Designing Digital Nudges to Encourage Sustainable Decisions

Developing and Testing a Framework

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June 24, 2018
Master’s Thesis in Interaction Technology and Design, 30 credits
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Abstract

The awareness of environmental impacts lead to that organizations are starting to work towards UN’s global sustainability goals. To influence customers into a more sustainable behaviour, organizations have the potential to look at nudging as a tool. A nudge is a way to alter peoples behaviour into taking a certain decision. However, since many organizations offer their service or product in the digital environment, such as websites or apps, increased knowledge of digital nudging is required. This thesis aims to establish a framework for how nudges should be designed and used on digital platforms to encourage sustainable decisions. The purpose is to enlighten designers of digital environment of the potential of nudges, pitfalls to avoid, and a general design process to follow. The framework is based on a literature study and interviews with people familiar with the concept of nudging. To examine how the framework works a case study is performed, this includes a workshop, performing a user research, developing prototypes and finally, conduct user tests. By testing the framework further methods could be found, this meant that more practical steps could be included in the framework. The result of this thesis shows that the framework proved to be useful and functional to use when designing digital nudges to encourage sustainable decisions.
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Chapter 1

Introduction

On the road to a more sustainable welfare the government of Sweden\(^1\) has identified food consumption as one of their biggest challenges. High meat consumption and large amounts of food disposal are factors that especially stand out. The current consumption pattern in Sweden is not sustainable, it has negative environmental and climate impacts \([1]\). However, this is only one of many sustainability issues that is currently a cause for concern. Due to this, a large number of organizations have started to work toward the United Nation’s\(^2\) (UN) global sustainable development goals \([2]\). Working with sustainable development includes working with the three core elements: economic growth, social inclusion and environmental protection \([3]\). Nevertheless, the benefits of working with sustainable development does not only contribute to a better world. The organization’s reputation by working with sustainability attracts and retains employees, consumers, business-to-business customers and investors \([2]\). Additionally, they can secure their licence to operate.

To create a successful strategy for solving problems of climate change, resource efficiency and environmental impacts, depend on public behaviours. People are constantly making decisions about all kinds of things, this includes issues that affect the environment. In the case of food consumption, the choice of products people purchase is directly connected to environmental impact. To change peoples consumer behaviour their decisions need to change, this can be accomplished through nudging. A nudge is a way to alter people’s behaviour in a predictable way without forbidding options or significantly changing their economic incentives \([4]\). In the area of sustainable behaviours a lot of experiments have been performed with nudging. To give an example, Theotokis and Manganari \([5]\) showcases in four different experiments the influence of the choice environment and the use of defaults. By changing the environment around a default choice and the default choice itself, peoples decision can be influenced

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\(^1\)Swedish government, http://www.sou.gov.se/agenda2030/

into a more sustainable one. Choice architecture, a term established by Thaler and Sunstein [4] describes the influence of the choice environment, the way a choice is presented is often the reason behind what decision the decision-maker finally makes. In this aspect, it is important for designers of choice environments to design and present the choices correctly. Designers of choice environments, i.e. choice architects, have the power to change people’s behaviours by using heuristics and biases to gently ”nudge” them towards certain choices [6].

Many of peoples decisions made today are in digital environments [7], for example, in web sites and mobile applications. People buy products from web shops, book travels from different booking platforms, and continuously make decisions based of content presented in digital information systems. A majority are using the internet today, in the ages up to 55 years more than 99% of Sweden’s population are using the internet\(^3\). The digital platform has a big potential in nudging people towards more sustainable behaviour. Although, for this to happen choice architects of digital environments, those who design and develop the user interfaces (UI) need to understand the potential of nudges and the importance of taking sustainability issues into account. Thus, extending the concept of nudges to the digital environment is called digital nudges. Which is defined as the use of user-interface elements to guide people’s behaviour in a digital choice environment [7]. For UI-designers it is common to focus on usability and aesthetics when they design, this mean that they often forsake the potential behavioural effects of different designs [6]. Understanding the effects of digital nudges can help designers guide users in digital choice environments, especially towards a sustainable behaviour.

1.1 Problem Statement

Nudging is a relative new concept but there is a lot of information about it and how it can be used. Most research on nudging has been in physical environments, but research on nudging in digital environments are growing into an important field in design science [7]. There are many reasons why the digital environment has great potential for the use of nudging. Advanced web technology offers many opportunities to test and optimize the effectiveness of digital nudges [6]. Although since user interfaces always steer people in directions (depending of how information is presented), designers need to understand the behavioural effects of interface design elements to avoid unexpected nudges and effects [7].

The usage of nudging for changing behaviours connected to sustainable decisions are frequently discussed, many countries are including this in their environmental policy debates [8]. The problem in the field of nudges for sustainable behaviours in the digital environment is the lack of information on how to design

1.2. Purpose and Aim

and implement them. This is why this thesis will address this problem. Focus will be put on finding guidelines and insights for how nudges should be designed and used in digital choice environments.

1.2 Purpose and Aim

The aim of this thesis is to establish a framework for how nudges should be designed and used on digital platforms to encourage sustainable decisions. By conducting a literature study and expert interviews different methods and guidelines for how to use digital nudges will be reviewed and summarized into a framework. To evaluate the framework a case study will be performed, which will answer the following question; How does the framework perform when developing nudges for sustainable decisions on a grocery’s stores website? This part will include a workshop, user research, development of prototypes and a qualitative test session. The ambition with the result of this work is to enlighten designers of the web about the potential of digital nudges with sustainable goals, possible risks and insights for how to design them.

1.3 Limitations

Even though the aim for this thesis is to provide a framework as general as possible, different limitations have been defined for the work:

**Digital** The study will investigate how the framework works in the digital environment. Due to time limitations the framework will only be tested on one case, which is a grocery store’s website.

**Effects** Measurements of the effects of nudges can not be done in line within this work. This since there is no available coding competence to utilize, the nudges can therefore not be implemented in a digital environment.

**General** The framework will serve as a general guide for how to design digital nudges, it will not lift specific design details and should therefore be seen as a supportive foundation.
Chapter 2

Background

For the convenience of the reader, information regarding the different subjects that are directly or indirectly involved in this thesis will be explained. This chapter will introduce the company Antrop\(^1\) and describe the case study chosen to be addressed in this thesis. Moreover, explain the background of the term nudging and how designers today work with the design development of the digital platforms.

2.1 Antrop

Antrop is a service design and experience design agency located in Stockholm with approximately 40 employees (2018). They help companies get a business critical understanding of their customers’ needs. Based on these insights they design industry-leading services, each step of the way until the business goals are meet. While working with projects they always strive to "make the world a better place for our kids" which is their main mission. This mission applies in all their work, which projects they choose to work with or which companies they choose to collaborate with.

This master thesis is written in collaboration with Antrop and conducted in their office in Stockholm during the spring of 2018.

2.1.1 Case Study Description

Antrop is currently working with a client (grocery store) to help them improve their customer experience and strengthen their brand. The work started in the spring of 2017 and since then a lot of work has been made. Antrop have delivered

\(^1\)Antrop, http://antrop.se/
2.2 Influencing Choices by Using Nudging

A new design proposal for the client’s website, and now they are working with a comprehensive user research. The current work includes interviewing and shadowing the grocery store’s customers, and summarizing and clustering their insights. The team at Antrop, 3 full-time employees has during the spring 2018 interviewed 20 customers about their shopping experience and also how and where they purchase groceries. The results of those interviews said that 70% have tried to purchase food online. Furthermore, the work that Antrop has done, as well as the client will act as a foundation for the case study of this thesis.

2.2 Influencing Choices by Using Nudging

In the area of nudging and behavioural science plenty of research has been made, the main protagonist in the subject is Richard Thaler, an american professor of Behavioural science and Economics. In 2017 he won the nobel prize in economics because of his behavioural science work. His contributions, along with collaborators, has given economists new insights into human psychology and frameworks for understanding and predicting economic outcomes [9]. One of his contributions regards how policies based on insights from behavioural economics can help people make better decision. This work was done with the colleague Cass Sunstein, together they wrote the book ”Nudge” which in short time after its release got quite influential [10].

The background explaining nudging is related to concept of libertarian paternalism. Sunstein [11] explains the term as following:

”The concept behind libertarian paternalism is that it’s possible to maintain freedom of choice — that’s libertarian — while also moving people in directions that make their own lives a bit better — that’s paternalism.”

Thus, those who use nudges, i.e choice architects strive to design arrangements to maintain or increase freedom of choice. But also, influence people’s behaviours in an attempt to make their lives longer, healthier and better.

2.2.1 Choice Architecture

A decision-maker does not simply make a decision out of the blue, they make them in an environment where several aspects (noticed and unnoticed) can influence the decision [12]. This environment is called a choice architecture, and those who creates it are a called choice architects [12]. Thaler and Sunstein [4] gives an example of a cafeteria, where the cafeteria itself serve as a choice architecture. The director of food services, the person responsible of deciding how the food should be displayed and organized in the cafeteria, is the choice architect.
2.2.2 Decision Making in Relation to Nudging

To understand how the human brain works when it comes to people deciding and thinking there are two cognitive systems to consider. One system is intuitive and automatic, the other is reflective and rational. Thaler and Sunstein [4] defines them as the Automatic system and the Reflective system:

**Automatic system** Is rapid and instinctive, in other words it is not associated with the word thinking. Every situation where a person react on reflex, for example, when a person duck when a ball is thrown at them, they are using the Automatic system.

**Reflective system** This system is more cautious and self-conscious. People use it whenever someone actively need to consider something, for example when a person calculate a math number.

An easier explanation of the systems is to think that the Automatic system is connected to a person’s gut reaction, and the Reflective system is a person’s conscious thought. Why these systems are relevant is because a nudge is trying to influence the Automatic system’s biases instead of informing the system [10]. By using different heuristics and behavioural biases people’s decisions can be influenced. Thaler and Sunstein [4] refer to heuristics as ”rules of thumb” when it comes to nudging. An example of heuristics is to draw the attention of decision-makers by using social norms and frame choices to finally change their behaviours [13]. More recently, scientist has come to understand that heuristics and biases is a result of the interplay between the Automatic- and Reflective systems [4].

2.2.3 What is a Nudge and its Purpose?

Human decision making is not great, this since people tend to make irrational decisions which they sometimes end up regretting. There is flaws and biases in human predictions, which is according to Thaler and Sunstein [4] a well stated fact by many studies. The power of inertia is one example of bias, when someone is following the norms and end up making a decision that is common based on those norms. Kahneman and Tversky [14] mentions that it is a risky choice when people act without advanced knowledge of the consequences. Would the power of inertia be harnessed, in a way that influence and help people make better decisions, people could rely on their Automatic system without getting into trouble [4]. Incentives and nudges can serve as a tool to improve people’s lives and still preserve everyone’s freedom of choice. Thaler and Sunstein [4] defines the term of nudging as following:

"A nudge, as we will use the term, is any aspect of the choice architecture that alter people’s behaviour in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy
2.3. Designing for Digital Platforms

Designers of digital environments, in fact all designers, focus on apprehending authentic solutions that serve people’s needs and reachable goals [15]. Their work is drawn from fields such as ergonomics and human-computer-interaction (HCI) to increase efficiency and avoid harming anyone. Good design counts as, according to Goodwin [15] as a design solution that is ethical, purposeful, pragmatic and elegant. However, designers rarely work alone, product development of digital platforms includes a whole team: Strategists defines the purpose and goals, interaction designers approach how users will interact with the product, visual designers creates the appearance, content strategists give the product a voice and developers makes everything work [16]. All roles play an important part in the design process since they are responsible of different parts of the product development.

2.3.1 Design Process

The design process describes the several steps and techniques involved in planning and conducting design research, as well as developing and iterating a design solution [15]. Depending on available time and budget the process can look differently, it can scale both up or down in size. An example of a design process for product development is the design-thinking process (see Figure 2.1). According to Gibbons [17] it follows the three main steps: understand, explore, and materialize. Within the overall steps the process also includes the following steps:

**Empathize** Conduct a user research to understand what users do, say, think and feel.

**Define** Combine the research with an observation of where users’ problems exists. From realizing the users’ need, move on highlight the possible innovations.

**Ideate** Brainstorm ideas that address the unmet needs identified from previous steps.

**Prototype** Build prototypes that represent the ideas generated from previous step. The goal of this phase is to realize which ideas work, and which do not.

**Test** Return to the users to test and receive feedback. The purpose of this phase is to investigate whether users’ needs have been met.
2.3. Designing for Digital Platforms

Figure 2.1: The design-thinking framework [17] follows the three main steps: understand, explore and materialize. Within the larger steps the process also includes the parts: empathize, define, ideate, prototype, test and implement.

**Implement** Implement the design and ensure that the work effect the end users.

The design-thinking framework is a user-centered process, as by Gibbons is a flexible and scalable process which address real user needs. Each step in the process is meant to be iterative and cyclical. It is well known [18][19], that user interfaces should be designed iteratively. This since it it practically impossible to design a user interface that has no usability problems from the beginning [20]. Why usability is important for digital environments is to maintain the users. If a user experience a website too difficult to use, get lost while using it, or do not find the answers of key questions, they will leave [21]. In other words, a thriving digital platform have a user interface that are easy to use.
Chapter 3

Methods

The methodology of this thesis has been divided into two phases: Investigation and Test.

Investigation phase The focus of the first phase has been to understand and analyze present literature that exist in the field of nudging. This was done by conducting a literature study, which will be explained further in section 3.1 Literature Study. To get more insight of how nudging work and how sustainable decisions should be considered interviews with experts was conducted, this method will be presented more in section 3.2 Interviews. The result from the literature study and the interviews emerged into the theoretical framework, which is presented in the chapter 4.

Test phase The second part was to test and evaluate the theoretical framework which resulted from the first phase. To test the framework each step introduced in the framework was performed and tested on a specific case, for this thesis the case study regarded a grocery store’s web platform. The methodology of the test phase will be presented in sections 3.3 Workshop, 3.4 User Research, 3.5 Prototyping and 3.6 User Tests. The result from the case study is presented in chapter 5. Further, to evaluate how the framework performed during the case study the result is analyzed and discussed, this part can be found in chapter 6.

3.1 Literature Study

In order to gain an understanding for how to design and use nudges in a digital choice environment an extensive literature study was conducted. The study aimed at finding information regarding how nudges should be used and designed towards a sustainable purpose as well as for the digital environment. The research resulted in that several relevant articles, books, reports and other
material were found. This by using reliable sources such as Google Scholar\(^1\), the online library of Umeå University\(^2\), and throughout references in other literature. Search words and phrases commonly used were “nudging”, “digital nudging”, “green nudges”, “nudging for sustainable behaviours” and “designing nudges”.

### 3.2 Interviews

In the meantime as the literature study interviews with experts in the area of both nudging and sustainable design was conducted. The purpose of the interviews was to investigate what people familiar with nudging said about it, and if they had something special they thought was important to consider when working with nudges to motivate sustainable decisions. Additionally, to gain a better understanding of how nudges should be designed, and what common mistakes to avoid. Since the interviews focused on the experts own experiences and opinions, the semi-structured interview was the method of choice. According to Rowley [22] is it the most common type of interviews and works well when the research goal is to understand experiences, opinions, attitudes, values, and processes.

In total was 4 one-hour interviews conducted, all in Swedish. The questions asked can be seen in Appendix A, and further information of the interviewees can be seen in Appendix B. Some of the interviews were held over the digital video and voice call service Skype\(^3\) and some over the phone during the spring of 2018. To avoid loosing any relevant information the interviews were audio recorded, this with permission of the interviewees.

### 3.3 Workshop

The workshop was a part of the second phase of this thesis, where the theoretical framework was tested. The goal of the workshop was to firstly understand, for which sustainability goals the nudge should focus on. Secondly, to understand which decisions a customer make on the grocery store’s website that can be linked to the goals. The workshop was conducted with the 3 employees at Antrop currently working with the case, in Antrop’s office in Stockholm the 14th March 2018.

The first step of the workshop was to investigate which sustainability goals the grocery store is working with. By comparing the grocery store’s goals with UN’s sustainable development goals an understanding for which sustainability

\(^1\)Google Scholar, https://scholar.google.se/
\(^2\)Umeå University Library, http://www.ub.umu.se/en
\(^3\)Skype, https://www.skype.com/
3.4 User Research

In order to gain a bigger understanding of the customers of the grocery store a user research was performed. The overall goal of this work was to understand which behavioural biases a nudge may influence. The research was done by investigating the previous work the team at Antrop already had done in their work with the grocery store. One of the previous work was a market analysis, which was a summarized report of quantitative data regarding the website’s users. The next step was to look through finalized personas which represented the primary users of the grocery store. The team from Antrop had earlier performed several interviews with the companies customers and from those interviews developed personas. The personas describe the company’s target groups and relevant in-

Figure 3.1: During the workshop every participant sat individually and brainstormed to find the different choice situations a user made in the customer journey that could be linked to the sustainability goals.
3.5 Prototypes

formation to consider while designing for these users. Personas are a good tool for describing targeted users, this because they are fictional but still a realistic representation of the targeted users [24]. To understand how to influence the targeted users another step was to compare and match the gained insights with suitable behavioural influences and heuristics found from the theory.

3.5 Prototypes

When a better understanding of how the users should be influenced with heuristics and behavioural biases, the digital nudges could be designed. To display how the digital nudges should look like on the grocery store’s website two different types of prototypes were created; low-fidelity (lo-fi) and hi-fidelity (hi-fi). Prototypes are often built to simulate the finished product and examine how the content, aesthetics and interaction may affect the user. By developing and testing prototypes a designer can find usability problems in the early stages of the development process, which helps save both time and money [25].

3.5.1 Lo-Fi

To generate ideas and start visualizing the digital nudges with UI-elements on the grocery store’s website, simple wireframes were created by using pen and paper. These sketches were used as a part of a brainstorming session, some of the better ideas were further developed into hi-fi prototypes and polished by using Sketch\(^4\). Since the lo-fi prototypes only served as a foundation for ideas, no user tests were performed by using these prototypes.

3.5.2 Hi-Fi

In order to investigate the chosen ideas from the lo-fi prototypes, hi-fi prototypes with UI-elements and interaction schemas were created. Hi-fi prototypes were developed to showcase the nudges in action on the grocery store’s website. This was done by designing in Sketch, and to show the interaction schemas clickable prototypes were developed in the prototype tool Marvel\(^5\). These prototypes was used for the user tests.

3.6 User Testing

The last part of the test phase was to user test, the purpose of this was to get a better understanding of how the nudges are received by the user. And

\(^4\)Sketch, https://www.sketchapp.com/
\(^5\)Marvel, https://marvelapp.com/
also, investigate the usability of the nudges, as by Nielsen [21] describes the ease-of-use. Testing prototypes is a common method of usability professionals, this since usability problems and flaws can be found at an early stage of design [25]. A qualitative user test session with 5 users was conducted (see Table 3.1) during the spring of 2018. The reason as to why only 5 test participants were tested was due to the statement by Nielsen [26] that most usability issues can be found by only testing with 5 people. The test subjects were selected to the tests based on if they matched any of the primary user groups, which was found from the investigation of users. All of the primary user groups was evaluated, there was at least one test subject in each group.

Table 3.1: This are the specifications of the five test participants that volunteered for the usability tests.

<table>
<thead>
<tr>
<th>Test 1</th>
<th>Test 2</th>
<th>Test 3</th>
<th>Test 4</th>
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<td>Age</td>
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<td>Sex</td>
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</table>

To figure out how the test performed a pilot test was conducted together with a colleague at Antrop. The reason was to investigate if there was any complications with the test before jumping in to the real test session. Once the test session was conducted, the test participants were encouraged to perform naturally and imagine that the prototypes represented a real grocery store’s website. To get an understanding of how the users thought during the test the test subject were encouraged to “think aloud”. They were also encouraged to motivate their choices in the prototype. The reason was to get a better understanding for why the test participant made their choices, but also to evaluate the nudges. All tests were performed in quiet group rooms, and all in Swedish since all test subjects are from Sweden. During the test a test subject got several tasks to perform on the prototype, which were the following:

- Choose any product and add it to the shopping bag
- Go to the shopping bag
- Complete the purchase
- Go to 'My page'
- Find shopping history of a certain grocery category
Chapter 4

Theoretical Framework

This section represents a collection of theory based on an extensive literature study and interviews with experts in the area of nudging and sustainable design, which completes the first phase of this paper. This investigation serves as a foundation of the second phase (defined in Chapter 3). The framework will lift information that should be considered when designing digital nudges towards sustainable behaviours and decisions. It introduces different digital nudging techniques, behavioural biases and lifts the importance of ethics.

4.1 Designing Digital Nudges

Based on existing design guidelines of nudges in offline contexts, Schneider et al. [6] have developed guidelines focusing on digital platforms. The design process for digital nudges (see Figure 4.1) looks familiar as the cycle for developing information systems, this because of similar parts (planning, analysis, design, implementation) and because of the iterative process. However, the guidelines Schneider et al. have provided are a general guide for designing all kinds of digital nudges. This might mean that details about nudges for specific purposes can fall between the lines. To get a better understanding of the process behind digital nudging with the aim of sustainable decisions the guidelines will be further developed. The following parts will be explained and further developed: Define the Goal, Understand the Users, Design the Nudge and Test the Nudge.

4.1.1 Define the Goal

As Schneider et al. [6] explains, the first step in the cycle focuses on understanding the goal behind the nudge. This is can be done by investigating the
4.1. Designing Digital Nudges

Figure 4.1: An illustration of Schneider et al. [6] design process for designing nudges on digital platforms. The process includes the following parts: Define the goal, Understand the users, Design the nudge and Test the nudge.

organization’s overall goal in each choice situation [6]. Since the goal of organizations can be anything from increasing sales, provide people with information and collect money for charity purposes, designers also need to identify goals for specific situations [6]. There are plenty of organizations working towards the global sustainable development goals [2], how and which of these goals they work with depends on the organization. For example, a clothing store’s general goal is to increase sales, although, when it comes to their sustainability goals they might want to focus on how the products are delivered to their customers. In this example the organizations overall goal is not connected to their sustainability goal, although they are equally important to consider when designing digital nudges. The reason is because every one of these goals determine how choices should be designed, especially which kind of choice to be made [6].

Identify Choice Situations Connected to the Goal

When the organization’s goals are identified a further step is to find decisions that are connected to the goal. Not only is the goal closely connected to the choices in the choice environment, but also what kind of nudge that is going to be used [6]. When looking on the choice situation we can identify different types of choices, for instance, accepting terms of service is a binary choice (yes/no or agree/disagree), choosing between items is a discrete choice, and do-
nating money each month is a continuous choice (although it can be presented as a discrete choice) [6]. Once the decisions connected to the goal and the different choices are identified, the designer can move on investigating how the user response to these decisions.

4.1.2 Understand the Users

When the goal and the choice situations has been discovered an investigation of the target group is essential. Norman [27] describe the understanding of the user as following:

"If there is any principle that is sacred to those in the field of user-interface design and human-computer interaction, it is “know your user”.”

In the field of nudging and choice architecture this is especially relevant since all choosers are human, and people tend to have different opinions and behaviours when it comes to different choices. Hackos and Redish [28] mentions that the better a designer understands the users, the better designs can be made. Nevertheless, if the design not meet users needs the result is often high production costs, frustration and errors that impact users [28]. To decide which users are relevant for the project focus should be on those who use the organization’s product/service. Although, emphasis should be on those users who actually use the interface or information that are going to be designed [28]. A regulation is to find primary and secondary users. The primary users are directly connected to the goal, since they use interfaces and information to perform tasks to reach the goal [28]. For example, a primary user is a person who has bought a microwave to heat food, while a secondary user are the person who is indirectly using the microwave. Designers need to investigate users, and both the primary and secondary users are equally important [28].

Individual differences

There are individual differences of users to consider as a designer and choice architect, this because they may affect the outcome of the design [28][29]. There have been situations when earlier nudges have gone wrong and resulted in multiple effects since personal characteristics has influenced the outcome [29]. Individual differences can be found in personal characteristics, physical abilities, cultural assumptions, behaviour and motivation in different contexts, such as workplace, expertise and education [28]. A choice architect should not only know the choice environment but also acknowledge the characteristics of the targeted users, understand how they process, draw conclusions and which goals they have [29]. In some cases the right choice architecture might differ between the targeted users. This can lead to that users are left without assistance and meet other complications. A designer need to investigate individual differences,
4.1. Designing Digital Nudges

and consider if the percentage of the users that are affected are relevant to consider in the design [29]. Hackos and Redish [28] also lifts the importance of avoiding stereotypes while investigating your users, since they are easy to confuse as individual differences.

Norms

Since the target group has been identified a further step is to investigate which norms applies on this group. Using social influences to nudge is a common method, Thaler and Sunstein [4] claims that it is one of the most effective ways to nudge (for good or bad). The reason is that humans tend to do what others do, it can be small examples such as we smile when others smile, or that we yawn when other does. A practical example is Goldstein et al. [30] experiment where they tested whether guests at a hotel reused their towels more often if they were presented with information of environmental impact, or with information of descriptive norms. They found that a significant number of people reacted towards the descriptive norm-sign rather than the environmental impact sign. The result of this experiment is relevant for this paper, it tells us that simply displaying information of environmental impact does not make people change their behaviour. Social influence can persuade people to actually take a step into a change.

Although the use of norms are good to encourage behaviours there are risks to consider when using this technique. De Jong [31] mentions in an interview that she is critical about the use of nudging. One reason for this is because there exist groups in our society, and in order to make nudging work all groups need to be included. Using one norm to attract a part of the target audience could also lead that another group is excluded.

Behavioural Biases and Heuristics

To motivate a user to make a certain decision heuristics and behavioural biases can help influence them. There are several ones that can be relevant to consider when designing a nudge [4][6][32][33]. This thesis will consider behavioural influences relevant to nudges for sustainable decisions and which has the potential of being used in the digital platform. Schneider et al. [6] mentions several heuristics and biases that can influence a user in a digital environment, although only a few will be presented in this thesis. Since all projects are different it is important to acknowledge that the following heuristics and biases can differ between cases. The following biases and heuristics are according to OECD [8] those who impact environmental policies:

**Framing Effect** Describes how an option is presented (framed) affects the individual choice among several alternatives [8]. Framing works because people tend to make rash and passive decisions. Their Reflective system
4.1. Designing Digital Nudges

does not check whether the question would produce another answer. One reason why people ignoring reframing the question is because they want to avoid contradiction. This conclude why framing is a powerful way to nudge, and also why it should be selected with caution. [4]

**Loss Aversion** People hate losses (and their Automatic system can react quite hard about them) [4]. Loss Aversion occur when the cost of loosing something is perceived greater than the benefit of actually acquire the very same thing [8]. People put greater value of just owning an object, rather than that the object itself has any value. Loss Aversion also helps to produce inertia, which can be explained as the desire of holding on to your current possessions [4]. In a way Loss Aversion can be seen as a cognitive nudge, persuading us to not make any changes even though other options are in our favour.

**Endowment effect** Describes the phenomenon of when peoples motivation increase since they believe they are close to achieving a goal [32]. This heuristic act on inertia as well, a person feel the need of continue with a task since they are close to complete it. Companies such as Linkedin\(^1\) and Facebook\(^2\) are using this heuristic to encourage people finishing their online profiles [32]. They often show how far the user have left with an illustrating process bar.

**Status-quo bias** Loss aversion is not the only reason for inertia. People also has a tendency to stick with their current situation, which is a phenomenon called "the status quo bias". The reason for why it works is partly because of lack of attention at users. Thaler and Sunstein [4] mention the "yeah, whatever" heuristic which explains the usage of the status-quo bias. It can be illustrated by that a TV-show is being watched, when the show ends and another starts many viewers just say "yeah, whatever" and continue watching the next show.

### 4.1.3 Design the Nudge

Once the designer has defined the goals and got an understanding of the user’s decision process and the heuristics and biases, the designer can select a suitable nudging technique to influence users decisions. But before deciding the nudge and how it should be implemented in the digital choice environment, the specific choice to be made, either binary, discrete or continuous options, and relevant heuristics and biases should be considered [6].

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\(^1\)https://www.linkedin.com
\(^2\)https://www.facebook.com/
4.1. Designing Digital Nudges

Nudging Technique

Tools of nudging include default options, working with warnings, changing layouts and features of the choice environments, reminding people of their different choices, drawing attention to social norms and using framing to finally changing peoples behaviours [13]. Schneider et al. [6] has established three steps to follow (See Figure 4.2) to choose a suitable nudging technique and also give some examples. The first step is about identifying which type of choice in the digital choice environment are to be influenced. Next step is to decide the heuristics and biases at play. Finally, depending on the two previous steps a suitable nudge can be selected.

According to Schneider et al. [6] a common nudge connected to binary choices is to preselect the desired option which can effect the status quo bias. This is known as a default, which is a common technique when focusing on environmental impact. Changing the default has shown to have quite the influence on peoples behaviour towards sustainability [34][35][5]. Although, as Sunstein and Reisch [36] reflect upon, the default rule might be influential since people do not want to engage in thinking, take a risk, or make a tradeoff. But there are times when the default is not working, this is when social norms or inertia is not particularly strong, which is why consumers will reject that default [36]. If the nudge are involved in a discrete choice or a continuous choice there are other heuristics and biases to consider, Schneider et al. mentions for example norms and loss aversion, which is also mentioned to affect sustainable policies.

Prototypes and Implementation

Designers have a variety of different techniques at their disposal which they can use to implement nudges [6]. A common method, which designers often start with is to build prototypes. A prototype is a model of the user interface which is developed to investigate and test design ideas [25]. Usually before implementing the designs prototypes are being tested, this to evaluating the usability of the user interface. Gould and Lewis [18] means that in order to streamline the development, building and testing prototypes is essential.

There are other aspects that are important to consider while in this phase as a choice architect, and designer of a nudge. It regards the decision of which and how many options to present to the decision-maker in the choice environment. Johnson et al. [29] explains that there are two considerations for a designer when deciding this: the more options provided increase the chance to match users preference, although more options also creates a bigger cognitive burden for the users while evaluating the options. A few general guidelines exist for this question, according to Johnson et al, these are the important aspects to consider:

- The willingness of the decision-maker to engage in the choice process
### 4.1. Designing Digital Nudges

Schneider et al. [6] suggest three steps to think of when designing a nudge (and some examples for how). The steps to consider are: Type of choice to be influenced, heuristics/bias and design element/user interface pattern/possible nudges.

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of choice to be influenced</strong></td>
<td><strong>Heuristic/Bias</strong></td>
<td><strong>Examples of Design Elements/User-Interface Pattern and Possible Nudges/Mechanisms</strong></td>
</tr>
<tr>
<td>Binary (yes/no)</td>
<td>Status quo bias (defaults)</td>
<td>• Radio buttons (with default choice)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check box (checked/unchecked)</td>
</tr>
<tr>
<td>Discrete choice (e.g., two products)</td>
<td>Status quo bias (defaults)</td>
<td>Use of defaults in</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Radio buttons</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check boxes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Dropdown menus</td>
</tr>
<tr>
<td>Decoy effect</td>
<td>Presentation of decoy option(s) in</td>
<td>• Radio buttons</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check boxes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Dropdown menus</td>
</tr>
<tr>
<td>Primacy and recency effect</td>
<td>Positioning of alternatives/presentation of the desired option(s)</td>
<td>• Earlier (primacy)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Later (recency)</td>
</tr>
<tr>
<td>Middle-option bias</td>
<td>Addition of higher- and lower-priced alternatives around the preferred option</td>
<td>• Ordering of alternatives</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Modification of the option scale</td>
</tr>
<tr>
<td>Continuous</td>
<td>Anchoring and adjustment</td>
<td>• Variation of the slider endpoints</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Use of the default slider position</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pre-defined values in text boxes for quantities.</td>
</tr>
<tr>
<td>Status quo bias (defaults)</td>
<td>Use of the default slider position</td>
<td></td>
</tr>
<tr>
<td>Any type of choice</td>
<td>Norms</td>
<td>• Display of popularity (social norms)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Display of honesty codes (moral norms)</td>
</tr>
<tr>
<td>Scarcity effect (loss aversion)</td>
<td></td>
<td>• Display of limited availability</td>
</tr>
</tbody>
</table>

Figure 4.2: Schneider et al. [6] suggest three steps to think of when designing a nudge (and some examples for how). The steps to consider are: Type of choice to be influenced, heuristics/bias and design element/user interface pattern/possible nudges.
4.2. Consider Criticism and Ethics

- The decision-makers satisfaction of the choice process
- The nature of the processes that will be used to make the decision
- Personal characteristics of the individual decision-maker

4.1.4 Test the Nudge

Testing the nudge is an important step since the nudge can work differently depending on context, goals and target groups [6]. Since designs of digital environments are easy to implement it makes the test period much more effective. A regular test method to measure the effects of a nudge is according to Schneider et al. [6] to perform online experiments, such as a split test (A/B test). It is a variant of quantitative testing, which only offer an indirect assessment of the usability in the design [37]. Although, quantitative tests can never investigate the question of why, which may be quite relevant regarding the usability of digital nudges. Nielsen [21] lifts the importance of usability when designing for the digital platform, which concerns how easy a user has to interact in the user interface. This means that whenever a designer is integrating new design elements it might be useful to investigate if there are any usability issues. Since split testing only answer questions of, how many and how much [37], adding qualitative tests can be good. Qualitative test can also be done in line with the design phase in the design process, which means that usability issues can be discovered at an earlier stage.

4.2 Consider Criticism and Ethics

There are criticisms towards nudging which can be good to know of as a choice architect. Some people suggest that nudges is patronizing because the underlying assumption that people are to stupid to make good decisions on their own [10]. Others mean that nudging is wrong because people are forced to some decisions. Although, as Thaler and Sunstein [4] explains:

"The second misconception is that paternalism always involves coercion. In the cafeteria example, the choice of the order in which to present food items does not force a particular diet on anyone, yet Carolyn, and others in her position, might select some arrangement of food on grounds that are paternalistic in the sense that we use the term".

Thaler and Sunstein states that some types of paternalism should be acceptable of those who are concerned of their freedom of choice, since no coercion is used. As long as other choices are available there is less risk of a bad choice architecture. Although, there are other risks with nudges as well. People can find nudges manipulative and get upset if they notice a nudge [38]. Therefore
it is important that people have the possibility to know of the nudging in some way. Transparency and accountability is important when it comes to nudging and should be considered [39][38].

An important thing for choice architects to think about as well, is the ethical aspects. Nudging people towards decisions that can harm them or their well-being is unethical, and in addition the affected organizations will receive long-term negative effects [39]. Discussions has been made in the area of nudging connected to welfare and the ethical implications [39]. One angle is that nudges regarding welfare is not for people’s good, its for the good of the environment. In terms of nudging, people often think of people’s good as reference to their own judgments and evaluations [11]. Then again, reflecting on the environmental impacts, when buying products or driving certain kinds of cars people inflict harms on other. According to Sunstein [11] peoples judgments of their own welfare are not complete. People want nudges that help people who are being nudged, but at the same time help people who are harmed by those who do not take into account which damage they do [11].

4.3 Avoid the Pitfalls

Since nudging is a relatively new term in many different industries it is easy to make mistakes. In this section common pitfalls regarding nudging, identified from expert interviews, will be explained. The following are those pitfalls that should be avoided once designing a digital nudge towards a sustainable decision: Nudging as a Substitute, Target the Wrong Crowd, One Nudge For All, Nudges Without Explanations and Expect the Same Effect.

4.3.1 Nudging as a Substitute

An important aspect to consider is to not mistake nudges as a substitute for making a real change. Altmejd [40] mentions that nudges should be considered as a supplement, the real change must include other attributes. This since a nudge works on a very small margin, which means that a nudge is all about a small effect [40][41]. Broms [41] illustrates the effect of a nudge with an example:

"A nudge is not a silver bullet that will solve all sustainability issues. It works on specific contexts, for example, if you want people to take less food, you offer them a smaller plate and they will take less food. But when it comes to bigger changes, for example, how we can stop the global warming, a nudge will not be the answer. This because it is a too complex problem for a nudge to solve."
4.3.2 Target the Wrong Crowd

There are those people who have already made up their mind about certain decisions. This is not a crowd that nudges should focus on, because the nudge may not work [38]. For example, a person who is motivated to buy a sports car when they can afford one, will buy a sports car when they saved enough money. To target the untargetable audience is unnecessary since the nudge will not have any effect. A nudge should, therefore, try to focus the other users who stands between choices.

4.3.3 One Nudge for All

A problem with nudging is to believe that a nudge will address all users. What is important to consider is that all individuals have differences and belongs to different groups in the society. It means that a nudge may work on one group of users, but not on another group [41][31]. It is therefore important when designing nudges to have a greater understanding of social contexts related to the targeted users.

4.3.4 Nudges Without Explanations

Sometimes it is hard to avoid the fact that the nudge will get noticed by a user. However, problems may arise if the user feels cheated by the nudge [38]. This is when it can go wrong, since tricking someone into a decision is not the purpose of a nudge. To address this problem, it is important with transparency and being open with the purpose with the nudge [31]. In spite of the fact, it has to be on a reasonable level since people may affect differently on the information. For example, a person who knows they are being pushed towards A, may instead go towards B [38].

4.3.5 Expect the Same Effect

Another common mistake regarding nudging is to believe that an effect of a certain nudge will work the same in other cases. As Altmejd [40] explains, a nudge is context dependent. For example, if a certain nudge has a positive effect on an e-commerce website does not mean that the nudge will have it on another website. An important part of nudging is therefore to test the nudge [40]. Testing is to designers a well-known method, but for other professions, it may not. Nonetheless, it is an essential method that should not be forgotten.
Chapter 5

Results from the Case Study

The following chapter will present the result from testing the theoretical framework. It includes parts from the methodology which will be explained further are: 5.1 Workshop, 5.2 User Research, 5.3 Prototypes and 5.4 User Tests.

5.1 Workshop

The workshop resulted in an understanding for which goals and decisions the nudges could approach in this case study. Both the goals and choice situations will be explained further in the following sections.

5.1.1 Analysis of Goals

From the brainstorming during the workshop three goals were found. The goals identified are those the grocery store is currently working with and which can be connected to the global sustainability goals.

1. Climate
   - Transport
   - Reduce food waste
   - Ecological products
   - Vegetarian food
   - Sustainable agriculture and fishing
5.1 Workshop

2. Health
3. Social sustainability
   - Work conditions

5.1.2 Choice Situations Connected to the Goals

Other findings from the workshop were found using the customer journey to identify relevant choice situations. The customer journey consists of parts for how the user interact with the company’s service. In this case, customers of a grocery store’s website goes through the following steps when using their website: 1) They plan their shopping 2) They purchase food 3) They decide how the food get delivered 4) They cook and eat the food 5) They follow up their shopping. Since these steps involve situations where the users make decisions, different choices connected to the goals could be found (See Table 5.1).

Table 5.1: Choice situations in the customer journey connected to the sustainability goals

<table>
<thead>
<tr>
<th>Plan</th>
<th>Shop</th>
<th>Transport</th>
<th>Cook</th>
<th>Follow up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recipes</td>
<td>Products</td>
<td>Transport</td>
<td>Storage</td>
<td>Member-ship</td>
</tr>
<tr>
<td>Tips from</td>
<td>Ready-made food</td>
<td></td>
<td>Cooking process</td>
<td></td>
</tr>
<tr>
<td>others</td>
<td>bags</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prices</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Considering that the steps in the customer journey included many different choices which may affect several different goals, the focus was to identify those choice situations connected to sustainability goals. To describe the specific choices in more detail the customer journey will be further explained:

Plan the grocery shopping

Before a customer start their grocery shopping they often plan which products to buy. One way of planning is to go through and choose which recipes to cook. There are several recipes presented for the users on the website, which means that it is a opportunity to encourage a customer to a more sustainable decision. The choice of recipe affect the goals because a user can choose only vegetarian recipes, or those recipes that contains of only ecological products. Cooking tips from cooks and recommendations from other customers are also presented on the website, which can help a customer select a more sustainable product. A product’s price is also an influence for which products a customer is planning to buy, customers often tend to purchase items that are cheaper.
5.1. Workshop

Shop groceries

While shopping on a grocery store’s website a customer can choose between different products or ready-made food bags, which product or bag they choose can both favor the environment as well as their own health. A customer visit several pages on the website while shopping, it can be category pages and single product pages. Every page offer opportunities to help the customer make a more sustainable decision. Depending on if the customer choose to buy locally produced products, ecological products and other eco-labeled products, the sustainable goals can be achieved.

Transport the groceries

The transportation of the groceries back to a customers home can be done in several ways. How a customer choose to do this is a decision which is connected to the first goal, environmental impact. For example, should a customer choose to pick the groceries up by themselves by walking to the store, a smaller carbon footprint is made than if they would drive their car to the store.

Cook the food

Once the groceries has arrived at the customers home there are many ways of preparing the ingredients for cooking. Firstly, the choice of storage result in which quality the product have. This is a decision which affect both the goal of climate and health. Secondly, the choice of cooking process can save energy. For example, a user can choose to directly put a stew in the oven, instead of waiting until the oven is fully heated.

Follow-up

When a customer has done the previous steps in the customer journey they can choose to follow-up on their shopping. A customer may reflect upon a recipe they have cooked or product they bought. By applying for a membership a customer can get feedback of which products they bought, personally discounts and recipes they saved. Reflecting upon old decisions may affect a costumer in their new decisions. For example, a customer who has tried a vegetarian recipe and liked it very much, could choose to cook this recipe once more. These kinds of choices affect the sustainable goals as well.
5.2 User Research

This section describes the result from the user research which included both an investigation of the market analysis and personas. The findings from the user research lead to that suitable heuristics and biases could be selected, these are presented and further explained as well.

5.2.1 Investigation of Marketing Analysis

The findings from the market analysis was based on a lot of quantitative data over the grocery store’s current customers and background information of them. Although, the main result of the market analysis was the discovery of the grocery store’s primary users. The largest proportion of the grocery store’s current customers were the following:

- Toddler-families
- Middle-aged couples
- Youths
- Singles

5.2.2 Analysis of Personas

From analyzing the personas insights for how a customer on a grocery store’s website make their decisions was discovered. The relevant insights from different users were the following:

1. Some people has already made their mind about what they want to buy.
2. There are users that take less thoughtful- and spontaneous decisions while shopping to optimize their time.
3. There are those who likes to listen to other peoples reviews about certain products or recipes to make their shopping decisions.
4. Some people are strict and want to shop the best offer, they want to make the best deal and purchase the cheapest products possible.
5. Some customers makes their decisions very carefully, they do not want to be tricked into buying something.
6. There are those who do not plan their choices in advance, they make their choices as they come while shopping and buy the products they are currently interested in.
7. Other users want to buy products that are of good quality and which is beneficial for the environment and their health.
From these insights, important factors that affect how people make their choices could be found. For instance, for a customer who has already planned which products they are going to buy their shopping routines can be hard to change. Likewise, those users who only buy the cheapest products.

5.2.3 Behavioural Biases and Heuristics

Once an understanding of the different users were made, suitable heuristics and biases were discovered. Since individual differences and characteristics could not be found from only investigating the market analysis and personas, the use of norms was excluded from the list of potential heuristics. By considering the goals, the information of the users and the website’s choice situations, the following heuristics and biases were chosen:

Status quo bias: When a user sticks with the default choice
Endowment effect: When a user experiences increased motivation to make a choice when the user is close to achieving a goal
Loss Aversion: The fear of losing out on something can sway a user to make a certain decision
Framing: How things are portrayed affect the choice of a user

5.3 Prototypes

This section reviews the selected choice situations that were found to be most appropriate to nudge a user at the store’s website, but also which nudging techniques that were chosen to work with. Based on the techniques chosen several prototypes was developed, these will also be further explained.

5.3.1 Nudging Techniques and Choices to Address

Due to the fact that there was many choice situations in the customer journey linked to the goals, a delimitation of choices were made for the designing phase. The steps from the customer journey that were focused on for the prototypes were: Plan, Shop, Transport and Follow-up. Additionally, the choice situations that were chosen to address with nudges was the choice of product and transport. Adapted to the selected choice situations and heuristics and biases, several nudges were chosen to work with:

- Defaults
- Progress bars
- Limited offers
5.3. Prototypes

Figure 5.1: An overview of a category page on the grocery store’s website. A limited offer box is highlighted, which serve as a digital nudge to motivate a user to buy products that currently has a short expiration date. The other products displayed are filtered by a default "green" filter, which also serves as a digital nudge, although to motivate users to buy ecological products.

- Highlighted products

5.3.2 Lo-Fi

The following are five different wireframes that were created in the early stages of the prototype session. Figure 5.1 shows how the products are displayed while on a category page on the website. Figure 5.2 illustrates how a pop-up window serve as feedback when a product has been added to the bag. Figure 5.3 is an overview of the cashier where a costumer can complete their purchase. Figure 5.4 shows the order confirmation after the purchase. Finally, the last Figure 5.5 illustrate a customer’s monthly consumption of groceries.

5.3.3 Hi-Fi

The following are the high-fidelity prototypes that were developed to showcase the nudges in action on the grocery stores website. The prototypes are based on the low-fidelity showed in previous section. Figure 5.6 illustrates the first page of the grocery store’s website. Figure 5.7 visualizes the pop-up window that occur after a customer has added a product to the bag. Figure 5.8 shows how the cashier looks like. Figure 5.9 is an overview of the order confirmation
5.4 User Tests

The following are the major findings from the user tests of the prototype. The result is divided into four parts: Choices Made, Motivations Behind Choices, User Insights and Usability Issues.

5.4.1 Choices made

In the prototypes there was several nudges presented for the user, although not all of them were noticed by the test subjects. This section will present what the test participants decided to do while encountered several nudges in the prototype.

Default green filter A majority of the test subjects did not notice that the category page already was filtered for green products once they were making their decision of fruit to buy. Regardless of the fact, all test subjects chose to buy a green product.
Figure 5.3: An overview of the cashier where a costumer can fulfill their purchase. In a last attempt to motivate a user to buy a more sustainable product, two different ecological products are highlighted. A progress bar is also illustrating that two products can be exchanged to make the entire shopping bag "green". Additionally, the choice of transportation is preselected, a default is set on a carpool alternative. These functions serves as digital nudges on this page of the website.
5.4. User Tests

Figure 5.4: In this figure the order confirmation is displayed. It shows once again the progress bars, although the final ones since the purchase is done. To motivate a user to continue shopping "green" products, the feedback is in the form of motivational and engaging text.

Figure 5.5: This figure is displaying the first section in the 'My page'-page on the website. The bars give feedback for how a customer has shopped, they compares how much money a customer has spent on "ordinary" products and green products. The bars serve as a digital nudge to motivate a user to continue buying sustainable products.
5.4. User Tests

Figure 5.6: A finalized Hi-Fi prototype of Figure 5.1, which shows a category page of the grocery store’s website.

Figure 5.7: A finalized Hi-Fi prototype of Figure 5.2, it illustrates how a product is added to the shopping bag.
5.4. User Tests

Figure 5.8: A finalized Hi-Fi prototype of Figure 5.3, which is an overview of the cashier.

Figure 5.9: A finalized Hi-Fi prototype of Figure 5.4, it displays the feedback after the purchase.
5.4. User Tests

Figure 5.10: A finalized Hi-Fi prototype of Figure 5.5, the bars represents the monthly grocery consumption.

**Limited offer** All test subjects noticed the limited offer box placed among the products. Although, only 2 of 5 test subjects chose to purchase the product highlighted in the box.

**Switch to greener products** All test subjects noticed the highlighted products they could switch to while in the cashier. Nevertheless, only 3 of 5 test subjects chose to switch the products.

**Default choice of transportation** All test subjects noticed that the car pool alternative was preselected, and all chose to stick with this alternative.

**Progress bars** All test subjects noticed the progress bar while in the cashier. Only 2 test subjects mentioned the bar in the pop-up window which occurred when adding a product.

5.4.2 Motivations Behind Choices

During the test a test subject were questioned about why they chose to act like they did, and they were encouraged to share their motivations of their choices. These were the findings:

**Choice of product** The test subjects motivated their choice of fruit differently. The main reason behind their choice, which all test subjects mentioned was that they chose the fruit by liking. Other factors that also played a role of the choice was the price and that it was an ecological product.
5.4. User Tests

Switch to greener products Why the test participant chose to switch products in the cashier was mainly because of their drive to purchase ecologically products. They also mentioned that it was a small price difference, which made the choice easier to make. The test subjects that did not switch products said that it was because of the price.

Choice of transportation All test participants had more difficulty motivating the decision of transportation. The majority said that they would like to stick with the car pool alternative if they could get the food delivered soon after the purchase. Two test participants also mentioned they would stick with the default since it was free of charge.

5.4.3 User Insights

This section will summarize and present the most relevant user insights from the test sessions. These insights affect the specific nudges as well as desirable features from the users.

1. All test participants were positive about the green aspect which they thought was a clear overall theme on the grocery store’s website.

2. With regard of the green aspect on the website, one participant reflected upon the fact that they never were able to choose this aspect for themselves. The green aspect was already preselected for them.

3. One test subject mentioned regarding the highlighted products they could switch to while at the cashier, that they would have a hard time shop more products while already at the cashier. The reason is because they can see the total price of their groceries. Although, the majority of the participants were positively about the function where they could switch products.

4. One participant mentioned that she felt happy because of the positive feedback after the purchase. She felt good about herself but also motivated to buy more green products in the future.

5. Another insight from one of the test participants were that they would have liked to see a list over which green and non-green products they bought in the order confirmation.

6. All participants liked the idea with the bars that showed how much money they spent on what kinds of groceries during a month. A majority mentioned that the bars was encouraging to continue shop more green products.

7. General insights were also that it was easy to see notice the highlighted products, and overall the website was easy to use.
5.4.4 Usability Issues

During the test a few usability issues were discovered, which were the following:

1. The definition of "green products" was hard to understand.
2. It was hard to understand which of the current products in the bag that did not count as "green".
3. The meaning of "green" meat consumption was hard to understand.
4. The sort function of the bar graph found in "My page" was hard to find.
Chapter 6

Discussion

This chapter consist of four main sections: 6.1 Result Discussion, 6.2 Framework Discussion, 6.3 New Framework Proposal.

6.1 Result Discussion

In this section we will discuss the result from testing the prototypes which included the different nudges. The following are those collected insights regarding how the nudges were used during the test session.

6.1.1 Motivations Behind Choices

During the test session the participants were encouraged to shop like they are used to and imagine that the prototypes represented a real grocery store’s website. Since they all shared their thoughts and motivated their choices while using the website it was easier as an observer to understand the reasons for their decisions. It was obvious that all test subjects were used to shop ecologically, this since they were very positive about the highlighted ecological products and the general green approach the website had. The result from the test also showed that the test participants clearly chose to purchase products of their liking. However, a product’s price was also a factor which affected the final decision. For example, one test subject wanted to purchase a mango, once they identified all possible choices the cheapest one was selected. These influencing factors do we believe played a part once the nudges were presented and used by the test participants.
6.1.2 The Use of Nudges

From the tests we could see that not all nudges seemed to affect a user during their shopping. In this section we will discuss the usage of nudges and share the insights gathered reflecting upon the use of nudges.

**Default green filter**

No one of the test participants noticed that the category page already was filtered with only ecological and "green" products. A reflection based on this fact is: Should it be consider as a good or bad thing that a user never noticed this? What would have happened if a user after a while noticed the filter? This is one aspect that could not be further investigated in this test session, although it would be quite interesting to analyze. Regarding the information about ethics and criticism shared in Section 4.2, we can imagine that some customers would bother and others would not. Then again, considering the term of libertarian paternalism who Thaler and Sunstein [4] lifts, which is about the importance of maintaining the freedom of choice. In this case there was no deleted choices, a customer had the option to uncheck the default option if they would have wanted to. All participants tested for this session were also satisfied with their choices. Nevertheless, to further investigate how this nudge would be received of other test participants could be good as there may be more user aspects to take into account.

**Limited offer**

The box with specific offers was noticed by all test subjects. Although, not all chose to buy the highlighted product. The reason for this, which was well motivated from the test participant, was because the highlighted product was not the one they were after. Since this nudge did not receive any criticism or contained any usability issues we can assume that it was a successful nudge, even though not everyone chose the highlighted product.

**Switch to greener products**

All of the test participants noticed the highlighted products in the cashier. Although, not all chose to switch the products. Some of the test participants mentioned the higher price, that it was the reason for why they did not want to switch the products. However, the attitude against the function was overall positive. One test participants said that she would have wanted even more products highlighted, though not only "green" products, but also personal offers and such. Another interesting thought from one of the test participant regarded the position of the nudge. Thus, once you acknowledge the total price of your
shopping, one might not be so motivated to add even more groceries to the bag and increase the expenses. Due to this, a test participant reflected upon the fact if a relocation of this feature could be more effective. This is one insight from the usability tests that can be interesting to further investigate. Since it does not take long to change the prototypes it can be tested in a upcoming test session.

Default choice of transportation

Another default in the prototypes was the choice of transportation. This was a choice most of the test participant chose to stick with, although they all commented about the delivery date. One test subject mentioned that if the time and date would not fit, they would have wanted to change options. From this we can imagine that users would after realizing that the date was wrong, most likely switch transportation method. Nevertheless, the nudge have great potential to work and it would be interesting to actually move on and measure the effects while in action on the website.

Progress bars

In an other attempt to motivate users of the website to choose more sustainable products were the use of progress bars, which visualized their grocery consumption. The bars which was on "My page" illustrated how much green products compared to ordinary products a customer has purchased, and each bar represented one category of groceries. This was a function that many of the test participants noticed and commented during the tests, and the feedback was positive. Many test participants mentioned that it was a good idea since it is today very hard to realize where to improve oneself. With the help of the bars a costumer can both keep track of expenses and how sustainable they are in their shopping. Progress bars was also used when a costumer added a product to the bag and in the cashier. Some test participants noticed them during the test, and the reaction was positive. With this in mind, we can assume that progress bars may be a effective nudge once they are implemented.

6.1.3 Limitations and Drawbacks

For the test sessions five persons volunteered as test subjects, although in this case all of them happened to think positively about the fact of purchase more sustainable products. How sustainable each participant is shopping was not consider while recruiting the participants for the test. But to really evaluate the nudges and the green aspect of the website all possible users need to be investigated and considered. However, this means that even though we tested
at least one test participant from each group of primary users, further tests would be good.

Another limitation, which was one of the biggest was the question regarding the number of test participants. Due to time limitations there was not possible to test more than five test participants. Although, a grocery store has several different target groups, four different primary users was found in the user research. Considering this, it would have been better to test five from each group to get a wider and comprehensive result.

During the test two separate errors was found of two test subjects, which were not found during the pilot test. The errors was quite small, it was regarding small design elements that were not changed once the test participants moved on during the tests. Luckily the errors had nothing to do with the actual result, although it might have affected and confused the test subject during the test.

### 6.2 Framework Discussion

This section discusses the outcome of having tested the theoretical framework. It will lift details from the test phase, as well as insights into how the design process actually was to work with.

#### 6.2.1 Framework Result

Going from theory to practice regarding the framework was tricky. This since the previous framework from Schneider et al. [6] which served as a foundation, did not provide any concrete methods that could be used to complete the steps in the framework. The methods were therefore chosen experimentally, yet, from those methods commonly used in the design process for designing for the web. Another difficulty was to apply a design process on an ongoing project. Regardless, once we had acquaint oneself with the project it was easier to understand where and how the design process could be used.

Since all steps in the design process has been used for the test phase, we will discuss all parts further:

**Find the Goals**

To investigate which sustainable goals the digital nudges should approach a workshop was put together. Invited to the workshop was colleagues from Antrop, which currently was working with the company linked to the case study. Together with the team a discussion started, this to identify which of the 17 global sustainable goals the company from the case study is working with. For
the unfamiliar of the case, it was difficult to get into this stage. It would have been desirable for a designer to possess experience and insights of the specific case before starting the work. This is why it was good to include people who has worked very close to the company and knew a lot about it.

However, when the goals were found the workshop could move on trying to find the choice situations the nudges should target. There were no recommendations to go by when the choice situations were to be investigated. This resulted in that an experimental method was chosen, which were to use the customer journey map. Why the customer journey was chosen was because it is an ordinary tool while investigating users and their behaviour towards a certain product or service. The team from Antrop had from the previous work with the case, compiled a customer journey map which quickly could be put to use in the workshop. The use of the customer journey proved to be very useful and effective in this case. By connecting the sustainable goals identified in the earlier stages of the workshop towards the steps into the customer journey, several choice situations were found. By means, the customer journey can serve as a good tool for finding the choice situations when working with nudges.

Understand Users

Another step in the design process was to understand the users behind the grocery store. This step was difficult to execute since the user research regarding the case study had already been performed in earlier stages of the case. However, the documentation from these parts was really good and served as a good foundation. The team at Antrop had developed personas which clearly showed the primary users commonly behaviours when shopping groceries and which factors that was important in their choice of products. It was very helpful once the behavioural influences was to be decided. Although, since we actually did not meet any of the customers interviewed for the user research it was hard to evaluate the users properly. Personal characteristics and differences could not be found from only analyzing personas. Desirably, would have been to investigate the users from scratch and asked them questions regarding their motivations behind certain choices. It is something we can recommend others to do when working with this stage of the framework. Since the nudge depends on users, it is quite critical to get to know the users properly.

Nevertheless, this lead to that behavioral influences was selected quite experimental. The theoretical framework lifted those heuristics and biases relevant for sustainable choices, based on them a few were chosen to focus on. The reason for why we did not use norms as a behavioral influence to nudge was because we could not understand the customers shopping patterns. Although, as stated in the theory, norms are proved to be influential once the purpose is to promote sustainable behaviours. But in regards to ethics, only those biases and heuristics that suited the information of the users, the choice situations, and the sustainable goals, was chosen.
6.2. Framework Discussion

Design the Nudge

Moving on from investigating the users to design the different nudges was tricky, mainly because of lack of previous experience of designing nudges. Although, with the help of the theoretical framework suitable UI-elements that could match the behavioural influences and the type of choices, could be chosen. Once the nudge was decided, the design phase begun, which included sketching wireframes and developing high-fidelity prototypes. This is a common workload for a designer and also the reason for why this phase went smoothly.

Although, digital platforms does not only includes design elements, it also includes system information, which also may affect a user regarding the nudge. This is a part that could not be focused on in this case, this since the possessed skills included user experience- and user interface design. However, a further step in the development of this framework might be to include other roles from a design team, such as a content designer. This would be interesting to further investigate, how the designed nudges can be improved by motivating and relevant texts.

Test the Nudge

Once the design phase was completed the next step was to test the nudges. Since this thesis did not had the prerequisite to implement the nudges, only usability test was performed in line with this work. Although, with the help of usability tests we could observe and grow an understanding of the possible usability issues. In this case, we could also grow a better understanding for how the nudges was received by a user, and the motivations behind a user’s choices. This are factors that may be good to investigate before the future work with the nudges. For example, if a nudge were to be received badly by users during a usability test, then maybe the nudge should be removed from being taken further in the process. A positive thing about usability tests is that they can be performed in the earlier stage of the product development. This means that re-designs to fix possible usability issues and further tests can be developed if necessary. By implementing those designs that is proven by usability tests to be a good solution helps reduce the workload and optimize the development time. This is why usability tests should be seen as a preliminary step before starting the more resource-intensive implementation of nudges.

By performing split tests (A/B tests) the real effects of nudges can be witnessed. This is the only way to investigate and realize which nudges were really used by the users. There always exist a margin of error regarding tests, since a test participant may be affected by the test itself, and not really perform like they usually do in a more relaxed environment. Split testing is good since users might not be aware of the fact that they are being tested, in other words, they perform like they usually do. This leads to that split tests helps a designer identify which
nudges did work and those who did not. Henceforth, a combination of both usability tests and split test would be preferable for testing a nudge.

6.2.2 Framework Improvements

Since the theoretical framework was tested we could identify both some flaws but at the same time some improvements. In this section we will explain which framework improvements are necessary and the reason behind it.

Methods

The theoretical framework did not present any practical methods to perform the steps in the process. Although, this resulted in that the framework was quite tricky to work with. After testing the design process several methods were found that proved to be very useful. This is why we recommend that these methods should be included in the framework as well. The methods are the following:

**Workshop** A workshop was put together to investigate which goals and choice situation the nudges should target. The workshop was performed with people familiar with the case, which happened to be very useful.

**UN’s global sustainable development goals** To find the goals behind the nudge UN’s global sustainable development goals were used. Those sustainable goals the organization in the case worked with served as the goals for the nudges as well. Since the focus was to motivate sustainable decisions and behaviours this proved to be a good solution.

**Customer journey map** Once the choice situations were to be found the use of the customer journey map was a good solution. We were able to identify those choices situations in the customer journey that were in line with the sustainability goals.

**Personas** Personas is good to use since they identify the primary users of an organization. It also summarizes the users needs, pain points and goals. Which are all good aspects to consider while working with nudges.

6.3 Framework Conclusion

The theoretical framework proved to be useful when designing digital nudges towards sustainable decisions in this case. It included parts that are similar to those in the existing design process of digital environments. It is also a iterative process, this means that it is suitable and easy to include in the ordinary design process for designing for the web. Although, the lack of methods was one of the
setbacks. Which is why further improvements of methods has been discussed and developed.

Based on both the theoretical framework and the testing of the framework this paper has completed, a conclusion is that there is a lot more to consider while designing digital nudges than Schneider et al. [6] has suggested in their framework. Especially if the focus is to encourage users to more sustainable decisions. However, this has resulted in the need for a new framework, one that strengthens the design process towards the digital environment and that has a sustainability focus. This is why we can state that the framework lifted in this thesis serve as a better foundation for this purpose.
Chapter 7

Summary of New Framework

In this chapter, a summary version of the new framework, which is based on the theoretical framework and the result of the case study, will be presented. For an overall understanding of how the framework works, it is recommended to read through this paper.

7.1 Design Process

In order to design digital nudges in the best interest of the user, and with a sustainable aspect, there have been some modifications of Schneider et al. [6] framework. Although their design process has worked as an underlying foundation, further development has been done. The new design process (see Figure 7.1) is explained in more detail in Chapter 4, although it includes the following parts:

Find goals and choice situations The first step is to investigate the organization’s goals and identify which sustainable goals they are working with. This can be done by bringing several employees and relevant persons from the organization together during a workshop. Find the goals by discussing UN’s 17 global sustainability goals. Next step is to identify which choice situations affect the organization’s users. A method for this is to use the customer journey map to identify which choice situations that are connected to the discovered sustainability goals.

Understand the users Once the goals and choice situations have been found next step is to investigate the targeted users. This step is important since the purpose of the nudge is to convince a user into a more sustainable
Figure 7.1: This is a new modified model of Schneider et al. [6] design process for digital nudges. The new process has a sustainability focus, and is more adapted for the ordinary design process for designing in the digital environment.

decision, to understand how this is going to happen we have to understand the users. A method suggested for this step is to interview users and gather relevant insights into personas. Based on the insights from users choose suitable behavioural influences that can affect your users.

Design the nudge Based on user insights from previous step suitable nudging techniques can be investigated. To choose the right technique you need to consider the goals, choice situations, type of choice and the behavioural influences. Once the nudge is decided, move on and sketch wireframes to generate ideas for how this nudge is going to fit the user interface. Proceed with those ideas that feel right and develop high-fidelity prototypes. To make it easier to test these design proposals another step is to develop clickable prototypes.

Test the nudge Once the design of the nudge, as well as the rest of the user interface, is done, the test session can begin. We recommended starting with usability test to find potential errors in your designs. This is a test which you can perform while still in the design phase since potential usability issues can be found and re-designs need to be done. When the design is final, the implementation can begin. Once the implementation is done, split testing should be performed to realize how the nudges are working. Split tests can investigate how many are using your nudge, and
also track how they are using it.

7.1.1 Other Considerations

Since the new framework is dedicated to work for the digital environment, as well as towards sustainable decisions, further important aspects need to be considered. This is the part with considering ethics and avoid common mistakes regarding nudges. For further explanation it is recommended to read Chapter 4, although here is a summary:

**Criticism and Ethics** Considering ethics is something that should not only be considered in a step in the design process, but throughout the entire process. This since designs should never be hurtful to anyone.

**Avoid the Pitfalls** Mistakes can be made in every project, but you would like to avoid them. It is common to make mistakes regarding nudges, for example, to target the wrong audience and expect the same effect of your nudges as others.

7.1.2 Practical Steps

To help a designer in their work of designing digital nudges with a sustainable approach, these concrete steps were developed to help to lead the way:

1. **Find goals and choice situations**
   - Gather relevant people from the organization together, for example a workshop
   - Use the 17 global sustainability goals to discuss from, and identify which goals the organization are or can work with
   - Connect the goals to the steps in the customer journey (if a customer journey does not exist yet, create one by move on the the next step - Understand the users)

2. **Understand users**
   - Interview users to understand how they use the organizations product or service
   - Cluster insights and develop personas
   - Choose suitable heuristics and biases

3. **Design the nudges**
   - Choose nudging techniques (based on goals, choice situations and heuristics and biases)
7.1. Design Process

- Sketch wireframes
- Take it further (optional), with high-fidelity prototypes or even clickable prototypes

4. Test the nudges
   - Usability tests with primary users, re-design if necessary
   - Implement the nudges
   - Perform split tests to measure effects of nudges
Chapter 8

Conclusion

The aim of this thesis was to establish a framework for how digital nudges should be designed to motivate a user to make more sustainable decisions. The underlying purpose was to brief designers of digital environments of the potential of nudges, pitfalls to avoid, as well as provide general steps to follow when designing digital nudges to encourage sustainable decisions. The work led to investigating existing guidelines and further develop them to fit the purpose of the thesis better. By conducting a literature study and expert interviews specific insights for how nudges with a sustainable approach should be handled and designed was gathered. Once the theoretical framework was completed the next phase of the thesis begun, which was the test phase. To review the framework a case study was performed, the design process disclosed by the framework was used and tested on the case with a grocery store. This part included performing a workshop, user research, development of prototypes and usability tests. As a result of the case study, the framework proved to be, in this case, very useful and functional. Additionally, several methods used during the case study was also added to the framework. The work emerged into a new framework which can be used of designers of digital environments in their existing design process. However, since the framework only have been tested on one case, should it be seen as a general foundation.

8.1 Future Work

In this thesis, the lack of prerequisites led to that the last step in the design process could not be tested and further investigated. It was about the implementation and the performance of split tests. Henceforth, a future step would be to actually measure the effects of the nudges. This by using split tests (A/B tests), since it is the only way to do this, and draw a final conclusion of the nudge.
Chapter 9

Acknowledgements

The author would like to thank everyone at Antrop for their support and dedication during this project. A special thanks goes to Fanny von Heland for being the best supervisor by supporting, giving inspiration and feedback and always pushing this project forward. Also, a sincere thank you to the team at Antrop working with the case used for this thesis.

Thanks to all the participants, both the interviewees and the test subjects participating in the user tests.

Last but not least, we would like to thank everyone that helped reviewing this paper, especially the peer-reviewers Arvid Långström, Filip Eriksson, Sandra Waldenström and the mentor at Umeå University, Stefan Berglund.
Bibliography


[38] Anonymous, Previous Research Assistant at an research institute, Personal Interview, Feb 2018.


Appendix A

Interview Questions

- Tell us a bit more about you and what you work with, and also how you have worked with nudging.

- Nudging
  - Are there any special conditions for nudging to work?
  - Do you see any pitfalls when it comes to nudging? Where do it go wrong?

- Digital nudging
  - How do you think digital nudges are used today? Is there anything missing?
  - What potential do you see in digital nudging?

- Sustainable decisions and behaviours
  - Which behaviours do you think can change when it comes to sustainability?
  - For which decisions do you think nudging can get us be more sustainable?
  - Do you have any example how you work with nudging for sustainable decisions?
  - Based on your previous work, what would you say is a good nudging method towards sustainable decisions?
  - What do you think is the future for sustainable nudges?
  - What is the most important to think of when you design nudges for sustainability?
- Which nudges do you think creates a long-term effect on users behaviours and which ones gives a shorter effect?

• Do you have any additional comments?
Appendix B

Interviewees

Anonymous Previous Research Assistant at an research institute in Stockholm, Sweden. The interview was conducted using Skype on February 22, 2018.

Annelise de Jong Senior Researcher at RISE Interactive in Eskilstuna, Sweden. The interview was conducted using Skype on February 27, 2018.

Loove Broms Senior Researcher at Green Leap in Stockholm, Sweden. The interview was conducted by telephone on March 16, 2018.

Adam Altmejd PhD student of economics in Stockholm, Sweden. The interview was conducted by telephone on March 16, 2018.