriented justification of nudging" (Lembcke *et al.*, 2019) and these concerns remain applicable to digital environments according to them. They argue that in order to avoid unethical nudges, choice architects should include ethical considerations at an early stage when conceptualizing and designing digital nudges.

Ethics would be supported in an application if the goal of the nudge is described in the specification and if the user is notified of the intention of the nudge before starting using the application. The same notification may be given every time the user starts the application and this way the user is able to choose whether or not to use the application. (Karlsen and Andersen, 2019b)

In their work "Ethical Guidelines for the Construction of Digital nudges", Christian Meske and Amojo (2020) provide a "ready to use" ethical guideline for the design of digital nudges. They include four steps in their design approach (Meske and Amojo, 2020):

1. Understand potential users' intention and their cognitive heuristics and biases.
2. Derive the goals of digital nudging.
3. Design and implement the nudge.
4. Evaluation of the digital nudge and iteration.

2.5 Nudging for a sustainable food consumption

What are modern food consumers' goals, and how do we influence their choices? Distinctive nudges are used to influence and achieve different behavioral change goals. Some heuristics and mechanisms are better suited than others. Central to understanding how to influence and achieve different behavioral change goals is to have solid insight about users, their motivations, needs and goals.

In their article "Nudging To Get Our Food Choices On A Sustainable Track" Vandenbroele et al. (2019) state that nudging clearly triggers responses without requiring too much cognitive effort from consumers. Unlike classic education and information campaigns where the goal is to convince consumers to change behavior with rational arguments, nudging requires less cognitive effort (Vandenbroele *et al.*, 2019). However, by simplifying complex information that normally would require more cognitive effort and use it to educate consumers in a relevant choice situation, is potentially suitable in a food context, where a choice between options often is motivated by fast, automatic cognitively effortless responses.

Further, Vandenbroele et al. (2019) discuss past research about the use of nudging to create cognitive impact and the effect on behavior through the use of signifiers like labels or visibility enhancements, affective responses from sensory and social influences. They state that research on sustainable consumption nudging is in the early stages, but that we will experience more of this in the coming years after seeing that nudging applications in other domains are successful. They emphasize that there is a lack of knowledge of the effect of nudges in other cultures because most studies were conducted in highly developed western societies, and further state that conditions of cognitive processes in different contexts should also be taken into account when designing interventions. They emphasize that a framework for designing sustainable food choices has not been published yet, as far as they know.

In their article "Nudging – A promising tool for sustainable consumption behaviour?" Matthias Lehner, Oksana Mont and Eva Heiskanen study how nudging should be used to be most effective in the context of consumption and the environment based on previous research. They find that the insights from behavioral science are used as information to shape governments' policies. They refer to the use of "eco-labels" as well as "standardized nutritional information to improve the salience of health impacts of foods, as tools for making complicated information about sustainability and the environment comprehensible and user friendly, as examples of this. Furthermore, they point out that there is an absence of "nudging" to promote environmental causes in food consumption, such as reducing meat consumption resulting in climate change and food waste, compared to the widespread use of "nudging" as an attempt to tackle the Western world's obesity epidemic. Four types of nudge strategies or tools are particularly recommended by the authors (Lehner, Mont and Heiskanen, 2016) in terms of sustainable consumption: "Simplification and framing of information", "Changes to the physical environment", "Changes to the default policy", and "The use of social norms".

In their chapter "6.2.1 Evidence for the effectiveness and efficiency", they summarize what they refer to as "Nudge mechanisms used to influence food consumption" (Lehner, Mont and Heiskanen, 2016) presented with all its contents in the table below:

Nudge mechanisms:	Applications to food consumption:	Evidence of effectiveness:
Simplification and framing of information	Provide simplified information and signifiers	Small-scale studies in controlled environments indicate large impact; no large-scale studies available; impact seems to vary for different segments of society.
Changes to the physical environment	Change visibility and accessibility	Strong evidence in controlled environments (i.e., canteens; restaurants).
	Influence size	Experiments with portion size and package size suggest a strong impact.
Changes to the default option	The positioning of product choice	Wide use in retailing suggests large impact; few studies available for pro-sustainable nudging.

Use of social norms	Provide information about others' behavior and ideal-type behavior	Studies suggest effectiveness, particularly when behavior is publicly visible and in cases of uncertainty about appropriate behavior.

Table 2.5: Four effective nudge mechanisms (Lehner, Mont and Heiskanen, 2016).

Two of the nudge mechanisms listed above are relevant to use in this project in the context of online food purchasing with examples are described below.

"Simplification and framing of information" refer to information added to a context to make explicit information more salient, like a sign in a form such as a sound, image or printed word (Google Dictionary), is referred to as signifiers and is examples of simplified information. The likelihood of influencing individual consumers will increase if simplified information and signifiers is provided and customized to a specific choice situation.

A good example of signifiers is "eco-labelling" of food and beverage products used to signal organic or other sustainability attributes. Whether these are effective alone is another question. Feedback from people spoken to and insights from the survey produced in this project, indicate that they find that many of the existing labels are unknown, and difficult to interpret. Another example of simplified information relative to food consumption, is using the traffic light system green, yellow and red. Green represents good choices, yellow neutral and red bad (Vandenbroele *et al.*, 2019). The traffic light labelling system has been tested in many countries in various contexts without being implemented as a mandatory requirement by local authorities.

In their article "Nudging To Get Our Food Choices On A Sustainable Track'' Vandenbroele et al. state that, what they refer to as "evaluative labelling" using traffic light symbolism, led to better health decisions in a canteen or cafeteria, and further explain that the results will depend on which country such experiment is taking place. Research showed that the effect was positive In Germany but had no significant difference in Poland.

"Use of social norms" refers to the fact that people tend to be influenced by their social environment and it affects what the type of food and how much they eat. If people eat alone or in company with others, it has a big effect on the amount of food eaten, as well as the size of the portion (Lehner, Mont and Heiskanen, 2016). Successes for nudging depend on a number of factors. Some are highlighted in the report by Lehner, Mont and Heiskanen, which is based on their review of literature on the topic of food consumption. They emphasize that controlled spaces like in a grocery store or in an app on your mobile phone work best if you want to nudge people into changing food consumption. The effect of a nudge will increase significantly if you know the audience, understand who they are and how they think, the behavioral environments and which nudges would work well for them. Impressive results for nudging interventions are seen in previous studies, but unfortunately, they are restricted to very limited sample sizes and specific environments (Lehner, Mont and Heiskanen, 2016).

The decision on what to buy should not be left alone to the consumers in the supermarket to achieve a change in thoughts and behavior. They are overloaded with information and temptation every time they shop and for every item they buy when this is done (Torma, Aschemann-Witzel and Thøgersen, 2018). Increasing product transparency might help people to shift their focus from price to sustainability, and then change behavior and choose a sustainable diet. Improving salience through visualization

of the product journey, in a controlled environment, is another potential success factor as well as providing facts and complex product information through simplification and signifiers.

2.5.1 Orientations of nudges

Romain Cadario, Pierre Chandon (2017) refer to three categories of nudges in their work "Which Healthy Eating Nudges Work Best? A Meta-Analysis of Field Experiment". One is Cognitive nudges which provide information, such as nutrition counts or make healthy options more visible on the shelf or on the menu. Visual attention is necessary for cognitively oriented interventions to influence behaviors. Another is Affective nudges which seek to influence how people feel, without necessarily changing what they know, for example by touting the taste of the food, not its healthiness. A third is Behavioral nudges try to directly change behaviors without necessarily changing what people think or what they want, for example by changing the amount of food on the plate or by making healthier foods easier to select and consume.

In their article "Nudging – A promising tool for sustainable consumption behaviour?" Vandenbroele et al. (2019) refer to the same two Cognitive and Affective orientation nudges in terms of label-signifiers. The first is the Cognitively oriented with the subcategories: Descriptive labeling, Evaluative labeling, Visibility enhancements. The other is the Affectively oriented with the subcategories: Hedonic enhancements, Vision, Taste, Audition, Olfaction, and Social influences. They emphasize that there is a lack of knowledge of the effect of nudges in other cultures because most studies were conducted in highly developed western societies. They state that conditions of cognitive processes in different contexts should also be taken into account when designing interventions. They emphasize that a framework for designing sustainable food choices has not been published yet, as far as they know Vandenbroele et al. (2019).

2.5.2 Selection of nudges

A relevant nudge mechanism for this project is "Language and signage design" - 'stimulus response compatibility'. This refers to the degree to which something is designed effectively so that the design helps to understand and respond to it in the best possible way. A classic example is red representing 'stop' and green 'walk'. "Eco-labelling" is a relative widely used tool to convey information about sustainability in food. Another popular suggestion discussed the use of a "traffic light system" in packaging design as dissemination tool for framing consumer decisions in line with learned knowledge about traffic lights (red is bad, green is good i.e.) (Sacks, Rayner and Swinburn, 2009). Findings from small-scale studies in controlled environments have proved a large impact using such signifiers. However, more research is needed to investigate the impact, and it may vary for different segments of society and cultures (Thaler and Sunstein, 2009). Food labelling provides an opportunity for information on key characteristics of food items, thereby potentially driving more sustainable food choices or demands. In their review Tobi et a. (2019) explores how consumers value different elements of sustainable diets. They found that consumers valued attributes that were combined more than isolated attributes, and a positive attitude towards social and environmental responsibility food labelling schemes. They conclude that there are opportunities for combination labeling and that a mix of sustainable dietary attributes seem to be effective (Tobi et al., 2019).

Another relevant nudge mechanism is Simplification and framing of information. This is applied by providing simplified information and signifiers to the consumer. Simplification means that information is simplified and presented in a way that is adapted to the information processing possibilities and decision-making processes of the individual (Johnson et al., 2012). According to Fogg simplicity changes behavior (Fogg, 2009) Framing is the formulation of information that leads to the activation of certain values and attitudes in individuals.

Framing is a powerful nudge that must be used with caution. People may respond differently to the same question depending on how it is formulated and presented. The nature of the question changes and can lead to positive or negative perceptions, different associations or ways of distorting to what extent something is unattractive or attractive (Thaler and Sunstein, 2009). Framing is the presentation or orientation of information that alters its perceived nature. This includes positive/negative accentuation, association or many other ways of distorting the attractiveness/ unattractiveness of something (Performance and Theory, 2020). The nudges simplification and framing are often seen used simultaneously.

Relevance is a third nudge mechanism which refers to how well the respondent's personal needs, situation, and self-image correspond to an intervention. Instinctively, people judge whether they feel comfortable or whether it is appropriate when given a signal and ask if it is relevant to them. If it is not perceived as relevant, the likelihood is that they will act on it.

Finally, relevant to use is the nudge mechanism "Conforming – following the herd and social influences". This is a social proof heuristic and refers to the "fact" that people are easily affected by what other people do. Conformity relates to people's need for affirmation and belonging, on top of the fear of isolation and exclusion from the group. The effect is further enhanced through social media and the internet, as well as by cultural factors.

Social influences are divided into two groups. The first is information. If many believe the same about that information, it conveys that this is correct and what one should consider, do or think. The others include peer pressure and whether you care about what people think about you. In a case like this, you might "go with the crowd" to "avoid their wrath or curry their favor" (Thaler and Sunstein, 2009).

3 Methodology

3.1 Segmentation for sustainable food consumer behavior

3.1.1 Segmentation model

To identify purchasing behavior to define potential sustainable consumer segments, theory of segmentation strategy and purpose was studied. This to understand which classifying segmentation variables and motivational factors for decision-making processes to include as determinants in a segmentation model. Based on insight from existing theory the construction of a segmentation model was developed.

The first step to was study theory on traditional marketing and strategic approaches to segmentation, before determinants and classification variables was evaluated and selected. The goal of this research was to accumulate knowledge about consumer segmentation to understand how to develop a segmentation behavior model and which variables and driving factors for behavior to include in such a model to make it an effective tool for defining segments of potentially sustainable food consumers.

"*Market Segmentation can be defined as the process of dividing a market into distinct subsets of consumers with common needs or characteristics and selecting one or more segments to target with a distinct marketing mix"* (Mobach, 2007).

Segmentation is the process of breaking down the intended market into manageable groups. Segmentation is a market strategy that involves dividing a market into submarkets of consumers who have common needs and priorities, and then develop and implement strategies for communication and influence. To use segmentation for defining what type of consumer to promote sustainability benefits of consuming sustainable food to, was important.

Next, literature about sustainability consumption was further used as sources to identify which determinants would be beneficial to include in the sustainability segmentation behavior model. The purpose was to understand how to develop a suitable segmentation model and use it to identify and define protentional sustainable consumer segments and their purchasing behavior. This to be able to justify the choices of nudge strategies and design suggested to influence a potential sustainable consumer segment towards sustainable purchasing behavior.

A large number of determinants and variables may be used to divide consumer into homogenous groups. Before the creation of the segmentation model, pros and cons of potential determinants to potentially include and relevance for use was studied. This to understand which individual characteristics, attitudes and factors are potential drivers for influencing sustainable food purchasing behavior. The goal was to identify the most significant determinants possible to use to establish potential sustainable consumer segments based on their behavior, and finally use it as foundation for developing nudge strategies and nudge intervention designs.

3.1.2 Segmentation variables sustainable food consumer

To be able to define consumer segments in terms of sustainable food, who to target, what relevant models exists possible to use and which potential determinants to incorporate in a sustainability behavior model had to be investigated.

The motives behind consumers' food choices are important to understand in order to provide targeted nudge communication to different consumer segments. A simple definition of and a one-size-fits-all communication solution was insufficient because consumers must be viewed as a spectrum of consumers with different needs.

To understand how to directly influence efforts to consumers with differing values, attitudes, food lifestyles and decision-making behavior, it was important to define homogenous consumer groups by segmenting consumers into different clusters with common characteristics to whom nudge strategies developed and design in the project could appeal to.

The method used to understand this was to study theory and existing research on segmentation for sustainable consumption, identify what type of variables which usually were included av classification variables, and which to possibly include in a segmentation model in terms of sustainable food consumption (Appendix 2) in order to defend the choice of different nudge strategies for potential user segments.

A selection of determinants for sustainable consumption was identified, adopted and combined to form a basic construction for the segmentation behavior model for developing potential sustainable consumer segments.

When the sustainability segmentation behavior model was constructed (Appendix 2), insight on consumer behavior and motivation from theory and literature was next extracted, sorted and implemented into the segmentation model, each underneath the five determinants suggested for classifying potential sustainable consumers. Finally, by utilizing this instrument, three relevant potential sustainable consumer segments based on motivation for behavior and decision-making were possible to identify and select.

3.2 Consumer segments and profiles

To answer the research question about which components of consumer purchasing behavior is most beneficial to use to develop effective nudge strategies, a deeper understanding was needed about who the potential sustainable consumer people are, how they make purchasing decisions and who and what they are influenced by.

The first method used to get this understanding was to analyze and extract insight on consumer behavior and motivation from theory and literature. The second method used was to implement this insight about purchasing behavior and motivation of sustainable consumers into the segmentation model under the relevant determinants suggested used to classify potential sustainable consumer segments (Appendix 2).

The segmentation model with its determinants of potential sustainable purchasing behavior was thus used as a tool to identify individual differences between food consumers as a basis for developing different sustainable food consumer profiles. Further, based on this, develop relevant strategic solutions for each consumer segment to promote food sustainability to influence towards sustainable food purchasing behavior.

3.2.1 Potentially sustainability consumer segments

A study of existing literature and research on the topics sustainable consumer behavior and motivation were conducted to look for typical characteristics of these segments. This to be able to analyze and determine which of these segments had the greatest potential to be influenced by nudge interventions to promote sustainable food consumption.

By using the segmentation model and framework for identifying different consumer behavior (Appendix 2), three potential sustainable consumer segments were developed based on motivation for sustainable consumer purchasing behavior in my research study and defined by my segmentation work.

These new potential sustainable consumer segments were defined by the five selected determinants of personality and purchasing behavior defined by the segmentation model. These five determinants and classification variables defined key characteristics, behavior and decision-making patterns typical for each segment in terms of potential sustainable food consumption.

Finally, a framework for humanizing and visualizing the behavior in the consumer segments was created (Appendix 3). The most prominent characteristics in each segment was incorporated as well as the proposed strategic directions based on the results of different purchasing behavior generated by the segmentation model.

Hand drawn illustrations was used to represent individuals in the three consumer segments. The software Adobe InDesign was used to create the consumer segment profile framework.

3.3 Nudge strategy and design

To answer the questions about which nudge mechanisms would be best suited for developing relevant strategies for the segments, and how to frame and present information and design to provide the support they need to make decisions, a design method was used.

The design method "The digital nudge cycle" by (Datta and Mullainathan, 2014; Ly et al., 2015) was used to develop nudge strategies and design. This method is much like the well-established four-step design model "Double Diamond" developed by the British Design Council in 2005. The difference is that the key questions asked in this design process was better suited to provide the answers needed to develop proper nudge strategies and designs aimed at the defined potential sustainable consumers.

The design method was adapted for this master project, and to answer suggested key questions in the first three steps 1. Define the goal, 2. Understand the user and 3. Design the Nudge in the design process was chosen. Step 4. Test the nudge was excluded due to the limited time and scope of this master project.

The first task in using the modified version of the design method, was to define the overall goal of the nudge design. The overall goal was to establish nudge strategies defended by insight from the segmentation model, and design nudge interventions targeted at potential sustainable consumer segments which purpose was to inspire to sustainable food purchasing behavior.

The second the task was to ask questions about who the potential sustainable consumers in each of the three segments are in terms of personality, their unmet needs, what type of decision-making process they use and what heuristics might influence their choices.

The questions were answered by analyzing insights from existing theory and research and implemented in the segmentation model designed to define potential sustainable consumer segments. This tool made it possible to identify personality characteristics and patterns of decision-making and buying behavior which were further used to develop differentiated strategies for these segments.

The third task was to ask what types of nudges would counter or increase the influence of biases, what nudges could influence the consumers choices, what strategies to choose and how to design nudges based on that strategy.

3.3.1 Nudge strategies

The results from the segmentation model defined sustainable consumer segments and their motivation for sustainable behavior. This insight was used as a foundation for different and potential strategic directions. One strategy direction for nudge design could be to emphasize sustainability benefits by eating certain foods, such as and environmental and animal welfare, and social justice. Another strategy direction could be to assess the health benefits of sustainable foods emphasize the added value or grasp the notion that it is.

As a guideline for creating potential strategies, the method POV (point of views) was used to create problem statements using the "How might we" technique (Dam and Siang, 2019). Results from the segmentation model was analyzed, which problems to address was identified and this used to solve the strategy challenge in a goal-oriented manner with a focus on the consumers (descriptive), their needs (verb) and insight (because). The goal was to develop three problem statements each reflecting values, attitudes or feelings of the potentially sustainable consumers.

Some key questions asked was:
What do they need to buy sustainable food products?
Why don't people buy sustainable food products?
Why do they buy sustainable food products?
How do we motivate people to buy sustainable food consumption?
How do we promote sustainability to the segments visually and verbally?
How do we frame one and the same sustainability message to three potentially sustainable food consumers based on their difference in values, attitudes, interests, motivations and knowledge?

Three fundamentally different hypothetical strategies which support behavior of three segments were developed based on results from my segmentation work and related insight. A combination of existing theories was used to construct the strategies to use for each segment to design nudges interventions or sustainability label-signifiers.

3.3.2 Nudge design

Once the strategies for each segment was developed, and the goals, motivations, heuristics and biases and decision-making processes of each segment was defined, they were used as a guideline for the creation of three sustainability label-signifier designs.

Relevant nudge mechanisms proven by research to be effective for influencing sustainable food consumption behavior was studied, analyzed and selected to support these strategies. Based on this insight three different prototypes of sustainability label-signifiers were designed, which reflect and support the hypothetical strategies for the segments.

The goal of the sustainability label-signifiers design proposed in this thesis was to counter or influence consumers biases and choices and thus aid and inspire to make healthier, sustainable or conscious choices in the decision-making process.

The sustainability label-signifiers were created with textual information and modified existing graphical elements downloaded from online image databases. Three design solutions for sustainability label-signifiers were finally designed in the software Adobe InDesign. Several design solutions were implemented and justified until a selection of three was finalized (see chapter 4.4.2).

4 Results and Discussion

4.1 Process model

A process model was created to get a clear idea of the process and the components which had to be included for developing potential sustainable consumer behavior, segments and strategies (Appendix 1). The process consisted of four steps. In step one (1) the determinant variables were defined, and in step two (2) the individual differences, motivation and purchasing behavior in terms of sustainable food consumption was analyzed and extracted. In step three (3) potential sustainable consumer segments was defined, and in step four (4), nudge strategies for each of the consumer segments was created.
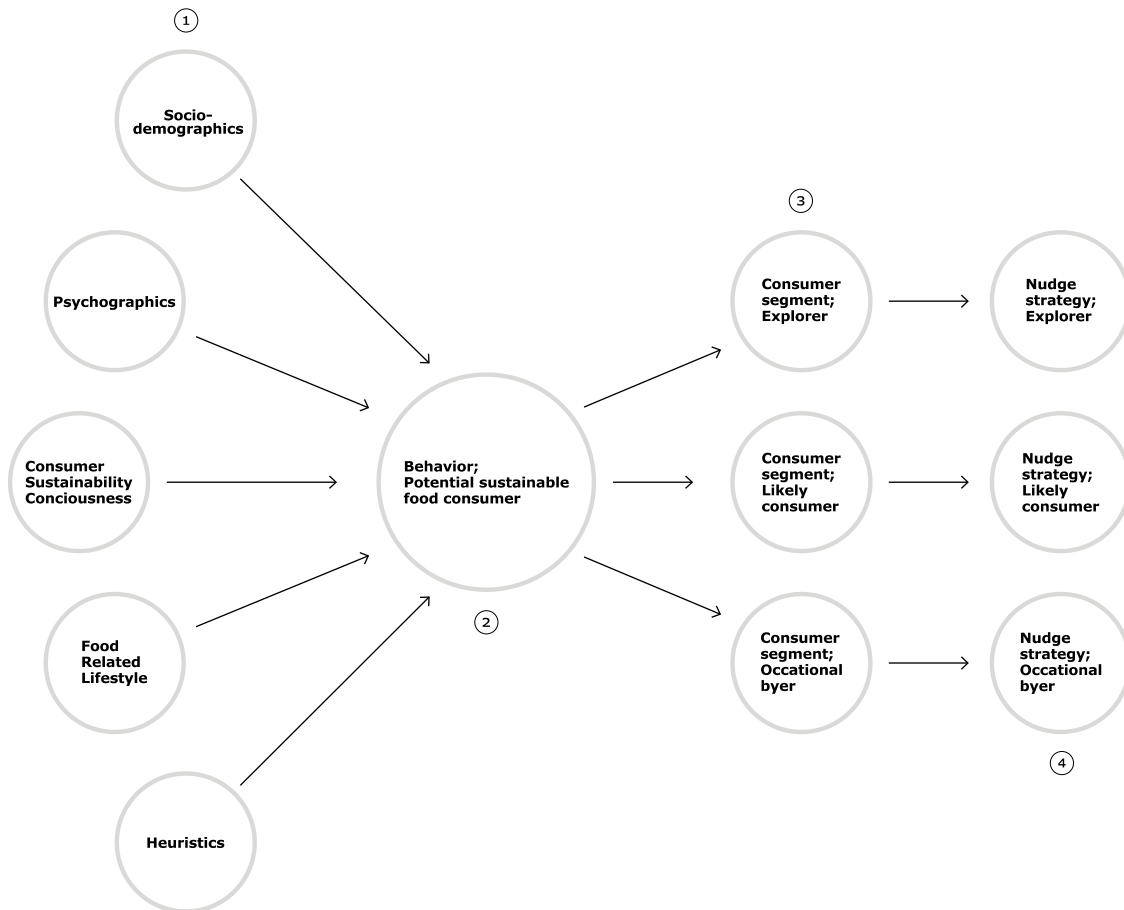
Figure 4.1: Process model.

The figure illustrates the four-step process and how the various variables determine motivation and purchasing behavior which further define consumer segments and thus form the basis for and justify the selection of nudge strategies.

4.2 Segmentation for sustainable food consumer behavior

4.2.1 Segmentation model

The segmentation model was created as a tool to be able to identify individual differences between food consumers in terms of sustainability, and how it has consequences for which nudge strategies will possibly work and why (see table 4.1). This model was created based on analysis of theories by Schwartz (1992), Grunert, Brunso and Bisp (1993) and (Stern, 2000), and reports by Yadav *et al.* (2020), De Carvalho, Salgueiro and Rita (2015) and Joshi and Rahman (2015).

Insights from this study were used in combination to create the framework for the sustainability model and a basis for deciding which determinants a segmentation model should include in order to define a potential sustainable consumer segment.

The most commonly used determinants used to classify segments are demographics (e.g. age, ethnicity, gender, family structure, income (Solomon, Russell-Bennett and Previtte, 2014) Psychographics (e.g. values, internal motivation) and behavior (e.g. needs, benefits, attitude, loyalty status, brand familiarity, occasion, type of problem solving needed or information required).

The segmentation model is constructed by combining psychosocial variables and other relevant influencing factors found to be linked to sustainability behavior throughout my study. The sustainability segmentation behavior model was as a result, used to define protentional sustainable consumer segments and their food purchasing behavior, which thus justifies the choice of (three) nudge strategies.

The sustainability food consumer segmentation model has distinct features designed for use in the thesis. The model is split in five types of determinants for sustainable consumer behavior hereunder socio-demographics, and internal and external variables of influencing variables and factors.

The five determinants used to classify potential sustainability consumers are Socio-demographics (S), Psychographics (P), Consumer Sustainability Consciousness (CSC), Food-Related Lifestyles (FRL) and Heuristics (H). These classifying features define the construct of the segmentation model for behavior.

The first determinant used to classify consumers is Socio-demographics. Socio-demographics refer to who the customer is. Socio-demographics characteristics included are variables such as generation, family structure, occupation and education. Generational characteristics opened up the possibility of assessing how each generation can consume and buy food, and what characterizes each generation. This in combination with family structure, education and occupation gave the determinant demographics variables that together could define clear segments and flexibility.

The second determinant used to classify potentially sustainable consumers is Psychographics. Psychographics refers to why they buy. Psychographic characteristics included internal variables such as Schwartz (1992) human values and emotion to describe personality characteristics. Values motivate to take action, provide direction and intensity to emotion. Values *serve as guiding principles in people's life"* (Schwartz, 1992) and are found to be rather stable predictors and guides of a wide range of environmentally significant behaviors (Poortinga and Darnton, 2016), (Azzurra, Massimiliano and Angela, 2019). Values as classification variable was thus relevant to include in the segmentation model. The four categories of values found most relevant for

classifying potentially sustainable consumers was "Openness to change", "Self-enhancement". "Conservation" and "Self-transcendence" (Schwartz, 2012).

Further, three more determinants were used to classify consumers food-related behavior. Behavioral segmentation divides consumers based on how and why they use products (Lawley, 2011). Consumers often buy the same products for different reasons and use them in different ways. For example, two people might buy fruit for different purposes. One might buy the fruit to pack in their child's lunchbox and to be eaten as an after-school snack, whilst another person might buy fruit to make smoothies to align with their busy lifestyle. Similarly, some consumers may buy soup to use as a meal while others may buy the soup to use as an ingredient in another dish. Thus, it is important to know how consumers use a product.

The third determinant used to classify consumers was the five dimensional Consumer Sustainability Consciousness (CSC) construct developed by (De Carvalho, Salgueiro and Rita, 2015). Classifying consumers according to their sustainability awareness opens up for better insight into what the driving forces behind a conscious consumption of sustainable foods are. According to (De Carvalho, Salgueiro and Rita, 2015) there are various factors that contribute to awareness of consumers that make them start thinking about consuming sustainable or socially responsible products. Consumer Sustainability Consciousness construct involves five dimensions of potential influential factors. All but one of the five was found most relevant to include in this project is "Sense of Retribution", "Access to Information", "Labelling and Peer Pressure" and "Health issues", all described previously (see chapter 2.3.2).

Third fourth determinant is used classify consumers is by the Food-Related Lifestyle (FRL) instrument. The Food-Related Lifestyle instrument groups consumers based on their attitudes toward the purchase, shopping and cooking methods, quality aspects of food such as health, price, freshness and tastiness, consumption situations and purchasing motives. The goal of using Food-Related Lifestyle as a classification variable is to try to characterize consumers according to how they use and eat food to achieve values in life (Grunert *et al.*, 2011)*.* The Food-Related Lifestyle was originally developed by Grunert first introduced in the mid-1990s (Grunert, Brunso and Bisp, 1997). Since then it has been a leading tool used for segmentation in the food domain (Grunert et al., 2011). Lifestyles related to consumption are defined by Grunert et al. (1993) as *"the system of cognitive categories, scripts, and their associations, that relate a set of products to a set of values"* (Grunert, Brunso and Bisp, 1993). The purpose of including Food-Related Lifestyle as one of five important determinants in the segmentation model, was to generate data which allow deeper understanding of consumer behavior with regard to how they employ food products to attain life values (Reid, Li and Bruwer, 2008).

The fifth determinant is used to classify consumer by based on their heuristics and cognitive influences. Heuristics influences human behavior and is described as a mental process people use to solve problems and make judgments quickly and efficiently (Kahneman, 2011). Heuristic rule-of-thumb strategies are used to speed up the process of finding a pleasing solution referred to as "mental shortcuts" that ease the cognitive load of making a decision (Kahneman, 2011).

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The five determinants and dimensions hereunder, which are used to define segments and motivational determinants for sustainable food consumer decision-making behavior, is presented in table 4.1.

Segmentation model				
Motivational determinants for sustainable food consumer decision-making behavior				
Socio-demographics Generational Family structure Education Occupation	**Psychographics** Personality Values Emotional attitude	**Consumer Sustainability Consciousness** Attitudes Knowledge	**Food-Related Lifestyle** Contextual	**Heuristics** Cognitive stimuli Affective stimuli *(Types of Nudges to reduce mental effort needed to make a decision)*
S1. Generation Z (1995+) (G-Z) S2. Generation X, Y (1965-1994) (XY) S3. Baby Boomers (1946-1964) (BB) S4. Single (S) S5. Family w/Kids (FK) S6. Out of Nest (ON) S7. Student (ST) S8. Higher Education (HE) S9. Specialized Profession (SP)	P1. Openness to change (OC) P2. Self-enhancement (SE) P3. Self-transcendence (ST) P5. Responsible (RE) P6. Open minded (OM) P7. Skeptical (SK)	CSC1. Sense of Retribution (SR) CSC2. Access to Information (AI) CSC3. Labelling and Peer Pressure (LPP) CSC4. Health issues (HLT)	FRL1. Ways of Shopping (FRL1.WS) FRL2. Cooking Methods (CM) FRL3. Quality Aspects (QA) FRL4. Consumption Situations (CS) FRL5. Purchasing Motives (PM)	H1. Automatic (SYS1) H2. Reflective (SYS2) H3. Language and Signage Design (LSD) H4. Simplification and Framing of Information (SFI) H5. Use of Social Norms (USN). H6. Hedonic Enhancements (HE)
Behavior potential sustainable consumer segments: Three segments				
"Explorer»		"Likely consumer"		"Occasional buyer"

Table 4.1: Segmentation model for potential sustainable food consumer behavior.

4.3 Consumer segments in terms of sustainability

4.3.1 Potentially sustainability consumer segments

Three primary sustainable consumer segments were identified in the work of (Young *et al.*, 2010) and (Verain *et al.*, 2012). They were "Green" consumer, "Potential green" consumer, "Non-green" consumer. The findings of the analysis were unambiguous and indicated that the segment "potential green" was most interesting to further develop. The segment "Potential green" (Verain *et al.*, 2012) was selected to further modify into a "potential sustainable consumer segment".

Next, three additional potential sustainable sub-segments were discovered in the work of Chryssohoidis and Krystallis (2005), Gil et al. (2000), and Grunert and Juhl (1995) D'Souza et al. (2006). They were "Explorer", "Likely consumer" and "Occasional buyer".

These terms were adopted, and further developed into three new potential sustainable consumer segments based on the result generated by utilizing the segmentation model with insight from the work of Yadav et al. (2020), Mostafa (2009) and Joshi and Rahman (2015) which study segmentation for sustainable consumption, and motivation for sustainable consumer behavior.

These descriptions were adopted, each to represent three new potential sustainable consumer segments. These segments were further modified and developed into three new potential sustainable consumer segments.

The final creation of the "potential sustainable consumer segments": "Explorer", "Likely consumer" and "Occasional buyer" was defined by the results of the segmentation work generated by the five determinants of personality and purchasing behavior in the sustainability consumer segmentation model*.

These determinants defined the key characteristics, behavior and decision-making patterns typical for each segment in terms of potential sustainable food consumption.

The "Explorer" (Fig. 4.2), the first potential sustainable consumer segment, represent people in generation Z, Millennials (born 1995+). This generation "live their lives" through social media and heavily influenced by friends and society, as well as being exposed to a wide variety of food types and "healthy-food" trends.

The motivational human value type "Openness to change" (Schwartz, 1992) is representative for consumers in this segment and may be recognized by valuing stimulation, curiosity, excitement and challenge in life. Also, excitement, challenge in life characterize this segment.

The "Explorer" value self-respect and pay attention to own health when learned about chemicals in food and think ecological food is safe and healthy. They rely on advice from friends, specialists and product information. The "Explorer" enjoy purchasing food on impulse, and when cooking for self or friends, they like to experiment. Motivating buying motives are self-respect through healthy hedonism, and they purchase food to maintain a healthy diet to feel good about themself and their health.

Furthermore, they find that studying labels to find out if foods are safe to eat is time consuming, strenuous and frustrating. These *key* characteristics of the "Explorer" define behavior and purchase decision-making and the motivational attitude *"Good for me – good for the planet"* (De Carvalho, Salgueiro and Rita, 2015), and are used to guide strategic direction for this segment.

Potential sustainable consumer profile representing the segment "Explorer".

Martin, 26: "Explorer"

"I purchase food to maintain a healthy diet to feel good about my health and myself".

Frustration

Time consuming and hard to know or understand wether a food products if safe to eat. Studying labels are time consuming and straining to interpret.

Heutristics

Decision-making: Automatic. Emotional, spontaneous and intuitive.

Influences: Hedonic enhancements. Use of social norms

Motivations

Sustainability Conciousness: Started paying attention to own health when learned about chemicals in food through media and friends. Think ecological food is safer and healthier. Rely on advice from friends and specialists.

Ways of shopping: Enjoy shopping food, impulse buys. Perceived health benefits of food guides purchasing behavior.

Cooking method: Creative. Into all kinds of food (Thai, Mexican, Indian, etc.)

Quality aspects: Healthy and safe diet is important. Worry about chemicals. Frequnt buyer of organic food, think it is healthier than conventional food.

Consumption situations: Enjoy trying new types of food when dining with friends.

Purchasing motives: Self-respect; healthy hedonism and social events.

Key characteristics

Generation: Z. Millennial

Family structure: Single

Education: Student, Sport Science NTNU.

Values: Openness to change. Self-respect; Healthy hedonism. Spontaneous, exploring. Value excitement and challenge in life. Social "Busy bee".

Emotion: Open minded

Attitude: "Good for me – good for the planet."

Strategy nudge interventions

Orientation: Affective

Trigger: Facilitator. ("It's easy). Increase ability by simplification.

Evaluative labelling: Visual enhancement, color-coding: Heuristic reference traffic-lights; green "go", yellow "pause" red "stop".

Sustainability discriptive labelling: "Most", "Partly", "Least" sustainable. "Sustainabiliy-calls"; Animal welfare, environmental welfare, social justice.

Simplification and Framing: Textual message: Healthy hedonistic angle; *"When you care about your health".*

Graphical symbol: Smiley

Figure 4.2: Consumer segment profile: "Explorer".

The "Likely consumer" (Fig. 4.3), the second potential sustainable consumer segment, represent people in generation X and Y and is born between 1965-1994. This generation grew up being exposed to cuisines from all corners of the world and access to a wider variety of food untraditional food than previous generations.

The motivational human value type Self-transcendence (Schwartz, 1992) is representative for this segment and is recognized by altruistic values such as Universalism and Benevolence. These consumers are down to earth, understanding and respect and value protection for the welfare of all people, nature and their "tribe".

They are aware of negative consequences of unsustainable consumption habits and its impact on environmental and social problems. They typically seek to obtain a high quality and sustainable diet, and are guided by eco-labels, and purchases are often driven by passion before price. They enjoy shopping at specialty food markets because it may be challenging to find foods that both meet their own quality requirements that also support sustainability in conventional grocery stores.

Motivational buying motives are self-fulfillment through their passion for cooking and they look for qualities of "naturalness" in food which is in line with their pro environmental and ethical beliefs, in addition to the need to cultivate family and social relationships.

These key characteristics of the Likely consumer define behavior and purchase decision-making and the motivational attitude *"Do your bit"* (De Carvalho, Salgueiro and Rita, 2015) are used to guide strategic direction for this segment.

Potential sustainable consumer profile for the segment "Likely consumer".

Hanna, 38: "Likely consumer"

"I look for qualities in food which is line with with my pro-environmental and ethical beliefs."

Frustration

Find it somewhat challenging to find food products that both meet requirements of quality requirements and sustainability in-line with personal believes.

Heutristics

Decision-making: Automatic; Intuitive and unconcious. Reflective; Analytical, conscious and rational.

Influences: Atruistic values, facts and logic. Stimulus-response compatibility

Motivations

Sustainability Conciousness: Aware of negative consequences of unsustainable consumption habits and its impact on environmental and social problems. Will change habits in line with more knowledge.

Ways of shopping: Passion purchases before price. Guided by eco-labels. Enjoy shopping at specialty food markets.

Cooking method: Love cooking with family and friends.

Quality aspects: Novelty, naturalness and freshness are important qualities, before price. Positive attitudes towards organic food products.

Consumption situations: Consider type of food every meal, including casual dinners with family and friends.

Purchasing motives: Self-fulfilment in food (passion, quality; naturalness). Supporting family and social relationships. Environmental conservation.

Key characteristics

Generation: Y

Family structure: Married, two kids.

Occupation: Interiour Architect

Values: Universalism and Benevolence. Understanding, appreciation and protection for the welfare of all people and for nature, and the "tribe" (friends).

Emotion: Passionate and responsible (heart & mind)

Attitude: Down to earth. Independent thinker, obligated to "Do her bit."

Strategy nudge interventions

Orientation: Affective and Cognitive

Trigger: Signal ("Do it now"-reminder). Support high motivation and ability.

Evaluative labelling: Visual enhancement by color-coding. Heuristic reference traffic-lights; green "go", yellow "pause" red "stop".

Sustainability discriptive labelling: "Most", "Partly", "Least" sustainable. "Sustainabiliy-calls"; Animal welfare, environmental welfare, social justice.

Simplification and Framing: Textual message: Responsible angle. "When you also care about consequences of what you eat".

Graphical symbol: Globe

Figure 4.3: Consumer segment profile: "Likely consumer".

The "Occasional buyer"(Fig. 4.4), the third potential sustainable consumer segment represent people in the generation named Baby Boomers and is born between 1946-1964. This generation grew up during conservative time in terms of food when a meal should consist of "one type of meat and four vegetables".

The motivational human value type is Self-enhancement (Schwartz, 1992) is representative for this segment and is recognized by values such as hedonism, self-centered satisfaction and fulfillment through habits.

This generation would have grown up children, and thus more money to spend on food purchases. However, within the scope of this project, this segment is defined as price-sensitive, usually guided by shopping lists, but as occasionally byers organic food with some predispositions to the concept "sustainable" food.

The "Occasional byer" make decisions based on careful consideration and study labels to disprove skepticism if they find it relevant, to be sure that the high price of "sustainable" food is defended. Consumers in this segment is cooking for convenience but consider alternative of food for traditional events.

Motivational buying motives are self-indulgence to satisfy the need and desire for good taste in food, and they look for information which confirm that sustainable food is worth the money. These key characteristics of the Occasional consumer define behavior and purchase decision-making and the motivational attitude *"Give me a reason"* (De Carvalho, Salgueiro and Rita, 2015).

Potential sustainable consumer profile representing the segment "Occasional byer".

Jonas, 57: Occasional buyer

"I buy food I know or think tastes good with a look at the relationship between price and benefit".

Frustration

Think it is hard to defend the high price of "sustainable" food vs. benefit. Unsure if it is worth the price. Needs convinsing and confirmation.

Heutristics

Decision-making: Reflective. Analytical, conscious and rational.

Influences: Familiarity in taste, habits and brands. Produkt information, facts and logic.

Motivations

Sustainability conciousness: Personal predispositions to the concept "sustainable" food, partly distrustful eco-labels, but reads labels if he think it is relevant to be disproved.

Ways of shopping: Shopping list, planner, careful consideration, "one-stop". Buy organic food products occasionally, price criterion vs. value when purchasing organic (or food with sustainability attributes).

Cooking Method: Convenience.

Quality Aspects: Familiarity, food habits and taste are important.

Consumption Situations: Consider type of food when special or social event (holidays, vacation, traditon).

Purchasing Motives: Big spender, but aim for "value for money". Self-indulgence, seeking pleasure.

Key characteristics

Generation: Baby Boomer.

Family structure: Married, «out of nest».

Occupation: Appraiser, self-employed.

Values: Self-enhancement. Achievement and Hedonism, pleasure in eating and familiarity in taste. Value a price-quality relationship in food and cultural customs.

Emotion: Skepticism (distrust)

Attitude: Is aware of environmental risks, reads but distrust eco-labels. "Give me a reason."

Strategy nudge interventions

Orientation: Cognitive

Trigger: Spark ("Do it because"). Increase motivation by reasoning.

Evaluative labelling: Visual enhancement by color-coding. Heuristic reference traffic-lights; green "go", yellow "pause" red "stop".

Sustainability discriptive labelling: "Most", "Partly", "Least" sustainable. "Sustainabiliy-calls"; Animal welfare, environmental welfare, social justice.

Simplification and Framing: Textual message: "When you want good reason".

Graphical symbol: Chart diagram

Figure 4.4: Consumer segment profile: "Occasional byer".

Based on the characteristics of each segment, the consumer profiles were created to make people in these segments more realistic as a tool to create relevant nudge strategies and later design. The consumer segment profiles also include key components which the suggested strategic solutions are composed by.

4.4 Nudge strategies and design

4.4.1 Nudge strategies

Nudge strategies was created based the results on behavior from the segmentation model for potentially sustainable consumer. To define potential strategies most prominent determinants of food purchasing behavior was identified and combined with theory from the books Thinking, Fast and Slow by Kahneman, (2011) and Nudge by Thaler and Sunstein (2008), theory on behavior change by Fogg (2019), and the work of Lehner, Mont and Heiskanen (2016), Vandenbroele *et al.* (2019) and Joshi and Rahman (2015). The results generated by using the segmentation model, provided guidelines for which elements in consumer behavior, purchasing motivation and decision-making processes could be included as components for constructing strategies.

Three problem statements were created by using the method POV (point of views) and the "How might we" technique (Dam and Siang, 2019), which each reflect values, attitudes or feelings and needs of the potentially sustainable consumers:

"Explorer", health-conscious individuals into new, exciting food and having a fun time and dinners with friends, needs an easy way to be able to sustain a healthy and safe diet, because they worry about chemicals in food and cares about their own health.

"Likely consumer", caring, down-to-earth, family- and family-oriented individuals, need to maintain their passion for naturalness in food and be able to make responsible food purchases which both meet desired food quality requirements and sustainability benefits.

"Occasional byer", hedonistic, satisfaction seeking, sceptic and into food familiarity need convincing information about food sustainability which confirm that this type of food is worth the money.

These power statements were next used to create three hypothetical strategies were, one for each segment.

The strategies are constructed by three components: 1) The level of motivation for purchasing behavior based on values, attitudes and food-related lifestyle, 2) How consumers think, their processing style for decision-making and triggers, and 3) Types of nudge mechanisms used to influence food consumption.

The first component refers to the three types of triggers "Facilitator", "Signal" and "Spark" defined by Fogg, (2009) and used is included as tools to influence motivation for the desired behavior. One of these triggers is included in each strategy and aims to correlate with values that represent the individual consumer profile and the level of sustainability-consumption motivation.

The second component (2) is based on the two modes of thought "System 1" (Automatic) which is fast, instinctive and emotional, and "System 2" (Reflective) which is slower, more deliberative, and more logical (Kahneman, 2011). These systems work both differently and accordingly in terms of processing information to make decisions. As described before, the Automatic works unconsciously and intuitively and are influenced by experiences, emotions and memories. The Reflective system works conscious, reflective and rationally and are influenced by facts, logic and evidence. Based on this knowledge, the strategies are framed to meet consumers in the segments' non-rational and rational motivations associated with each type of thinking processes, which either are used separately or complement one another.

The third (3) component included refers to nudge mechanisms that can be used to potentially affect sustainable food consumption. Two nudge mechanisms are chosen as instruments to support heuristics used by potential sustainable food consumers, which in the work of Lehner, Mont and Heiskanen (2016) have been proven to be effective in influencing sustainable food behavior.

The first nudge mechanism selected to include is "Language and signage design" - 'stimulus-response compatibility' which is about how something is designed to help us understand so that we respond in the best possible way. Relevant to design in the context of this project was "label-signifiers" to promote to what degree a food product is sustainable.

There are two main categories of label-signifiers. One is cognitively oriented interventions and with the subcategories: evaluative labelling, sustainability descriptive labelling and visibility enhancements. The other is affectively oriented interventions with the subcategories: Hedonic enhancements, Vision and Social influences. Both of these two categories of label-signifiers orientations were found relevant to use.

The second nudge mechanism selected to include is "Simplification and framing of information". Simplification means that information is simplified and presented in a way that is adapted to the information processing possibilities and decision-making processes of the individual (Johnson et al., 2012). Framing is the formulation of information which leads to activation of certain values and attitudes in individuals (Lehner, Mont and Heiskanen, 2016). Framing was used as a tool to activate specific values and attitudes in consumer in the segments by conscious formulation of the messages in the labels to make them relevant.

A synthesis of the insight and components described above resulted in me concluding with the following three hypothetical strategies:

1. Strategy (hypothesis) "Explorer": This segment, with high motivation but low ability needs a Facilitator trigger, and with an automatic processing style, need an Affectively oriented label-signifier with information framed with a hedonic enhancement emphasizing the health aspect of a sustainable diet aimed at influencing decision-making emotionally will be most effective. This in combination with a cognitive oriented label-signifier with sustainability descriptive labelling (Liem et al., 2018), evaluative labelling with visual enhancement by the use of a traffic-light metaphor representing the level of sustainability; green (most), yellow (partly) and red (least.

Message: "When you care about your health".
Appeal to healthy hedonism: "Good for me – good for the planet".

2. Strategy (hypothesis) "Likely consumer": This segment, with both high motivation but high ability needs a Signal trigger, and with both an automatic and reflective processing style, an Affectively oriented label-signifier framed with altruistic enhancement which correlate quality and sustainability aimed at influencing decision making both emotionally and rationally will be most effective. This in combination with a Cognitive oriented label-signifier with sustainability descriptive labelling, evaluative labelling with visual enhancement by the use of a traffic-light metaphor representing the level of sustainability; green (most), yellow (partly) and red (least).

Message: "When you also care about consequences of what you eat".
Appeal to the feeling of responsibility: "Do your bit".

3. Strategy (hypothesis) "Occasional buyer": This segment, with low motivation but high ability needs a Spark trigger, and with a reflective processing style, an Affectively oriented label-signifier framed with hedonic enhancement emphasizing a logical cue for value of sustainability in food aimed at influencing decision making rationally will work most effectively. This in combination with a Cognitive oriented label-signifier with sustainability descriptive labelling (Liem et al., 2018), evaluative labelling with visual enhancement by the use of a traffic-light metaphor representing the level of sustainability; green (most), yellow (partly) and red (least).

Message: "When you need a good reason"
Appeal to logic thinking; "Give me a reason".

Sustainability label-signifiers was next designed for each segment based on these three hypothetical strategies.

4.4.2 Nudge design – Sustainability label-signifiers

The three potential strategies were used as direction for the design of three types of proposed nudge interventions, a "sustainability label-signifier", which aims to encourage consumers to make sustainable food purchasing decisions.

The mantra throughout this project has been the quote *"Anything you can do will reduce cognitive strain will help"*, by Daniel Kahneman. This quote was used as a directional tool in the work of designing sustainability label-signifiers which might confirm the consumer's thoughts and feelings and make their decision process as simple and effortless as possible.

The strategy for the design of food sustainability label-signifier schemes was to combine a set of elements with communication attributes. The design of sustainability label-signifiers is constructed by combining four elements to promote food sustainability (Appendix 4).

The first element is a graphical image (1) with evaluative visual enhancement included to evoke associations and feelings. The second element is a textual message (2) included to appeal to different sets of values. The third is a sustainability evaluative textual element (3) and the fourth is (4) a sustainability descriptive textual element, both included to convey food sustainability calls (see figure 4.5).

Textual "Message"
Simplified and framed information.

②

"WHEN YOU CARE ABOUT YOUR HEALTH".

Graphical image, two attributes:

1. *Evaluative visual enhancement with color-coding: Green, yellow, red.*

①

MOST SUSTAINABLE ③ ← **Evaluative textual element** *Sustainable: Most, partly, least.*
Environmental welfare
Animal welfare
Social justice

2. *Simplified and framed signifier (symbol).*

④

Sustainability descriptive textual element
Environmetal welfare, Animal welfare, Social justice.

Figure 4.5: Wireframe illustrating the construction of a sustainability label-signifier.

This example is one of three possible sustainability label-signifiers suggested to use in the effort of trying to affect consumers in the segment Explorer in terms of food sustainability.
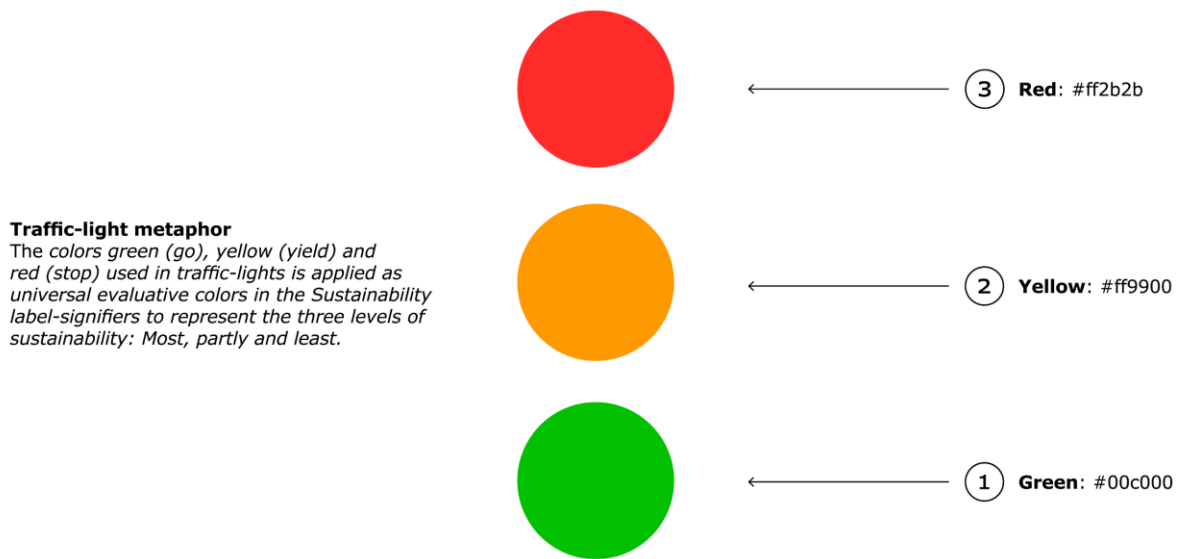
The graphical elements (images) were either downloaded from Flaticon (*Flaticon*, no date) and modified in Adobe Illustrator or created by using Glyphs from the typeface Webdings in Adobe InDesign and modified as well.

The universally understood palette used in traffic-lights green (go), yellow (caution/yield) and red (stop) was applied as the universal color palette in the nudge "wayfinding" Sustainability label-signifier design. This palette was established in the early twentieth century by the need of American traffic engineers for a standardized color-signal vocabulary.

The colors for the traffic-light metaphor were selected from the classic rainbow spectrum defined by Isaac Newtons (Gibson, 2009) by choosing two primary colors yellow and red, plus one secondary color green.

The sustainability labels are primarily meant to operate in digital environments, therefore to perform optimally on digital screens, the RGB color system was used to define the color codes in Hexadecimal (HEX)(*W3C Colour theory*, 2018).

The color-codes for the traffic-light (see fig. 4.6) are #00c000 (green), #ff9900 (yellow) and #ff2b2b (red). These three colors were used across the segments and applied in the textual messages tailored to each consumer segment and the graphical symbols.

Traffic-light metaphor
The *colors green (go), yellow (yield) and red (stop) used in traffic-lights is applied as universal evaluative colors in the Sustainability label-signifiers to represent the three levels of sustainability: Most, partly and least.*

③ **Red**: #ff2b2b

② **Yellow**: #ff9900

① **Green**: #00c000

Figure 4.6: Traffic-light colors applied to represent the level of food sustainability.

Green represents "most", yellow "partly" and red "least". The textual message targeting the different segments was written in the same colors green, yellow and red with the font face Acumin Variable Concept designed by Robert Slimbach and offered by Adobe Fonts as part of my Creative Cloud subscription. The same font face was used for textual evaluative information underneath the colored messages, but this information was written in dark grey to both stand out to communicate the level of sustainability and the sustainability-calls easy to read in small size.

To support the potentially visually impaired consumer, the colors and contrast were slightly adjusted to enhance readability and minimize visual strain, in addition to a redundant cue (*Dictionary of Design Concepts*, no date) added to communicate the difference between the colors red and green, to make color-encoded information accessible to people with color vision deficiencies. In addition, the signifiers were designed with a hawk's eye at "the laws of UX" (*Laws of UX*, no date).

The nudge mechanism "Language and signage design" is the instrument used to create evaluative visual enhancement in the graphic elements by applying the color attributes: green, yellow and red, and were used to signal a sustainability scale where green represents the most sustainable product. This scale in a form of "traffic-light" metaphor", assesses the extent to which the food product addresses the three aspects of sustainability: Environmental welfare, animal welfare and social justice, chosen within the scope of this project.

The nudge mechanism "Simplification and framing of information" is the instrument used to frame the messages and graphical elements. The wording of the textual information in the message and the type of graphic symbol selected, are framed and simplified according to the three strategies to make these elements relevant to the segments and thus activate targeted values and attitudes they represent.

Next, to support this concept for evaluating food sustainability, the evaluative textual element which say "Most", Partly and "Least" sustainable, and the sustainability descriptive text element which say, "Environmental welfare", "Animal welfare" and

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"Social justice" are combined used, were used as one universal element across the segments, to communicate the level of sustainability. This textual evaluative information was written in dark grey #252525 to be softer in a smaller font size on white background, but still easy to read.

The goal was that these four elements together shaped as a series of sustainability label-signifiers, serve as instruments to trigger desired behaviors in consumers. These four elements combined into one sustainability label-signifier collectively reflect each of the three strategies defended by the segmentation model. The proposal for the design of "food sustainability nudges" is rooted in these strategies, and aims to promote welfare and justice in society, and to influence decision-making processes and purchasing behaviors which benefit the environment, animals and people.

Summarized, the sustainability label-signifiers are oriented in two ways; Affectively oriented by the framing and simplifying information both visually and textually and Cognitive oriented by the use of signage design, both through visual enhancement and evaluative labelling. These orientations may be used separately or simultaneously in an attempt to influence the user's desired behavior, and as the strategy describes, one type of orientation can hypothetically be more effective than the other to apply to the various consumers. The graphical image (1) and textual message (2) provide the Sustainability label-signifiers with the Affectively orientation (see fig. 4.5). These two elements are tandemly framed to suit the profiles of the consumers in each segment and together they form the triggers "Facilitator", "Signal" and "Spark", which purpose is to meet different consumer's level of motivation for buying sustainable food and trigger different associations that can stimulate action. Finally, the Cognitive orientation is mainly provided through the signage design by the visual enhancement (3) and evaluative labelling (4) combined (see fig. 4.5).

4.4.3 Nudge design and strategies implemented

In figure 4.7, the sustainability label-signifier design proposed for the potential consumer segment "Explorer" are presented.

This sustainability label-signifier is designed to appeal to consumers in the segment "Explorer" which are defined as consumers with high motivation but limited knowledge and sustainability consciousness.

The graphical image, the smiley and the textual message "When you care about your health" are the two elements designed to work as a facilitator which collectively contribute to the label being quick and easy to trust and understand. The smiley symbol is included to address the heuristic "Social proof" and the textual message refer to healthy hedonism, which characterize these consumers, with the word health being the cue.

The evaluative textual element with the wording "Most", Partly and "Least" sustainable, and "Environmental welfare", "Animal welfare", "Social justice" is the universal textual element used across the segments to convey the level of sustainability and the sustainability-calls.

Figure 4.7: Sustainability label–signifier for the segment "Explorer".

In figure 4.8, the sustainability label-signifier design proposed are demonstrated applied in the context of an online grocery store.

Figure 4.8: Sustainability label–signifier for "Explorer" applied in context.

In figure 4.9, the sustainability label-signifier design proposed for the potential consumer segment "Likely consumer" is presented.

This sustainability label-signifier is designed to appeal to consumers in the segment "Likely consumer" which are defined as consumers with both ability, sustainability consciousness and the motivation to perform the target behavior.

The image of the globe and the textual message "When you also care about the consequences of what you eat" are included in the design to operate as signals and reminders to act responsible. In addition, the evaluative labelling colors green, yellow, red etc. will in itself signal that a behavior appropriate or not and thus also work as a reminder.

Also included, is the universal evaluative textual element used to convey the level of sustainability and the sustainability-calls across the segments.

Figure 4.9: Sustainability label-signifier for the segment "Likely consumer".

In figure 4.10, the sustainability label-signifier design proposed are demonstrated applied in the context of an online grocery store.

Figure 4.10: Sustainability label-signifier for "Likely consumer" applied in context.

In figure 4.11, the sustainability label-signifier design proposed for the potential consumer segment "Occasional buyer" is presented.

This sustainability label-signifier is designed to appeal to consumes in the segment "Occasional buyer" which are defined as consumers with knowledge of food sustainability, the ability to perform the target behavior but lack motivation.

The graphical image of the chart diagrams and the textual message "When you want a good reason" are elements included to combined work as motivational sparks. These consumers are occasional buyers of what they consider to be alternative foods and their decisions are governed by a form of proof that it is profitable to buy "sustainability certified" products before they take action.

The universal evaluative textual element used to convey the level of sustainability and sustainability-calls across the segments is, like in the other two examples, also included.

Figure 4.11: Sustainability label-signifier for the segment "Occasional buyer".

In figure 4.12, the sustainability label-signifier design proposed are demonstrated applied in the context of an online grocery store.

Figure 4.12: Sustainability label-signifier for "Occasional buyer" applied in context.

4.5 General discussion

4.5.1 Segmentation model

Through my research work, knowledge was acquired about how to develop market segments and which segmentation models and classifying variables have proven effective to use in a segmentation model to define potential sustainable food consumers and behavior. This knowledge was used to develop relevant nudge strategies and effective sustainability-label signifiers that provide the support the consumer segments need in their decision-making process.

Determinants commonly used to classify segments in various combinations of segmentation models found was Demographics, Psychographics (e.g., values, internal motivation) and behavior (e.g., needs, benefits, attitude, loyalty status, brand familiarity, occasion, type of problem solving needed or information required) and Food-Related Lifestyles. In addition, Consumer Sustainability Consciousness was found used to classify sustainable consumers segments and food purchasing behavior. However, no articles were found where the five variables were used combined in a segmentation model. Analysis of these classification determinants concluded that all were relevant to use in a segmentation model. This to be able to define good and different potential sustainability segments based on the key drivers for sustainable purchasing behavior. A stronger combination of variables was needed in a model for it to provide an effective tool to generate segments with different personality characteristics and different factors motivating buying behavior. This so the results could further be used to fruitfully define different but relevant nudge strategies and designs for different consumer segments.

The segmentation model created was thus constructed with a combination of five motivational internal and external determinants for potential sustainable consumer decision-making behavior. The five classifying determinants are Socio-demographics, Psychographics, Consumer Sustainability Consciousness, Food-Related Lifestyles and Heuristics. These components define the construct of the suggested "potential sustainable consumer segmentation model for behavior" created in this master's thesis. Combined they generate a holistic view of the potential sustainable consumer and their decision-making behavior in terms of purchasing food. This in return, provide a strong model with distinct customized features which was required to answer the questions in my research.

This combination of determinants in a model was effective. This because they made it possible to generate potential sustainable consumer segments and profiles with clear differences in personality and potential sustainable decision-making behavior. Next, these consumer segment profiles made a solid foundation for strategic directions and design of sustainability-label signifier design.

4.5.2 Nudge strategy and design

Sustainability labeling schemes already exist which aim to communicate different sustainability attributes in food products. Examples are Debio Økologisk, Debio Bærekraftig, Fairtrade and Marine Stewardship Council (MSC). However, the problem is that these represent one aspect of sustainability and leave much of the responsibility to the consumer to understand their purpose of use.

Some of the many existing sustainability labeling schemes have a better effect than others, but common to all and the biggest void is that they do not take into account individual differences in consumers and their different motives behind purchase-behavior. The sustainability labels lack strategic adjustments to be able to better hit and trigger the action they are designed to do. They are designed without regard to personalization and context awareness.

Knowledge of consumer segments and their behavior and the situation they are in is central when designing effective nudges or labels. Insight about their behavior must be collected to create a consumer profiles, and this information analyzed and put in context with the consumer. The different market segments need different solutions. Today's labeling schemes do not take this into account. A new sustainability label-signifier as a solution to make it easier for consumers to make better choices for themselves, the environment and society was called for.

Today's labeling of food for various aspects of sustainability is deficient and the communication of the sustainability message is not clear. They are unambiguous and represent either organically grown food (artificial fertilizers or chemical pesticides), ethical food (production that safeguards the welfare of humans and animals) or climate footprints in terms of sustainability. Nor do they take into account that people are different, with different values, knowledge and awareness of sustainability, who are motivated by different factors and thus make decisions on different grounds. My contribution takes these factors into account.

Consumers ask for transparency in food products. Insight from my research found that found one segment which was concerned about their own health and chemicals in food. Another segment wants to satisfy their need for quality and naturalness in food as well as

to take environmental and social responsibility. A third was concerned with perceived added value of sustainable food products.

The void can be filled with a labeling scheme that illuminates both the three most important aspects of sustainability; environmental welfare, animal welfare and social justice found in my research work, in one label, which also is evaluative in terms of the extent to which they support sustainability. This will create a sustainability-label signifier which conveys the livelihood of sustainability more clearly and provide a label scheme that makes decision-making about food based on individual needs in terms of sustainability more effective. In addition to this, effective by basing the sustainability-label signifier design on three different strategies that support the individual needs of the targeted segments.

In my research work, I found that in order for something to be able to trigger a desired action, the call-for-action must be adapted and framed so that it is relevant to the recipient. The different market segments thus need different solutions for sustainability labels. Nudge strategies and the design of sustainability-labels must appeal to the various segments and their personality traits and support their motivational drivers for buying food.

In the suggested nudge strategies and sustainability-label signifier designs, I would like to highlight the strengths that defend the claim that these will work better than today's brand solutions to promote sustainable food consumption. First, they appeal to different segments and their needs linked to values (egoistic and altruistic) and motivational food-purchasing behavior which is defended by the use of the segmentation model. Secondly, they have an evaluative dimension which both conveys the livelihood of sustainability and signal three important aspects of sustainability in food. Third, they consider individual differences in human orientation of decision-making.

The nudge design proposals are a first draft, which must be tested and adjusted before they can be implemented in an online grocery store environment. Alternative prototypes for these, which represent individuals' characteristics and behavior in the three consumer segments, should also be designed and tested.

4.5.3 Further work

To truly understand who the potential food consumers are and what motivational factors influence their food-related behavior and what they base their decision making is a puzzle.

As of now, three different segments and consumer profiles with different needs and decision-making purchasing behavior is created generated by the segmentation model based on insight from the research study conducted and my segmentation work. Whether this selection of components and determinants is the best combination to generate potential consumer segments, further research should be conducted by involving people which potentially represent the suggested consumer segments in the design process to establish objective data.

Based on results from using this model as a tool, nudge design of sustainability label-signifiers for three potential consumer segments have been created: "Explorer", "Likely consumer" and "Occasional byer".

These potential consumer segments take into consideration differences in personality characteristics as values, attitudes and behavior related to sustainability consciousness,

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food-related lifestyle and heuristics which all summarized are influential factors of food purchasing behavior.

As of now three fundamentally different nudge strategies is created based on insight from my research work. This by combining nudge mechanisms proven to be effective to influence sustainable food consumption, and insight about food decision-making behavior in a simplified sustainability label-signifier design with information and visual elements framed to speak to consumers the different segments. Whether these suggested strategies and sustainability label-signifiers will activate the targeted behavior or work successfully to promote food sustainability-calls is up for question. Like in any strategy development and design process, real consumers representing the different segments should be involved in these processes and the effectiveness of suggested solutions should be tested.

Further research should test the effectiveness of the nudge in various ways to understand if the nudge works in the given context. Addressing key questions such as how effective the nudges are relative to each segment, whether the effectiveness differs across segments, whether the nudges fit the context and consumer goals and finally, whether our understanding of the consumer's decision-making process is correct, would be important. With a collection of feedback from real consumers objective data can thus be used to analyze behavioral patterns, emotional state and cognitive style to further evaluate the strategies and if needed, implement iterated nudge designs.

However, whether consumers food choices are based on complex formulas or "fast and frugal" heuristics (Scheibehenne, Miesler and Todd, 2007) is impossible to say for sure. Considering that people may have limited time and bounded rationality, instead of trying to decide "the best" option, they might search for something that is "good enough". Further research on these topics is up for suggestion.

5 Conclusion

In this thesis a segmentation model was constructed by motivational determinants for potential sustainable consumer decision-making behavior. The combination of the five classifying variables and factors for decision-making Socio-demographics, Psychographics, Consumer Sustainability Consciousness, Food-Related Lifestyles and Heuristics selected provided me with the instrument that was needed to define potential sustainable consumer segments and purchasing behavior. Three different consumer segments were created by utilizing the segmentation model, which include five motivational determinants for sustainable consumer decision-making behavior.

The segmentation model constructed to define different motivational consumer behavior and develop different consumer segments based on this information, was effective to use to establish nudge strategies. Defended by insight from the segmentation model, nudge interventions targeted at potential sustainable consumer segments which purpose was to support or inspire to a sustainable food purchasing behavior was possible.

Despite of how much objective research data we collect on motivation for food purchases will after all be based on many different internal or external factors that are neither predictable nor stable. Motivation will vary from person to person and what triggers a purchase-decision may change from time to time, be decided by a particular situation or purpose of use. Sometimes it's about finances, other times about desire or mood.

Consumer behavior and choices are triggered by a large number of factors described in this thesis. Many variables and factors are difficult to predict and impossible to control. Nor is it possible to "save the world" alone by consuming sustainable food today.

However, it is possible to develop strategies based on the behavioral patterns we can identify. Information and visual elements can be framed so that they reflect these patterns and become relevant to consumers.

It is possible to provide a consumer-friendly system of sustainability-label signifiers based on customized strategies which takes into account individual differences, needs and motivation of consumers in different segment.

It may be possible to increase awareness and knowledge about sustainability in food through these, in addition to make it easier for potential sustainable food consumers to make conscious choices in line with personal values, wants and beliefs, as well as better choices for themselves, the environment and society.

The negative impact of people's food consumption on society is impossible to reverse in one day. However, if we influenced by a nudge make environmentally and socially better choices, we are one step closer. One small choice in the right direction for man, is potentially *one giant leap for humanity"* (Neil Armstrong, 1969).

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Nudging: Strategies and sustainability-label signifiers to influence potential sustainable food consumer behavior.

Appendices

Appendix 1: Process model

Appendix 2: Segmentation model

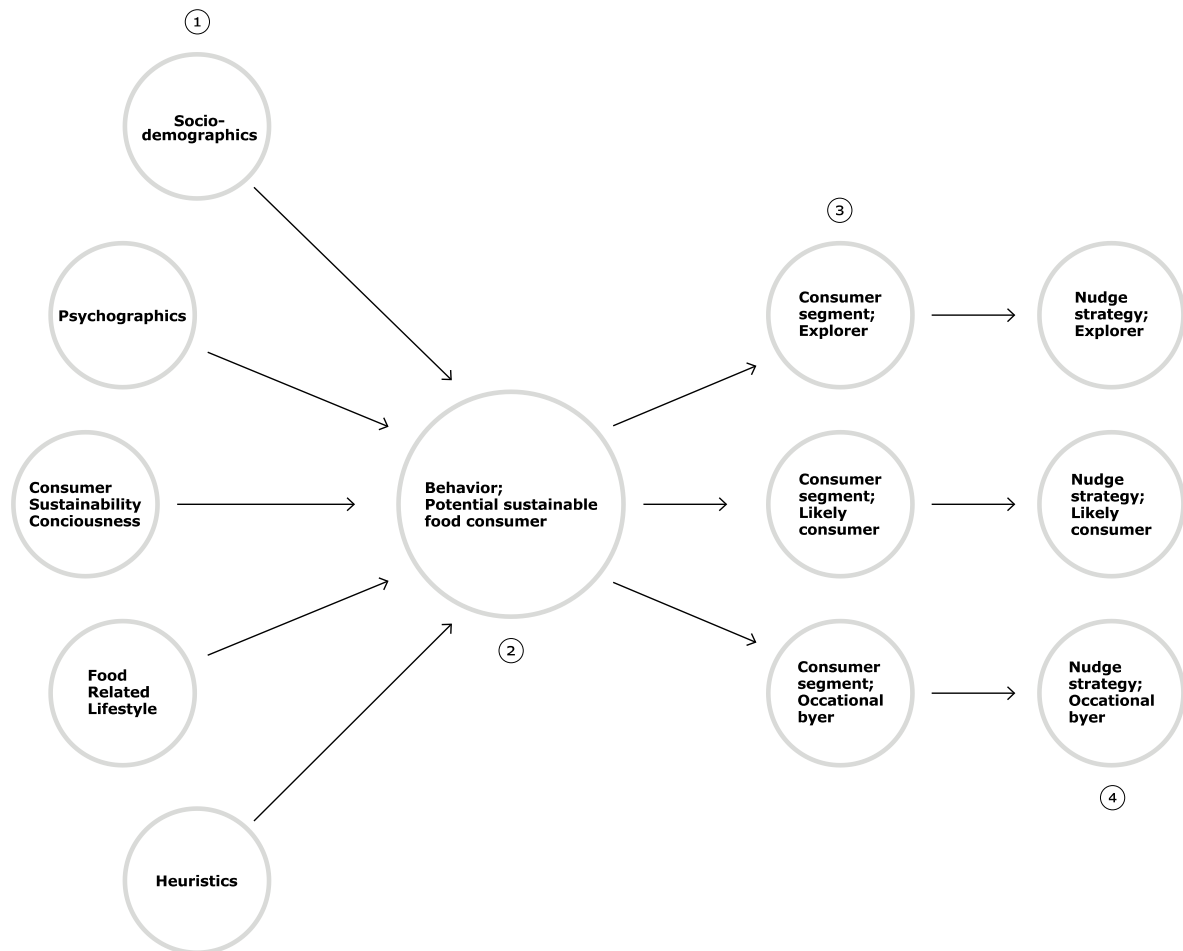**Appendix 3:** Consumer segment profiles

Appendix 4: Sustainability label-signifier Wireframe

Appendix 5: Traffic-light metaphor

Appendix 6: Sustainability label-signifier strategy and design

Appendix 7: Sustainability label-signifiers applied in context

Nudging: Strategies and sustainability-label signifiers to influence potential sustainable food consumer behavior.

Appendix 1: Process model

① Socio-demographics

Psychographics

Consumer Sustainability Conciousness

Food Related Lifestyle

Heuristics

② Behavior; Potential sustainable food consumer

③ Consumer segment; Explorer → Nudge strategy; Explorer

Consumer segment; Likely consumer → Nudge strategy; Likely consumer

Consumer segment; Occational byer → Nudge strategy; Occational byer ④

Appendix 2: Segmentation model

Segmentation model including motivational determinants for sustainable consumer behavior

Segmentation model				
Motivational determinants for sustainable food consumer decision-making behavior				
Socio-demographics Generational Family structure Education Occupation	**Psychographics** Personality Values Emotional attitude	**Consumer Sustainability Consciousness** Attitudes Knowledge	**Food-Related Lifestyle** Contextual	**Heuristics** Cognitive stimuli Affective stimuli *(Types of Nudges to reduce mental effort needed to make a decision)*
S1. Generation Z (1995+) (G-Z) S2. Generation X, Y (1965-1994) (XY) S3. Baby Boomers (1946-1964) (BB) S4. Single (S) S5. Family w/Kids (FK) S6. Out of Nest (ON) S7. Student (ST) S8. Higher Education (HE) S9. Specialized Profession (SP)	P1. Openness to change (OC) P2. Self-enhancement (SE) P3. Self-transcendence (ST) P5. Responsible (RE) P6. Open minded (OM) P7. Skeptical (SK)	CSC1. Sense of Retribution (SR) CSC2. Access to Information (AI) CSC3. Labelling and Peer Pressure (LPP) CSC4. Health issues (HLT)	FRL1. Ways of Shopping (FRL1.WS) FRL2. Cooking Methods (CM) FRL3. Quality Aspects (QA) FRL4. Consumption Situations (CS) FRL5. Purchasing Motives (PM)	H1. Automatic (SYS1) H2. Reflective (SYS2) H3. Language and Signage Design (LSD) H4. Simplification and Framing of Information (SFI) H5. Use of Social Norms (USN). H6. Hedonic Enhancements (HE)
Behavior potential sustainable consumer segments: Three segments				
"Explorer»		"Likely consumer"		"Occasional buyer"

Nudging: Strategies and sustainability-label signifiers to influence potential sustainable food consumer behavior.

Segmentation framework: Work file for extracted insight and segmentation modelling.

"Explorer" Chryssohoidis and Krystallis (2005) *Based on and further developed.*	"Likely consumer" Gil et al. (2000) *Based on and further developed.*	"Occasional buyer" Grunert and Juhl (1995) D'Souza et al. (2006) *Based on and further developed.*
Socio-demographics: Generation Z, Millennials, 1995+ (S1.GZ) Single (S4.S) Student (S7.ST)	**Socio-demographics:** Generation X, Y, 1965-1994. (S2.GXY) Family with kids (S5.FK) Higher education (S8.HE)	**Socio-demographics:** Baby Boomers, 1946-1964. (S3.BB) Family «Out of nest» (S6.O) Specialized Profession (S9.SP)
Psychographics: Openness to change (P1.OC) Self-respect. Healthy hedonism. Spontaneous, exploring. "Busy bee", value excitement and challenge in life. Open minded (P5.OM) "Good for me – good for the planet."	**Psychographics:** Self-transcendence (P3.ST) Altruistic values. Down to earth. Value belonging and living a balanced life. Universalism and Benevolence; understanding, appreciation and protection for the welfare of all people and for nature, and the "tribe" (friends). Responsible (P5.RE). Pro-environmental and ethical responsibility. Independent thought and action. "Do your bit."	**Psychographics:** Self-enhancement (P2.SE). Achievement and Hedonism, self-centered satisfaction. Is aware of environmental risks but are price sensitive. Also, value tradition. Skeptical P7.SK) "Give me a reason."
Consumer Sustainability Consciousness: Access to information (CSC2.AI) Started paying attention to own health when learned about chemicals in food through media. Health issues (CSC4.HLT) Think ecological food is safer and healthier. Labelling and Peer Pressure (CSC3.LPP) Rely on advice from friends, specialists and product information.	**Consumer Sustainability Consciousness:** Sense of Retribution (CSC1.SR) Aware of the fact that unsustainable habits have a negative impact on environmental and social problems (Maiteny, 2002). Open to change when made aware of the consequences of unsustainable food consumption on the environment through media and the internet. Labelling and Peer Pressure (CSC3.LLP) Trust eco-labelling, use them as guide, but not always – think they could be easier to understand. Are aware of environmental problems but need for more knowledge.	**Consumer Sustainability Consciousness:** Access to information (CSC2.AI) Personal predispositions towards the concept "sustainable" food but interested in information on product labels. Labelling and Peer Pressure (CSC3.LPP) Partly distrust eco-labels but willing to trust if convinced. Is aware of environmental risks, reads labels anyway. Need for more knowledge to be convinced to change behavior.
Food-Related Lifestyle: Diet; mostly Pescatarian (fruit, vegetables and fish), but also white meat poultry. Ways of Shopping (FRL1.WS) Enjoy grocery shopping online, often to impulse buying. Health benefits of food guides purchasing behavior. Cooking Method (FRL2.CM) Spontaneous, looking for new ways. Into all kinds of kitchens (Mexican, Indian, Thai, etc.) Quality Aspects (FRL3.QA).	**Food-Related Lifestyle:** Diet; Flexitarian (vegetables and all kinds of meat). Like to eat high quality food and aim for a sustainable diet – more vegetable-based food and less red meat. Ways of Shopping (FRL1.WS) Online and regular grocery shopping. Guided by eco-labels and product information. Enjoy shopping at specialty food markets. Passion purchasing before price. Frequent buyer of food with sustainability-attributes (organic, fair-trade etc.).	**Food-Related Lifestyle:** Diet; Flexitarian. Love traditional dishes. Ways of Shopping (FRL1.WS) Online shopping by careful consideration and regular grocery shopping, one-stop. Shopping list. Mostly guided by habits and loyalty to brands. Buy organic food products occasionally. Price criterion when purchasing organic (or food with sustainability attributes). Cooking Method (FRL2.CM) Convenience

Nudging: Strategies and sustainability-label signifiers to influence potential sustainable food consumer behavior.

Health aspects and attributes of food. Worry about chemicals. Often but not consistent buyers of organic food. Think organic food is healthier than conventional food. Healthy and safe diet is important. Consumption Situations (FRL4.CS) Enjoy dining with friends. Purchasing Motives (FRL5.PM) Self-fulfilment, health and social events.	Taste, sensory appeal important for food choice as well as sustainability benefits (Scheibehenne, Miesler and Todd, 2007). *(Rozin & Zellner, 1985; Stafleu, de Graaf, van Staveren & Schroots, 1991).* Cooking Method (FRL2.CM) Passion for food and cooking with quality ingredients. Love cooking with family and friends. Quality Aspects (FRL3.QA). Novelty, naturalness and freshness are important qualities, before price. Positive attitudes towards organic food products. Believe organic food holds higher quality than industrial food (Chryssohoidis and Krystallis, 2005). Consumption Situations (FRL4.CS) Rituals and habitual dinner events with family and friends. Purchasing Motives (FRL5.PM) Self-fulfilment in food (passion). Supporting family and social relationships. Environmental conservation.	Quality Aspects (FRL3.QA). Familiarity and taste are important. Value price-quality/value relationship. Consumption Situations (FRL4.CS) Value tradition, into rituals. Purchasing Motives (FRL5.PM) Big spenders, when perception of "value for money". Self-indulgence, seeking pleasure.
Heuristics: Automatic decision-making (H1.SYS1) Emotional, spontaneous and intuitive. Language and Signage Design (H1.LSD) Use of Social Norms society (H5.USN) Influenced by friends and trends. Simplification and Framing of Information (H4.SFI) Hedonic Enhancements (H6.HE) (Healthy hedonism)	**Heuristics:** Automatic decision-making (H1.SYS1) Emotional, unconscious and intuitive. Reflective decision-making (H2.SYS2) Analytical, conscious and rational. Language and Signage Design (H1.LSD) Simplification and Framing of Information (H4.SFI)	**Heuristics:** Reflective decision-making (H2.SYS2) Analytical, conscious and rational. Language and Signage Design (H1.LSD) Simplification and Framing of Information (H4.SFI) Hedonic Enhancements (H6.HE)
<td colspan="3" align="center">Nudge strategies</td>		
Strategy Explorer: A1. Affective oriented A2. Facilitator	**Strategy Likely consumer:** B1. Affective and Cognitive oriented B2. Signal	**Strategy Occasional buyer:** B1. Cognitive oriented B2. Spark

Segmentation model framework for defining behavior, segments and strategies.

		Socio-demographics	Psycho-graphics	Consumer Sustainability Consciousness	Food-Related Lifestyle	Heuristics		
Segments potential sustainable consumers	**Explorer**	**S1.GZ** S4.S S7.ST	**P1.OP** **P6.OM**	CSC2.AI CSC3.LPP **CSC4.HLT**	FRL1.WS FRL2.CM FRL3.QA FRL4.CS **FRL5.PM**	**H1.SYS1** **H5.USN** **H6.HE**	**A1. Affective** **A2. Facilitator**	Nudge strategies (Thaler + Kahneman + Fogg)
	Likely consumer	**S2.GXY** S5.FK S8.HE	**P3.ST** **P5.RE**	**CSC1.SR** CSC3.LPP	FRL1.WS FRL2.CM FRL3.QA FRL4.CS **FRL5.PM**	**H1.SYS1** **H2.SYS2** H3.LSD H4.SFI	**B1. Affective, Cognitive.** **B2. Signal**	
	Occasional buyer	**S3.BB** S6.ON S9.SP	P3.SE **P7.SK**	**CSC2.AI** **CSC3.LPP**	FRL1.WS FRL2.CM FRL3.QA FRL4.CS FRL5.PM	**H2.SYS2** H3.LSD H4.SFI **H6.HE**	**C1. Cognitive** **C2. Spark**	

Segmentation model: Motivational determinants for sustainable consumer decision-making behavior

Appendix 3: Consumer segment profiles

Consumer segment profile: "Explorer"

Martin, 26: "Explorer"

"I purchase food to maintain a healthy diet to feel good about my health and myself".

Frustration

Time consuming and hard to know or understand wether a food products if safe to eat. Studying labels are time consuming and straining to interpret.

Heutristics

Decision-making: Automatic. Emotional, spontaneous and intuitive.

Influences:
Hedonic enhancements.
Use of social norms

Motivations

Sustainability Conciousness: Started paying attention to own health when learned about chemicals in food through media and friends. Think ecological food is safer and healthier. Rely on advice from friends and specialists.

Ways of shopping: Enjoy shopping food, impulse buys. Perceived health benefits of food guides purchasing behavior.

Cooking method: Creative. Into all kinds of food (Thai, Mexican, Indian, etc.)

Quality aspects: Healthy and safe diet is important. Worry about chemicals. Frequnt buyer of organic food, think it is healthier than conventional food.

Consumption situations: Enjoy trying new types of food when dining with friends.

Purchasing motives: Self-respect; healthy hedonism and social events.

Key characteristics

Generation: Z. Millennial

Family structure: Single

Education: Student, Sport Science NTNU.

Values: Openness to change. Self-respect; Healthy hedonism. Spontaneous, exploring. Value excitement and challenge in life. Social "Busy bee".

Emotion: Open minded

Attitude: "Good for me – good for the planet."

Strategy nudge interventions

Orientation: Affective

Trigger: Facilitator. ("It's easy). Increase ability by simplification.

Evaluative labelling:
Visual enhancement, color-coding:
Heuristic reference traffic-lights; green "go", yellow "pause" red "stop".

Sustainability discriptive labelling:
"Most", "Partly", "Least" sustainable. "Sustainabiliy-calls"; Animal welfare, environmental welfare, social justice.

Simplification and Framing:
Textual message: Healthy hedonistic angle; *"When you care about your health".*
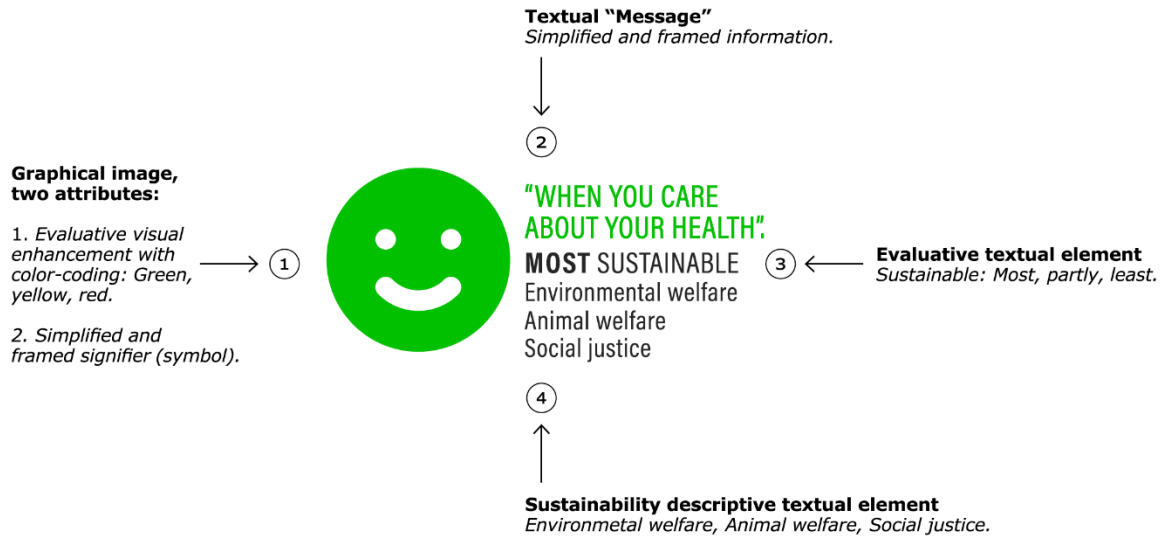
Graphical symbol: Smiley

Consumer segment profile: "Likely consumer"

Hanna, 38: "Likely consumer"

"I look for qualities in food which is line with with my pro-environmental and ethical beliefs."

Frustration

Find it somewhat challenging to find food products that both meet requirements of quality requirements and sustainability in-line with personal believes.

Heutristics

Decision-making:
Automatic; Intuitive and unconcious. Reflective; Analytical, conscious and rational.

Influences: Atruistic values, facts and logic. Stimulus-response compatibility

Motivations

Sustainability Conciousness: Aware of negative consequences of unsustainable consumption habits and its impact on environmental and social problems. Will change habits in line with more knowledge.

Ways of shopping: Passion purchases before price. Guided by eco-labels. Enjoy shopping at specialty food markets.

Cooking method: Love cooking with family and friends.

Quality aspects: Novelty, naturalness and freshness are important qualities, before price. Positive attitudes towards organic food products.

Consumption situations: Consider type of food every meal, including casual dinners with family and friends.

Purchasing motives: Self-fulfilment in food (passion, quality; naturalness). Supporting family and social relationships. Environmental conservation.

Key characteristics

Generation: Y

Family structure: Married, two kids.

Occupation: Interiour Architect

Values: Universalism and Benevolence. Understanding, appreciation and protection for the welfare of all people and for nature, and the "tribe" (friends).

Emotion: Passionate and responsible (heart & mind)

Attitude: Down to earth. Independent thinker, obligated to "Do her bit."

Strategy nudge interventions

Orientation: Affective and Cognitive

Trigger: Signal ("Do it now"-reminder). Support high motivation and ability.

Evaluative labelling:
Visual enhancement by color-coding. Heuristic reference traffic-lights; green "go", yellow "pause" red "stop".

Sustainability discriptive labelling:
"Most", "Partly", "Least" sustainable. "Sustainabiliy-calls"; Animal welfare, environmental welfare, social justice.

Simplification and Framing:
Textual message: Responsible angle. "When you also care about consequences of what you eat".

Graphical symbol: Globe

Consumer segment profile: "Occasional byer"

Jonas, 57: Occasional buyer

"I buy food I know or think tastes good with a look at the relationship between price and benefit".

Frustration

Think it is hard to defend the high price of "sustainable" food vs. benefit. Unsure if it is worth the price. Needs convinsing and confirmation.

Heutristics

Decision-making: Reflective. Analytical, conscious and rational.

Influences:
Familiarity in taste, habits and brands. Produkt information, facts and logic.

Motivations

Sustainability conciousness:
Personal predispositions to the concept "sustainable" food, partly distrustful eco-labels, but reads labels if he think it is relevant to be disproved.

Ways of shopping: Shopping list, planner, careful consideration, "one-stop". Buy organic food products occasionally, price criterion vs. value when purchasing organic (or food with sustainability attributes).

Cooking Method: Convenience.

Quality Aspects: Familiarity, food habits and taste are important.

Consumption Situations: Consider type of food when special or social event (holidays, vacation, traditon).

Purchasing Motives: Big spender, but aim for "value for money". Self-indulgence, seeking pleasure.

Key characteristics

Generation: Baby Boomer.

Family structure: Married, «out of nest».

Occupation: Appraiser, self-employed.

Values: Self-enhancement. Achievement and Hedonism, pleasure in eating and familiarity in taste. Value a price-quality relationship in food and cultural customs.

Emotion: Skepticism (distrust)

Attitude: Is aware of environmental risks, reads but distrust eco-labels. "Give me a reason."

Strategy nudge interventions

Orientation: Cognitive

Trigger: Spark ("Do it because"). Increase motivation by reasoning.

Evaluative labelling:
Visual enhancement by color-coding. Heuristic reference traffic-lights; green "go", yellow "pause" red "stop".

Sustainability discriptive labelling:
"Most", "Partly", "Least" sustainable. "Sustainabiliy-calls"; Animal welfare, environmental welfare, social justice.

Simplification and Framing:
Textual message: "When you want good reason".

Graphical symbol: Chart diagram

Appendix 4: Sustainability label-signifier, wireframe.

Textual "Message"
Simplified and framed information.

↓

②

**Graphical image,
two attributes:**

1. *Evaluative visual
enhancement with
color-coding: Green,
yellow, red.*

→ ①

2. *Simplified and
framed signifier (symbol).*

"WHEN YOU CARE
ABOUT YOUR HEALTH".
MOST SUSTAINABLE ③ ← **Evaluative textual element**
Sustainable: Most, partly, least.
Environmental welfare
Animal welfare
Social justice

④
↑

Sustainability descriptive textual element
Environmetal welfare, Animal welfare, Social justice.

Appendix 5: Traffic-light metaphor

Traffic-light metaphor
The *colors green (go), yellow (yield) and red (stop) used in traffic-lights is applied as universal evaluative colors in the Sustainability label-signifiers to represent the three levels of sustainability: Most, partly and least.*

(3) **Red**: #ff2b2b

(2) **Yellow**: #ff9900

(1) **Green**: #00c000

Appendix 6: Sustainability label-signifier strategy and design

Sustainability label-signifier for the consumer segment "Explorer".

"WHEN YOU CARE ABOUT YOUR HEALTH".
MOST SUSTAINABLE
Environmental welfare
Animal welfare
Social justice

"WHEN YOU CARE ABOUT YOUR HEALTH".
PARTLY SUSTAINABLE
Environmental welfare
Animal welfare
Social justice

"WHEN YOU CARE ABOUT YOUR HEALTH".
LEAST SUSTAINABLE
Environmental welfare
Animal welfare
Social justice

Sustainability label-signifier for the consumer segment "Likely consumer".

"WHEN YOU ALSO CARE ABOUT CONSEQUENCES OF WHAT YOU EAT".
MOST SUSTAINABLE
Environmental welfare
Animal welfare
Social justice

"WHEN YOU ALSO CARE ABOUT CONSEQUENCES OF WHAT YOU EAT".
PARTLY SUSTAINABLE
Environmental welfare
Animal welfare
Social justice

"WHEN YOU ALSO CARE ABOUT CONSEQUENCES OF WHAT YOU EAT".
LEAST SUSTAINABLE
Environmental welfare
Animal welfare
Social justice

Sustainability label-signifier for the consumer segment "Occasional byer".

"WHEN YOU WANT A GOOD REASON".
MOST SUSTAINABLE
Environmental welfare
Animal welfare
Social justice

"WHEN YOU WANT A GOOD REASON".
PARTLY SUSTAINABLE
Environmental welfare
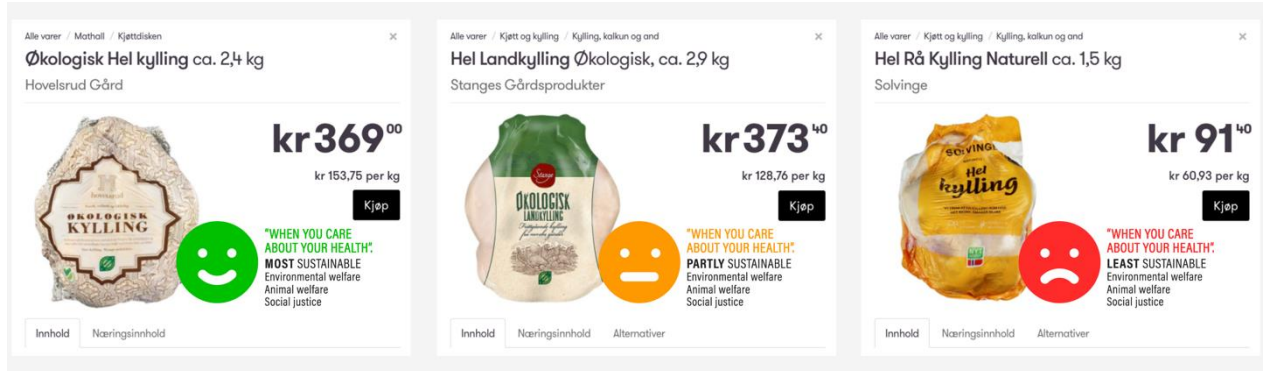Animal welfare
Social justice

"WHEN YOU WANT A GOOD REASON".
LEAST SUSTAINABLE
Environmental welfare
Animal welfare
Social justice

Appendix 7: Sustainability label-signifiers applied in context

Sustainability label-signifier for the consumer segment "Explorer".

Sustainability label-signifier for the consumer segment "Likely consumer".

Sustainability label-signifier for the consumer segment "Occasional byer".