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"The Limits of Nudging"

A Case Study on Nudge-based Interventions in E-commerce Sustainability

Athulya Purushothaman

Supervisor

Dr. Matthias Lehner

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Tel: +46 – 46 222 02 00, Fax: +46 – 46 222 02 10, e-mail: iiiee@iiiee.lu.se

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Abstract

Modern consumerism and overconsumption in e-commerce have profound ecological ramifications, necessitating the adoption of pro-environmental behavior. Imagine a world where sustainable choices are seamlessly integrated into our online shopping experience. Nudging is a powerful tool that holds the key to transforming consumer behavior and promoting sustainable online shopping. However, there is a critical gap in understanding which nudges are most effective in encouraging sustainable shopping behavior. While previous research focused primarily on health contexts, this study examines the efficiency of digital nudges in the environmental field, specifically within the context of Sweden. The focal point of this research is Apotea, a leading Swedish e-commerce platform, providing a real-world setting to investigate the impact of nudging on consumer choices. The study sought to gain insights into the effectiveness of digital nudges by conducting a literature review, a nudge experiment, and an interview with a sustainability professional at Apotea. Surprisingly, the findings challenge conventional assumptions about nudging's impact on pro-environmental behavior. The study reveals minimal to no impact of nudges on influencing consumer decisions. This raises intriguing questions about the true effectiveness of nudges or if it was the role of experimental conditions. This research also unearths the complexities and challenges associated with implementing nudging strategies for sustainable consumption in an e-commerce website. It emphasizes the need for a comprehensive approach, collaborative efforts, and the integration of sustainability goals, going beyond nudging alone. Moreover, the study sheds light on the issue of greenwashing, emphasizing the importance of genuine green marketing strategies. Companies are urged to adopt green marketing as an integral part of their overall marketing efforts, driving meaningful change and promoting sustainable behavior. To empower companies and policymakers, this study proposes a practical nudge roadmap that guides the incorporation of nudging into long-term sustainability and marketing strategies.

Keywords: Pro-Environmental Behavior, Nudge, E-Commerce, Digitization, Digital Nudges, Consumer Behavior, Digital Marketing

Executive Summary

Problem Defenition

The exponential growth of e-commerce has been found to significantly contribute to greenhouse gas emissions, unsustainable resource extraction, pollution, and deforestation. Therefore, there is an urgent need for sustainable practices and responsible consumption in the e-commerce industry to mitigate environmental degradation. To address this issue, the concept of "nudging" is introduced. Nudging is a behavioral economics approach that aims to modify people's behavior without restricting their choices or changing economic incentives. It involves adjusting the decision-making context to help individuals make better choices. In the context of e-commerce, this can be achieved through digital nudging, which uses user interface design features to influence users' behavior in digital decision-making situations. Digital nudging is particularly relevant in the digital age, where more purchase decisions are made online. It offers a cost-effective and efficient way to influence users' behavior and encourage sustainable consumption. Various studies have shown the effectiveness of digital nudges in promoting sustainable choices in e-commerce, including adding green icons to energy-efficient products, displaying eco-labels, and providing feedback on users' environmental impact. Sweden, as a country with a high level of consumer power and technological proficiency, has a significant influence on global environmental impacts. The Swedish government has recognized the importance of nudging as a strategy to encourage pro-environmental behavior and achieve climate targets by reducing consumption. However, there is still a lack of information on the most effective types of nudges in promoting sustainable shopping behavior. Therefore, the goal of this study is to collect data and determine the effectiveness of digital nudges in influencing Swedish consumers towards pro-environmental behavior, using the e-commerce website Apotea as a case study.

Aim and Research Questions

This thesis aims to understand and explore how nudging can influence consumer behavior and help promote sustainable online shopping through a Swedish e-commerce website called Apotea. To attain this aim efforts were made to explore the following research questions.

RQ1: To what extent can digital nudges encourage pro-environmental behavior among consumers in online shopping contexts?

- **RQ 1 a: Is the use of local messaging more effective than global messaging in nudging individuals towards pro-environmental behavior?**
- **RQ 1 b: Is the use of emotional messaging more effective than factual messaging in nudging individuals towards pro-environmental behavior?**

RQ 2) How can companies use nudging as a tool to encourage sustainable consumption?

The study's objectives are to provide 1) empirical evidence on the effectiveness of digital nudges in promoting pro-environmental behavior in the context of online shopping; 2) identify effective nudge strategies, and 3) offer practical recommendations for e-commerce platforms to encourage

pro-environmental behavior among consumers. 4) Add to the corpus of knowledge on nudging and sustainable customer behavior

Research Design and Methadology

The research design and methodology used in this study involve a literature review and a quantitative, true experimental-based research approach. The study aims to explore the impact of nudging on pro-environmental behavior in online environments.The literature review was conducted in two phases, using both grey and academic literature sources. The review focused on understanding digital nudges, consumer behavior, and pro-environmental behavior. The selected literature was analyzed and organized according to the main research questions. The case study was conducted on Apotea.se, Sweden's largest online pharmacy, known for its sustainability efforts. The study involved a quantitative analysis of nudging practices and their influence on pro-environmental behavior among Apotea's customers. The study duration was two weeks, with a control week and an experimental week. The experimental conditions included three groups: a local message condition, a global message condition, and a control condition. Participants were randomly assigned to these conditions. The dependent variable was the comparison of product performance before and during nudging. Five product categories were selected for the study, and two products were chosen from each category based on sustainability criteria. Nudges were created and developed using techniques like content reiteration, highlighting, priming, framing, and third-party labeling. The effectiveness of emotional messaging versus factual messaging was explored through a case study analysis.

Data collection involved collecting metrics such as page visits, time spent on the website, and the number of purchases made. Statistical techniques, including analysis of variance, were used to analyze the collected data. The results were interpreted and evaluated based on the research questions and hypotheses. Overall, the study aimed to provide insights into the effectiveness of nudging in promoting pro-environmental behavior in online shopping contexts and contribute to the existing literature in the field.

Key Findings

The Wilcoxon Signed Ranks Test for global messaging showed no statistically significant difference in engagement rates before and during nudging periods. There was no difference in engagement rates for all, local, or global messaging types. The limitations of the study include self-imposed marketing restrictions, weak website infrastructure for tailoring messages, a short time period for research, lack of integration within the company, inadequate demographic data, restricted access to decision-making departments, and external factors such as seasonal effects.

The interview with Desire Cichy, the sustainability project officer at Apotea, provided additional insights into the findings. Apotea's focus on sustainability primarily revolves around implementing sustainable practices rather than communication efforts and nudging consumers. Nudging is seen as a useful tool for behavior change, but it should be integrated into the overall sustainability and marketing strategy. Collaboration between departments, particularly sales, and marketing, is important for the successful implementation of nudging initiatives. A comprehensive approach that considers

pricing, marketing strategies, and systemic changes is necessary for promoting sustainable consumption. The impact of sustainability guidelines on marketing environmentally friendly products can be both positive and negative. While they make it challenging to effectively communicate sustainability efforts, they also ensure transparency and accuracy in marketing claims, discouraging greenwashing. The effectiveness of nudging as a marketing strategy depends on various factors such as pricing, visibility of sustainable products, and understanding local and global messaging preferences. Nudging should be combined with other important factors to maximize its impact.

In conclusion, the study found that nudging had minimal to no impact on influencing pro-environmental behavior in online shopping consumer decisions. Several limitations and challenges were encountered during the study, highlighting the need for a comprehensive approach, collaboration between departments, and integration of sustainability goals throughout the company.

Conclusion and Recommendations

The findings indicate that it is challenging to incorporate nudging as a strategy in private companies. To address this, a nudge roadmap was proposed to help companies integrate nudging into their long-term sustainability and marketing strategies effectively.

Greenwashing hinders effective green marketing and contributes to overconsumption. The study calls for the marketing department of companies to play an active role in promoting green products and highlights the importance of a holistic and integrated approach. Further research using rigorous methodologies is recommended to explore the topic in more depth. Nudging is identified as a promising strategy, and companies are encouraged to incorporate nudging techniques into their marketing practices. Policymakers should explore ways to promote green products and consider implementing policies that encourage the use of nudges. However, it is important to implement nudges ethically and transparently, respecting consumer autonomy and freedom of choice. These steps can contribute to mitigating climate change and creating a more sustainable future.

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Abbreviations

NEs - Nudging elements

DNEs - Digital Nudge Elements

PEB - Pro-Environmental Behavior

ITA - International Trade Administration

EU - European Union

TPB - Theory of Planned Behavior ,

PBC - Perceived Behavioral Control

NEA - The National Environment Agency

IMC - Integrated Marketing Communications

CSR - Corporate Social Responsibility

UK - United Kingdom

OECD – The Organization for Economic Cooperation and Development

1. Introduction

1.1. Background

During covid-19 outbreak, I found myself relying on e-commerce websites like Amazon, eBay, and Etsy for buying basic necessities. Browsing through practically every product's infinite alternatives made me question how difficult it is to make my online purchases more sustainable. Information on the product's 'environmental impact' or 'sustainable alternatives' was lacking, which made me realize how dependent these decisions are on the consumer. E-commerce while influencing modern consumerism with ease and accessibility also has a huge hidden cost of environmental impacts that cannot be ignored (Igini, 2022). Companies have been exploring environmentally friendly packaging, streamlining delivery routes, and using renewable energy sources to reduce these impacts (Root, 2022) . However, as e-commerce grows, it is critical to emphasize environmental sustainability and develop new ways to reduce its environmental impact potentially by influencing the way people shop. The effectiveness of policies to address this rise in e-commerce, climate change, resource efficiency, and environmental impacts increasingly depends on whether the technical solutions already available can and will be complemented by changes in consumer behavior (OECD, 2021). Therefore individuals, policymakers, and private companies need to make collective efforts to minimize these effects that come through overconsumption or find ways to help consumers shop sustainably. It is evident from a series of research that although consumers show a positive attitude toward environmental protection these attitudes don't necessarily translate toward changes in consumer behavior (Bamberg, 2007), (Carrington et. al, 2010),(Schmitt,2021), (Vermeir & Verbeke 2006) . This phenomenon results in the 'green gap', which can have negative implications on the way companies adopt or intervene with consumers toward pro-environmental behavior since they do not expect any changes in behavior (Schmitt,2021). According to (Tarkiainen & Sundqvist, 2005) lack of time, motivation, information, and price can be attributed to consumer's neglecting sustainability while making purchase decisions. Nudging is a strategy used by most companies that help close this attitude-behavior gap while influencing consumers.

1.2. Problem Definition

1.2.1 Issue of Modern Consumerism and Overconsumption

Modern consumerism and overconsumption in e-commerce has raised concerns about their environmental impacts. Numerous peer-reviewed articles have shed light on this issue, highlighting the environmental consequences of rampant consumerism. For instance, (Van Loon et. al, 2015)

conducted a comprehensive study analyzing the carbon emissions resulting from online shopping and delivery processes. Their findings revealed that the exponential growth of e-commerce has significantly contributed to greenhouse gas emissions, further exacerbating climate change. Similarly, (Olah et al, 2023) in their study examined the environmental implications of overconsumption in e-commerce, emphasizing the unsustainable extraction of resources and the subsequent pollution caused by the production and disposal of goods. Moreover, (Ho, 2022) explored the connection between modern consumerism and deforestation, stressing how the demand for paper packaging and timber products fuels destructive logging practices. These articles collectively highlight the urgent need for sustainable practices and responsible consumption in the e-commerce industry to mitigate environmental degradation.

1.2.2 Nudging

Behavioral economics interprets human behavior in a nuanced way. In their book, Thaler and Sunstein define "nudge" as any component that can predictably modify people's behavior without removing alternatives or significantly altering their economic incentives. (Thaler & Sunstein, 2008). This intervention must be simple and inexpensive to be considered a light nudge. Nudging thus aims to help people make better choices by adjusting the decision-making context rather than limiting the number of options through laws, regulations, or fiscal means (Ferrari et al. 2019; Thaler & Sunstein 2009; Lehner et al. 2016). (Thaler & Sunstein, 2008)define nudge theory as a decision-making theory based on choice architecture. Choice architecture refers to the design of the environment and choices offered to the consumer (Thaler and Sunstein, 2008). It involves presenting options in a way that encourages pro-environmental behavior. For example, placing recycling bins in highly visible and easily accessible locations can encourage people to recycle. Nudging elements (NEs) or nudge interventions have been discussed as a potential solution to encourage more sustainable consumption that has received significant attention from academics, policymakers, and businesses and influence human behavior (Schubert 2017) (Lehner et al. 2016).

1.2.3 Digital Nudging

Nudging and its effectiveness have become crucial in the digital age, as more purchase decisions are made in digital contexts. This also emphasizes the relevance of research that addresses digital nudging. The use of user interface design features to direct people's behavior in digital decision-making situations is referred to as digital nudging (Weinmann et al., 2016; Weinmann et al., 2018). Digital nudging elements or digital nudge elements (DNEs) have been shown to be an effective design strategy for favorably influencing users' behavior in unconscious and day-to-day decisions (Weinmann et al.

2016). DNEs can be designed and installed more quickly and cheaply than in an offline physical environment (Mirsch et. al, 2017).

Digital nudging can thus be defined as the use of digital interfaces to encourage or discourage certain behaviors by changing the context in which decisions are made without limiting the range of options available to the user (Weinmann et al (2016). Richard Thaler and Cass Sunstein presented one of the first and most important definitions of digital nudging in their book "Nudge: Improving Choices Concerning Health, Wealth, and Happiness" (2008). They argued that digital nudging is a way to design decision-making architectures that can lead people to make better decisions without taking away their freedom of choice. A paper by (Weinmann et al, 2016) defined digital nudging as "the use of choice architecture in digital environments to influence user behavior predictably and beneficially". They identified four key design features of digital nudging: 1) the use of a digital interface to present the nudge, 2) the nudge should be designed to encourage desirable behavior, 3) the nudge should be transparent, and 4) the nudge should be easy to opt out of. Another paper by (Bergram et al 2022) provides a more detailed taxonomy of digital nudges, which they divided into six different categories: Reminders, Feedback, Social Norms, Defaults, Framing, and Priming. These nudge categories will be later discussed in the context of pro-environmental behavior.

1.2.4 Pro-environmental behavior

Sarkis et al. (2011) stress the need of establishing a win-win link between economic and green growth. Understanding and fostering pro-environmental behavior (PEB) is crucial in this setting for minimizing global warming, reducing natural resource use, and sustaining the biosphere. PEB is defined as behavior that consciously seeks to reduce the harmful effects of human activity on the biosphere (Stern, 2000). According to (Byerly et al., 2018), there is evidence that social influences and minor changes in decision attitudes can affect pro-environmental decisions. These findings suggest that nudging toward sustainable goals can have comparable achievable environmental impacts when implemented in the context of virtual supermarkets and e-commerce. In the context of e-commerce, digital nudges can be used to encourage consumers to engage in pro-environmental behaviors.

Research has shown that digital nudges can effectively promote pro-environmental behavior in e-commerce settings. For example, a study by (Bergram et al 2022) found that adding a digital nudge in the form of a green icon to energy-efficient products on an e-commerce website increased the likelihood that consumers would purchase those products. Similarly, a study by Chen, He, and Wang (2020) found that adding a digital nudge in the form of an eco-label to products on an e-commerce website increased the likelihood of consumers choosing environmentally friendly products. Another way digital nudges can promote pro-environmental behavior is by providing feedback to consumers

about their environmental impact. For example, a study by Emil Petersson (2019) found that displaying a digital nudge in the form of a green scorecard on an e-commerce website increased consumers' awareness of their carbon footprint and encouraged them to choose greener options. Overall, the use of digital nudges in e-commerce can be an effective tool for encouraging environmentally friendly behavior. Through gentle reminders and feedback, digital nudges can encourage consumers to make more sustainable choices without relying on heavy-handed regulations or incentives

1.2.5 Sweden's Consumer Power and Environmental Accountability

Sweden ranks seventh in the world when it comes to individual consumption per capita and has a huge influence in contributing towards negative environmental impacts (OECD, 2021). Sweden's consumer base demonstrates a high level of technological proficiency and purchasing power, positioning them as leading users of e-commerce both within Europe and on a global scale (ITA, 2022). According to Eurostat's report in 2021, the online shopping rate among the Swedish population in 2020 stood at 86 percent (European Union, 2021). Achieving Sweden's goal of incorporating emissions generated abroad due to its consumption into its overall climate target demands encouraging Swedish consumers towards pro-environmental behavior (Dahl,2022) and the Swedish government has been proactively looking to nudging as a strategy to help achieve this target by 2045 (Nielsen, 2017).

The use by businesses of cognitive limitations in consumers to change their behavior has of course always been part of the tool kit businesses use to be successful, and is well-documented. However, a gap was identified in the search for information on companies that use pro-environmental nudges to change consumer behavior. The literature has helped identify nudges or information practices that could be used in the future to influence consumer behavior, but there is still a lack of information on what types of nudges are most effective in promoting sustainable shopping behavior. Thus, the goal of this study is to not only collect available information on whether nudges may be promising methods for encouraging pro-environmental behaviors but also to collect data to assist us to determine what sort of nudges are beneficial in modifying consumption behavior. Currently, most of the studies are limited to the health context, therefore it is crucial to have more studies related to nudges in the environmental field. Also, a study to examine the effectiveness of digital nudges in consumers toward pro-environmental behavior has not been done in the context of Sweden. This will ideally be done through a working e-commerce Swedish website named Apotea that will help identify if and what kind of nudges can influence consumers towards pro-environmental behavior.

2. Aim and Research Questions

This thesis aims to understand and explore how nudging can influence consumer behavior and help promote sustainable online shopping through a Swedish e-commerce website called Apotea. To attain this aim efforts were made to explore the following research questions.

RQ1: To what extent can digital nudges encourage pro-environmental behavior among consumers in online shopping contexts?

- **RQ 1 a: Is the use of local messaging more effective than global messaging in nudging individuals towards pro-environmental behavior?**
- **RQ 1 b: Is the use of emotional messaging more effective than factual messaging in nudging individuals towards pro-environmental behavior?**

RQ 2) How can companies use nudging as a tool to encourage sustainable consumption?

The study's objectives are to provide 1) empirical evidence on the effectiveness of digital nudges in promoting pro-environmental behavior in the context of online shopping; 2) identify effective nudge strategies, and 3) offer practical recommendations for e-commerce platforms to encourage pro-environmental behavior among consumers. 4) Add to the corpus of knowledge on nudging and sustainable customer behavior.

2.1 Scope and Limitations

The scope of this study includes topics of digital nudging and pro-environmental behavior in e-commerce websites. The main focus of this research is on Apotea consumers and their behavior upon implementation of nudges. The research is exclusively based on the empirical data that was collected during the time period that the experiment was conducted and the researcher had access to the data provided by the company.

This study makes an effort to compare four different types of nudges (local vs global), and (emotional vs factual) to evoke pro-environmental behavior in Swedish consumers. Instead of analyzing the entire Apotea website, only five product categories were selected for comparison among different nudges.

This decision was influenced by factors such as feasibility limitations, technical capacity, and self-imposed restrictions imposed by Apotea. Another major limitation of this project is the time period. A longer period of time would have allowed to conduct more interviews, literature review and more in-depth analysis. The limitations shall be further discussed in the methodology and discussion section of the study.

2.2 Ethical Considerations

The research design of this thesis does not require an ethical approval as the study is conducted solely for educational purposes. The involvement of the case company Apotea was solely for the purpose of data collection. The collaboration with the company did not exert any influence on the research process, as the nature of the relationship and the research's objectives were explicitly communicated right from the initial contact. During the early stages of the study, the company provided information regarding the experimental setup, which was relevant to the research. In order to maintain the confidentiality of the participants, no personal information was collected within the scope of this research. Prior to the final submission, a copy of the thesis was shared with the case company to offer them the option of remaining anonymous in the study. All consumer data collected from Apotea has been anonymized, ensuring that no individual's identity can be traced back from the data. No further ethical considerations have been reported after all consumer data has been collected and anonymized. However, it should be emphasized that even though the data is anonymized, proper data handling practices are followed to prevent potential privacy breaches or data misuse. Any identifiable information was removed using pseudonyms or coding systems for participants and the case company.

2.3 Audience

The intended audience includes e-commerce companies, policymakers, governmental representatives, and academics in the field who aim to work with creating and executing policy frameworks that can influence sustainable consumption in digital environments. This research can be beneficial to local governments to help focus their efforts on nudging people toward sustainable behavior by limiting the effects of greenwashing and understanding consumption patterns. This research is also relevant for researchers examining nudge strategies in e-commerce websites as empirical evidence for setting up experiments based on nudging. Additionally, this research would be helpful for anyone interested in the practicalities associated with implementing a nudge-based experiment on an e-commerce website.

2.4 Disposition

Chapter 1 offers the background of the themes that will be the focus of the research along with the relevant concept and theories that will serve as the foundation for the study.

Chapter 2 outlines the research gap that the study attempts to address before moving on to the purpose and research questions, along with the scope and limitations.

Chapter 3 provides an extensive literature review on what influences human thinking, nudging in e-commerce, and how marketing strategies can play a significant role in promoting sustainable consumption and influencing consumer behavior towards sustainable choices.

Chapter 4 presents the theories and models that lay the groundwork for the subsequent analysis and discussion of nudging strategies in promoting pro-environmental behavior.

Chapter 5 includes the research design and methodology highlighting the research approach, hypothesis, nudge creation, and execution of the experiment.

Chapter 6 presents the results from the nudge experiment using SPSS analysis

Chapter 7 looks into quantitative and qualitative result analysis and discussion

Chapter 8 presents the conclusion of the study and the way forward with green marketing

3. Literature review

3.1 What Influences Sustainable Human Behaviour?

In the initial section of the literature review, I will delve into theories and concepts that explain the factors that drive human behavior, particularly focusing on what motivates individuals to make sustainable consumer choices. Daniel Kahneman (2011), put forth the idea that human thinking can be divided into two systems: System 1 and System 2. System 1 corresponds to our intuitive and automatic thought processes, while System 2 pertains to our reflective and rational thought processes. System 1 thinking is fast, instinctive, and doesn't involve active contemplation, it operates at an automatic level (Kahneman, 2011). Examples of sustainable consumption activities that rely on System 1 thinking include instinctively recycling a paper item instead of throwing it in the trash, turning off lights when leaving a room without consciously thinking about energy conservation, or feeling an aversion towards using single-use plastic bags without needing a conscious justification (Verplanken & Roy, 2016). System 2 thinking is slower and requires conscious effort (Kahneman, 2011). It involves deliberate reasoning and calculations. Examples of sustainable consumption activities that engage System 2 thinking include consciously evaluating the environmental impact of different products before making a purchase, conducting research to choose energy-efficient appliances for a sustainable home, or carefully planning a waste reduction strategy by analyzing the life cycle of various products (Evans et. al, 2013).

Stanovich and West (2000) were the first to introduce the terms System 1 and System 2 to describe these two types of thinking. Another way to understand these two systems is to consider System 1 as our gut feeling or intuitive responses, while System 2 represents our conscious thinking. For instance, in our daily thought processes, System 1 dominates around 98% of the time, where quick and automatic decisions are made, while System 2 is responsible for the remaining 2%, where more deliberate and conscious thinking occurs (Kahneman, 2013; Groenewegen, 2018). Kahneman (2013) discusses priming, which involves the subconscious linking of stimuli. This concept is relevant in sustainable consumption as it can be used to shape people's behavior and decision-making towards environmentally friendly options. Suppose a grocery store strategically places images and labels of fresh fruits and vegetables near the entrance, leading customers to associate the store with healthy eating. (Bargh et al, 1999). This priming effect can influence their subsequent purchasing decisions, making them more likely to choose sustainable and nutritious food options (Bargh et al, 1999). Within the realm of sustainable consumption, nudges can be tailored to target either System 1 or System 2 thinking, depending on the desired outcome (Thaler and Sunstein, 2008). For example, a recycling campaign may utilize a simple and visually appealing poster (System 1) to prompt individuals to recycle

their waste, while a comprehensive educational program (System 2) may be employed to encourage consumers to make informed choices about sustainable products and packaging (Mont et al, 2019). The design and context of the nudges determine which cognitive system is more prominently influenced.

3.1.2. Attitude-Behaviour Gap

Various literature has shown the attitude-behavior gap between consumers' concerns and intentions about sustainability and their purchasing behavior in the sustainable fashion field (Bordi and Moon, 2019; Niinimäki, 2010). An attitude-behavior gap symbolizes the complex consumer purchase behavior (Connolly and Shaw, 2006) and explores why consumers that favor sustainable attitudes and are willing to make ethical purchases do not translate this into actual purchase behavior (Davies et al., 2012). As a result, nudging begins from the consumer's point of view. Understanding how customers make decisions in a complicated environment gives insight into how nudging might lead to long-term purchasing decisions. This is known as choice architecture optimization, choice architecture refers to the design of the environment and the choices presented to consumers and in this context, it is also about presenting options in a way that encourages pro-environmental behavior (Thaler, Richard & Sunstein, C. & Balz, John, 2012). There are several explanations for this gap which is referred to as the green attitude gap. Many studies attribute this gap to the fact that social responsibility is not the main criterion in their buying decision (Boulstridge and Carrigan, 2000; Kong et al., 2016). Some attribute it to decision-making evaluation criteria, drivers such as price, style, availability, and (lack of) knowledge, which are considered more important than ethical and environmental issues when buying (Goworek et al., 2012; Iwanow et al., 2005). Overall, the attitude-behavior gap reinforces the challenges for sustainable consumption and the need for nudging consumers to minimize this gap.

3.1.2. Theory of Planned Behaviour

The dominant theory for explaining Pro-Environmental Behavior (PEB) is Ajzen's Theory of Planned Behavior (TPB), which is illustrated in Figure 3-1 (Ajzen,1991). This theory suggests that individuals make rational choices by evaluating the consequences of their actions, seeking rewards, and avoiding punishments (Ajzen,1991). The TPB proposes that the attitude towards a behavior is determined by the overall assessment of these consequences. Additionally, the TPB identifies two other factors that influence behavioral intentions: Perceived Behavioral Control (PBC) and subjective norms (George, 2004). PBC refers to how individuals perceive the ease or difficulty of performing a specific behavior (Ajzen,1991). Together with social norms, which represent the influence of important people on behavior, these factors indirectly determine actual behavior through the intention to engage in that behavior (George, 2004). Among these factors, only PBC directly predicts actual behavior. The

Theory of Planned Behavior (TPB) can be applied to understand individuals' choices regarding environmentally friendly products (Rex et.al, 2015). For instance, when considering purchasing an electric vehicle, an individual evaluates the potential benefits such as lower emissions and cost savings, as well as the potential drawbacks such as limited charging infrastructure (Si, et al, 2020). Their overall attitude towards purchasing an electric vehicle is shaped by weighing these consequences. Furthermore, the individual's perceived control over the purchase decision (PBC) and the influence of social norms, such as the opinions of family and friends, contribute to their intention to buy an electric vehicle (Si, et al, 2020). Ultimately, the TPB suggests that the combined effect of attitude, PBC, and social norms determines whether the individual will actually make the sustainable consumption choice and purchase an electric vehicle. This combination could be used in terms of nudging consumers in online retail environments.

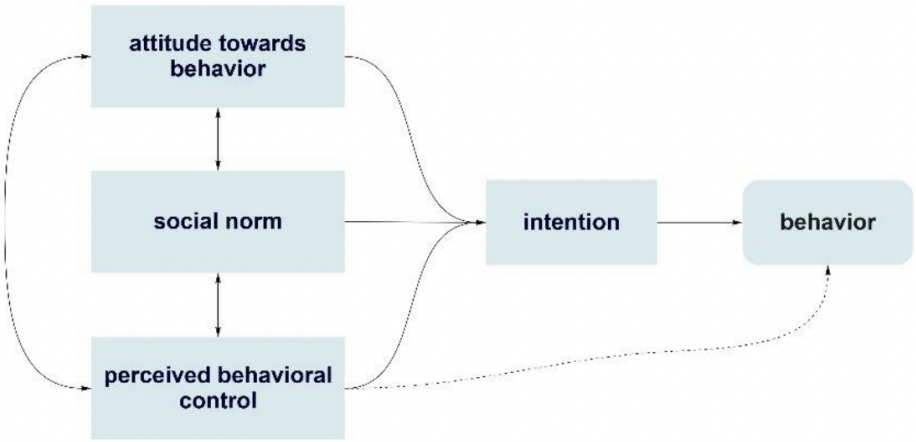

Figure 3-1 Theory of planned behavior by Ajzen (1991)

Source: Exploring Driving Forces of Green Shopping Behavior (Jadkowski, 2021)

3.1.3. Norm-Activation Model

The Norm-Activation model proposed by (Schwartz,1977) in Figure 3-2 explains that moral or personal norms play a crucial role in driving prosocial behavior. These norms refer to an individual's personal conviction or sense of obligation to engage in a particular behavior, rather than being influenced by external social pressures (Geller et al, 1981). Moral norms are influenced by two factors: (1) having an awareness of the consequences associated with a behavior, and (2) attributing personal responsibility to oneself for performing that behavior (Geller et al, 1981).

The Norm-Activation model suggests that individuals' engagement in environmentally friendly behaviors can be influenced by their moral norms (Thøgersen, J., & Ölander, F. 2006). For example, a person who strongly believes that they have a personal responsibility to protect the environment may feel obliged to adopt sustainable practices such as recycling, conserving energy, or purchasing eco-friendly products (Thøgersen, J., & Ölander, F. 2006). This internalized moral norm drives their pro-environmental behavior. Nudging, on the other hand, involves using subtle interventions or prompts to influence people's behavior in a desired direction without restricting their freedom of choice (Sunstein et al, 2017). In the context of the Norm-Activation model, the nudging can be applied to promote sustainable consumption by influencing the formation and activation of moral norms For instance, by providing information about the environmental impact of certain products or behaviors, individuals can be nudged towards developing a stronger awareness of the consequences and subsequently activating their moral norms (Carrus et al, 2008). Similarly, nudges can be employed to evoke feelings of guilt or social norms related to sustainable consumption, which can further reinforce individuals' moral obligations and encourage pro-environmental actions.

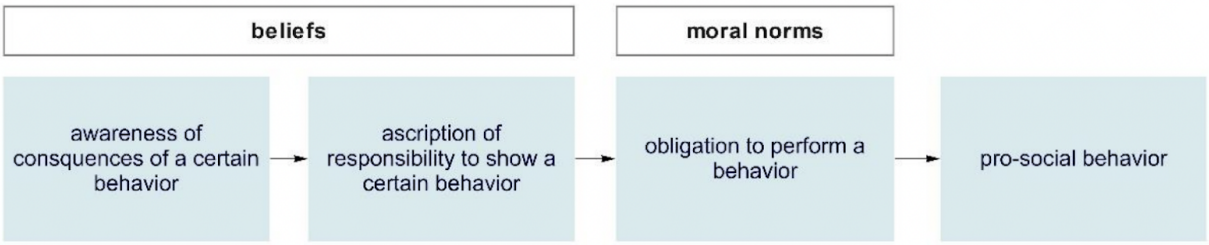

Figure 3-2 The Norm-Activation Model by Schwartz

Source: Exploring Driving Forces of Green Shopping Behavior (Jadkowski, 2021)

3.1.4. Value-Belief-Norm Theory

According to Stern's Value-Belief-Norm theory, which is an extension of the Norm Activation model, additional elements such as value theory and the new ecological paradigm are incorporated into Schwartz's framework in Figure 3-3 (Stern, 2002). This expanded theory aims to provide a more comprehensive understanding of how people behave in relation to the environment. The theory emphasizes the role of three types of values: egoistic values (focused on personal benefits), altruistic values (focused on the welfare of others), and biospheric values (focused on environmental benefits) (Stern, 2002). These values contribute to an individual's ecological worldview, which in turn shapes their beliefs, moral norms, and ultimately their behavior or intentions related to the environment. The

sequential process of values influencing beliefs, moral norms, and behavior has been supported by empirical testing conducted by (De Groot & Steg 2009).

The Value-Belief-Norm theory suggests that individuals' values play a crucial role in their environmentally friendly behavior (Chen & Mei-Fang 2015). For instance, someone with strong biospheric values may prioritize purchasing products that are eco-friendly and have minimal environmental impact. They may actively seek out sustainable alternatives and make efforts to reduce their ecological footprint. On the other hand, individuals driven by egoistic values might be more inclined to consume products that offer personal benefits such as cost savings or convenience, without considering their environmental impact. By understanding the influence of these different values, interventions, and campaigns can be designed to promote sustainable consumption behaviors effectively.

The Value-Belief-Norm theory provides insights into how nudges can be employed to promote environmentally responsible behavior. For example, a grocery store could implement a nudge by strategically placing eco-friendly products in prominent positions, making them more visible and appealing to shoppers (Dolan et al, 2010). By doing so, they tap into individuals' biospheric values, highlighting the benefits to the environment and encouraging the selection of sustainable alternatives (Chen & Mei-Fang 2015). Another nudge could involve displaying information or labels that highlight the environmental impact of certain products, appealing to individuals' moral norms and influencing their decision-making process (Steg and Vlek, 2009). These nudges capitalize on the underlying values and beliefs that drive environmentally conscious behavior, effectively guiding individuals toward more sustainable choices.

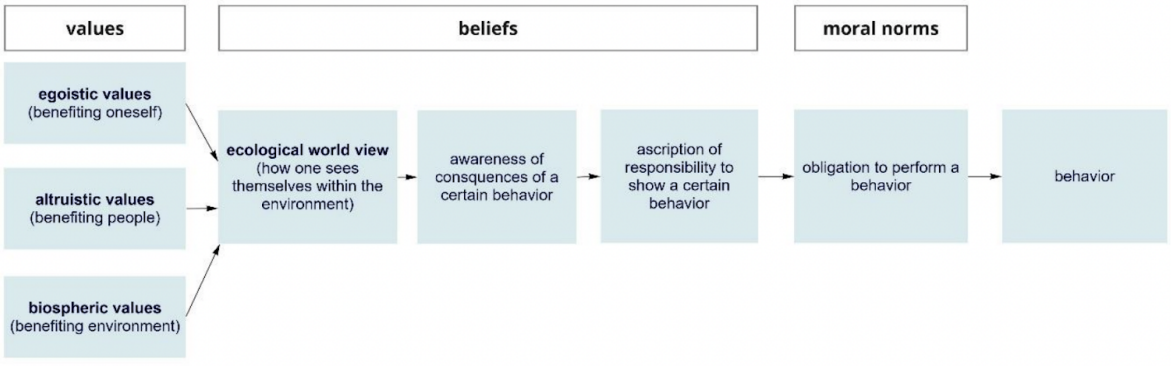

Figure 3-3 The Value Belief Norm Theory by Stern

Source: Exploring Driving Forces of Green Shopping Behavior (Jadkowski, 2021)

3.1.5. Model of Pro-Environmental Behaviour

The model of pro-environmental behavior developed by (Kollmuss & Agyeman 2002) aimed to understand why there is a gap between people's knowledge about the environment and their actual behavior. This model combines various theories to identify the drivers and barriers of pro-environmental behavior (PEB) see Figure 3-4 . According to the authors, there are two main factors that influence pro-environmental behavior: internal and external factors (Kollmuss & Agyeman 2002). Internal factors involve the interplay between environmental knowledge, emotions (such as emotional involvement and fear), and values/attitudes that form an individual's environmental consciousness (Thøgersen,2012). These internal factors can either reinforce each other (e.g., increased knowledge leading to stronger environmental values) or create barriers (e.g., fear hindering the acquisition of new knowledge) (Stern,2000). External factors, such as social and cultural norms, can influence internal factors, and internal factors can also have an impact on external factors through activities like political activism (Stern,2000). While both internal and external factors contribute to pro-environmental behavior, they can be hindered by barriers, such as a lack of environmental consciousness or incentives, as well as habitual behavior patterns (Kollmuss & Agyeman 2002). Additionally, the model considers the feedback loop that occurs after engaging in pro-environmental behavior. If the feedback is negative or insufficient, it can diminish future pro-environmental behavior (Jadkowski, 2021).

Internal factors include environmental knowledge, emotions, and values/attitudes. Increased knowledge about the harmful effects of plastic pollution can lead to stronger environmental values and a greater willingness to reduce plastic usage or feelings of fear and concern for future generations can motivate individuals to adopt sustainable behaviors, such as recycling or reducing energy consumption (Thøgersen,2012). External factors can include social/cultural norms and political activism, in a community where recycling is widely encouraged and supported, individuals are more likely to engage in pro-environmental behavior like separating recyclables from regular waste (Thøgersen,2012).

Barriers: Lack of environmental consciousness, incentives, and habitual behavior. Individuals who are unaware of the environmental impact of fast fashion may continue to purchase clothes from unsustainable brands out of habit or lack of knowledge. If an individual receives negative or no feedback after implementing energy-saving measures in their home, they may be less motivated to continue with such actions in the future. Positive feedback and recognition for engaging in sustainable consumption, such as receiving praise for reducing waste or using renewable energy sources, can reinforce and encourage individuals to maintain pro-environmental behavior.

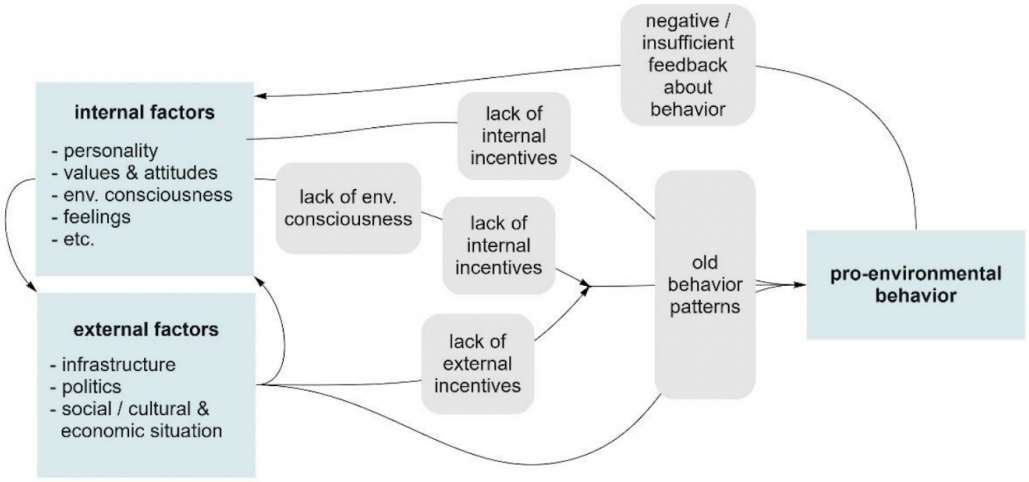

Figure 3-4: Model of Pro-Environmental Behaviour by Kollmuss and Agyeman

Source: Exploring Driving Forces of Green Shopping Behavior (Jadkowski, 2021)

This section provided various theories and models that provided a foundation for understanding human thinking and the factors influencing sustainable human behavior. The section begins by introducing the concept of human thinking divided into two systems: System 1 and System 2. System 1 represents intuitive and automatic thought processes, while System 2 refers to reflective and rational thought processes. Examples of sustainable consumption activities associated with each system are provided. Next, the section discusses the attitude-behavior gap, which refers to the disconnect between consumers' attitudes and intentions toward sustainability and their actual purchasing behavior. The gap is attributed to factors such as the dominance of other decision-making criteria, lack of knowledge, and the influence of social norms. Choice architecture and nudging are introduced as approaches to bridge this gap and encourage pro-environmental behavior.

3.2 Nudging and its effectiveness

The second part of the literature review examines existing literature regarding nudging, our current understanding of its efficacy, the reasons behind nudge failures, the ethical considerations surrounding nudging, and the potential implications of utilizing nudges as a strategy for companies to influence consumer behavior.

Nudges defined as any component that evokes subtle changes to the decision-making environment, have emerged as a promising approach to promoting behavioral change (Thaler & Sunstein, 2009). They are designed to steer individuals toward making choices that align with their long-term goals while preserving their autonomy (Thaler & Sunstein, 2009). Literature mainly highlights four categories of nudges. The default nudges are the preset choices offered to consumers (Nelson et al, 2021). By setting pro-environmental behaviors as a default option, people are more likely to choose them. For instance, setting energy-saving options as the default on appliances or setting up carpooling schemes as the default option for commuting to work (Mirsch et.al, 2017). Secondly, social norms are the unwritten rules and expectations that govern behavior in society (Caraban et al, 2019). This involves highlighting the behavior of others to encourage similar actions. For instance, highlighting how many people are adopting environmentally-friendly behaviors like recycling can encourage others to do the same. Feedback nudges provide consumers with information about their behavior, which can encourage pro-environmental behavior (Nelson et al, 2021). For example, showing the carbon footprint of a customer's order and offering suggestions for reducing it. Lastly, framing involves presenting information in a way that influences how people perceive it (Mirsch et.al, 2017). For instance, framing the benefits of pro-environmental behaviors in terms of personal benefits, such as cost savings or improved health, can encourage people to adopt these behaviors (Mirsch et.al, 2017).

3.2.1 The Power of Nudging

Numerous studies have demonstrated the effectiveness of nudges in influencing behavior across various domains. One notable example is the use of default options in retirement savings plans. Thaler and Benartzi (2004) found that automatically enrolling employees into retirement plans significantly increased participation rates compared to opt-in systems. This nudge leveraged the human tendency to stick with defaults, effectively improving an individual's long-term financial well-being (Thaler & Benartzi 2004). Nudges have also proven effective in encouraging healthier choices. A study by (Rising et al, 2017) highlighted the impact of calorie labels on menus. Their research revealed that providing calorie information alongside menu items led to reduced calorie intake by consumers. Such nudges capitalized on individuals' desire for self-control and better-informed decision-making, resulting in healthier eating habits (Rising et al, 2017). Additionally, nudges have been successful in promoting environmental sustainability. For instance, (Dominicis et al, 2012) investigated the effects of descriptive norm messages in encouraging energy conservation behavior. Their study found that displaying messages indicating the energy-saving behavior of others led to increased energy-saving actions among participants. By leveraging social norms and the desire for conformity, this nudge effectively influenced pro-environmental behaviors.

More studies show to what extent effective nudges are in various contexts. In a study conducted by Madrian and Shea (2001), they examined the impact of automatic enrollment a default nudge, in retirement savings plans on employee participation rates. The results showed that participation rates increased significantly from 49% to 86% when employees were automatically enrolled in the plan (Madrian & Shea, 2001). This demonstrates the substantial impact of nudges in improving retirement savings behavior. A field experiment conducted by Allcott and Rogers, aimed to evaluate the effectiveness of home energy reports, a feedback nudge in reducing residential energy consumption. The study found that households receiving the reports reduced their energy consumption by an average of 2% compared to a control group (Allcott & Rogers, 2014). This indicates the positive impact of nudges in promoting energy conservation behavior. A study by Hanks et al. (2012) investigated the effectiveness of changing the placement of healthier food options in school cafeterias on students' food choices. The results revealed that moving healthier food items to more prominent locations increased their selection by 18.4% (Hanks et al, 2012). In a study examining the impact of personalized reminders as a nudge on tax compliance, (Vainre et al., 2020) found that personalized messages resulted in a 5.1% increase in the probability of paying taxes promptly compared to standard reminders. This suggests that tailored nudges can have a significant impact on encouraging compliance with tax obligations. Nudges have gained significant attention as a behavior change intervention, aiming to influence individuals' decisions without restricting their freedom of choice. The findings highlight the positive impact of nudges on promoting desirable behaviors and provide insights into the underlying mechanisms that make nudges effective.

The effectiveness of nudges can be attributed to several underlying mechanisms. First, nudges often tap into individuals' cognitive biases and heuristics, which are mentioned in the first part of the literature review (Löfgrena & Nordblom, 2020). By aligning the decision-making environment with these biases, nudges make it easier for individuals to make choices that are in line with their long-term goals (Hummel et al, 2020). Secondly, nudges leverage social influences, such as social norms and peer comparisons, to shape behavior (Hummel et al, 2020). Humans are inherently social beings, and nudges that tap into these influences can have a powerful impact on decision-making processes (Löfgrena & Nordblom, 2020). Moreover, the context in which nudges are implemented plays a crucial role in their effectiveness. A study by Halpern et al. (2017) highlighted the importance of tailoring nudges to specific situations and individuals. They found that personalized messages were more effective in promoting tax compliance compared to generic reminders. This suggests that considering individual differences and contextual factors when designing nudges can enhance their effectiveness.

3.3 Nudging Towards Pro-environmental Behavior

The concept of digital nudging hasn't been explored much from a research perspective. From a behavioral perspective, digital nudges are an extension of nudging, but literature shows that people tend to behave differently towards physical and digital nudges (Mirsch et.al, 2017), (Bergram et al, 2022). Nudging in a digital environment takes the extra mile by having the option to tailor the information/ messages to your audience (Hummel et al, 2020). Nudging in a digital environment is a powerful tool to change the way people behave and influence their thinking. A study by (Johnson, et al 2018) looked at the efficiency of default nudges in encouraging sustainable behavior in e-commerce. Customers were automatically enrolled in a green shipping program as a default option unless they choose to opt out (Johnson, et al 2018). The findings revealed a noticeably higher percentage of customers choosing the green delivery option, demonstrating the effectiveness of the nudge in influencing sustainable behavior. Researchers examined the influence of social norms on sustainable purchase behavior in online shopping in a study by (Smith et al. 2020). They conducted an experiment informing participants about the average purchase pattern of other consumers, with highlighted information on either high or low levels of sustainable purchases. The result of this study emphasized the fact that participants perceived that sustainable behavior was the norm and changed the way they behaved. Lastly, a study done by (Lee, and Adams, 2019) explored the effectiveness of framing messages on sustainable behavior in an e-commerce website. They found that positively framed messages that gave consumers emphasis on the benefits of sustainable choices were more effective as a nudging strategy than negatively framed messages framed based on guilt, shame, or loss. These four studies not only establish the fact that nudges are an effective tool to change consumer behavior towards sustainable choices but also an insight into what kind of information or techniques would lead to a perceived change in behavior.

Table 3-1: Different Types of Nudges, Effectiveness, and their indicators of Effectiveness

Nudge Type	**Description**	**Reference**	**Indicators of Effectiveness**	**Factors Affecting Effectiveness**
Default	Setting pro-environmental options as default choices	Johnson, E.J., & Goldstein, D. (2003). Do	The proportion of individuals selecting the default	Clarity and prominence of the default option Relevance and alignment of default choice with individual preferences and values

		defaults save lives?	pro-environmental option	
Social Norms	Highlighting the prevalence of pro-environmental behaviors	Cialdini, R.B., Reno, R.R., & Kallgren, C.A. (1990). A focus theory of normative conduct	Change in individuals' perceptions of the prevalence of pro-environmental behavior	Consistency and credibility of social norm information Cultural and contextual factors influencing social norm acceptance and influence
Feedback	Providing real-time information about the environmental impact	Darby, S. (2006). The effectiveness of feedback on energy consumption	Reduction in energy consumption or resource usage	Frequency and timing of feedback provision Clarity and relevance of feedback information Personalization of feedback based on individual behavior patterns
Personalization	Tailoring messages to personal preferences and characteristics	Kamleitner, B., & Thaler, R.H. (2020). Addressing climate change: Determinants of consumers' green buying	Increase in individuals' engagement with pro-environmental behaviors, such as purchasing green products	Relevance and alignment of personalized messages with individual preferences and value Effective targeting and segmentation of the audience
Goal Setting	Encouraging individuals to set specific environmental goals	Locke, E.A., & Latham, G.P. (2002). Building a practically useful theory of goal setting and task motivation	Achievement of setting environmental goals	Clarity and specificity of environmental goals Supportive and accessible tools or resources for goal pursuit

Visual Cues	Using visual cues to promote pro-environmental behaviors	Diekmann, A., & Preisendörfer, P. (2003). Green and greenback: The behavioral effects of environmental attitudes	Change in individuals' behaviors or choices toward more environmentally friendly options	Salience and visibility of visual cues Consistency and clarity of message conveyed by visual cues Individual's level of attention and receptivity to visual stimuli

Source: Designed by Author

Table 3-1 summarizes different types of nudges, indicators, and factors affecting their effectiveness with reference to pro-environmental behavior. This shows that according to these studies, the effectiveness of a default nudge can be assessed by the proportion of individuals who choose the default option that promotes environmentally friendly behavior (Mirsch et.al, 2017). Various factors influence its effectiveness, including how clear and prominent the default option is, and how well it aligns with individual preferences and values (Johnson et al, 2003). Conversely, in the case of social norms, the nudge highlights the prevalence of pro-environmental behaviors (Caraban et al, 2019). The effectiveness is evaluated by measuring the change in an individual's perception of how common such behaviors are. Factors that affect its effectiveness include the consistency and credibility of the social norm information, as well as cultural and contextual factors that influence the acceptance and impact of social norms (Cialdini et al, 1990). A feedback nudge, on the other hand, aims to reduce energy consumption or resource usage. Its effectiveness is determined by the amount of reduction achieved (Nelson et al, 2021). Factors that influence its effectiveness include the frequency and timing of providing feedback, the clarity and relevance of the feedback information, and the degree to which the feedback is personalized based on individual behavioral patterns (Darby,2006). In the case of personalized nudges, their effectiveness depends on the relevance and alignment of the personalized messages with individual preferences and values, as well as the accuracy and targeting of the audience segmentation (Kamleitner, 2020). Nudges that encourage individuals to set specific environmental goals are referred to as goal-setting nudges (Mirsch et.al, 2017). Their effectiveness is measured by the extent to which individuals achieve their environmental goals. Factors that impact their effectiveness include the clarity and specificity of the goals, as well as the availability of tools and resources that support and facilitate goal pursuit (Locke et al, 2002). Additionally, visual cues can be utilized to promote pro-environmental behaviors. The effectiveness of visual cues is evaluated by measuring the changes in an individual's behaviors or choices toward more environmentally friendly options (Mirsch et.al, 2017). Factors influencing its effectiveness include the salience and visibility of the visual cues, the

consistency and clarity of the conveyed message, and the level of attention and receptiveness of individuals to visual stimuli (Diekmann et al, 2003).

This literature analysis underscores the effectiveness of nudges in influencing behavior change across various domains. The research studies cited provide compelling evidence that nudges can promote desirable behaviors without compromising individuals' freedom of choice. The underlying mechanisms, such as cognitive biases and social influences, contribute to the efficacy of nudges. By understanding these mechanisms and tailoring nudges to specific contexts and individuals, policymakers and practitioners can harness the power of nudges to promote positive behavior change. The next section would discuss how nudges are used by government agencies and private organizations to promote behavioral change.

3.4 Government Intervention vs. Corporate Inertia

Governments have effectively employed nudges to induce behavioral changes in individuals (Benartzi et al, 2017). For instance, in the UK, the establishment of the Behavioral Insights Team, commonly known as the "Nudge Unit," in 2010 aimed to utilize principles from behavioral science to enhance policy design and implementation, leading to better outcomes and altered behaviors (Mukherjee, 2020). The team has implemented various nudges, such as personalized reminders to encourage tax payments, employing social norms to promote energy conservation, and simplifying forms to increase organ donation rates (Halpern, 2010). In the United States, the Save More Tomorrow (SMarT) program serves as an example of a government-led nudge strategy (Thaler & Benartzi, 2004). Developed by Richard Thaler and Shlomo Benartzi, this initiative encourages employees to gradually increase their retirement savings over time. By capitalizing on decision-making inertia, employees are automatically enrolled in the program, and their savings contributions are automatically raised when they receive salary increases (Thaler & Sunstein, 2009). The National Environment Agency (NEA) in Singapore has also utilized nudges to foster environmental sustainability. One program introduced by the NEA, known as the "3R Awards," incentivizes and recognizes organizations for their efforts in reducing, reusing, and recycling waste (NEA, 2023). By highlighting positive behaviors and instilling a sense of competition, the NEA employs social norms and recognition as nudges to encourage sustainable waste management practices (Schirrmacher, 2019). Similarly, the Netherlands implemented a nudge-based policy to boost organ donation rates (Sheen, 2016). Through the Donor Registration Act, individuals are automatically registered as organ donors unless they explicitly opt out (Sheen, 2016). This approach leverages the default bias, making it easier for individuals to become organ donors and significantly increasing donation rates (Halpern et al, 2012). As a result, the Netherlands has achieved one of the highest organ donation rates globally (Sheen, 2016).These

examples exemplify how governments have effectively harnessed nudges as a strategy to influence behavior change across diverse areas, including taxation, retirement savings, environmental sustainability, and organ donation.

While nudging can be an effective strategy in various contexts, including environmental behavior change, its effectiveness in promoting environmental behavior in private companies can sometimes be limited. Listed are the few findings from the literature that hinder the effectiveness of nudge in private companies. Firstly, (Weber et al, 2017) in his research highlights that nudges have a limited scope of influence as private companies have complex organizational structures, decision-making processes, and diverse employee populations. Nudging relies on altering the decision-making environment to influence behavior, but in private companies, there may be multiple factors that influence behavior beyond the decision-making context (Weber et al, 2017). Nudges alone may not be sufficient to address all the underlying barriers and motivations that affect environmental behavior in such settings (Weber et al, 2017). It is no secret that private companies often prioritize profit generation and operational efficiency (Kollmuss & Agyeman, 2002). Environmental concerns may not be the primary focus, especially if they are perceived as conflicting with short-term financial goals. In such cases, nudges promoting environmental behavior may not have strong alignment with the company's incentives and may be seen as additional burdens or distractions (Kollmuss & Agyeman, 2002). Implementing nudges within private companies may also face resistance from employees who are resistant to change or perceive nudges as attempts to manipulate their behavior (Hargreaves & Nye, 2016). Hargreaves and Nye also mention that without proper communication, involvement, and engagement, employees may resist or undermine the nudges, reducing their effectiveness in promoting sustainable behavior (Hargreaves & Nye, 2016.. Nudges often work best when there is monitoring and enforcement of the desired behavior. In private companies, without proper monitoring mechanisms and enforcement measures, employees may not feel compelled to adhere to the nudges (Shu et al, 2012). This can weaken the effectiveness of nudging strategies and limit their impact on bringing behavioral change. The complex reasoning as to why nudges fail in private companies would be because it often requires a comprehensive approach that includes a combination of nudges, education, incentives, and organizational culture change (Gatersleben, 2014). Relying solely on nudges may not be sufficient to bring about meaningful and sustained changes in behavior, especially in complex organizational settings. It is worth noting that the effectiveness of nudging in private companies can vary depending on the specific context, organizational culture, and the design and implementation of the nudges themselves.

3.5 Towards the Green Nudge Strategy

Nudge marketing is a tactic employed by many businesses and organizations to influence a customer's choice subtly and covertly by providing the person with suggestions and reinforcements (Sanghi et al., 2018). Various sectors use nudge marketing to influence consumer decisions in favor of the company. In a fast-growing industry like the e-commerce industry, nudging plays a crucial role in attracting and convincing customers to make purchases. The problem arises from the fact that though nudging and marketing are very similar, the intentions behind them are quite contrary. While marketing is about selling more, nudging is about achieving a goal of something good for the consumer, society, or the environment (Petersson, 2019).

Lee and Park (2007) identify Integrated Marketing Communications (IMC) as a concept wherein a company strategically coordinates its diverse messages and multiple communication channels, combining them into a cohesive set of marketing communications. This aims to convey a clear and consistent message and image about the company and its contributions to the target market. Recently, as the market demands communication focused on environmental respect, some scholars have begun to examine IMC from a sustainability perspective (Bormane, 2018; Alevizou et al., 2019). Bormane (2018) defines IMC for sustainability as a novel research field that encompasses three areas: climate change, corporate social responsibility, and sustainable consumption. It is defined as the incorporation of marketing activities that integrate opportunities for public welfare and promote balanced economic development, thereby enhancing the value of product or service consumption through the company's communication with market participants and utilization of distribution channels for long-term benefits (Bormane, 2018). For an e-commerce website to nudge people toward pro-environmental behavior IMC should be done in a way that reflects the brand's commitment to environmental protection and incorporates the message in most of its communication efforts.

3.6 Why do nudges fail?

3.6.1 Factors that influence nudge effectiveness and Resistance

Nudging is a powerful tool to influence consumer behavior however, the effectiveness and resistance of the nudge can be quite questionable depending on the context. Literature shows that there are various aspects of nudging that make it effective enough to induce a behavioral change. To create an effective nudge it is necessary to understand what causes nudge resistance.

Trust and Transparency: The degree of transparency and reliability of the organization/ website where the nudge is introduced has a big impact on how effective the change in behavior would be.

According to (Sunstein, 2016) people are more inclined to accept nudges when they believe the source to be trustworthy and reliable. therefore, building trust can facilitate reducing resistance and boosting compliance by being open and transparent about the goal and possible outcomes of the nudge.

Personalization and Relevance: Personalised nudges that are tailored towards individual characteristics and circumstances are more effective as interventions. These tailored nudges resonate with people and increase the possibility of behavioral change by taking into account various factors such as demographics, past preferences, and behavior (Wood, W., & Rünger, D., 2016). Relevance is another factor that is essential in capturing the attention of a consumer and engaging them in the decision-making process.

Simple and Striking: The way a nudge is designed and presented plays a crucial role in its effectiveness. Salient nudges or interventions that stick out and grab attention are more likely to influence behavior (Thaler & Sunstein, 2008). As discussed above, a nudge should be simple and easy to understand because complex messages can confuse the consumers or lead to cognitive overload which brings more resistance to the nudge (Payne, 1993).

Social influence and social norms: Humans are greatly influenced by social norms and the way other people behave. Nudges that influence people's behavior by conveying a pattern of the desired within a particular group can be a motivator for behavior change (Schultz, 2005). (Goldstein et. al, 2008) in their research about social norms discusses how emphasizing the behavior of peers and influential people can generate a social influence that will promote compliance.

Timing and Context: The timing and context in which a nudge is introduced can have a huge impact on how effective the nudge would be. Studies show that if nudges are presented during times when decisions are being made or behaviors are most likely to occur, then people are more receptive to them (Milkman et. al, 2011).

Framing and Messaging: A nudge's effectiveness depends on how the nudge is framed and what language/ tone is used to present this message. According to research, nudges that use positive framing, which emphasizes gains or benefits after the change in behavior tend to be more effective than negative framing which involves the focus on losses or potential negative outcomes (Johnson, E. J., & Goldstein, D. 2003). It is also important to use clear and concise messaging which resonates with the target audience to increase the effectiveness of the nudge.

Autonomy: Respecting an individual's right in a way that the nudge does not perceive to limit the freedom of choice is crucial in preventing nudge resistance. When people feel like their autonomy is under question or their choices are being manipulated, they might resist the nudge or push against it leading to counterproductive behaviors (Reisch, L. A., & Sunstein, C. R. 2016). Nudges that respect the freedom of choice of individuals and allow individuals to opt -out of the nudge are typically well-received.

Impact over time: Nudges must be created with the intention of having a long-lasting effect. Nudges are proven to influence temporary behavioral changes however, nudge interventions should take into account reinforcing mechanisms, feedback loops, and having continuous support systems (Thaler, R.H., 2018).
To nudge consumers toward sustainable behaviors these factors must be taken into while creating a nudge. It is, however, essential to understand that individual responses to nudges can be different depending on the context in which they are applied. A nuanced understanding of these factors along with rigorous testing with valuation and feedback can help achieve the best possible outcome.

3.7 Is Nuding Ethical?

While nudges have received a lot of attention and have been used in a variety of policy domains and marketing strategies, it is essential to assess the potential ethical concerns associated with the intervention. Literature claim that nudges can be manipulative and violate people's freedom of choice and autonomy (Sustein, C.R., 2015). Critics argue that nudges could take advantage of people's cognitive biases and subtly pressure them into making choices that might not be consistent with their actual preferences or values (Rebonato, R., 2017). Researchers stress the significance of informed consent and make the argument that people should have the freedom to make their own decisions without intervention (Rebonato, R., 2017). Nudges are criticized for having a paternalistic attitude because the people who design the nudge presume that they know what is best for people, even if individuals themselves might have different preferences or values than the nudge that's created (Bovens, L.2009). Thus nudges could potentially limit an individual's ability to make their own decisions.

A nudge is often presented without the individual's consent. Therefore, there is a higher risk that consumers could be manipulated and exploited without their knowledge (Hausman, D. M., & Welch, B.,2010). This questions the transparency and fairness of the nudges and is hugely influential when powerful entities like governments or corporations incorporate nudges to prioritize their hidden interests above what is best for the individuals which can result in an unjust outcome for individuals (Hausman, D. M., & Welch, B.,2010). Allowing nudges without an ethical framework or policy can lead to more intrusive interventions that can erode personal freedom and privacy. Similarly, nudges usually don't take into account the right to information, individuals not only are unaware of the nudges but also cannot opt out of the nudge (Bovens, 2009). The issues presented in the literature about autonomy, manipulation, unexpected effects, transparency, and the potential for inappropriate use highlight the necessity of giving the ethical implications of nudges considerable thought. While using nudges responsibly and ethically can result in beneficial outcomes, it is essential to retain a critical

viewpoint and promote a larger social dialogue to ensure that nudge treatments are consistent with core ethical values.

3.8 Creating a Green Nudge

In order to conduct this experiment effectively, it is crucial to understand the commonly used techniques of nudging that promote environmentally-friendly actions within private organizational settings.

1. Default options which involve setting pro-environmental behavior or the sustainable option as the default for the consumer to choose from (Thaler & Sunstein, 2008).
2. Social Norms show that highly the sustainable behavior of peers can influence people to choose more environmentally friendly options because it is perceived as the most acceptable social behavior (Schultz et al, 2007)
3. Feedback and information provision: Providing consumers with personalized feedback on their environmental impact can raise awareness and encourage behavioral changes (Allcott, 2011)

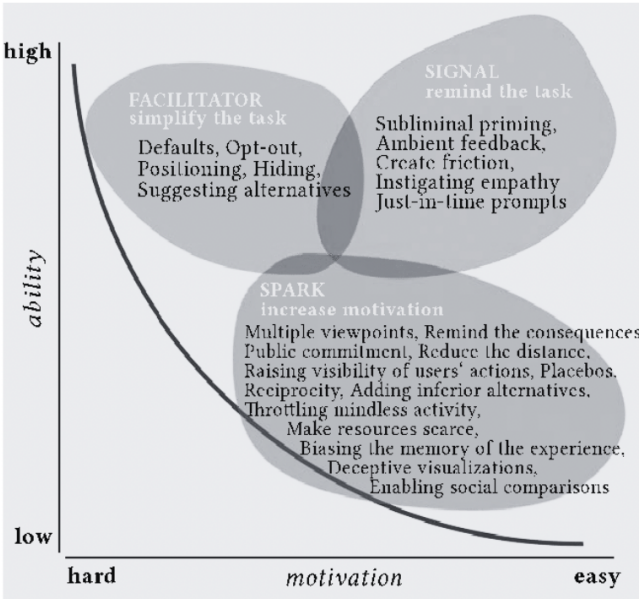

Figure 3-5: Three types of triggers with 23 nudge mechanisms

Source: 23 Ways to Nudge: A Review of Technology-Mediated Nudging in Human-Computer Interaction by Caraban et. al, 2019.

Caraban et. al, 2019 in their study aims to address what nudges are more effective in inducing a pro-environmental behavior. They divided 23 nudges (Figure 3-5) into three different categories

facilitator nudge, which simplifies the task , Signal nudges which remind people about pro-environmental behavior and spark nudges which give the motivation to nudge toward pro-environmental behavior (Caraban et. al, 2019). This study concluded that framing messages can best evoke pro-environmental behavior in consumers.

3.9 Summary of Literature

E-commerce and sustainable consumption are important areas where collective efforts are needed to minimize negative environmental impacts. However, consumers' positive attitudes towards environmental protection do not always translate into sustainable purchasing behavior, resulting in a "green gap." Nudging, a strategy used by companies, can help bridge this gap and influence consumers toward pro-environmental behavior. Digital nudging, an extension of traditional nudging, is a powerful tool in e-commerce to change consumer behavior and thinking. Studies have shown that default nudges, social norms, personalized feedback, and positively framed messages can effectively influence sustainable purchase behavior. However, the effectiveness of nudges can vary depending on the context and target audience. Nudge marketing is commonly used in e-commerce to subtly influence consumer choices. Examples include suggesting complementary eco-friendly products, creating a sense of urgency, and offering incentives for pro-environmental behavior. Integrated Marketing Communications (IMC) can also play a role in promoting sustainability by conveying a consistent message about a company's environmental commitment. While nudging is a powerful tool, its effectiveness and resistance can be influenced by factors such as trust and transparency, personalization, simplicity, social influence, timing and context, framing and messaging, autonomy, and long-term impact. Framing is found to be one of the most effective nudges to evoke pro-environmental behavior. Understanding these factors and tailoring nudges accordingly is crucial for successful behavior change. Overall, nudging in e-commerce and marketing strategies can play a significant role in promoting sustainable consumption and influencing consumer behavior towards environmentally friendly choices.

4. Analytical Framework

4.1 Designing a Digital Nudge

Research Questions 1a and 1b of the experiment aimed to assess the effectiveness of different types of nudges in promoting pro-environmental behavior. To achieve this, digital nudges will be developed and implemented.

- RQ 1 a: Is the use of local messaging more effective than global messaging in nudging individuals towards pro-environmental behavior?
- RQ 1 b: Is the use of emotional messaging more effective than factual messaging in nudging individuals towards pro-environmental behavior?

For the purpose of this thesis study, an analytical framework has been created by modifying Schneider et al's framework in order to answer these research questions. (Schneider et al, 2017) in their study came up with a design process for designing nudges in digital platforms. Step 1 of the decision-making process involves defining the objective in the given situation, which involves understanding the overall goal of the organization. For instance, an e-commerce platform may aim to increase sales, while governmental taxing authorities may seek to simplify the tax filing process (Johnson, 2018; Smith, 2020). Step 2 focuses on comprehending the users and their decision-making processes, which are influenced by various heuristics and biases that can impact their choices positively or negatively (Kahneman & Tversky, 1974; Thaler & Sunstein, 2008). Moving on to Step 3, the designer chooses suitable nudging mechanisms based on the established goals and the recognized heuristics and biases (Thaler & Sunstein, 2008). In Step 4, the effectiveness of the selected nudges is tested, especially in digital environments where alternative designs can be generated easily and online experiments like A/B testing can be conducted to evaluate the impact of the nudges (Ecker et al., 2021; Kohavi et al., 2013). Testing is crucial as the success of a nudge relies on factors such as context, goals, and the target audience. It is vital to consider the distinct characteristics of different platforms and user preferences (Thaler & Sunstein, 2008). If a nudge fails to yield the desired effect, the designer may need to reassess the implementation, analyze the influencing heuristics and biases, or even redefine the goals of the decision-making situation (Kizilcec et al., 2016; Thaler & Sunstein, 2008).

Further developments have been made to the (Schneider et al, 2017) framework in order to design digital nudges that prioritize the user's best interest and incorporate a sustainable aspect in the context of Apotea research. While their design process has served as a foundational basis, modifications have been implemented to enhance its effectiveness and applicability. The four steps to designing a nudge for the empirical experiment and designing a nudge are given below.

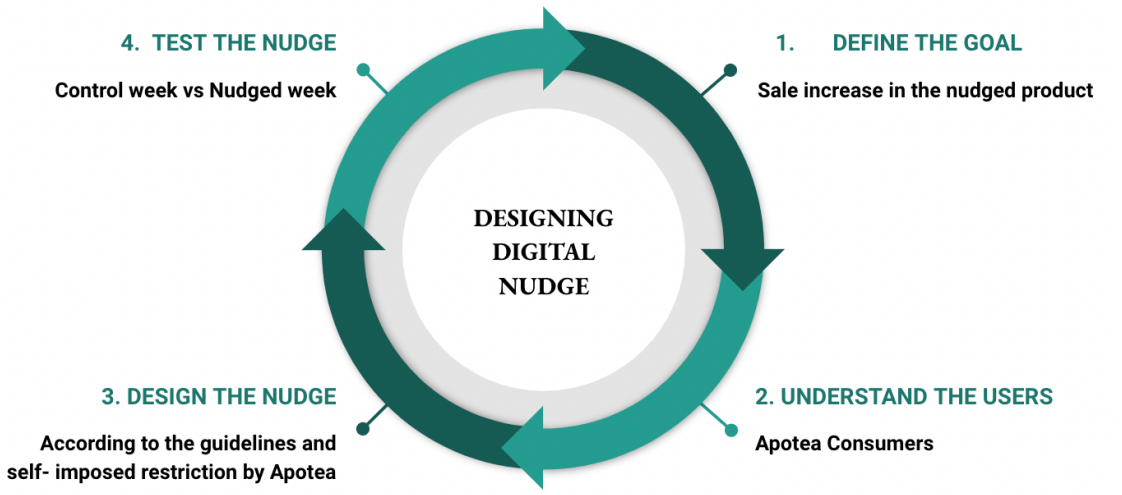

Figure 4-1: Adapted and Modified Model of Schneider et al design process for designing a nudge for Apotea

Source: Designed by the author

Step 1 – Define the goal: The goal of Apotea is to nudge individuals towards pro-environmental behavior, specifically in the context of their purchasing decisions.

Step 2 – Understand the users: Conduct research to answer RQ 1a and RQ 1b. Determine whether the use of local messaging or global messaging is more effective in nudging individuals towards pro-environmental behavior (RQ 1a). Additionally, investigate whether emotional messaging or factual messaging is more effective in achieving the same goal (RQ 1b). This research will provide insights into the heuristics and biases that influence decision-making related to pro-environmental behavior.

Step 3 – Design the nudge: Based on the findings from Step 2, design a nudge that aligns with the goal of nudging individuals towards pro-environmental behavior. If the research suggests that local messaging is more effective, the nudge could involve emphasizing the local impact of environmentally friendly choices. If emotional messaging is found to be more effective, the nudge could evoke emotions related to environmental concerns. It is important to consider the ethical implications of the nudges and ensure they align with the overall goal.

Step 4 – Test the nudge: Implement the designed nudge on the Apotea platform and conduct online experiments to test its effectiveness. Use A/B testing methods to compare the impact of local messaging versus global messaging (as per RQ 1a) and emotional messaging versus factual messaging (as per RQ 1b) in nudging individuals towards pro-environmental behavior. Collect data and analyze the results to determine which nudge implementation is more effective in achieving the desired goal.

4.2 Hypotheses Development: Local vs Global Messaging

Table 4-1 Research indicating that localized messaging is more effective than global messaging

Table 4-1 presents research studies that provide evidence for the effectiveness of localized messaging over global messaging in promoting pro-environmental behavior. However, it is important to recognize that these studies were conducted in offline settings, and further research is needed to investigate whether similar results can be replicated in digital/online e-commerce settings. To address this gap, an analytical framework is proposed, drawing on Pro-Environmental Behavior Theory and Information Framing Theory. The framework proposes three hypotheses, suggesting that local messaging will lead to greater pro-environmental behavior compared to no PEB-related information and global messaging and that global messaging will lead to higher PEB compared to no PEB-related information.

Study	Main Findings	Reference
Kizilcec et al. (2015)	Local messaging emphasizing the energy-saving behaviors of immediate neighbors increased pro-environmental actions.	Kizilcec, R. F., Bailenson, J. N., & Reeves, B. (2015). The ecology of the self: Impact of online self-presentation on environmental conservation. Journal of Environmental Psychology, 45, 136-146.
Geiger et al. (2017)	Local messaging tailored to specific low-income communities was more effective in promoting energy conservation than global messaging.	Geiger, N., Swartz, S. M., & Molter, T. W. (2017). Context matters: Examining the efficacy of local messaging for promoting energy conservation in low-income communities. Journal of Environmental Psychology, 52, 11-19.

Schultz et al. (2007)	Local norms (e.g., the behavior of neighbors) had a stronger impact on individual behavior than global norms (e.g., national statistics).	Schultz, P. W., Nolan, J. M., Cialdini, R. B., Goldstein, N. J., & Griskevicius, V. (2007). The constructive, destructive, and reconstructive power of social norms. Psychological Science, 18(5), 429-434.
Smith & Louis (2008)	Descriptive norms (actual behavior) had a stronger influence on behavior than injunctive norms (perceived expectations). Local messaging emphasizing nearby individuals' behavior can be more effective.	Smith, H. J., & Louis, W. R. (2008). Do as we say and as we do: The interplay of descriptive and injunctive group norms in the attitude–behavior relationship. British Journal of Social Psychology, 47(4), 647-666.

Source: Designed by the author

Table 4-1 highlights the most prominent studies that indicate that local messaging is more effective in bringing a pro-environmental behavior than a global one. However, it is relevant to note that these studies have been done in offline settings and therefore it would be interesting to see whether results could be replicated in a digital/online e-commerce setting.

The analytical framework thus aims to examine the impact of local messaging and global messaging on an individual's pro-environmental behavior (PEB). PEB refers to actions taken by individuals to protect or preserve the environment. Local messaging focuses on emphasizing the relevance and impact of environmental issues at the local level, while global messaging highlights the broader, global consequences of environmental degradation. This framework draws on two theoretical perspectives:

a. Pro-Environmental Behavior Theory: This theory suggests that an individual's behavior towards the environment is influenced by their awareness, attitudes, and perceived efficacy to make a positive change. Providing information and messages that enhance these factors can lead to increased PEB (Stern, 2000).

b. Information Framing Theory: This theory suggests that the way information is framed or presented can significantly impact an individual's attitudes and behavior. Local messaging and global messaging represent different frames for conveying environmental information (Petty & Cacioppo, 1986).

Hypotheses Development:

H1: Local messaging leads to a greater level of PEB compared to providing no PEB-related information.

Local messaging emphasizes the relevance of environmental issues to an individual's immediate surroundings, fostering a sense of personal connection and responsibility. This localized focus is expected to increase individuals' motivation to engage in PEB, leading to a higher level of behavior change compared to situations where no PEB-related information is provided.

H2: Global messaging leads to a greater level of PEB compared to providing no PEB-related information.

Global messaging highlights the broader, global consequences of environmental degradation, aiming to evoke a sense of collective responsibility and urgency. By emphasizing the interconnectedness of environmental issues, global messaging can enhance individuals' awareness and perceived efficacy to make a positive change, thereby increasing their PEB.

H3: Local messaging leads to a greater level of PEB compared to Global Messaging.

Local messaging and global messaging represent two distinct frames for conveying environmental information. Local messaging focuses on the proximity and direct relevance of environmental issues to an individual's immediate surroundings, while global messaging emphasizes the broader, global consequences. It is hypothesized that local messaging, by creating a stronger personal connection and sense of responsibility, will lead to a higher level of PEB compared to global messaging.

The framework suggests conducting an experimental study to examine the impact of local messaging and global messaging on an individual's PEB. Participants could be exposed to different messaging conditions (local messaging, global messaging, no PEB-related information), and their PEB level could be measured using self-report scales, behavioral observations, or other relevant measures.

4.3 Hypotheses Development: Emotional vs Factual Messaging

Table 4-2: Research indicating that emotional messaging is more effective than factual messaging.

Study	Main Findings	Reference
Fisher & Wakefield (1998)	Explores the role of emotional messaging and group identification in promoting behavior change.	Fisher, R. J., & Wakefield, K. (1998). Psychology & Marketing.
Milfont & Duckitt (2010)	Discusses the development and validation of the Environmental Attitudes Inventory (EAI), a tool to assess environmental attitudes.	Milfont, T. L., & Duckitt, J. (2010). Journal of Environmental Psychology.
Gifford & Nilsson (2014)	Provides a comprehensive review of personal and social factors influencing pro-environmental concern and behavior.	Gifford, R., & Nilsson, A. (2014). International Journal of Psychology.
Böhm, Pfister & Kastenholz (2013)	Conducts a meta-analysis on the effectiveness of corporate environmental communication for employees' pro-environmental behaviors.	Böhm, G., Pfister, H. R., & Kastenholz, H. (2013). Journal of Environmental Psychology.

Kahan et al. (2012)	Explore how people's attitudes toward climate change can be influenced by their scientific literacy and numeracy.	Kahan, D. M., Peters, E., Wittlin, M., Slovic, P., Ouellette, L. L., Braman, D., & Mandel, G. (2012). Nature Climate Change.

Source: Designed by the author

Table 4-2 highlights the most prominent studies that indicate that emotional messaging is more effective in bringing a pro-environmental behavior than a factual one. However, it is important to notice that none of these studies have looked directly into emotional vs factual messaging in an online setting, these studies should be seen as precursors to build this hypothesis.

H1: Emotional messaging leads to a greater level of PEB compared to providing no PEB-related information.

This hypothesis suggests that emotional messaging, by evoking strong emotional responses such as empathy, guilt, or happiness, can positively influence an individual's engagement in PEB. Emotional messaging may resonate with individuals on a deeper level, resulting in a higher likelihood of adopting pro-environmental behaviors. Several studies have demonstrated the effectiveness of emotional appeals in promoting PEB (e.g., Chen et al., 2019; Feinberg and Willer, 2013).

H2: Factual messaging leads to a greater level of PEB compared to providing no PEB-related information.

This hypothesis claims that by providing individuals with factual information about the importance of PEB and its positive impact on the environment can enhance their motivation to engage in pro-environmental behaviors. Factual messaging appeals to individuals' rationality, providing them with knowledge and understanding of the environmental issues at hand. Numerous studies have indicated the effectiveness of factual information in promoting PEB (e.g., Vining and Ebreo, 2002; Schultz et al., 2007).

H3: Emotional messaging leads to a greater level of PEB compared to factual Messaging.

This hypothesis suggests that emotional appeals are more effective than factual messaging in promoting PEB. Emotional appeals can elicit a stronger emotional connection and motivation for behavior

change compared to providing straightforward information. Emotional messaging may tap into individuals' values, personal relevance, and emotional investment in environmental issues, resulting in a higher likelihood of engaging in pro-environmental behaviors. Research has shown that emotional appeals can be more persuasive than factual appeals in the context of PEB (e.g., Milfont and Sibley, 2014; Tanner et al., 2004).

The analytical framework provides a basis for investigating the differential effects of local messaging vs global messaging on an individual's PEB and emotional vs factual messaging on an individual's PEB. The hypotheses formulated within the framework can guide empirical research to shed light on the effectiveness of these messaging strategies in promoting sustainable behavior.

5. Research Design and Methodology

5.1 Research Approach

This research is based on a literature review and a quantitative, true experimental-based research design to explore nudging and pro-environmental behavior in online environments through the above-mentioned hypotheses. For true-experimental-based research, the effect of an intervention or nudge is tested by comparing two groups i.e., the experimental group or the treatment group and the control group (Babbie, 2010). A Deductive approach was taken, where I analyzed existing literature in the field to build a conceptual understanding of the field with an effort to develop the hypotheses used for the study.

5.1.1 The Literature Review

The methods used for this literature review were selected with the goal of providing an overview of knowledge and discourse surrounding nudges and their impact on sustainable consumption behavior, as well as specific cases for digital nudges. My literature review was undertaken in two phases. In order to understand the prevalent digital nudges that could be used to evoke pro-environmental behavior in a consumer, I used grey and academic literature found on the Google search engine and Google Scholar databases respectively. The terms that I used were 'Digitization', 'Digital Nudges', 'Consumer Behavior', and 'Pro-Environmental Behavior'.

To get more insights into the literature surrounding how online companies use nudging as a tool to change consumer behavior, I used combined search terms such as 'digital marketing and nudging' and 'Marketing and Consumer Behavior'. For my first research question which makes an effort to find evidence on digital nudges being effective in changing consumer behavior toward sustainable shopping practices, I combined the above-mentioned keywords with 'examples', 'studies', and 'experiments' to further investigate research in the field. The selected literature was sorted according to relevance through a quick analysis of the abstract, introduction, and conclusion, with relevant articles analyzed and placed within a synthesis matrix that was organized according to the main themes from the research questions.

5.1.2 The Case Study

Apotea.se is, the case company for this study. Being Sweden's largest online pharmacy, Apotea offers over 24,000 over-the-counter products and almost 16,000 prescription medicines for humans and animals and is Sweden's most sustainable e-commerce according to the Sustainable Brand Index 2020 and 2021(Apotea, 2023). Also awarded the top choice for Sweden's pharmaceuticals 'Good Choice'

Apotea aims to improve sustainable consumer behavior (Apotea, 2023). Apotea has shown a keen interest in assisting its customers in embracing sustainability by encouraging them to adopt more environmentally conscious behaviors. This spurred an interest in what information can be given or how the information can be presented in a way that consumers are nudged to make pro-environmental choices in their shopping habits. Thus, this research will have a quantitative analysis of nudging practices and the pro-environmental behavior of people who shopped at Apotea and to what extent nudging influences their shopping practices. The table below gives an overview of how each research question was answered.

Table 5-1 Ways to answer the Research Questions

Research Question	***RQ1:*** To what extent can digital nudges encourage environmentally sustainable consumer decisions in online shopping contexts? ***RQ 2:*** How can companies use nudging as a tool to encourage sustainable consumption?	***RQ 1 a***: Is the use of local messaging more effective than global messaging in nudging individuals towards pro-environmental behavior? ***RQ 1 b:*** Is the use of emotional messaging more effective than factual messaging in nudging individuals towards pro-environmental behavior?
Methods for Data Collection	Literature review from research	An experiment on the Apotea website
Type of Data	This data will be systematically identified and structured by overlying themes by means of the literature review	Quantitative data gathered from the experiment according to which each hypothesis was tested
Data Sources	Academic articles, reports, and documents (e.g., Lund University Library Online Database, Google Scholar)	Apotea website information
Methods for Data Analysis	Systematic Review	Quantitative data analysis in the SPSS software

Source: Designed by Author

5.2 Study Duration

The study was conducted over a two-week period. The control week, serving as the baseline, spanned from March 20, 2023, to Monday, March 26, 2023, Sunday. In the second week of the experiment, from March 27, 2023, to April 2, 2023, specific products were selected for nudging. These products were chosen based on their alignment with sustainability criteria, such as organic, natural, vegan, fairtrade, eco-labeled, or Vavald categories.

5.3 Experimental Conditions

The participants of this study are people who are users of the Apotea website. Participants should have a diverse demographic background to ensure the generalizability of the findings. The independent variable in this study is the engagement rate. Participants will be randomly assigned to one of the following experimental conditions:

a) Local message condition (Nudge 1): Participants will be exposed to local messages emphasizing the importance of pro-environmental behavior in their local community.

b) Global message condition (Nudge 2): Participants will be exposed to global messages emphasizing the importance of pro-environmental behavior for the planet as a whole.

c) Control condition: Participants in this condition will not be exposed to any specific messages and will navigate the Apotea website as usual.

The dependent variable is the depending samples which are comparing the performance of the same products on two different occasions before and during nudging.

5.4 Product Selection

In order to test these hypotheses among various products, five main product categories were identified. Baby products, food products, personal care, hygiene products, cleaning products, and medicine. The reasoning behind this selection is the fact that people behave differently to different products. For example, an individual buying a baby product tends to give more attention to the environmental impact of the product rather than a product that would be used to clean the house. Two products were selected from each mentioned category. The products were chosen based on criteria like organic, eco-labeled, vegan, fairtrade, and Valvald (in the case of medicines). Valvald is a requirement set by the pharmaceutical industry to make the products to use-phase of over-the-counter medicines more sustainable. As per the collaboration with Apotea, we tried and looked through Swedish green marketing guidelines, ICC guidelines, sustainability certification guidelines, and Valvald criteria to pick the products that fit in the category which would be legally allowed to present environmental

information on Apotea's website. After identifying the products' local and global messaging were given that best fit the product description.

5.5 Nudge Creation and Development

The nudge interventions were designed to be more personalized and impactful. Various techniques such as content reiteration, highlighting, priming, framing, and third-party labeling were employed to enhance the effectiveness of the nudges. The messages were initially presented in Swedish since the target audience consisted mainly of Swedish-speaking individuals. However, the Apotea website had the functionality to translate the content into English for non-Swedish speakers. This followed the development and implementation of the messaging intervention on the Apotea website, ensuring the messages are prominently displayed and noticeable during participants' interactions. Then Apotea monitored and recorded participants' pro-environmental behaviors during their browsing session on the website using google analytics. The products that were used for the experiment along with their before and after nudged interface are shown in the Appendix A. An example of how the nudge was displayed is given below.

5.5.1 Nudge for Global Messaging

Product Category 1: Baby Products

Before Nudging

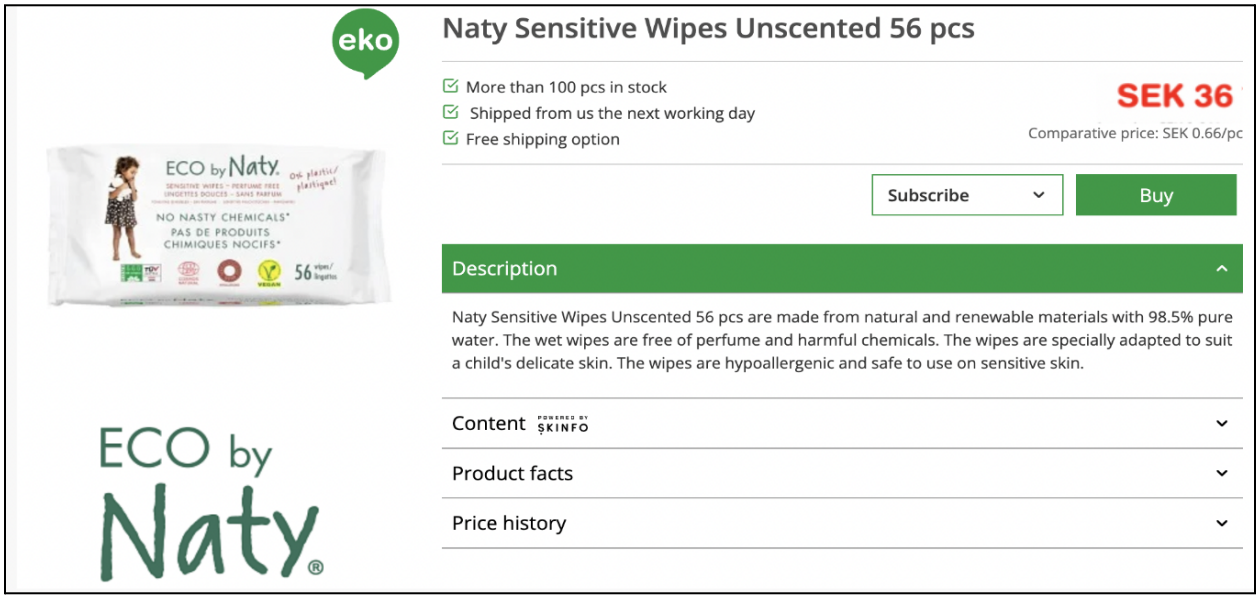

Figure 5-1: Product Category 1: Baby Product, Before Nudging

Source: Apotea Website

After Nudging

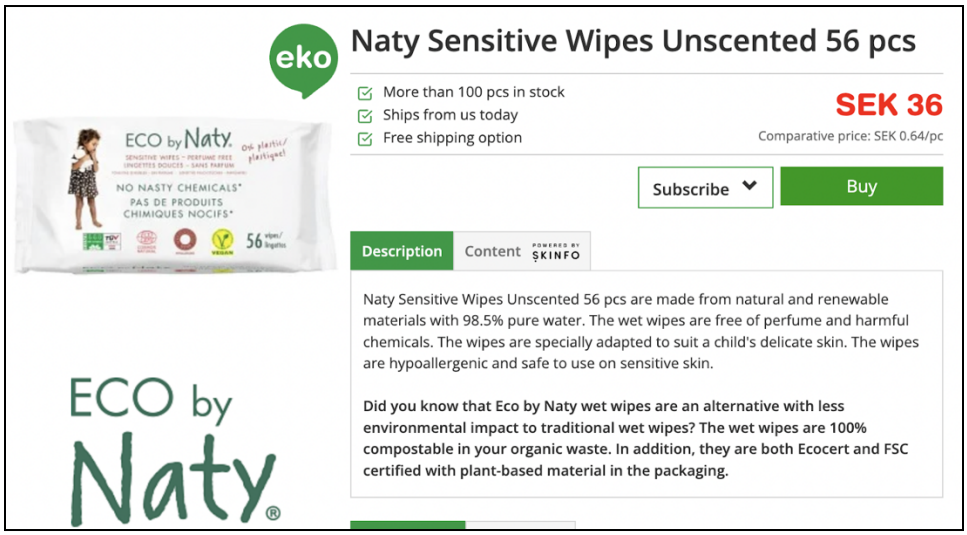

Figure 5-2: Product Category 1: Baby Product, After Nudging

Source: Apotea Website

5.5.2 Nudge for Emotional vs Factual Messaging

The initial research journey was set to identify how digital nudges could be used to promote pro-environmental behavior. Working closely with Apotea's sustainability team, I initially created two types of nudges: an emotional nudge and a factual nudge see. Figure 5-3. The emotional nudge aimed to evoke concern for future generations by highlighting the dire consequences of climate change. On the other hand, the factual nudge provided straightforward information about climate change and plastic pollution. Upon conversations with Apotea's sustainability team, we quickly realized that the practical process of implementing the nudge at Apotea brought to light various complexities and restrictions. One of the primary challenges we faced was the company's guidelines for advertising specific products. While these guidelines aimed to prevent greenwashing and ensure factual accuracy, they posed significant obstacles to the experimental design. The guidelines created a self-imposed restriction that prohibited the use of emotional messages in our nudges. Instead, we were required to provide consumers with factually correct information. This presented us with a fascinating dilemma: could we still achieve our research goals and assess the effectiveness of emotional messaging versus factual messaging under these limitations? To answer this question, we adapted our research approach and opted for a qualitative data collection with relevance to the research more general . This new methodology allowed us to conduct a case study analysis, exploring the effectiveness of emotional and

factual nudges within the constraints of Apotea's guidelines. We were intrigued to see how this real-world implementation would impact the outcomes and shed light on the feasibility and practicality of using nudges as tools for sustainable consumption in corporate settings.

Although the initial research question had shifted, the change presented an opportunity to delve into the effectiveness of these two approaches. The case study format allowed the research to capture the nuances of implementing nudges within a company and the intricate challenges that emerged along the way. Throughout this journey, an interview with Desire, a member of Apotea's sustainability department, was also done to gain valuable insights and firsthand information about the complexities of marketing green products and adhering to the company's guidelines. In conclusion, what began as a quantitative analysis of the power of digital nudges transformed into a captivating case study. This unexpected shift not only added depth and relevance to the research but also provided valuable insights into the possibilities and difficulties of implementing nudges as a tool for promoting sustainable consumption within companies like Apotea.

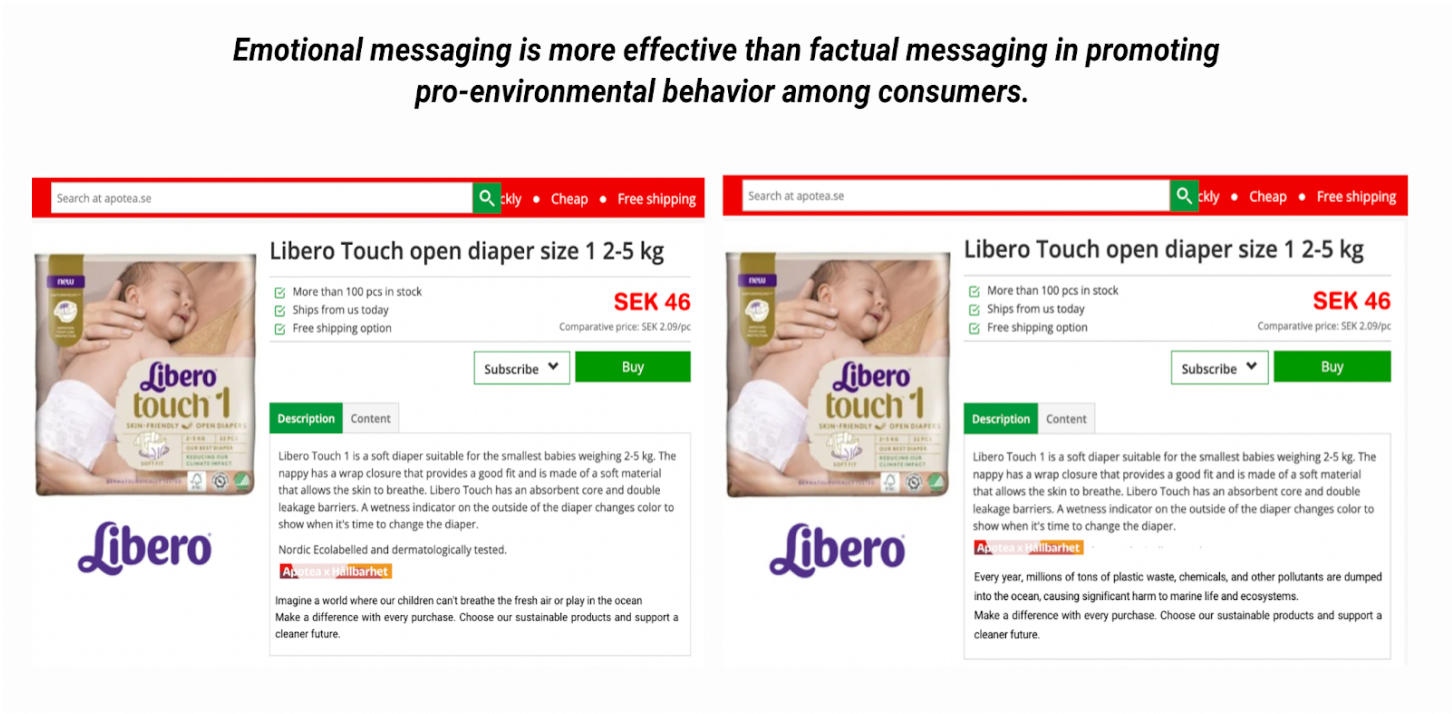

Figure 5-3: Emotional vs. Factual Nudge

Source: Apotea's website nudge prototype designed by author

5.6 Data Collection and Analysis

The data collected for analysis included page visits, time spent on the website, and the number of purchases made. These metrics were provided by Apotea, and their definitions were clarified to ensure accurate data interpretation. Additional details of the collected data are provided in the Appendix. Appropriate statistical techniques, such as calculations of increased or decreased sales, average session duration, average engagement time, and page visits, were employed to analyze the collected data. First, the collected data were analyzed using appropriate statistical methods, such as analysis of variance SPSS, to compare the effectiveness of the local and global messages in promoting pro-environmental behavior. Due to a high number of sales, the Google Shopping channel was turned off to manage the number of product purchases that were placed. This change could have influenced the sales, resulting in a difference of -11.36% in the sales data. The impact of this difference will be later adjusted against the sales data in week 2 for further analysis. The results of the data analysis were interpreted and evaluated based on the research questions and hypotheses. It was assumed that these consumers remained consistent throughout the experiment. The sample characteristics were diverse to ensure the generalizability of the findings. An interview was later conducted with the sustainability project officer Desire Cichy, from Apotea to gain deeper insights into the results, interpret the data, and understand the underlying context and practicalities of nudging a real-time e-commerce website. By following this methodology, the study aimed to gain insights into the effectiveness of local and global messages in promoting pro-environmental behavior on the Apotea website and contribute to the existing literature on nudging and environmental psychology.

5.7 Ethical Considerations

Ethical approval was not required from the research ethics committee as this study is conducted solely for educational purposes. Ethical considerations of nudging were taken into account, ensuring that the participant's autonomy and privacy were respected throughout the experiment and that no personal data were collected for the purpose of this thesis.

6. Results

6.1 Quantitative Data Analysis through SPSS

This section presents the results of comprehensive data provided by Apotea. The data provided by Apotea is derived from their sales and marketing department for the period in which the experiment was conducted. As a leading company in the field of e-commerce, Apotea possesses an extensive customer base and a vast range of products, making its dataset a valuable resource for exploring nudges and their effectiveness. The following subsections will present the data, key findings, and outcomes of the analysis.

6.1.1 Daily sales for the test period before nudging

Table 6-1 provides information on the daily sales of products with local and global messaging during the test period before nudging from 20/03/2023 to 26/03/2023. This table contains the product name and displays the sales figures for each day of the week, as well as the total sales for the entire week.

Table 6-1: Daily sales data before nudging

Product	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
	20/03/2023	21/03/2023	22/03/2023	23/03/2023	24/03/2023	25/03/2023	26/03/2023	
Products with Local Messaging								
Barnängen Children's Oil Eco	49	24	43	30	21	20	45	232
Dave & Jon's Dadlar Sour Cola	746	760	782	641	477	486	608	4500
Häxan Badrum	20	23	15	20	17	24	22	141
BARR Sweden Organic Cellulite Oil	0	0	0	0	0	0	0	0
Melatan tablett	181	165	154	122	104	101	156	983
Products with Global Messaging								
Pändy Candy Sour Fish	41	54	58	43	21	11	40	268

Naty Sensitive Wipes Unscented	**31**	**14**		**33**	**21**	**27**	**46**	**172**
Neutral Washing liquid	**198**	**43**	**45**	**31**	**33**	**51**	**64**	**465**
Urtekram Nordic Beauty Tea Shampoo	**33**	**25**	**32**	**22**	**19**	**28**	**30**	**189**
Allegra Medicine	**318**	**280**	**283**	**250**	**239**	**199**	**268**	**1837**

Source: Data collected by Apotea

6.1.2 Daily sales for the test period during nudging

Table 6-2 provides information on the daily sales of products with local and global messaging during the test period before nudging from 27/03/2023 to 04/02/2023. This table contains the product name and displays the sales figures for each day of the week, as well as the total sales for the entire week.

Table 6-2: Daily sales data after nudging

Product	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
	3/27/2023	3/28/2023	3/29/2023	3/30/2023	3/31/2023	4/1/2023	4/2/2023	
Products with Local messaging								
Barnängen Children's Oil Eco	**26**	**34**	**24**	**18**	**15**	**16**	**37**	**170**
Dave & Jon's Dadlar Sour Cola	**732**	**700**	**699**	**573**	**351**	**279**	**482**	**3816**
Häxan Badrum	**27**	**8**	**16**	**20**	**6**	**10**	**12**	**99**
BARR Sweden Organic Cellulite Oil	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**2**
Melatan tablett	**191**	**128**	**141**	**98**	**67**	**72**	**139**	**836**
Products with Global messaging								
Pändy Candy Sour Fish	**46**	**24**	**42**	**31**	**10**	**20**	**28**	**201**

Naty Sensitive Wipes Unscented		**12**	**48**	**31**	**31**		**40**	**162**
Neutral Washing liquid	**39**	**42**	**39**	**34**	**20**	**26**	**48**	**248**
Urtekram Nordic Beauty Tea Shampoo	**28**	**30**	**22**	**22**	**12**	**21**	**18**	**153**
Allegra Medicine	**262**	**261**	**210**	**159**	**89**	**138**	**307**	**1426**

Source: Data collected by Apotea

6.1.3 The difference in sales Google Shopping on vs off

Due to a high number of sales, the Google Shopping channel was turned off to manage the number of product purchases that were placed. This change could have influenced the sales, resulting in a difference of -11.36% in the sales data. The impact of this difference will be later adjusted against the sales data in week 2 for further analysis.

6.1.4 Session Data for the test period before nudging

A session is a period of time during which a user interacts with a website or an application. In Analytics, a session is initiated when a user either views a page or screen and no session is currently active (e.g. their previous session has timed out). By default, a session ends (times out) after 30 minutes of user inactivity. There is no limit to how long a session can last. A unique session ID is created by Google for each individual session and then google analytics calculates the number of sessions that occur on the website by estimating the number of unique session IDs. Google Analytics then provides a number of session metrics including Session, Engaged sessions, and Engaged sessions per user. These metrics allow the company to see the data about the number of sessions that have started on the website.

Table 6-3 includes information on product name, views, total users, sessions, engagement rate, average session duration, and average engagement time per session before nudging.

Table 6-3: Session data before nudging

Product Name	Views	Total users	Sessions	Engagement Rate	Average Session Duration (seconds)	Average Engagement Time per session (seconds)
Products with Local Messaging						
Barnängen Children's Oil Eco	329	310	339	19.76%	48.89	23.64
Dave & Jon's Dadlar Sour Cola	4952	4300	4869	16.41%	57.49	22.60
Häxan Badrum	838	776	838	31.15%	48.75	23.34
BARR Sweden Organic Cellulite Oil	N/A	N/A	N/A	N/A	N/A	N/A
Melatan Tablett	3428	3229	3474	8.78%	46.97	23.75
Products with Global Messaging						
Pändy Candy Sour Fish	168	168	184	1.63%	54.16	14.75
Naty Sensitive Wipes Unscented	109	80	122	13.11%	35.13	23.01
Neutral Washing liquid	768	652	758	22.82%	84.53	26.64
Urtekram Nordic Beauty Tea Shampoo	724	574	618	16.34%	80.58	30.26
Allegra Medicine	2861	2522	2745	10.09%	72.29	31.48

Source: Data collected by Apotea

6.1.5 Session Data for the test period after nudging

Table 6-4 includes information on product name, views, total users, sessions, engagement rate, average session duration, and average engagement time per session after nudging.

Table 6-4: Session data after nudging

Product name	Views	Total users	Sessions	Engagement Rate	Average Session Duration (seconds)	Average Engagement time per session (seconds)
Products with Local Messaging						
Barnängen Children's Oil Eco	337	311	342	14.04%	43.28	27.00
Dave & Jon's Dadlar Sour Cola	3968	3355	3828	16.46%	53.03	23.58
Häxan Badrum	377	339	377	11.41%	42.69	25.11
BARR Sweden Organic Cellulite Oil	N/A	N/A	N/A	N/A	N/A	N/A
Melatan Tablett	3335	3057	3295	7.56%	49.33	24.09
Products with Global Messaging						
Pändy Candy Sour Fish	143	113	156	6.41%	37.20	20.71
Naty Sensitive Wipes Unscented	108	108	116	19.83%	38.71	29.90
Neutral Washing liquid	427	367	402	11.94%	59.03	33.86
Urtekram Nordic Beauty Tea Shampoo	640	512	580	16.90%	63.02	35.04
Allegra Medicine	2366	2100	2306	13.70%	63.85	30.33

Source: Data collected by Apotea

7. Result Analysis

7.1 Quantitative Data Analysis

The obtained results pertain to dependent samples, specifically comparing the performance of the same products on two different occasions: before and during nudging. The dependent variable in this analysis is the engagement rate, which is preferable over comparing it to sales data because it considers the number of buyers. If only sales data were used, a situation where 100 items were purchased by one individual would be deemed "higher" than 50 items bought by 50 individuals. The results of the analysis comparing the engagement rates before and during nudging are presented in this section.

The Wilcoxon Signed Ranks Test was used to assess the statistical significance of the differences. The Wilcoxon signed-rank test is a non-parametric statistical test used to assess whether the medians of two related samples are significantly different from each other (Wilcoxon, 1945). It is an alternative to the paired t-test when the data do not meet the assumptions of normality or when dealing with ordinal or skewed data (Zar, 2010). The Wilcoxon signed-rank test can be one-tailed or two-tailed, depending on the research question and hypothesis (Wilcoxon, 1945). The two-tailed test is more commonly used, as it tests for the possibility of a significant difference in either direction. The analysis was conducted separately for all messaging, local messaging, and global messaging.

Global Vs Local Messaging Results

Table 7-1:Global vs Local Messaging Results

Ranks

		N	Mean Rank	Sum of Ranks
Engagement rate NUDGE - Engagement rate BEFORE	Negative Ranks	4[a]	6.50	26.00
	Positive Ranks	5[b]	3.80	19.00
	Ties	0[c]		
	Total	9		

a. Engagement rate NUDGE < Engagement rate BEFORE

b. Engagement rate NUDGE > Engagement rate BEFORE

c. Engagement rate NUDGE = Engagement rate BEFORE

Test Statistics[a]

	Engagement rate NUDGED - Engagement rate BEFORE
Z	-.415[b]
Asymp. Sig. (2-tailed)	.678

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

Source: Author's own table based on SPSS outputs

The Wilcoxon Signed Ranks Test revealed that there was no statistically significant difference in the engagement rates before (Mean Rank = 6.50) and during (Mean Rank = 3.80) nudging periods (Z = -0.415, p = 0.678, two-tailed). The ranks table showed that in 4 cases, the engagement rate before nudging was higher than during nudging, while in 5 cases, the opposite pattern was observed.

Local Messaging Results:

Table 7-2 Result of Local Messaging

Ranks

		N	Mean Rank	Sum of Ranks
Engagement rate NUDGE - Engagement rate BEFORE	Negative Ranks	3[a]	3.00	9.00
	Positive Ranks	1[b]	1.00	1.00
	Ties	0[c]		
	Total	4		

a. Engagement rate NUDGE < Engagement rate BEFORE

b. Engagement rate NUDGE > Engagement rate BEFORE

c. Engagement rate NUDGE = Engagement rate BEFORE

Test Statistics[a]

	Engagement rate NUDGED - Engagement rate BEFORE
Z	-1.461[b]
Asymp. Sig. (2-tailed)	.144

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

Source: Author's own table based on SPSS outputs

For local messaging, the Wilcoxon Signed Ranks Test indicated no statistically significant difference in the engagement rates before (Mean Rank = 3.00) and during (Mean Rank = 1.00) nudging periods (Z = -1.461, p = 0.144, two-tailed). The ranks table revealed that in 3 cases, the engagement rate before nudging was lower than during nudging, and in 1 case, the opposite pattern was observed.

Global Messaging Results:

Table 7-3 Result of Global Messaging

Ranks

		N	Mean Rank	Sum of Ranks
Engagement rate NUDGE - Engagement rate BEFORE	Negative Ranks	1[a]	5.00	5.00
	Positive Ranks	4[b]	2.50	10.00
	Ties	0[c]		
	Total	5		

a. Engagement rate NUDGE < Engagement rate BEFORE

b. Engagement rate NUDGE > Engagement rate BEFORE

c. Engagement rate NUDGE = Engagement rate BEFORE

Test Statistics[a]

	Engagement rate NUDGE - Engagement rate BEFORE
Z	-.674[b]
Asymp. Sig. (2-tailed)	.500

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Source: Author's own table based on SPSS outputs

The Wilcoxon Signed Ranks Test for global messaging showed no statistically significant difference in the engagement rates before (Mean Rank = 5.00) and during (Mean Rank = 2.50) nudging periods (Z = -0.674, p = 0.500, two-tailed). The ranks table indicated that in 1 case, the engagement rate before nudging was lower than during nudging, and in 4 cases, the opposite pattern was observed.

Overall, the results indicate that there were no statistically significant differences in engagement rates before and during nudging, regardless of the messaging type (all, local, or global). It is important to note that the analysis focused on the engagement rate as the dependent variable, which accounts for the number of buyers, unlike sales alone. The lack of access to Google shopping during the nudging period was not expected to have a substantial impact on consumers' decision to choose greener products, as indicated by the use of engagement rates as the measure of interest. This conclusion is also supported by examining the Ranks Table in the results section. Among the 9 products analyzed, in 4 instances, the engagement rate before nudging was higher compared to during nudging, while in 5 cases, the opposite was observed. It's relevant to note that these calculations were performed using the actual data. Considering the 11% reduction attributed to Google shopping unavailability during the nudging period, we could not identify a suitable method to "update" the results. However, since the dependent variable is now the Engagement Rate instead of Sales, the difference in sales volume is unlikely to have any impact. This means that nudging consumers will not (plausibly) impact their decision to buy a "greener" product once they find their way to it.

7.2 Limitations of the study

While formulating texts for nudging purposes, there were several limitations that affected the approach and effectiveness of the messaging. One significant limitation was the self-imposed restriction placed by Apotea on the use of marketing tactics commonly employed in the industry. Unlike other companies that utilize various emotional triggers and psychological techniques, such as fear, joy, and appealing to

different aspects of an individual's personality, Apotea prioritizes sustainability and refrains from employing such marketing strategies. While this may seem commendable on the surface, it presents a comparative disadvantage as other companies effectively utilize these tactics to nudge customers towards purchasing non-sustainable products. Consequently, the absence of these techniques could be considered counter-intuitive and counterproductive, potentially hindering the desired impact of the nudges.

Furthermore, the limitations related to the implementation of the nudging strategy further constrained the effectiveness of the texts. Firstly, due to technical constraints, the webshop's tools were rather weak, making it challenging to tailor messages to specific audiences effectively. While the concept of nudging is theoretically powerful, in practice, the limitations of the webshop's capabilities reduced its efficacy, rendering it similar to a traditional marketing tool.

The time period allocated for the research was also a limiting factor. The relatively short duration of the study did not allow for the collection of conclusive evidence regarding the effectiveness of the nudging strategy. Additionally, the absence of Google Shopping during the study further limited the reach and potential impact of the nudges, as this platform can significantly influence consumer behavior. Integration within the company was another limitation. Due to a lack of coordination and integration between departments, the research team faced challenges in accessing the marketing department or individuals responsible for decision-making processes. This lack of collaboration restricted the ability to gather relevant data and insights that could have made the findings more meaningful and helped evaluate the effectiveness of the nudges.

The limitations of the webpage infrastructure further hindered the research. The webshop's limited capabilities in obtaining demographic data undermined the ability to draw meaningful conclusions or determine the effectiveness of the nudging approach. Additionally, the inability to test the nudges adequately within the given time constraints restricted the ability to refine and optimize the messaging for optimal impact. It is unsure if consumers were even able to notice the nudge in order to have a behavioral change.

Moreover, external factors, such as seasonal effects, influenced the research outcomes. The Easter buying period and salary weeks could have skewed the results, making it challenging to isolate the true impact of the nudges on consumer behavior. If the research had been conducted over a longer duration and encompassed a more extensive range of products, it may have provided a more accurate reflection of real-world outcomes. Lastly, the frequency of the average sales data, collected on a weekly basis, might have been better for evaluating the effects of the nudges. A monthly data collection approach

could have potentially provided more meaningful insights into the long-term impact of the texts on consumer purchasing behavior.

In conclusion, while attempting to nudge people towards pro-environmental behavior through this experiment, several limitations were encountered. These included self-imposed marketing restrictions, limited technical resources for tailoring messages, a short time period for research, lack of integration within the company, inadequate demographic data, and restricted access to decision-making departments. Additionally, the absence of Google Shopping, the influence of external factors, and the frequency of sales data collection further impacted the effectiveness of the nudging strategy.

7.3 Qualitative Data Analysis

7.3.1 The interview

The three hypotheses of this experiment were:
H1: Local messaging leads to a greater level of PEB compared to providing no PEB-related information.
H2: Global messaging leads to a greater level of PEB compared to providing no PEB-related information.
H3: Local messaging leads to a greater level of PEB compared to Global Messaging

The study's findings indicate that all of the hypotheses were negated, indicating that nudging has minimal to no impact on influencing pro-environmental behavior in online shopping consumer decisions. This raises the question as to whether nudges are ineffective as a strategy or if the experimental conditions in which the experiment was done played a role. To gain a clearer understanding of the results, an interview was conducted with Desire Cichy, the sustainability project officer at Apotea, this helped to delve deeper into the findings, analyze the data, and grasp the contextual and practical aspects of implementing nudges on a real-time e-commerce website. The overall themes that came up throughout the interview would be discussed further in this section.

7.3.1.1 Apotea’s effort to increase sustainable consumption.

During the initial section of the interview Desire mentioned that Apotea's focus on sustainability primarily revolves around the implementation of sustainable practices rather than communication efforts and nudging consumers towards sustainable choices. However, the company acknowledges the

importance of incorporating communication and nudging strategies in the future. One recent project involved collecting information from suppliers regarding third-party labels on their products, such as organic, environmental, vegan, and social sustainability labels. The aim is to make these labels more visible on the Apotea homepage, providing customers with information about the products and their associated sustainability benefits. Apotea recognizes that to effectively promote sustainable consumption, various aspects such as pricing, marketing, and product visibility need to be considered alongside communication and nudging strategies.

7.3.1.2 Nudging as a Tool for Sustainable Consumption

When asked about the idea of nudging consumers and whether they think that nudging is a useful tool for Apotea to achieve sustainable consumption, Desire explained that Apotea expresses a positive view of nudging as a tool for behavior change and achieving sustainable consumption. She, however, believes that nudging should be integrated into the overall sustainability strategy and marketing strategy and efforts are to make this happen over time. Apotea recognizes that nudging can be effective in spreading information and influencing consumer choices. However, she emphasized the need for a comprehensive approach and the involvement of multiple departments to ensure the success of nudging initiatives.

7.3.1.3 Collaboration between Departments for Sustainability and Nudging

Sales and marketing teams are important partners in putting sustainability programs and nudging methods into practice, according to Apotea. Acknowledging that sales goals often take precedence, Apotea emphasizes the importance of establishing a good relationship and dialogue between the sustainability department and sales and marketing departments. Collaboration among these departments is essential for integrating sustainability goals into the company's overall strategy and ensuring that nudging initiatives align with long-term plans.

7.3.1.4 Limitations and Future Potential of Nudging

During Apotea's experiment, several factors limited the effectiveness of nudging in promoting sustainable consumption. The potential of nudging was constrained by various issues within the Apotea webshop, limitations in messaging options, abiding by the sustainability guidelines, and difficulties in targeting the right customers. Furthermore, the temporary suspension of Google Shopping had an impact on the results, redirecting customers to alternative websites. She believes that if these limitations were absent, the outcomes might have been different, potentially indicating a positive influence of nudging messages on product sales. However, the result is a mirror of reality in a

way that complying with regulations and ensuring accurate information though very necessary to avoid greenwashing, posed challenges when crafting nudging messages and how they were displayed. Apotea suggests that given more time, a wider range of products, and uninterrupted operations, nudging could be more effectively employed to encourage sustainable consumption.

7.3.1.5 Utilizing Insights from the Experiment for Future Sustainability Initiatives

Desire explained that there is a need to integrate the insights gained from the experiment into shaping the company's future sustainability initiatives. While the experiment indicated that local and global nudges were ineffective, Apotea acknowledges the importance of a holistic approach to sustainable consumption. Beyond communication and nudging, Apotea also emphasized the significance of pricing, marketing strategies, and systemic changes in achieving sustainable choices. By considering the complete picture and incorporating nudging as one tool among others, Apotea aims to drive meaningful changes in consumer behavior and align its sustainability goals throughout the company. She further went on to explore that integrating sustainability goals across different departments within a company is crucial. It's not enough to have a separate sustainability department that measures and sets goals. Instead, sustainability goals should be integrated into the entire company, including departments like sales. For example, if the sales department agrees to a goal of increasing sales of more sustainable products, they will develop strategies to achieve that goal. Without a specific goal, departments are likely to continue working towards maximizing sales without considering sustainability. Therefore, a clear sustainability goal is necessary to align the entire company's efforts towards sustainability.

7.3.1.6 The Role of Policies and Culture in Nudging Consumers:

Apotea highlights the importance of integrating sustainability goals into different departments and fostering a company culture that prioritizes sustainability. While policies can provide a framework for nudging consumers toward pro-environmental behavior, Apotea recognizes that it is the company's culture and the alignment of sustainability goals throughout the organization that truly impact behavior change and bring about changes in consumers as well. By emphasizing the significance of sustainability and integrating it into the company's business operations, Apotea aims to drive greater change in consumer behavior and foster a company-wide commitment to sustainability. Desire also mentioned that there is a lack of a refined case studies where nudging has been established as a market tool that could be used to nudge consumers and more studies will help companies to trust nudging as a possible strategy to push sustainability initiatives.

7.3.1.7 Impact of sustainability guidelines on marketing of environmentally friendly products

The impact of sustainability guidelines on the marketing of environmentally friendly products compared to non-environmentally friendly products can be seen from both positive and negative perspectives. On one hand, these guidelines make it more challenging to effectively communicate sustainability efforts. There is a fear of being accused of greenwashing, leading some companies to hesitate in promoting their eco-friendly initiatives. The guidelines require companies to provide accurate and specific information, which can be daunting for marketing departments unsure about how to effectively communicate sustainability.

However, the guidelines are important and necessary. Many companies engage in misleading advertising or greenwashing, where they make false or exaggerated claims about their environmental efforts. For instance, the aviation industry promotes "sustainable flying" despite the fact that truly sustainable flights do not yet exist. Such practices can be confusing for consumers who may lack information or understanding, leading them to believe they are making sustainable choices when they are not. The guidelines help ensure that marketing claims are backed by accurate information. They encourage transparency and discourage misleading practices. Companies are required to provide specific details about their sustainability initiatives, such as the percentage of bio-based or renewable materials used in packaging. Although it requires more work for marketing departments to comply with these guidelines, it ultimately ensures that consumers receive correct and reliable information.

7.3.1.8 Nudge as a marketing strategy

The effectiveness of nudging as a marketing strategy for promoting sustainable products depends on various factors. One important aspect is pricing, as it can greatly influence consumers' choices. Additionally, providing the right type of information and making sustainable products visible is crucial. This can be done by placing them prominently in stores or featuring them prominently online like with a head banner. Understanding local and global messaging is also essential, as certain triggers, such as products with a national identity, we know that Swedish customers buy Swedish stuff if it looks Swedish or has a Swedish name, or there's a Swedish flag on it because this is a really strong trend and can strongly influence consumer behavior. However, it is important to note that trends and consumer preferences may vary, and insights into what is trending in sustainability should be used in communication strategies. Overall, while nudging can be an effective approach, it should be combined with other important factors like pricing, visibility, and targeted messaging to maximize its impact. She went further to discuss various limitations that come with having done this experiment on a practical website like Apotea. The limitations mentioned include resource constraints, time limitations, and the

inability to prioritize certain aspects of the project. She explained that if more time and resources were dedicated to the project, alternative approaches could have been pursued. The limitations specifically pertain to the experimental website, such as the absence of a pop-up message and uncertainties regarding customer engagement with the messages.

7.3.1.9 Alternative Product Categories

If we had selected alternative categories, I believe we would have achieved a good diversity in terms of different categories, and we would have had valid justifications for our choices as well. In relation to our previous discussion about the food industry, where the distinction between good and bad products is highly visible, it would have been interesting to investigate items that are notorious for their significant environmental or climate impact. This could have prompted a shift towards more sustainable alternatives. However, since we lack the necessary information, the most prominent warning sign would be the clear distinction between the worst and best choices. Nonetheless, exploring different products, especially those with a strong consumer awareness of their negative qualities, such as palm oil in the food industry, would have been intriguing. The long-standing debate surrounding palm oil has led customers to ponder such concerns. On the other hand, in the pharmaceutical industry, we may not have a wide range of products that are widely recognized as being truly undesirable. Hence, our best approach would be to compare them to better alternatives.

7.3.1.10 A Different Approach

When asked about if she would have changed the way the project was executed, she mentioned that initially, the sustainability team would have engaged in discussions with the other parent departments to determine the long-term objectives of the project. Subsequently, a comprehensive plan would have been devised to achieve those goals. This plan would involve various activities, including the testing of nudging messages, along with several supplementary measures, to create a complete package of initiatives aimed at reaching the desired outcomes. Additionally, it would have been beneficial to gain a better understanding of the sales department's strategies and their prioritized product categories, as they likely have specific sales targets and market share objectives in mind. Considering this perspective would have influenced our selection of categories for the project. From a sustainability standpoint, the chosen categories were appropriate, although it would have been preferable to explore opportunities in the pharmaceutical sector. However, due to legal restrictions, we are unable to influence the sales of all pharmaceuticals, as they must be sold with a prescription. Nevertheless, we did have information on sustainability for certain pharmaceuticals available over the counter. To mitigate uncertainties associated with factors such as Google Shopping's anticipated changes, it would have been prudent to conduct a more extensive testing phase over a longer duration. This extended testing period would have allowed us to address any limitations and adapt to the expected modifications. It is worth noting

that our testing window was limited to two weeks, with one week being affected by the temporary suspension of the shopping feature.

In conclusion, Apotea's experiment and the subsequent interview shed light on the complexities and challenges of implementing nudging strategies for sustainable consumption. It emphasizes the importance of a comprehensive approach, collaboration among departments, integration of sustainability goals, and the consideration of various factors beyond nudging alone. By adopting such an approach, Apotea aims to drive greater change in consumer behavior and foster a company-wide commitment to sustainability.

7.3.2 The Story of the 'Nudge'

Working with one of the largest e-commerce companies in Sweden came with its own complexities. Apotea is an ambitious and climate-oriented company, they are the first Swedish e-commerce company to join the global climate goals. This is a reflection of how deeply they care about the impact they have on the environment. When approached with the concept of nudging, I initially proposed two different hypotheses to the company's sustainability department. Firstly, emotional nudging is more effective in nudging consumers toward pro-environmental behavior than a factual message and secondly, local messaging is more effective in encouraging consumers toward pro-environmental behavior than a global message. After the meeting with the sustainability team, it was decided that we cannot test the emotional vs factual nudging because it would be against the voluntary guidelines that Apotea adheres to, along with Swedish Marketing guidelines.

Then, we decided to carry out the experiment with the Local vs Global hypothesis. The next task was to make sure that the product chosen from the decided product category was a 'green' product which meant that they had aligned with sustainability criteria, such as organic, natural, vegan, fairtrade, eco-labeled, or Vavald categories. An Excel sheet was created with at least four different options for each category with the sustainability criteria highlighted see Figure, for an example of the cosmetic category.

Cosmetics				
	Organic: Here it is required that at least 95% of the ingredients (except water) must be organic. Made with organic ingredients: Here it is required that at least 70% of the ingredients (except water) are organic. The percentage of organic ingredients must be stated on the product. Residual ingredients that are not organic may only be used if an organic version of the ingredient does not yet exist.	ECO-certified and vegan. Made from 100% ingredients of natural origin, of which 89% of the ingredients come from organic farms.Organic: Here it is required that at least 95% of the ingredients (except water) must be organic. Made with organic ingredients: Here it is required that at least 70% of the ingredients (except water) are organic. The percentage of organic ingredients must be stated on the product. Residual ingredients that are not organic may only be used if an organic version of the ingredient does not yet exist.	Hurraw Balm is certified organic by the USDA Organic Regulations,COSMOS Natural certified by Ecocert (EU Organic Certification Body). The COSMOS certification guarantees: 1) Environmentally friendly production and processing processes respecting also human health. 2) Development of the concept of green chemicals 3) Responsible use of natural resources 4) Respect of biodiversity 5) Absence of petrochemical ingredient (except for authorized preservatives): parabens, phenoxyethanol, perfumes and synthetic colorants 6) Absence of GMO 7) Recyclable packaging	The Fairtrade certification means that the product is produced with regard to high social, economic and environmental requirements. Choosing Fairtrade-labell products contributes to better economic conditions for growers and employees. This, together with long-term trade agreements, provides security for all those who d not have such large margins to live on. The black mark is the Fairtrade product label. The proc mark is often found on products that only consist of one raw material, for example bananas, coffee, roses, rice, honey or sugar.

Figure 7-1 Screenshot of Excel sheet submitted to Apotea

Apotea then got back with the selected product (In this case, the Urtekram shampoo was chosen) and the next stage was to prepare a local nudge. Figure 7-2 shows the local message that was created in the beginning which highlighted the Ecocert Cosmos Organic label and vegan society label. It also highlighted information on how the package of the product is done from ingredients that are natural like sugar cane waste and reduced CO2 emissions. During the control week, the product also had information about Ecocert certification, which leads us to the question of to what extent can we frame messages to get a response from the consumer. The other big limitation was to know if the nudge was big enough for the consumer to see and evoke a behavioural response. The same process was repeated for the other 19 products across 5 different categories.

Before Nudging

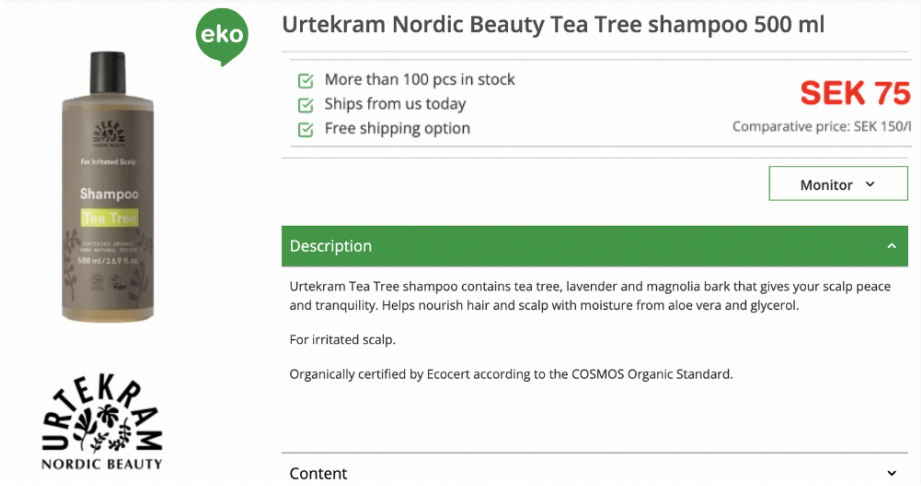

Figure 7-2 Screenshot of nudged product information on the Apotea website

After Nudging

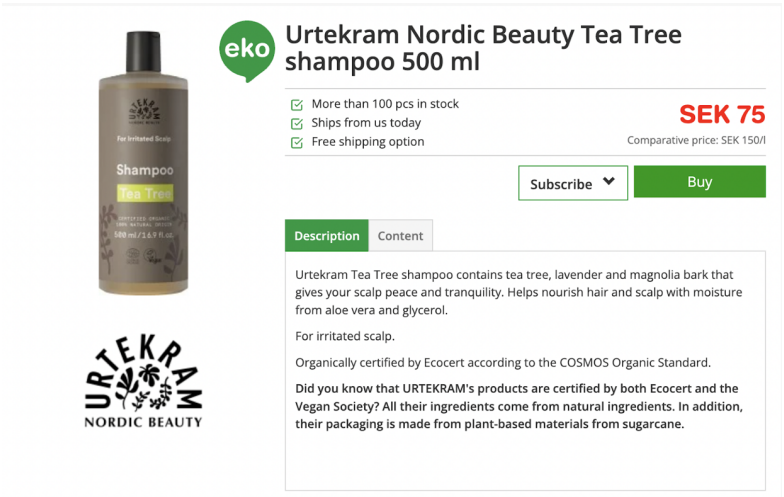

Figure 7-3Screenshot of nudged product information on the Apotea website

8. Discussion

8.1 The dance between influencing and ineffectiveness

The aim of this research was to answer the following research questions,
RQ1: To what extent can digital nudges encourage pro-environmental behavior among consumers in online shopping contexts?
RQ1a: Is the use of local messaging more effective than global messaging in nudging individuals towards pro-environmental behavior?
RQ1b: Is the use of emotional messaging more effective than factual messaging in nudging individuals towards pro-environmental behavior?
RQ 2: Is the use of local messaging more effective than global messaging in nudging individuals towards pro-environmental behavior?

The result for RQ1, the literature review has shown that default nudges, social norms, personalized feedback, and positively framed messages can effectively influence sustainable purchase behavior. However, the effectiveness of nudges can vary depending on the context and target audience. The Apotea experiment shows that while nudging is a powerful tool, its effectiveness and resistance can be influenced by factors such as trust and transparency, personalization, simplicity, social influence, timing and context, framing and messaging, autonomy, and long-term impact. Understanding these factors and tailoring nudges accordingly is crucial for successful behavior change. The RQ1a results suggest that nudging does't work and goes against most of the theories and experiments that are conducted. However, this points to the research gap of nudging in digital environments with a real-time website, which has its own layers and complexities.This research therefore leads to an interesting question of whether nudging should be an essential step in green marketing.

E-commerce and sustainable consumption are important areas where collective efforts are needed to minimize negative environmental impacts. However, consumers' positive attitudes towards environmental protection do not always translate into sustainable purchasing behavior, resulting in a "green gap." Nudging in e-commerce and marketing strategies can play a significant role in promoting sustainable consumption and influencing consumer behavior towards environmentally friendly choices. Therefore, nudging in a way is a constant flow between being influential and ineffective to nudge consumers toward sustainable consumption.

8.2 The Theory vs. Reality Conundrum

To discuss the RQ 1 a bit more, the literature discusses that the effectiveness of nudges can be attributed to their ability to tap into individuals' cognitive biases, leverage social influences, and align with individual preferences and values. Studies have shown that default nudges, such as setting pro-environmental options as default choices, can significantly increase the adoption of environmentally friendly behaviors. Social norms nudges, which highlight the prevalence of pro-environmental behaviors, can influence individuals' perception of what is considered normal behavior and encourage similar actions. Feedback nudges, which provide real-time information about the environmental impact, have been effective in reducing energy consumption and promoting resource conservation. Personalized nudges, tailored to individual preferences and characteristics, have shown positive results in promoting engagement with pro-environmental behaviors. Goal-setting nudges encourage individuals to set specific environmental goals, and visual cues can be used to visually promote pro-environmental choices.

While the concept of digital nudging is relatively new, studies have shown that digital nudges have the potential to change consumer behavior and influence thinking. Digital nudges provide the opportunity to tailor information and messages to the audience, making them a powerful tool in online shopping contexts.Factors that influence the effectiveness of nudges include the clarity and prominence of the nudge, relevance, and alignment with individual preferences, the credibility of social norm information, timing and frequency of feedback, targeting, and segmentation of personalized messages, clarity and specificity of environmental goals, and salience and visibility of visual cues. The literature also discusses the use of nudges by government agencies and private organizations to promote behavior change. Governments, such as the UK's Nudge Unit and the National Environment Agency in Singapore, have successfully employed nudges in various policy initiatives. Private organizations have also utilized nudges to encourage sustainable behavior, such as green shipping programs and framing messages on e-commerce websites. Overall, the evidence suggests that digital nudges can be effective in encouraging pro-environmental behavior among consumers in online shopping contexts. By understanding the underlying mechanisms and tailoring nudges to specific contexts and individuals, policymakers and practitioners can harness the power of nudges to promote positive behavior change.

8.3 Is sustainability hard to sell?

The interview with Desire and the experiment results point in the direction that, we as a society have come so far in climate communications as to ensure that there are criteria in place to tackle greenwashing however it is seen as hindering the marketing of green products. Therefore, implementing green nudges as a marketing strategy is an area to explore.

Organizations can utilize green marketing to enhance their environmental image and generate profits, as well as promote sustainable consumption (Sun et al., 2019), (Gordon et al., 2011). This marketing

approach is currently applied in areas such as sustainable packaging and the use of less harmful substances. While there are advantages to this approach, it also has negative aspects. Though environmentally friendly products are gaining popularity and can be profitable, some customers view green marketing as greenwashing, where organizations prioritize communication over genuine sustainability efforts (Jones et al., 2008).

To avoid falling into the trap of "sustainable marketing myopia," where too much emphasis is placed on creating sustainable products at the expense of meeting customer needs, effective communication of the sustainable benefits of products or services is crucial (Hadi, 2023). Customers are unlikely to purchase such products if they don't understand their benefits. Organizations that have incorporated sustainable marketing into their operations typically do so in a foundational manner, suggesting that this practice is relatively new. Ethical considerations, which encompass the overall societal benefits, are also vital for the success of sustainable marketing.

Implementing sustainable marketing poses several challenges for organizations. One significant challenge is persuading people to choose sustainable options, as it involves influencing human behavior and decision-making, hence: nudging. Green marketing bridges the gap between traditional marketing practices and environmental and societal realities. It involves strategic, tactical, and internal processes aimed at creating, communicating, and delivering products and services with minimal adverse environmental impact (Shaukat & Ming, 2022) . To achieve their desired goals, organizations should adopt a holistic green marketing orientation approach. Corporate Social Responsibility (CSR) can serve as a strategic tool, shifting focus from consumer marketing to corporate marketing. Organizations can leverage their environmentally responsible behavior as marketing tools. The concept of holistic marketing and stakeholder perspectives of marketing and CSR highlights the incorporation of social dimensions (Haidi, 2023).

Previous research indicates that proactive environmental strategies can lead to competitive advantages for businesses by developing unique and complex capabilities that differentiate them. At the organizational level, this enables sustainable competition in a globalized world and adaptability to changes. A green marketing orientation has emerged as a means for businesses to achieve a competitive advantage, improve performance, and cater to environmentally conscious consumers by focusing on differentiation strategies. Therefore, sustainability isn’t hard to market but we have to rethink the way we market green products. Although nudges offer a cost-effective and effortless approach through subtle modifications to existing choice architecture, they represent merely a minor instrument within the vast toolbox of behavioral science.

Whereas for RQ 1b, efforts were put to understand whether emotional messaging is better than factual messaging . Literature highlights that emotional messaging has been found to be more effective than factual messaging in promoting PEB in previous studies (as indicated in Table 4-2). Emotional appeals, by evoking strong emotional responses, such as empathy, guilt, or happiness, can resonate with individuals on a deeper level, potentially leading to a higher likelihood of adopting pro-environmental behaviors. On the other hand, factual messaging appeals to individuals' rationality by providing them with knowledge and understanding of environmental issues, which can also enhance their motivation to engage in pro-environmental behaviors. Emotional appeals could tap into individuals' values, personal relevance, and emotional investment in environmental issues, potentially resulting in a higher likelihood of behavior change.

However, the original research objective of investigating the use of digital nudges to encourage pro-environmental behavior was hindered by the company's guidelines, which prohibited the use of emotional messages on its website. As a result, the research approach had to be adjusted, and a case study analysis was conducted within the boundaries of these guidelines. The unexpected change in research approach added depth and relevance to the study, offering valuable insights into the application of nudges in corporate environments. This case study reflects the ongoing deliberations between the sustainability and marketing departments of Apotea as we sought to create an emotional nudge while avoiding greenwashing. However, these self-imposed restrictions and adherence to guidelines limited the available options for marketing a green product. Although we lack empirical evidence regarding the effectiveness of emotional messages in nudging consumers towards pro-environmental behavior, gaining insight into the practical implementation of nudges and the potentially deceptive aspects of green marketing prompts us to consider new approaches to promoting green products while maintaining a competitive advantage over non-environmentally friendly alternatives.

8.4 The Way Forward

The aim of the Research Question 2, was to find out how can companies use nudging as a tool to encourage sustainable consumption? Combining the available literature and the findings of the study, it was found that it is hard to incorporate nudge as a strategy in private companies. Therefore an effort was made to create a nudge roadmap that will help companies to incorporate nudging into their long-term sustainability and marketing strategies.

Figure 8-1 A Roadmap to nudging

Source: Designed by the Author

The proposed roadmap in Figure 8-1 to green nudging outlines a systematic approach to incorporating nudging as a strategy in private companies, particularly focusing on long-term sustainability and marketing strategies to bring about behavioural changes that favours sustainable consumption. This roadmap can be a useful tool as it provides a step-by-step guide for companies interested in implementing nudges effectively.

1. ***Define the goal:*** The first step involves clearly defining the specific goal or behavior that the company wants to nudge. This step is crucial as it sets the direction for the entire process and ensures that the nudge aligns with the company's objectives. By emphasizing the importance of goal definition, it highlights the need for a clear focus in nudging initiatives.

2. ***Conduct a sustainability audit:*** Performing a sustainability audit helps assess the current state of the company and identifies the behaviors that need to be nudged. This step provides valuable insights into the areas where nudges can have the most significant impact. By

including this step in the roadmap, this step emphasizes the importance of understanding the company's context and tailoring the nudges accordingly.

3. ***Integrate departments:*** There is an urgent need to integrating all relevant departments, particularly sales, marketing, and sustainability, to achieve successful nudging. By aligning these departments and fostering effective communication, the company can ensure a holistic approach to nudging and enhance the chances of achieving desired behavioral changes. This step highlights the importance of interdisciplinary collaboration and teamwork within the organization.

4. ***Create an appropriate nudge:*** Once the goal and target behavior are defined, the next step is to develop a nudge that is suitable for bringing about the desired behavioral change. This involves designing interventions that are effective, ethical, and respectful of individual autonomy. At this stage it is important to carefully craft nudges that are tailored to the specific context and target audience.

5. ***Test and optimize the nudge:*** This step involves implementing the nudge on a small scale, testing its effectiveness, and refining it based on feedback and data analysis. By incorporating testing and optimization, the roadmap emphasizes the need for an evidence-based approach and continuous improvement in nudging strategies.

6. ***Ensure communication between departments:*** Effective communication between departments is crucial to ensure that the goals of the nudging initiative are met. This step highlights the importance of ongoing coordination and collaboration to monitor progress, address challenges, and maintain a shared understanding of the nudge's objectives.

7. ***Collaborate with sustainable brands:*** For companies operating in the e-commerce sector, collaborating with sustainable brands can enhance the prevalence and impact of the nudge. This step suggests forming partnerships to amplify the nudge's message and increase consumer awareness and engagement. By highlighting the potential benefits of collaboration, this step provides practical recommendations for companies operating in specific industries.

8. ***Monitor and report nudge effectiveness:*** Monitoring and reporting the effectiveness of the nudge in a timely manner is crucial to ensure its long-term impact. This step underscores the importance of data collection, analysis, and evaluation to assess the nudge's success and make informed decisions about its continuation or modification.

9. ***Update nudges as needed:*** E-commerce websites are subject to constant changes in trends and consumer behavior. It is essential to regularly update the nudges to adapt to these changes and maintain their effectiveness. This step emphasizes the importance of agility and flexibility in nudging strategies to ensure their continued relevance and impact.

This comprehensive roadmap outlines a systematic approach to incorporating nudging in private companies. This roadmap not only provides practical guidance for companies interested in adopting nudging strategies but also contributes to the existing literature by addressing the challenges and considerations specific to private companies' context.

9. Conclusion

This empirical experiment has shed light on the issue of greenwashing and its hindrance to effective green marketing. The study highlights the misleading nature of presenting two similar products on a website, where one product undergoes green claims. At the same time, the other gains an advantage, ultimately contributing to the problem of overconsumption. The findings emphasize the urgent need to understand how information can be presented more effectively to guide consumers toward sustainable choices. One of the key recommendations is for the marketing department of companies, such as Apotea, to take an active role in promoting green products. This highlights the importance of a holistic and integrated approach from companies, as addressing climate change requires concerted efforts from various departments within an organization.

While this study represents an initial attempt to explore the topic, it is acknowledged that further research employing statistically rigorous methodologies is necessary. However, the findings of this investigation align with existing literature in the field and provide valuable support for the importance of incorporating green marketing strategies into business practices. Moreover, the study calls for more research in the realm of e-commerce and sustainable behavior. Understanding the complexities of online platforms and their impact on consumer decision-making is crucial in promoting environmentally responsible choices.

In order to combat climate change, it is evident that a combination of approaches is needed. While it is important not to limit people's choices, efforts must be made to change consumer behavior. The concept of nudging, which involves subtly guiding individuals towards more sustainable options, emerges as a promising strategy. It is recommended that companies consider incorporating nudging techniques into their marketing practices. Additionally, policymakers and governments should explore ways to promote green products in the era of overconsumption. This could include implementing policies that encourage the use of nudges or improving the accessibility of green products. Nevertheless, it is essential to acknowledge the criticisms and challenges associated with nudging. While nudges can be effective, they should be implemented ethically and transparently, ensuring that consumer autonomy and freedom of choice are respected. While nudges will inevitably play a role in sustainable consumption in digital environments, it is imperative to recognize that they alone cannot orchestrate the transformative shift we seek.

In conclusion, it is recommended that companies make it a policy to include green marketing strategies as part of their overall marketing efforts. Furthermore, future research should delve deeper into the potential of nudging as a marketing strategy, and policymakers should consider its implementation as a

means of promoting green products and sustainable behavior. By taking these steps, we can work towards mitigating climate change and creating a more sustainable future for generations to come.

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Appendix

Appendix A

Nudge for Local Messaging

Product Category 1: Baby Products

Before Nudging

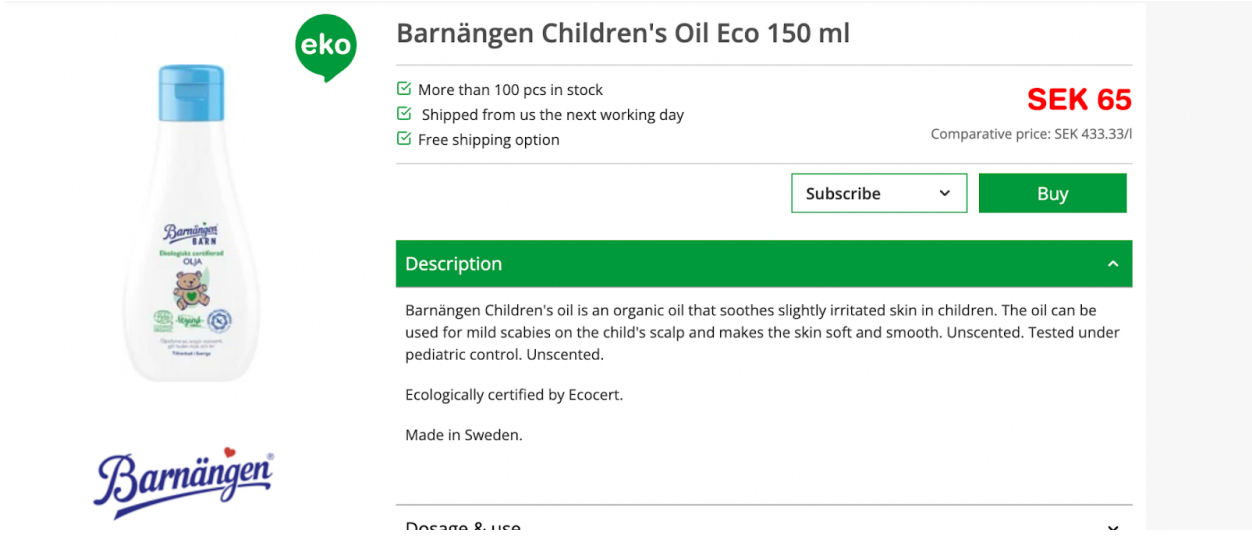

Figure1: Product Category1: Before Nudging

After Nudging

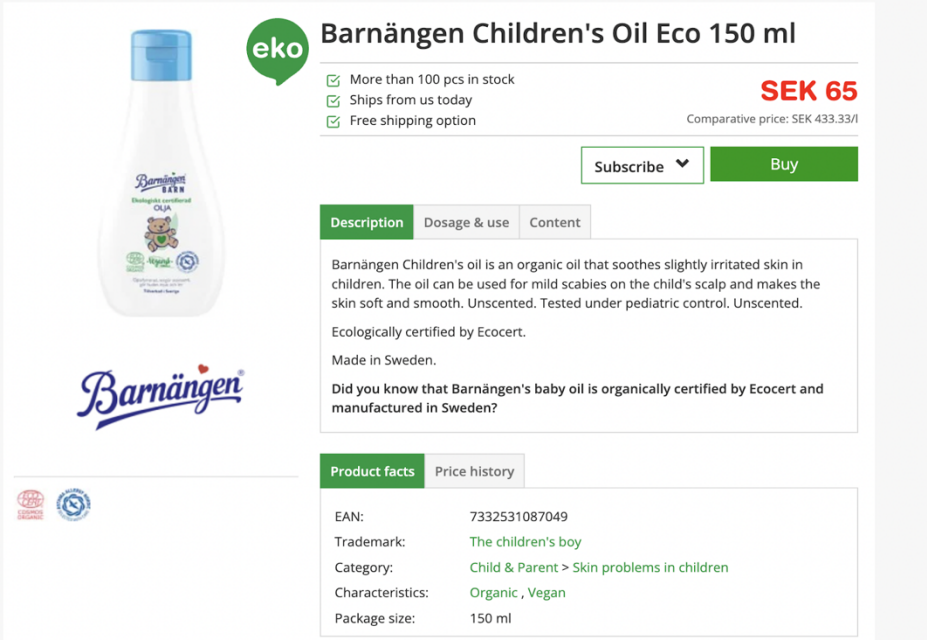

Figure2: Product Category1: After Nudging

Product Category 2: Food Products

Before Nudging

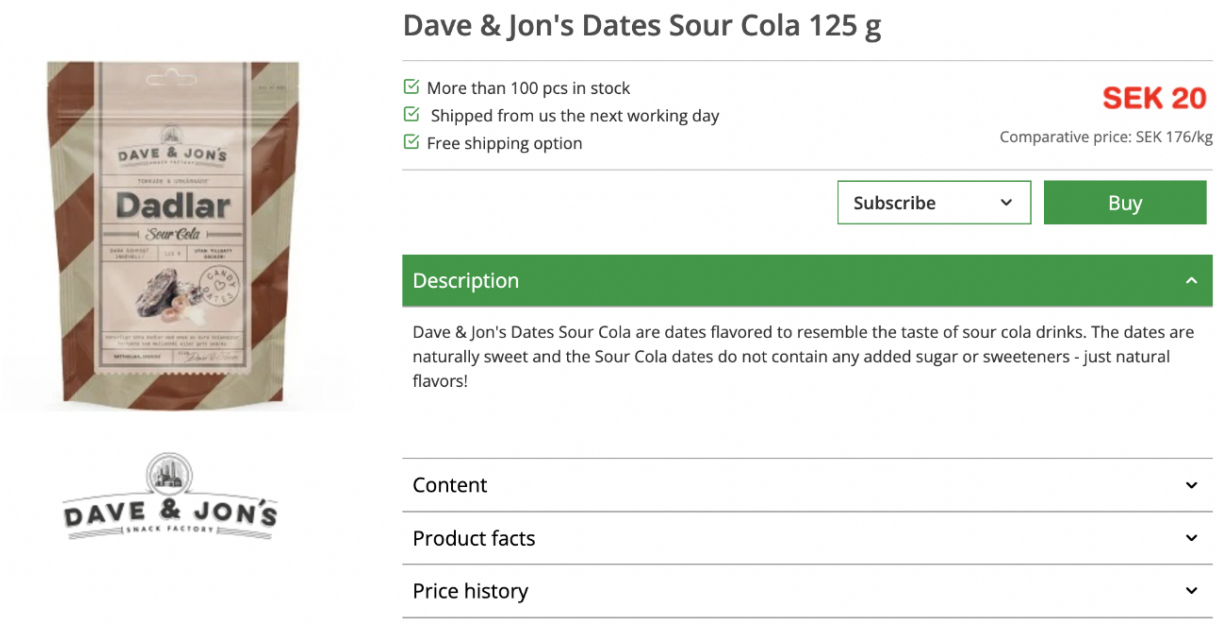

Figure 3: Product Category 2: Before Nudging

After Nudging

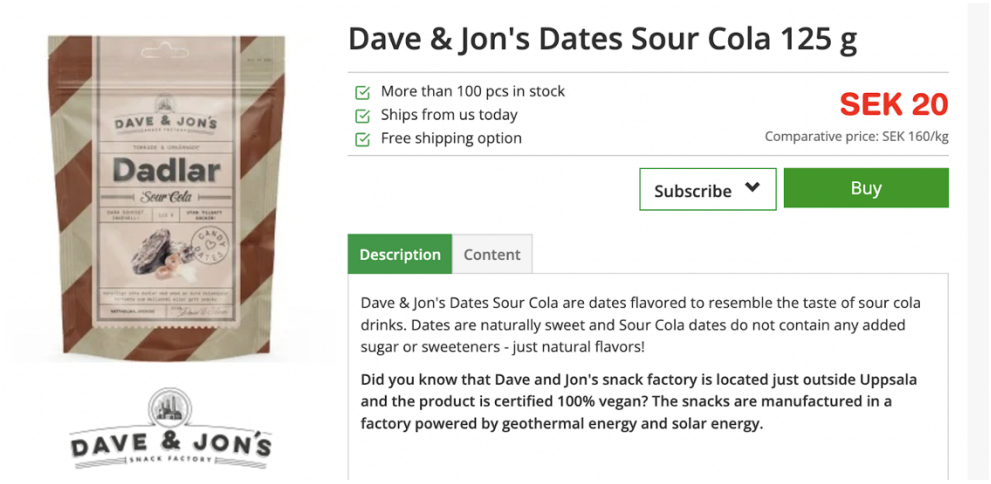

Figure 4: Product Category 2: After Nudging

Product Category 3: Cleaning Products

Before Nudging

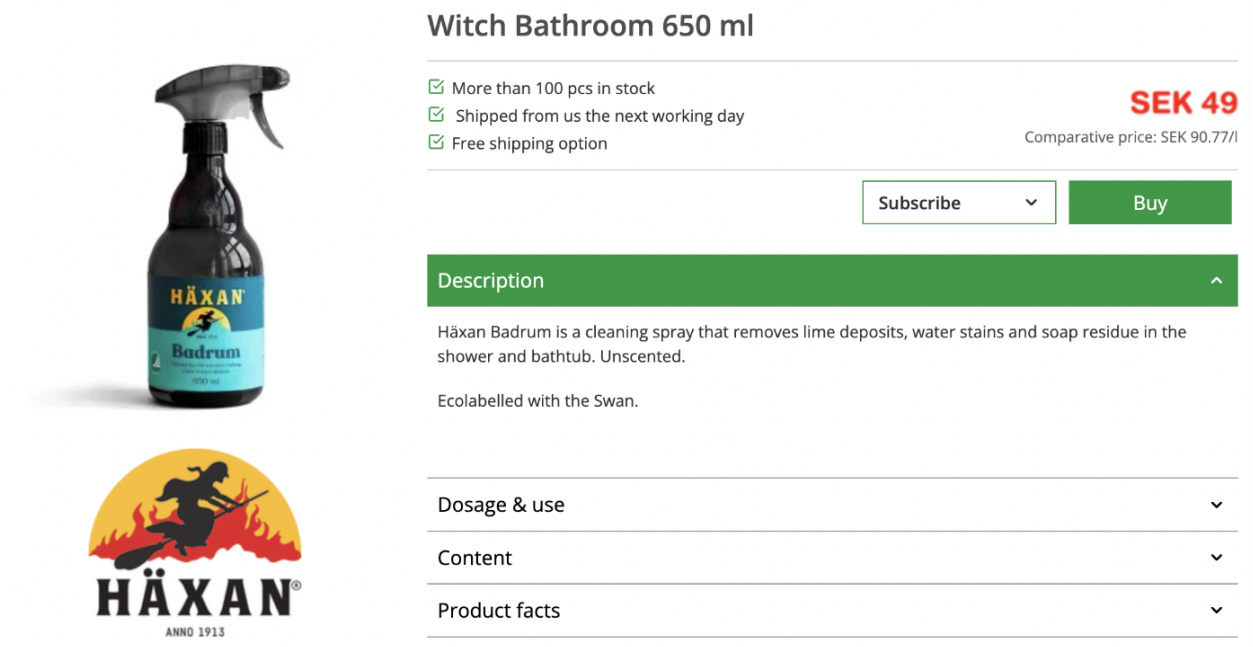

Figure 5: Product Category 3: Before Nudging

After Nudging

Figure 6: Product Category 3: After Nudging

Product Category 4: Personal Hygiene

Before Nudging

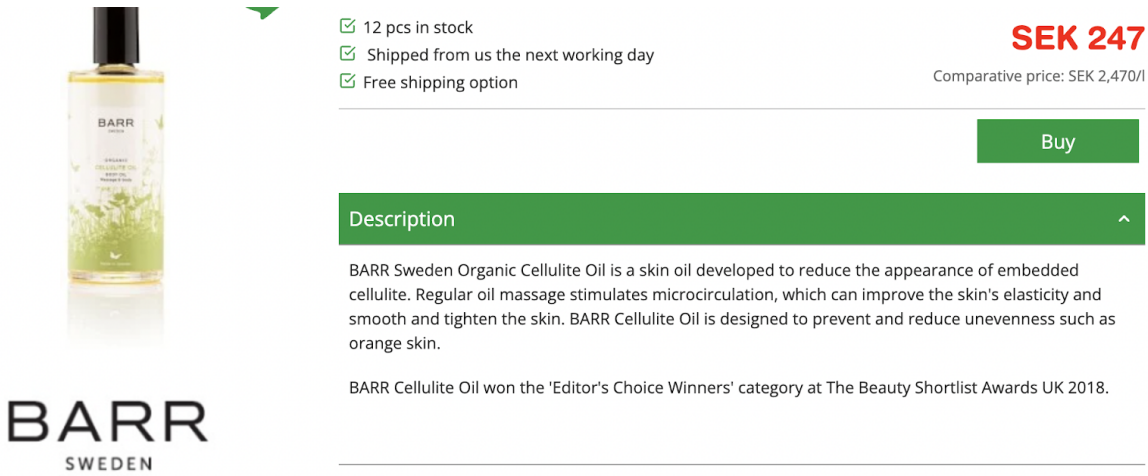

Figure 7: Product Category 4: Before Nudging

After Nudging

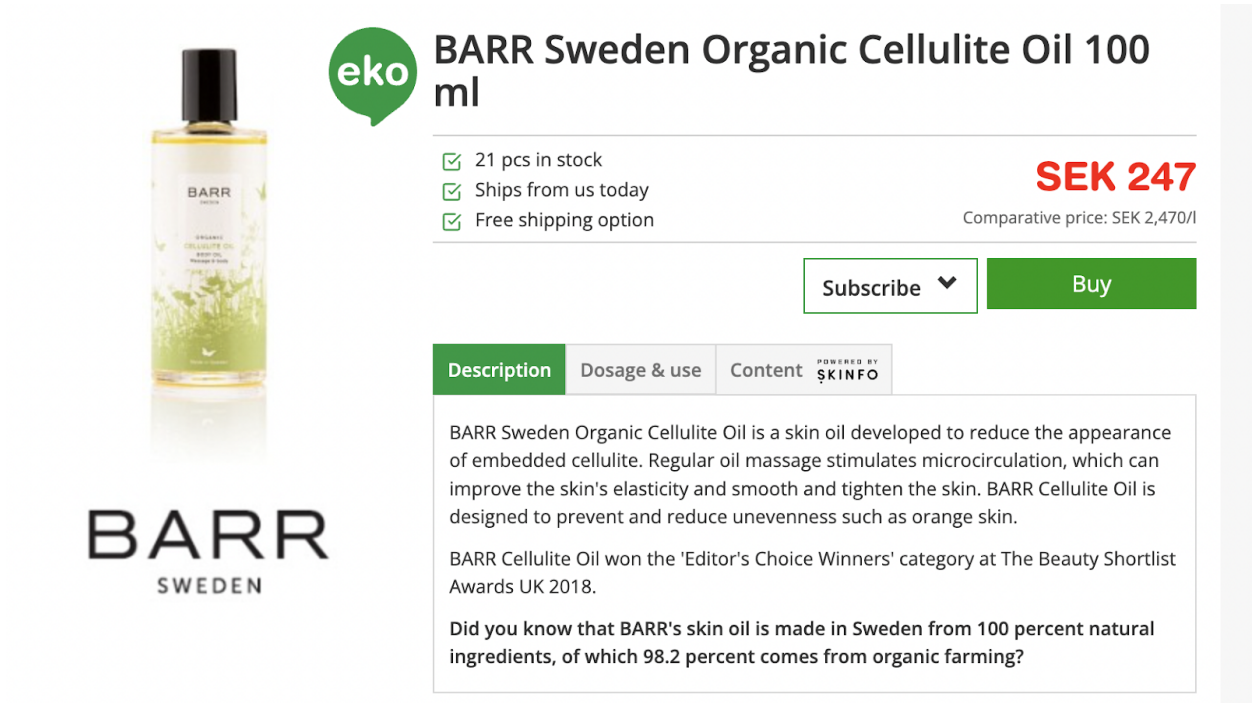

Figure 8: Product Category 4: After Nudging

Product Category 5: Medicine

Before Nudging

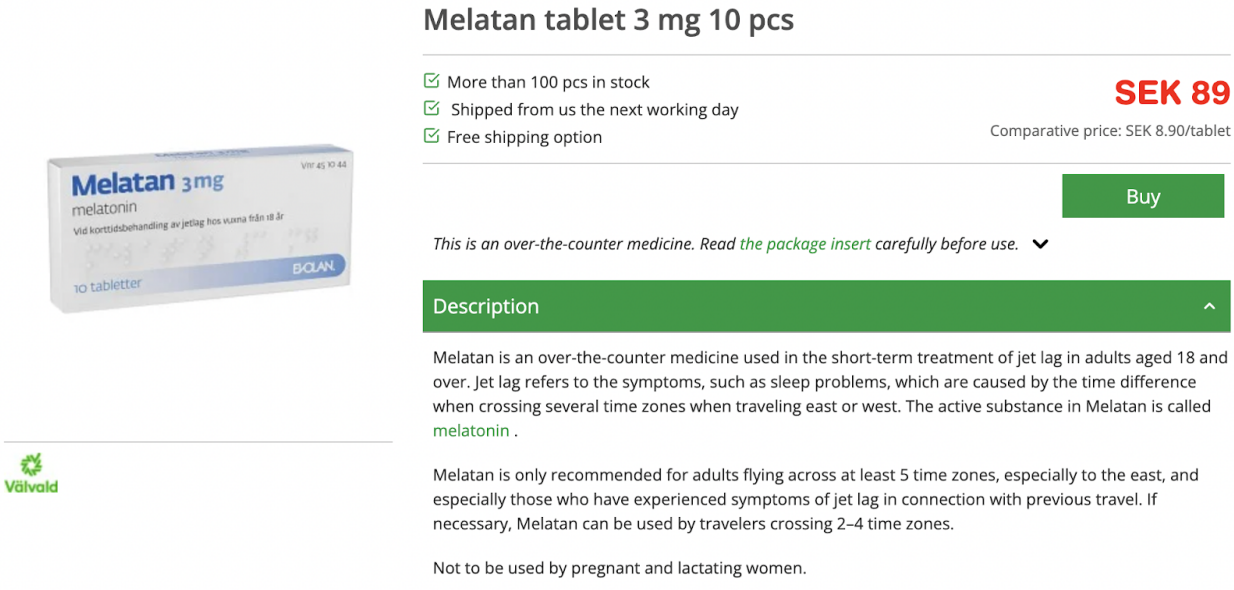

Figure 9: Product Category 5: Before Nudging

After Nudging

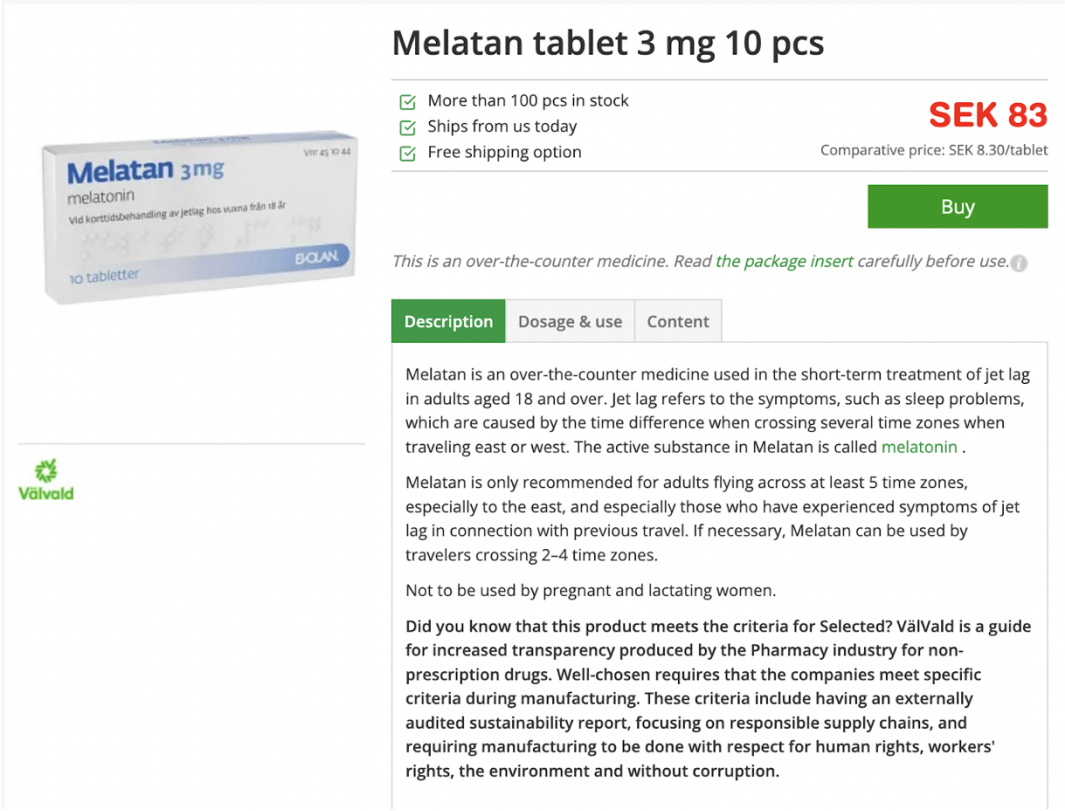

Figure 10: Product Category 5: After Nudging

Nudge for Global Messaging

Product Category 1: Baby Products

Before Nudging

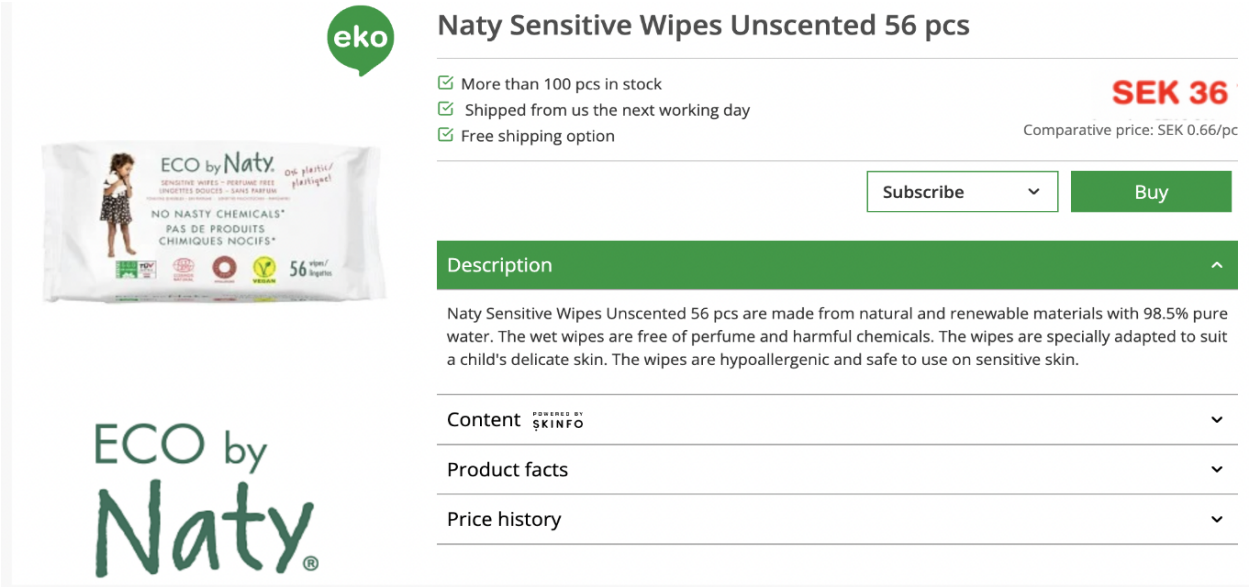

Figure 11: Product Category 1: Before Nudging

After Nudging

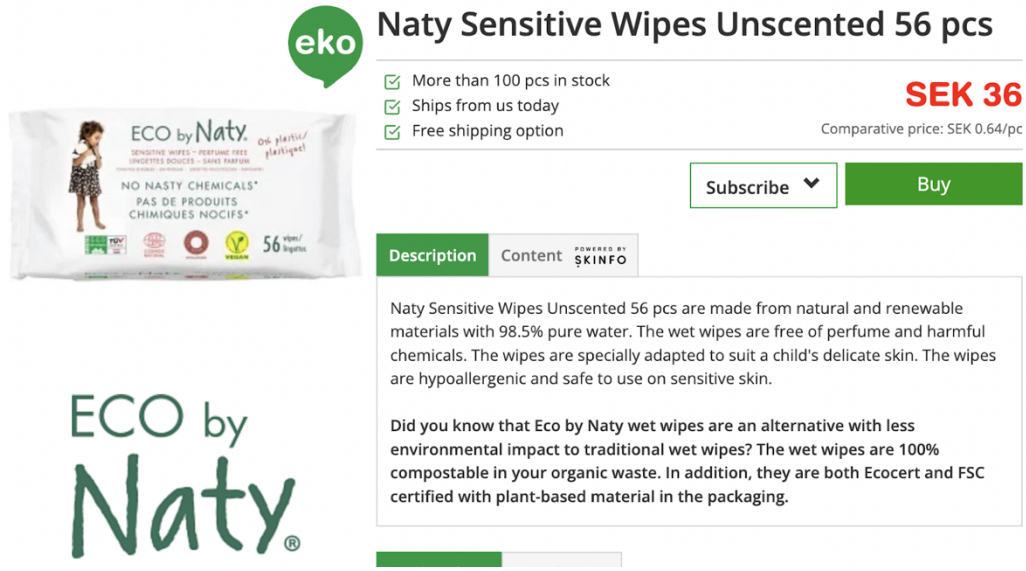

Figure 12: Product Category 1: After Nudging

Product Category 2: Food Products

Before Nudging

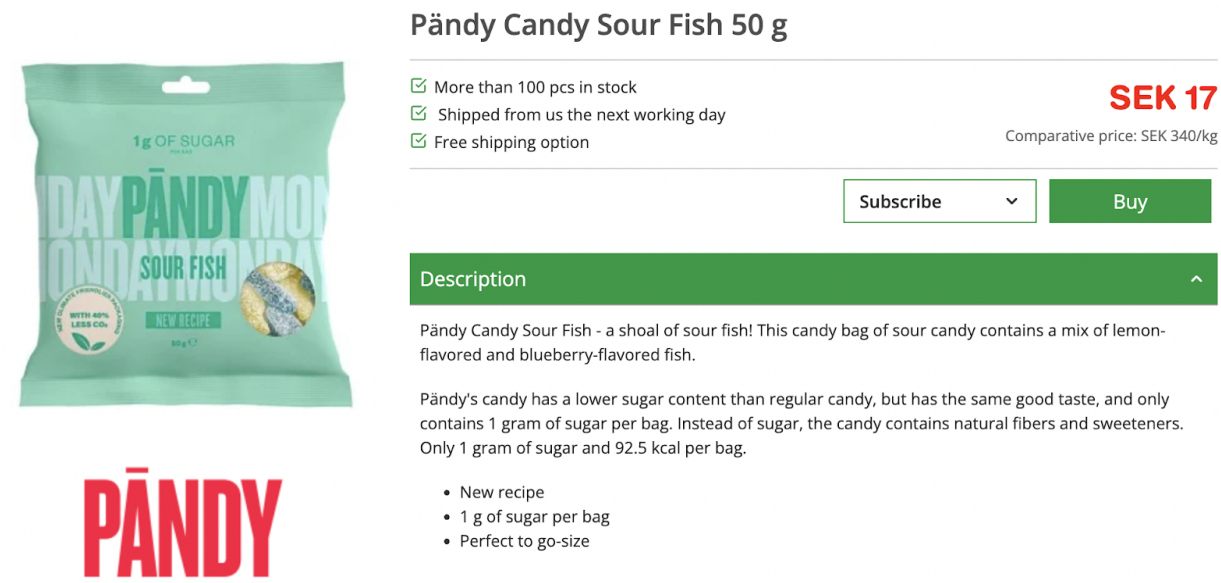

Figure 13: Product Category 2: Before Nudging

After Nudging

Figure 14: Product Category 2: After Nudging

Product Category 3: Cleaning Products

Before Nudging

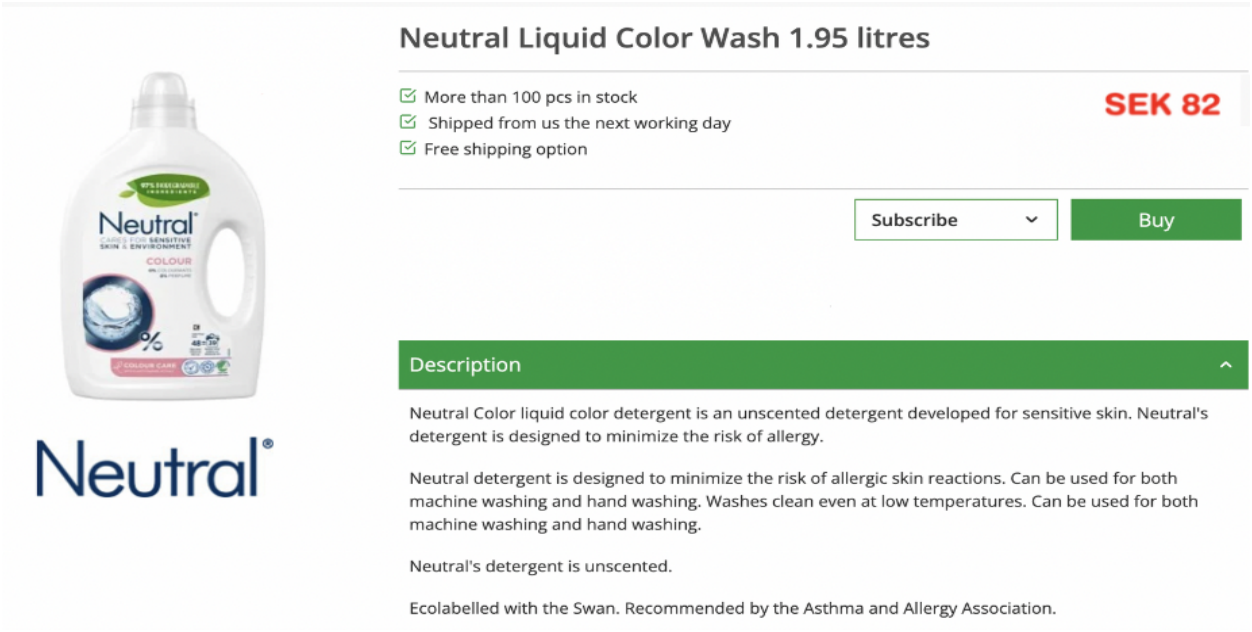

Figure 15: Product Category 3: Before Nudging

After Nudging

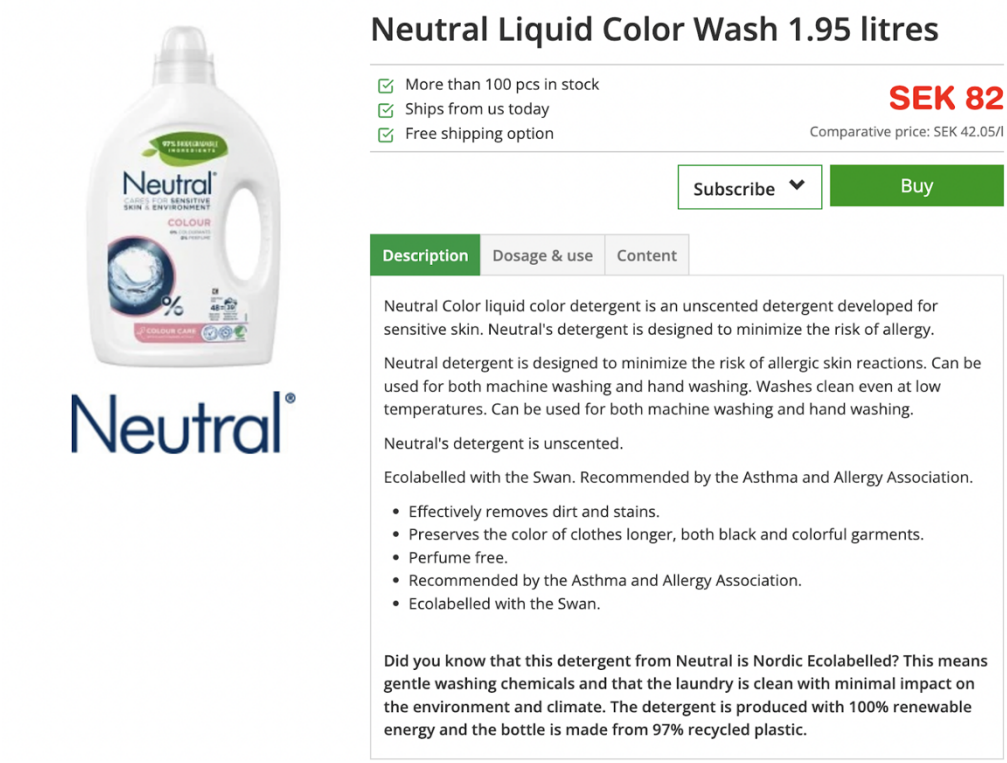

Figure 16: Product Category 3: After Nudging

Product Category 4: Personal Hygiene

Before Nudging

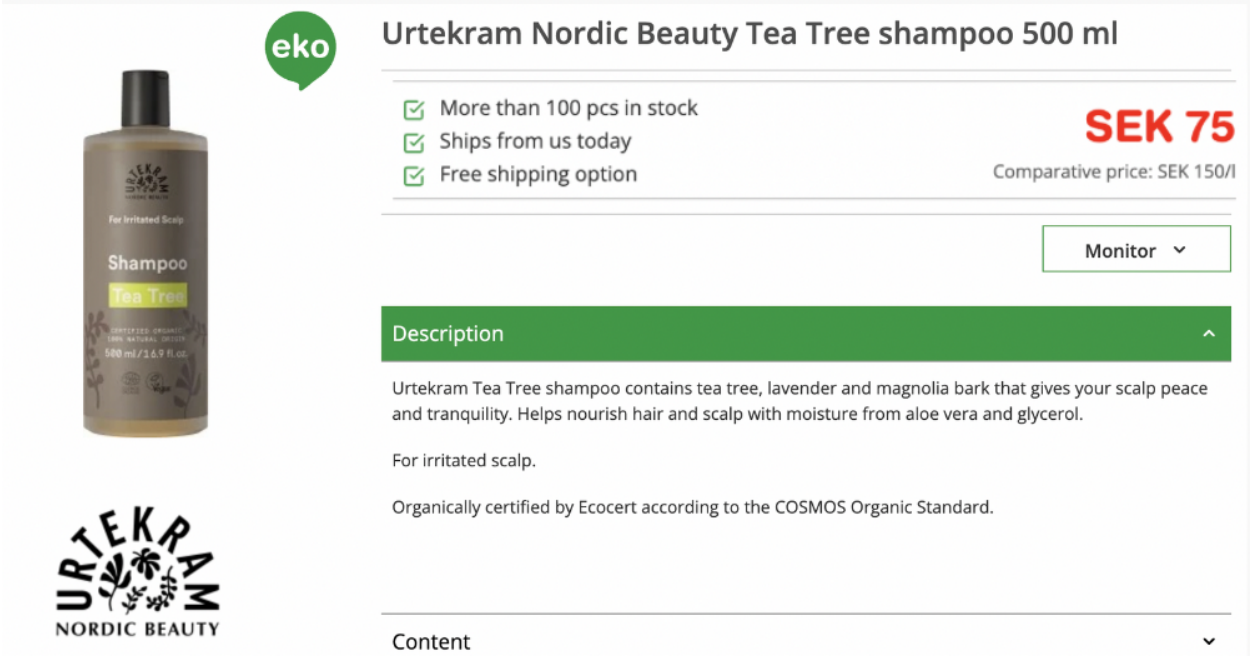

Figure 17: Product Category 4: Before Nudging

After Nudging

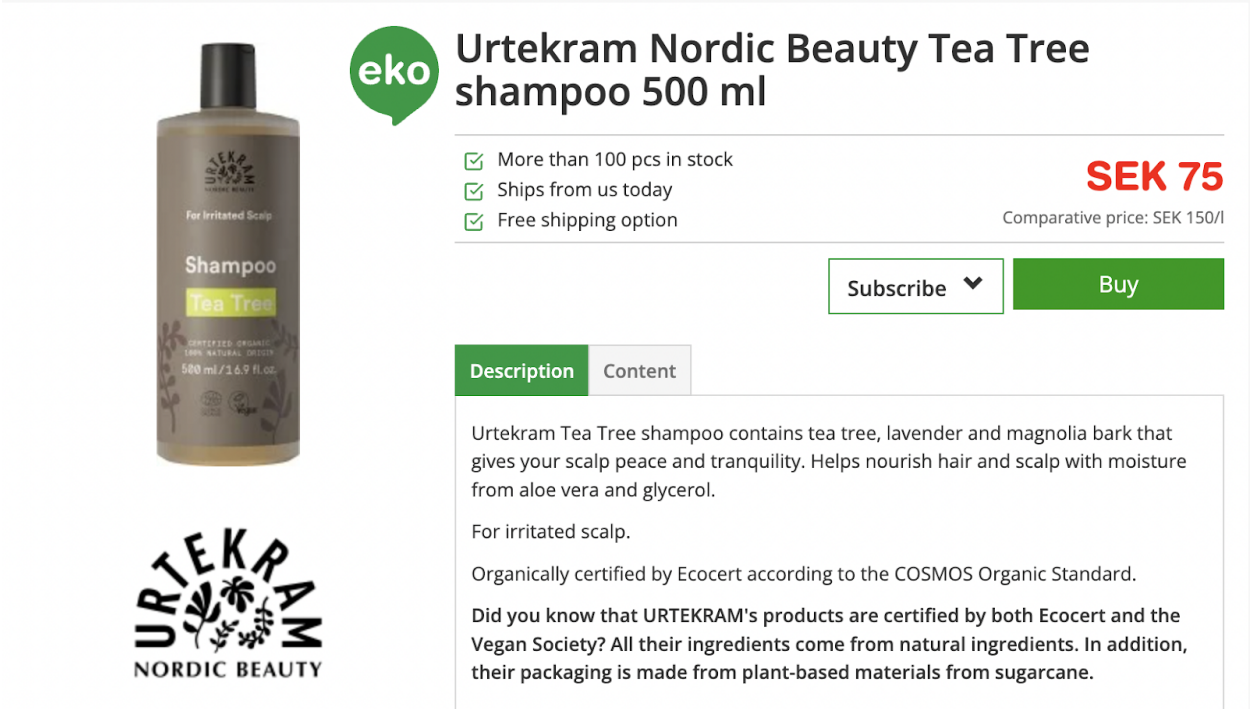

Figure 18: Product Category 4: After Nudging

Product Category 5: Medicine

Before Nudging

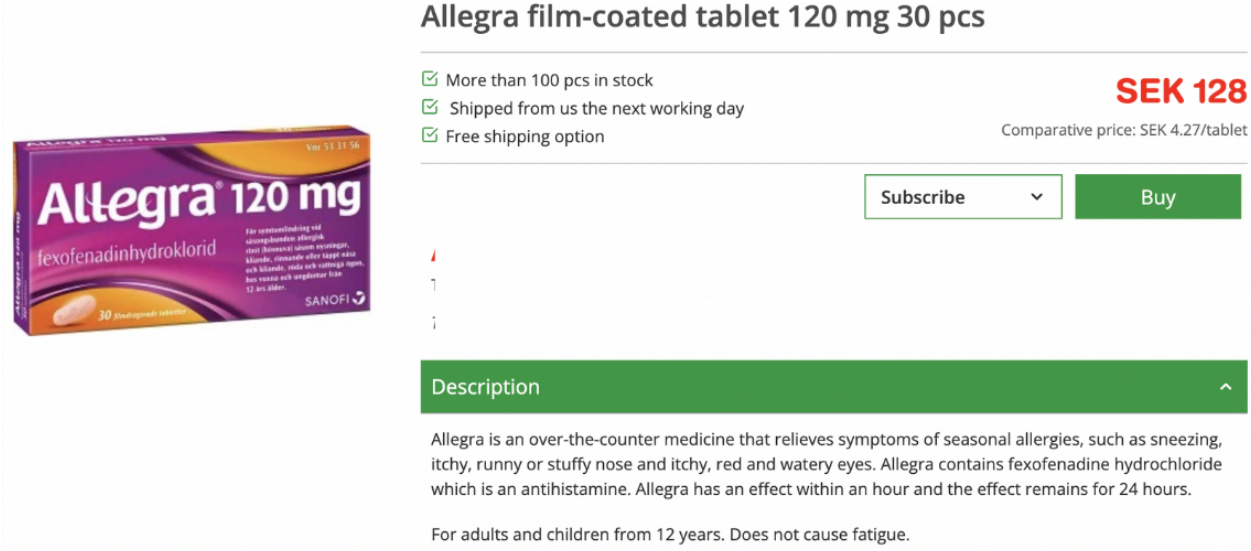

Figure 19: Product Category 5: Before Nudging

After Nudge

Figure 20: Product Category 5: After Nudging

Appendix B

Thesis Interview Questions

1) Can you describe how Apotea works with encouraging sustainable consumption among Apotea consumers, and what, in your experience, works or does not work?

2) Can you tell me if you are familiar with the idea of nudging consumers and whether you think this is a useful tool for Apotea to achieve sustainable consumption?

3) In our experiment, various limitations limited the ability to nudge. That related to what was possible on the Apotea webshop, what type of messaging was possible, and limitations in targeting different customers. Do you think nudging could be better used to encourage sustainable consumption without these limitations?

4) How do you envision using the insights gained from this experiment- that is (the local and global nudges are ineffective) in order to shape Apotea's sustainability initiatives in the future?

5) On this note, can you further explain your thoughts on why nudging might or might not be a good tool to steer consumers toward sustainable consumption?

6) What kind of effect does the Apotea company policy have in nudging consumers towards pro-environmental behavior?

7) How do you perceive the impact of sustainability guidelines on the marketing of environmentally friendly products compared to non-environmentally friendly products? Do you think the guidelines create more restrictions and hinder the marketing of sustainable products?

8) In your opinion, what is the effectiveness of nudging as a marketing strategy for promoting sustainable products? Do you think it is an effective approach or are there limitations to its impact?

9) To what extent do you believe that the product category plays a role in the effectiveness of marketing sustainable products? Do you think different product categories could have produced different results in a marketing experiment?, if so What kind of product categories and nudges are more effective in influencing consumer behavior towards Pro-Environmental Behavior?

Appendix C

Table A: Data for sales of selected products for 2022 and Q1 2023

Product	Ean	Total sales last 12 months (Q2 2022 through Q1 2023)	Average weekly sales
Products with Local messaging			
Barnängen Children's Oil Eco	7332531087049	11374	219
Dave & Jon's Dadlar Sour Cola	7350054797405	101983	1961
Häxan Badrum	7350125390146	2120	41
BARR Sweden Organic Cellulite Oil	7350086680072	36	1
Melatan tablett	7350041581734	79150	1522
Products with Global messaging			
Pändy Candy Sour Fish	7350000151626	9840	189
Naty Sensitive Wipes Unscented	7330933245012	9961	192
Neutral Washing liquid	8710908798375	35296	679
Urtekram Nordic Beauty Tea Shampoo	5765228837467	10943	210
Allegra Medicine	7046265331568	34850	670

Product	Ean	Total sales Q1 2023	Average weekly sales
Products with Local messaging			
Barnängen Children's Oil Eco	7332531087049	2697	207
Dave & Jon's Dadlar Sour Cola	7350054797405	40940	3149
Häxan Badrum	7350125390146	997	77
BARR Sweden Organic Cellulite Oil	7350086680072	12	1
Melatan tablett	7350041581734	16664	1282
Products with Global messaging			
Pändy Candy Sour Fish	7350000151626	3113	239
Naty Sensitive Wipes Unscented	7330933245012	2320	178
Neutral Washing liquid	8710908798375	9148	704
Urtekram Nordic Beauty Tea Shampoo	5765228837467	2939	226
Allegra Medicine	7046265331568	7805	600

Source: Data collected by Apotea

Appendix D

Link to the Guidelines that were used to create the nudge

International Chamber of Commerce Guidelines: https://icc.se/sjalvreglering/marknadsforing/miljo-klimat/#:~:text=ICC%3As%20Riktlinjer%20f%C3%B6r%20ansvarsfull,f%C3%B6r%20att%20undvika%20vilseledande%20element.

Apotea Sustainablity : https://www.apotea.se/hallbarhet

Valvald guidelines : https://www.apotea.se/valvald