Master's Degree Thesis

Strategic Recommendations for the Design of Nudges towards a Sustainable Society.

Nell Goepel

Maíra Rossini Rahme

Frida Svanhall

Blekinge Institute of Technology

Karlskrona, Sweden

2015

Examiner: Dr. Henrik Ny Ph.D.
Supervisor: Professor Karl-Henrik Robèrt
Primary advisor: M.Sc. Patricia Lagun Mesquita
Secondary advisor: M.Sc. Rachael Gould

Strategic Recommendations for the Design of Nudges towards a Sustainable Society.

Nell Goepel, Maíra Rossini Rahme, Frida Svanhall

School of Engineering
Blekinge Institute of Technology
Karlskrona, Sweden
2015

Thesis submitted for completion of Master of Strategic Leadership towards Sustainability, Blekinge Institute of Technology, Karlskrona, Sweden.

Abstract: Even though most people support the sustainability agenda, human behavior continues to play a major role in driving the long-term global trends comprising today's Sustainability Challenge. Raising awareness and public intention to act sustainably is not translating into meaningful change in sustainable behavior and legislation is time and cost intensive to implement. Another approach, that acts in the gap between intention and action, is cost and time efficient, and provides non-invasive guidance to decisions is nudge.

This research analyzes guides for designing nudges and the current practices of nudge designers to discover its potential to guide human behavior towards sustainability. Using the Framework for Strategic Sustainable Development the researchers conclude that nudging can effectively create incremental changes towards sustainable behavior.

The researchers see strong potential for nudging to have a greater impact within the Sustainability Challenge if scaled up and out. To do this, a strategic approach is required which considers the Earth's complexity and preserves freedom. Thus, the researchers recommend integrating a systems thinking approach, ensuring nudges are transparent to those being nudged, strategically coordinate nudges using backcasting from vision of success and a definition of sustainability based on Sustainability Principles.

Keywords: nudge, behavioral economics, sustainability, Choice Architecture, FSSD, backcasting.

Statement of Contribution

Way, way back in January this thesis crew was formed around their shared interest in the nudge and wine. They wondered what would be needed for nudges to strategically lead to a sustainable society, but knew they would need to travel to the faraway island of *The Nudge* to find their answer. A few days later they set sail on HMS Aspö to find *The Nudge*, bringing only the Framework for Strategic Sustainable Development (FSSD), the Strategic ABCD Planning Process and, of course, wine. They were a motley crew: Maíra, a Brazilian designer, Frida, a Swedish software engineer, Nell, an American youth developer and Michelle -L, their mascot. None of them had much experience with academic writing and research, but they knew that with a strong foundation of trust, open communication, hard work and ample wine, they could complete their quest by May.

The first months were wild as they sailed over the dips and dives of the waves of uncertainty, without a compass to guide them. How to reach *The Nudge*!?! The crew frantically read academic peer-reviewed publications, articles, and books to understand the current reality of *The Nudge*. Countless ideas and solutions were offered by each mate in efforts to provide some direction and stability for the journey.

Slowly, the crew became more comfortable with the day-to-day routine, becoming accustomed to conducting and transcribing interviews, coding and writing. Although the majority of the work was done collaboratively, they naturally stepped into roles and responsibilities that utilized and developed their unique gifts and talents. Below is how the mates described each other:

"**Frida** is the powerhouse! She gracefully balances her 'Orange' strength and energy with a kind spirit and her motherly care. On the strength side, she gets us going, keeps us enthusiastic, celebrates our accomplishments and lifts ordinary work to a whole new level. On the kind side, she will always make sure we have tea and coffee, that we have a check-in every day, and if someone is not doing ok, that we stop the work in order to take care of whatever is wrong. Frida has a gift for looking at issues from every side possible, ensuring our research and writing was objective and honors the integrity of the data. She asks insightful questions that helps us realize gaps in the process and research that we otherwise would have skipped over. Driven by her intense curiosity, Frida throws herself into research and always returns with extensive lists of statistics and quotes to expand our knowledgebase. Her analytical skills have been crucial in organizing the document content analysis in a way that is manageable; she is able to reduce the complex data into beautiful databases so that we can jump onboard and make sense of it. Frida was also very crucial in reaching out to many of the practitioners that we interviewed in Sweden, making such a good impression, we were even invited to give a lecture! Frida has been the report guardian, taking care of all the updating and formatting work of the final documents. Also, she has opened the door of her house to us and let us pet her dog and play with her daughter. For that we will be always forever grateful. It is a blessing to be in a family home when you are far away from your own people."

"**Maíra** is a fiercely creative and hard-working mate that facilitates meetings with ease. She takes on a heavy workload and always follows-through with her responsibilities, often going above and beyond. Maíra graciously accepts large tasks, such as developing our methods section, and is a gifted writer. Maíra takes the initiative confidently when leadership is needed and is able to be a bridge between differing opinions among us. She is not afraid to

speak her mind and is able to express her feelings in a way that does not affect the group's dynamics and process. She also is the crew's most confident networker, reaching out to various experts in the field and academia who have supported the journey along the way. Maíra, being a strong 'Gold' is a critical thinker who reminds us to pause and reflect on our process to ensure that it is still serving us. She is a bright star whose light brightens up Aspö even on rainy days."

"**Nell** has been a golden star since day 1. She is the pocket full of sunshine and will always bring a positive and giggly vibe to the group. She is pure goodness and smiles, and just being around her makes you feel good. Being 'Blue' in nature (according to the True Colors leadership style assessment), she has capacity to communicate clearly and empathize with practically any human being entitled her as the Main Interviewer during the second phase of our research. Nell has also been fierce in the Literature Review, summarizing and organizing all of the quotes and insights from articles, papers and journals in a way that it can be useful for the report. Her contributions were also crucial in the document content analysis; she brought some really relevant insights to the board and was able to draw a very comprehensive map of all the concepts present in the guidelines. Being a native English speaker Nell has also been checking the spelling and coherence in our reports and slides. One very important thing that Nellie has neatly added to this group is the capacity to switch gears between fun and work, bringing joy when we are tired and calming them down when we are hyper. She is also the queen of snacks, and always had fruits and fancy capers in hand!"

Months later the crew discovered how to navigate using what they have learned from nudge experts and MSLS advisors they met along the way, and chose a direction they believed would lead them in the right direction. They persevered through long days of workshops, writing and stormy debates, then one sunny day in May, Frida spotted land on the horizon.

Had they reached their destination? Could it be the answer they were looking for? Indeed it was. Finally, the crew had reached an understanding of the nudge and with their tools for sustainability and strategic planning; they were able to finally answer their question that began this whole journey. The following thesis illustrates their findings. Enjoy!

Acknowledgements

“To live a life of gratitude is to open our eyes to the countless ways in which we are supported by the world around us.”— Gregg Krech

We are especially thankful to our advisors Patricia (Tita) Lagun Mesquita and Rachael Gould for their time, energy, valuable insights, and for guiding us through this process with trust and a light heart.

We also thank Elaine Daly and Edith Callaghan for lending us their fresh eyes and giving us clarity to refine our research.

We feel fortunate to have interviewed an inspiring group of professionals, and we would like to formally acknowledge and thank them for their time and willingness to answer our questions: Åsa Sandberg (A Win Win World), Angela Tay (University of Singapore), Christina Gravert (University of Gothenburg), Göran Hodén (Miljöpartiet), Ida Lemoine (Beteendelabbet), Karsten Schmidt (iNudgeyou), Marcos Pelenur (Ministry of Business, Innovation, and Employment/NZ), Martin Westin (Swedesd), Pete Dyson (#Ogilvychange) Sille Krukow (Krukow Behavioral Design) and Steffen Kallbekken (GreeNudge) .

We thank our shadow group members Eva Milletorp, Jean Pierre Candiotti, Christopher Busiku, and all of our mates in the MSLS program for their support along the process. We specially thank our classmates Julia Gossenberger, Fredrik Härnby and Lena Sander for their input on this report.

We send a big hug to the MSLS 2015 staff members Tracy Meisterheim, Merlina Missimer, Pierre Johnson and Marco Valente who have made our MSLS journey so blissful, with special thanks to the founders Göran Broman and Karl-Henrik Robèrt, also in his role as supervisor.

Thank you to Alexander Craig for his support, and for proofreading this report. On that note, thank you also to Erica Scott for her valuable feedback on our Executive Summary.

We are also grateful to the Copenhagen Business School for hosting a public lecture with Cass Sunstein that was not only very informative, but also a wonderful opportunity to be in the same room as most of our interviewees.

We thank the library staff for letting us feel at home in the Aspö room, and to our mascot Michelle -L, who never failed to brighten the day.

Finally, we would like to thank our families, friends, housemates and partners for being patient, helpful, loving and supportive throughout this entire process.

Executive Summary

Introduction

In the 18th century, the Industrial Revolution enabled society to produce and manufacture goods with greater efficiency. However, since then, the human population has risen rapidly, causing significant increases in the consumption of natural resources and levels of pollution in the ecosystem. Because Earth's biosphere is comprised of countless interconnected and interdependent subsystems, the rate of these systemic human impacts such as rising global surface temperature and sea levels, are now threatening the viability of many of Earth's life sustaining ecosystems. A major shift in our behavior and decision making models is needed to meet what Robèrt et al. have named the Sustainability Challenge. Addressing this requires recognition of the interdependent systems of society and the environment, in order to generate solutions while staying within the Earth's ecological boundaries. For people to discern between choices that contribute either towards actions that are unsustainable or sustainable, a clear definition of sustainability is needed.

The Framework for Strategic Sustainable Development (FSSD) provides a definition of sustainability based on a set of scientifically rooted Sustainability Principles (SP's) which consider both ecological and social sustainability. The SP's are effective in that they are necessary and sufficient to cover all features of sustainability, concrete enough to guide actions and decision-making, and mutually exclusive to foster understanding and evaluation.

In a sustainable society,	
nature is not subject to systematically increasing…	people are not subject to systematic barriers to…
1. …concentrations of substances extracted from the Earth's crust, 2. …concentrations of substances produced by society, 3. …degradation by physical means	1. … integrity 2. … influence 3. … competence 4. … impartiality 5. … meaning

Although recent reporting shows a rise in general awareness about the sustainability issues caused by society, global trends in consumption are also increasing, indicating that most societies are not shifting their behavior in response to the acquired awareness. Despite the best intentions to act sustainably, the everyday actions performed by humans are partly influenced by habits, social norms and other factors. These factors add to the complexity of human behavior, while studies have shown that provision of information and value-based communication may not be enough to deal with this complexity.

One novel and promising approach to changing behavior is known as 'nudge', created by Professors Cass Sunstein and Richard Thaler. Nudge Theory is rooted in behavioral economics and uses behavioral science to investigate 'failures' in human cognition to help people make better choices. Much of human choice and behavior is performed on autopilot, drawing conclusions from mental shortcuts learned from previous experiences. Nudges act on that gap by setting up a Choice Architecture, or conditions for choosing that will guide one's

decision making in a direction that the individual should benefit from. In theory, nudges should always maintain freedom of choice, never be manipulative, and lead to protecting people against economic and physical harm. Furthermore, it must rely on evidence and be tested and prototyped to measure adverse consequences.

In recent years, there has been an increasing interest in the approach, given its' applicability both in the public and private sectors. This increase in popularity within policy making circles, as well as in private organizations suggests that nudging can be a promising approach to be adopted within societies to make citizens lives simpler, safer, or easier. Furthermore, the nudge approach has the potential of making sustainable behaviors much more attractive, effortless and rapid.

This research aimed to explore if nudge as a tool can be used to bring society towards sustainability. It utilizes the FSSD and its SP's as a lens to strategically investigate and evaluate the design of nudges and the field of practice.

The primary research question explored in this study is:

What is the role of nudging in changing behavior towards a sustainable society?

This is supported by the following questions:

SRQ1: How do Nudge Theory guidelines inform the design of nudges towards the betterment of the individuals and society?
SRQ2: How are nudge practitioners operationalizing the Nudge Theory into practice?
SRQ3: What is the potential of nudging towards sustainability, and what is lacking?
SRQ 4: How can sustainability be strategically integrated into the nudge design?

Methods

Considering the interdisciplinary nature of sustainability science as well as the emerging nature of the nudge concept, conducting a Qualitative Analysis was chosen by the researchers as the most appropriate way to design and conduct this research, which evolved and shifted throughout the research process. Maxwell's Model was used to map these iterations.

For this thesis the researchers chose to analyze the Nudge Theory and practice through the lens of the Framework for Strategic Sustainable Development (FSSD), which provides a definition of sustainability based on Sustainability Principles, and is an analytical planning tool that takes a systems approach helping to find solutions to complex sustainability problems. The FSSD is comprised of five levels of analysis including Systems, Success, Strategic, Actions and Tools. Each level provides a unique field of analysis and by exploring the interplay between levels new insights can emerge.

The FSSD also offers a strategic an approach known as 'backcasting' to identify and implement actions in response to complex challenges. Backcasting begins by identifying a clear definition of success for the system (i.e. a sustainable society), which serves as the guide that strategically aligns action steps, so that each step can be a logical platform for its users. The Strategic ABCD Planning Process was designed to offer a clear, four-step process, which guides users through backcasting. The process consists of the following steps:

A-Step: Creating a vision for success that aligns with the Sustainability Principles.

B-Step: Analyzing current practices through the lens of the Sustainability Principles.
C-Step: Brainstorming potential actions that will lead towards the vision for success.
D-Step: Prioritizing the actions generated in the C-Step using prioritization questions.

The research was carried out in four phases that followed the supporting research questions. The research methods were chosen according to their capacity to answer the SRQs, as described in the following table:

Phase	**Methods**
SRQ1	Document Content Analysis and creation of a generic model of nudge design for analysis.
SRQ2 and SRQ3	11 semi-structured interviews with nudge experts and practitioners using a set of questions structured under the Five Level Framework. Creation of a second generic model of nudge design for analysis. Thematic coding to identify definition of sustainability, opportunities and challenges associated with nudging towards sustainability.
SRQ 4	Integration of the Framework for Strategic Sustainable Development into the generic nudge design process mapped in the previous phases, which is explored within the discussion chapter.

The sample for the Document Content Analysis consisted of six guidelines for designing nudges, while the sample for interviews consisted of five experts and six practitioners in the field of nudges. Experts were classified as academic researchers publishing in the field of behavioral Economics, while practitioners were the ones working with the implementation of the Nudge Theory in the private and public spheres.

Results

Nudge Design Process - The Document Content Analysis and the first section of the interviews both offered a step-by-step process for nudge design. Since elements and steps were closely aligned, steps from these processes were combined and grouped into phases, resulting in a synthesized process for nudge design. Below are the phases of the generic model of nudge design:

PHASE 1: Current Reality - The current reality of the situation is mapped out, taking into consideration both the behavior itself as well as contextual factors such as social norms and situations where the behavior is present. Both are examined through the lens of behavioral insights to determine what biases and heuristics are at play and what barriers to the target behavior are present in the context. In this way, a baseline, or starting point, is created from which success may be measured later in the process.

PHASE 2: Target Behavior - A target behavior is selected and defined for and behavioral insights are consulted to determine what levers and motivators may best guide the target audience to exhibit the target behavior. Success metrics are established; that enable measurement of increase in desired behavior against the established baseline.

PHASE 3: Intervention Design - During the design phase the insights gained from current behavior and target behavior phases are matched to nudge techniques that will provide the most potential in guiding a target audience to exhibit the intended behavior. Lessons learned from previous interventions and stories of success are examined to inform this phase. The list of potential intervention techniques is prioritized by evaluating potential effectiveness, reach, and cost efficiency.

PHASE 4: Pilot and Monitor - The interventions selected from the Intervention Design phase are recommended to be piloted and monitored with a sample population alongside randomized control groups. The importance of this step was stressed by practitioners with the explanation that first when you see the results of a pilot and compare it to the control group, you know what actually worked.

PHASE 5: Evaluate - The pilot is evaluated against the previously determined baseline to measure success of the nudge interventions. The outcome of this phase is pertinent to inform the design of future interventions as well as which interventions to prioritize.

PHASE 6: Feedback - Lessons learned from the pilot and evaluations phases may be fed back into another iteration of piloting in order to create a stronger pilot and to inform a reassessment of the current reality.

PHASE 7: Scale Up - When an intervention is successful and can be replicated with consistent effectiveness the nudge intervention may be scaled up to have a wider reach and impact in a given population. There was little guidance found on what this looks like in practice.

Opportunity and Challenges in nudging towards sustainability - The interviews showed little consensus in the field regarding a definition of sustainability. Furthermore, subjects said the term 'sustainability', is too large, vague and challenging to understand and measure, so it was suggested to use more tangible language while working in the field. The subjects saw opportunity in the possibility that nudges can break down sustainability challenges into smaller, more tangible behavior changes, and can foster cross-sector collaboration. The challenges perceived by the subjects included that nudges could be considered a form of manipulation, there is a lack of consensus in the field regarding whether nudges should be transparent, and that the nudge is a buzzword that risks fizzling out because of lack of true impact. Finally, the subjects asserted nudging is not the only solution to society's problems; it should be used in concert with other educational and legislative approaches.

Discussion

To gain a clear understanding of current nudge design practice and offer strategic considerations for nudging towards sustainability, the researchers used the five levels of the FSSD, and its Strategic ABCD Planning Process. This resulted in the following guidelines for a sustainable nudge design:

Nudge process: phases and steps.		**ABCD Step.**	**Guidelines for a sustainable nudge design.**
Target behavior	Define desired behavior	A	Frame the Target of the intervention with the Sustainability Principles to enable nudges that lead society towards sustainability and help prevent adverse effects.
	Define success metrics		
	Analyze behavior using behavioral insights		
Current reality	Data collection and analysis	B	Relate behaviors to the larger sustainability scope. Ensure nudge is not contributing to violations in other areas or that issue is moved elsewhere.
	Understanding behavior		
Design intervention	Brainstorm interventions	C	Frame the brainstorm with the question: "what nudge intervention would help close the gap to a sustainable society?"

	Select intervention	D	Apply an evaluation to assess if the selected nudge intervention will provide a strategic step towards sustainable society.
Project phase	Pilot and monitor	N/A	
Evaluate	Measure success		
Feedback	Apply lessons learned		
Scale up/out	Repeat intervention in larger scale	ABCD	Adopt a systems thinking approach, use back-casting to strategically plan and coordinate nudges with other behavior change tools, create a shared vision of success with stakeholder engagement and policy buy in.

The results of this study reveal a lack of coordination and guidance for designing nudges across the field of practice. The researchers see opportunity in creating a centralized platform for collaboration through the convergence of the nudging networks and practitioners. Such a platform could leverage the embedding of sustainability into nudge practice.

On the debate about ethics, the literature and some practitioners raise concerns regarding the transparency of nudges, both in the public and private sectors. To minimize this problem, the theory, practitioners and guides suggest rigorous data collection and experimentation, as well as the involvement of key stakeholders. The researchers add three suggestions: practitioners could strive to align it with the FSSD's Social Sustainability Principles, making the intervention transparent and, if possible, engaging both reflective system and automatic system of the target audience members.

The FSSD analysis of the nudge indicates that the current practices are still rather contextual. The researchers argue that by integrating a systems thinking approach, nudge practitioners could strategically design interventions that leverage the relationships between systems and avoid counteraction. That means practitioners would setup a target behavior not only framed by the nudge principles and Sustainability Principles, but also expand their vision of success to a broader vision of a sustainable society, using a backcasting approach to strategically coordinate and connect multiple nudge interventions. Finally, adopting a more systemic perspective facilitates taking a holistic approach to tackle the sustainability challenge, applying nudges in combination with other behavior change approaches such as provision of information and direct and indirect regulation.

Conclusion

Having identified that nudges can break down the large, abstract and complex concept of unsustainability into smaller, tangle measurable actions, the researchers conclude that the approach has potential in shifting behavior towards sustainability not only incrementally but also on a larger, systemic scale. For this to happen, the researchers argue that nudges should be designed and strategically coordinated to reach a shared vision of sustainability that takes into account the social and ecological systems of the planet. Further research of this dynamic approach is needed to fully realize the nudge's capacity to become an effective tool in enabling and supporting behavior change across societies at both the speed and scale required in meeting the sustainability challenge.

Glossary

The Strategic ABCD Planning Process: A strategic tool for backcasting from Sustainability Principles.

Automatic: The part of our brain that is intuitive and automatic.

Backcasting: A strategic planning method where a successful future is envisioned first. The current reality of today is then assessed against the vision.

Behavioral Economics: Behavioral economics study the effects of psychological, social, cognitive, and emotional factors on the economic decisions of individuals and institutions. Behavioral economics is primarily concerned with the bounds of rationality of economic agents and is sometimes discussed as an alternative to neoclassical economics.

Behavioral Insights: Insights from inter-related academic disciplines (behavioral economics, psychology, and social anthropology). These fields seek to understand how individuals take decisions in practice and how they are likely to respond to options.

Choice Architecture: "If you indirectly influence the choices of other people you are a choice architect." (Thaler and Sunstein 2008, 93)

Cognitive Bias: A cognitive bias is a pattern of deviation in judgment, whereby inferences about other people and situations may be drawn.

Competence: Sustainability Principle 6; Every group and individual should have the opportunity to be good at something and develop to become even better.

Conceptual Framework: A conceptual framework is an analytical tool with several contexts, used to make conceptual distinctions and organize ideas.

Defaults: An option that will be obtained if the chooser does nothing. People will often go with what is preselected; the path of least resistance.

Descriptive norm: Descriptive norms depict what happens.

Dynamic Equilibrium: A stage where a system oscillates irregularly on a short time scale, but within rather well defined bounds and with some regularity over long time frames.

Econs: Short for Homo-Economicus.

Ecosphere: The biosphere plus the whole atmosphere with its ozone layer.

Ecosystem: A system, or a group of interconnected elements, formed by the interaction of a community of organisms with their environment.

Emergent: Arising casually or unexpectedly

Framework for Sustainable Development FSSD: A five level planning and decision-making framework for understanding root causes of unsustainability, plan and move strategically toward sustainability using backcasting from Sustainability Principles.

Generic Model: The stepwise process of nudge design created by the researchers.

Habit: Habits are learned dispositions to repeat past responses. Habits are controlled by the Automatic System.

Heuristics: Rules of thumb - Interplay between Automatic and Reflective systems.

Homo Economicus: These people are completely rational and adept to making decisions for themselves.

Impartiality: Sustainability Principle 7; This principle concerns people treating each other equally.

Incentive: A motivating factor for someone to do something. Financial incentives may include payments, concessions or tax incentives.

Influence: Sustainability Principle 5; This principles indicates that all individuals should be allowed to participate in shaping social systems.

Integrity: Sustainability Principle 4; This principle refers to not doing direct harm at the individual level; physically, mentally or emotionally.

Libertarian Paternalism: Want to make it easy for people to go their own way and not get in the way of free choice.

Lithosphere: The Earth's crust.

Meaning: Sustainability Principle 8; This principle refers to the reason for being an organization or system.

Nudgees: People being nudged.

Nudgers: People implementing nudges.

Paternalistic: Paternalism is behavior, by a person, organization or state, which limits some person or group's liberty or autonomy for that person's or group's own good.

Practitioners: Anyone implementing nudge in practice.

Reductionism: Trying to understand every detail in a system in order to understand the whole.

Reflective: The part of our brain that is reflective and rational.

Researchers: The authors of this paper.

Shove: Direct regulation and legislation.

Social norms: “shared understandings about actions that are obligatory, permitted or forbidden” (Ostrom 2000, 144).

Socio-Ecological System: The combined system made up of the biosphere, human society, and their complex interactions.

Stakeholders: Entities or individuals that can reasonably be expected to be significantly affected by an organization's activities, products, and/or services; and whose actions can reasonably be expected to affect the ability of an organization to successfully implement its strategies and achieve its objectives.

Strategic Sustainable Development (SSD): The Brundtland Commission report "Our Common Future" offers the following definition: to "meet the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland 1987, 24).

Subjects: The interviewed experts and practitioners

Sustainability Principles: First-order principles for sustainability that are designed for backcasting from sustainability.

Sustainability: A state in which the socio-ecological system is not systematically undermined by society. Society must be in full compliance with the eight Sustainability Principles to achieve full sustainability.

Sustainable Development: The Brundtland Commission report "Our Common Future" offers the following definition: to "meet the needs of the present without compromising the ability of future generations to meet their own needs". (Brundtland 1987, 24).

System 1: Fast and automatic system of the brain.

System 2: Slow and reflective system in the brain.

Systems-thinking: Acknowledgment of interconnectedness of complex, nested systems. This way of thinking includes problem solving that takes care to not introduce new issues in another part of the larger system.

Target Audience: People subjected to nudge interventions.

Think: Provision of information or education.

User: Someone using the guides included in the document content analysis.

Vision of Success: An imagined vision of a future state that contains the success of the entity framed by a sustainable society as described by the Sustainability Principles.

List of Abbreviations

CFCs Freons

FSSD Framework for Strategic Sustainable Development

MSLS Masters in Strategic Leadership towards Sustainability

ROI Return On Investment

RQ Research Question

SP Sustainability Principle

SRQ Supporting Research Question

SSD Strategic Sustainable Development

TNS The Natural Step

Table of Contents

List of Figure and Tables

Figures

Tables

1 INTRODUCTION

1.1 Sustainability Challenge

The human species has the privilege of enjoying the beauty and abundance of our planet, however evidence is mounting that a pressing need exists for us to shift our lifestyles to operate within the ecological limits of Earth (Robèrt et al. 2002). The Industrial Revolution, in the 18th century brought about major advances in science, technology, and economics (Deane 1979). This also marks the beginning of the Anthropocene, or the period when human behavior started having significant impacts on the environment (Oxford Dictionaries 2015). Meanwhile, Earth's human population has been increasing at exponential rates (see figure 1.1) (Steffen et al. 2015). This rise in both population and economic and social development has been fueled in turn by an exponential increase of consumption of natural resources to fulfill our everyday needs (see figure 1) (Steffen et al. 2015). William Rees, the co-creator of the 'Ecological Footprint,' describes the extent humans are stressing the environment: "The average world citizen has an eco-footprint of about 2,7 global average hectares while there are only 2.1 global average hectares of bioproductive land and water per capita on Earth. This means that humanity has already overshot global biocapacity by 30 percent and now lives unsustainably by depleting stocks of 'natural capital' (i.e. fish, forests, and soil) and eroding critical life-support functions" (Rees 2010, 4-5).

Consequences of humans' impact on the environment can be seen around the world including a rapid and systematic increase in concentrations of Carbon dioxide, Nitrous oxide and Methane in the atmosphere causing the increase of global surface temperature as well as ocean acidification (see figure 2).

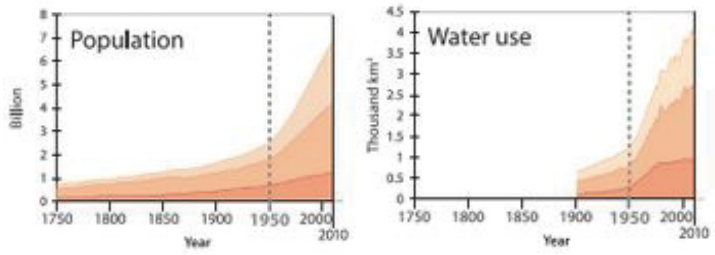

Figure 1-1: Population growth and water use (Steffen et al. 2015)

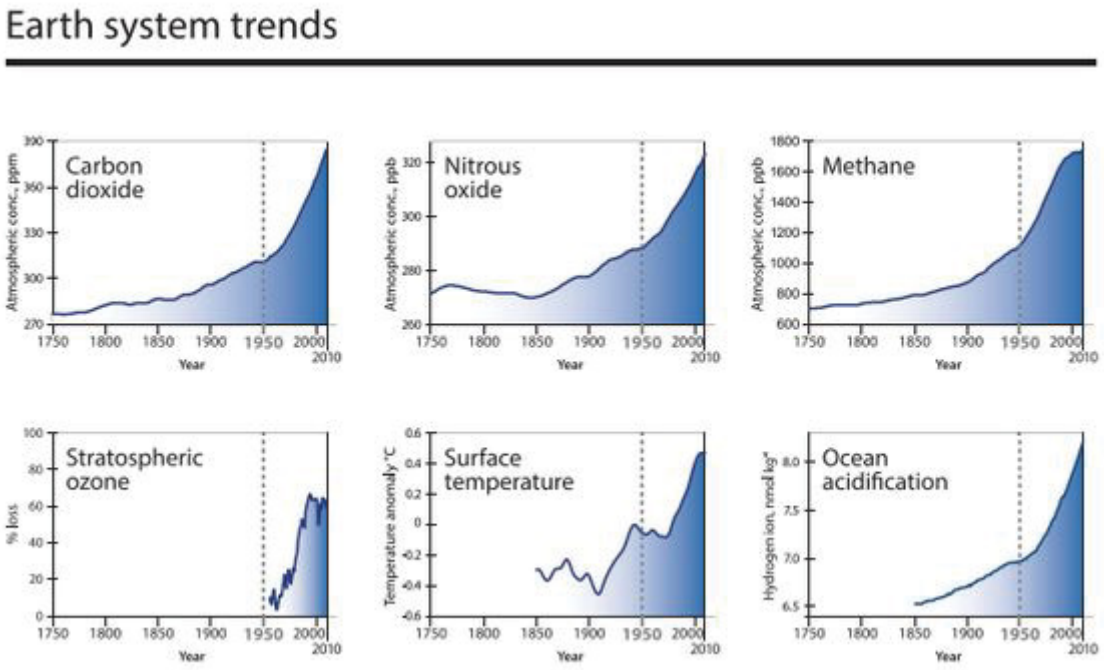

Figure 1-2: Earth system trends (Steffen et al 2015)

In poorer areas of the world, the depletion of natural resources is already having a major impact on the survival of inhabitants. For instance, many areas in Africa, Southern Asia and South America are extremely reliant on the natural ecosystem to provide water, fish and other food. In a few cases poverty has increased and life expectancy has decreased, as the natural environment has weakened (Vlek and Steg 2007). "The last 50 years have without doubt seen the most rapid transformation of the human relationship with the natural world in the history of humankind." (Steffen et al. 2004, 131). Furthermore, by treating 'humans' as a single, monolithic whole, it ignores the fact that the Great Acceleration has, until very recently, been almost entirely driven by a small fraction of the human population, those in economically advanced countries.

A major shift in our behavior and decision making models is needed in order to meet what Robèrt et al. have named the Sustainability Challenge. The Sustainability Challenge requires a recognition of the interplay and interdependence of systems in society and the environment, giving humans the opportunity to better understand sustainability and how to move towards it while staying within the Earth's ecological boundaries (Robèrt et al. 2002).

The Sustainability Challenge can be described using a funnel metaphor (Figure 3). The narrowing walls of the funnel represent the gradual and systematic degradation of the Earth's natural resources, and shrinking capacity of the Earth's ecosystems to support life. That indicates that society must carefully live and operate within the boundaries of the Earth or risk reaching beyond the limits and 'hit the funnel walls' (Robèrt et al. 2013).

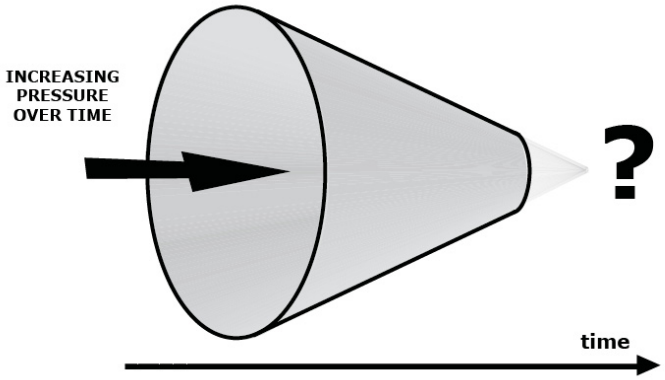

Figure 1-3: The Funnel Metaphor (Robért et al. 2013)

1.1.1 A clear definition of Sustainability

How will humans know when we are heading towards the funnel wall? In order to enable organizations, governments, citizens and other human actors to discern between choices that contribute either towards actions that are unsustainable or sustainable, a clear definition of sustainability is needed.

The Framework for Strategic Sustainable Development (FSSD) takes a unique approach in its definition for Sustainability by instead defining *un*sustainable behavior using a set of scientifically proven Sustainability Principles. The creators of the FSSD explain, "Since sustainability was a non-relevant expression until non-sustainability started to exist due to human activities, it is logical to design the system conditions as restrictions, i.e. principles that determine what human activities must *not* do". (Robèrt and Holmberg 2000, 298). These Sustainability Principles serve as boundaries for ecological and social sustainability, that protect both Earth's natural resources as well as humans' ability to meet their needs for themselves and future generations (Robèrt et al. 2000).

The eight ecological and social Sustainability Principles are as follows:

In a sustainable society nature is not subject to systematically increasing…

1. …concentrations of substances extracted from the Earth's crust;

This principle refers to bringing substances from the lithosphere into the biosphere in a way that leads to systematic increases in concentrations of those substances and their molecular waste in the whole biosphere or parts of it.

2. …concentrations of substances produced by society;

This principle refers to producing substances within the biosphere that then systematically increase in concentration in the whole biosphere or parts of it.

3. …degradation by physical means.

This principle refers to systematically and directly degrading the biosphere using physical means (Robèrt 2002).

In a sustainable society, people are not subject to systematic barriers to…

4. … integrity;

This principle refers to not doing direct harm at the individual level; physically, mentally or emotionally. In an organizational context it might refer to working conditions.

5. … influence;

This principle refers to being able to participate in shaping social system(s) one is part of and dependent on. At a minimum, this might mean being able to vote on leadership and issues and being able to make one's voice heard.

6. … competence;

This principle refers to safeguarding that every individual (and group) has the opportunity to be good at something and develop to become even better. It includes the securing of sufficient resources for education and other sources for continuous personal and professional development. This also includes the ability to learn in order to remain adaptable and therefore resilient.

7. … impartiality;

This principle refers to people treating each other equally, both between individuals, and between individuals and organizations such as in courts, authorities, etc. It is about acknowledging that all people have the same rights and are of equal worth.

8. … meaning.

This principle refers to the reason for being an organization or system. How does it inspire its members, what does it aim to do and why? (Missimer 2013, 31-33).

1.1.2 A Complex Challenge

The ecosphere's ability to sustain its systems the way we know today depends on the interactions between the species and ecosystems that it contains. That means that the ecosphere is not a predictable, linear system: it is, instead, rather complex, meaning a relatively large number of parts are in constant exchange, producing behavior that is sometimes counterintuitive. When it comes to unsustainability, complexity is an increasing factor, given the broad range of symptoms present in the system (e.g.: climate change, loss of biodiversity, etc.), and the gap in space and time between cause and effect of these symptoms (e.g.: the delay between manufacturing CFCs and diagnosing their effects in the ozone layer). Up to this day, Earth has sustained a dynamic equilibrium in this system. However, it is hard to predict how much it can be disturbed and altered before the system conditions start to shift.

Society can be perceived as a system nested within biosphere, and it is completely dependent on the ecosystem for its survival. The social system can also be classified as complex, given

that the system's behavior cannot be predicted from the behavior of the separate parts. Additionally, the interrelationships among the parts in social systems are not only increasing in number and type, but also becoming more elaborate (Clark et al. 1995 in Missimer 2013). Furthermore, globalization and technology have been significant factors in amplifying the degree of complexity of modern society. (Missimer 2013).

As presented before, scientific evidence suggests that humans are a main driver of unsustainability on the ecological system (Steffen et al. 2015). It seems important, therefore, to understand how human behavior adds to the complexity of the sustainability challenge.

1.2 Human Behavior

The 2014 Greendex report contains results from surveying and ranking 18 countries around the world on the environmental sustainability connected to their behaviors. It indicates that society has become more aware of the global sustainability challenges humanity is facing. For example the report finds that 65 percent of the surveyed respondents agree with scientists about the theory that human activity is causing climate change. Yet, at the same time the rising consumption trends in the survey are indicating that this awareness has not resulted in changed behaviors to reflect this knowledge. It is stated in the report that "consumers in wealthy countries have a proportionately greater impact on the environment than others - and that they can and should make more sustainable choices" (National Geographics 2014, 5). So if society is aware and capable of changing their behaviors why is the trend moving in the wrong direction?

The sheer multitude of choices the contemporary human is facing in society every day, combined with the lack of immediate feedback to the individual regarding the impact his/her decisions are causing long term, makes it difficult for us to link individual actions to the effects on the environment. In sociology this is known as the "law of unintended consequences" (Merton 1936). According to Merton's analysis, there are two sources of unintended consequences that directly impact these long-term effects on the environment: ignorance and immediate interest. In this context the term ignorance is used to describe that it is impossible to anticipate the effects of everything in an emergent system such as society, and that the collective impact of our behaviors and decisions are hard to understand and to connect to as an individual. Not only is society often unaware of the upstream and downstream impacts of the products and services it consumes, but also humans' brains cannot comprehend the cumulative impact at a collective level. The second factor, immediate interest is referring to when an individual purposefully discounts any long-term effect of his/her actions due to the immediate satisfaction the behavior brings (Merton 1936). To this point, Greendex reports that "British, German, and Swedish consumers are the least easily influenced by learning about their own environmental impact, they feel relatively little guilt about their own environmental behaviors and say they do not intend to make any changes to the way they live their lives after finding out the results of the survey" (National Geographics 2014, 5). Thus, "consumer attention to information is selective, and knowledge progress need not always trigger behavioral adaptations" (Woersdorfer n.d.).

Even when consumers are willing to act more sustainably, people may not make choices and take actions that reflect this. This disconnect between willingness and action ultimately leads to economic and environmental harm (Sunstein and Reisch 2013). Understanding this it is

necessary to understand what affects human behavior at large. “To stumble is human. With every choice we make, individual motivation interacts with emotions, cognition, and social norms” (Amir and Lobel 2009, 3). Elinor Ostrom describes social norms as “shared understandings about actions that are obligatory, permitted or forbidden” (Ostrom 2000, 144). Furthermore, Social norms “signal appropriate behavior or actions taken by the majority of people (although what is deemed ‘appropriate’ is itself subject to continual change)” (Samson 2014, 27). Beyond that, a lot of the behaviors displayed in everyday life are acted out as part of habitual routines that we are only semi-conscious about. “Most of the time what we do is what we do most of the time. Sometimes we do something new” (Townsend and Bever 2001, 2). Habits may be initiated by a pursuit of a specific goal. Yet when repeated over time, patterns of context may trigger a habitual response intentionally or unintentionally in the course of daily life, without the behavior resulting in reaching a particular goal. This indicates that a lot of the things humans do on a daily basis are performed on autopilot and may not always serve a conscious purpose (Wood and Neil 2007). “Our decision making stumbles are often the result of the ways in which information is presented and choices are constructed before us. Finding patterns of how we stumble and designing systems that can prevent common behavioral failures is the subject of the new field of behavioral economics” (Amir and Lobel 2009, 3).

1.3 Approaches to promote behavior change: the think, shove and nudge strategies

It is now known that human behavior is causing some of the crises that humanity faces (Hansen 2013). In order to address the threats to social and environmental resources depletion, a number of approaches can be adopted, such as providing information, regulatory rules, financial incentives and others (Steg & Vlek 2007).

This research will touch on three of these approaches: the provision of information, direct and indirect regulation, and the ‘nudge’ approach (Thaler and Sunstein 2008), which is the main focus of the study.

1.3.1 Provision of information – the think approach

The act of educating people to be able to participate in a process of choice making is proven to lead to significant changes (Hungerford and Volk 1990). In this approach, people are equipped with information relevant to the choice environment they are within, and left free to choose what suits them best. This strategy is sometimes referred to in literature as the ‘think’ approach (John 2011), and derives from the democratic theory that has been dominant over the last three decades. It stands for public deliberation as an avenue to support free and equal citizenship (John 2011), since it avoids patronization and the implication that the government or civil society institutions have an answer to what is best. It is discussable the assumption that the information provided will consequentially lead to effective ‘thinking’, however, “think argues it is possible to get citizens to think through challenging issues in innovative ways that allow for evidence, and the opinions of all, to count” (John 2011, 10). Furthermore, this strategy has been said to have the power to shift people’s values and emotions, and build in them the ability to act, allowing the development of a world population that “has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively towards solutions of current problems and the prevention of new ones”

(UNESCO-UNEP 1976, 2). An example of this approach in the sustainability context is conservation education, for which the ultimate purpose is to affect individuals' behaviors, and call for change in a way that supports conservation practices without imposing on individuals the way they should act (Heimlich and Ardoin 2008).

1.3.2 Direct Regulation – the shove approach

Direct regulation stands on the opposite side of the 'think' approach in the continuum of behavior change strategies. It is often labeled as the 'shove' approach (French 2011), and consists of using the standard tools in policy making: economic incentives, mandates, and bans. One of the benefits of this strategy is that it brings fast results when it is put in place (Dobson 2014). However, it can backfire in the longer run, since it is based on an assumption of what is best for people, in a process of coercion and restriction of liberty. Furthermore, if considering the increasing loss of trust on the public sector, this paternalistic approach can be seen as a fragile strategy, for "much of the time, and in many areas of policy, simply telling people what to do can be wholly counterproductive, especially at a time when the deference is low and mistrust of politicians and civil servants is high." (John 2011, iv).

It is also the case that governments in many modern industrial societies can no longer rely on deference and obedience to messages from a benevolent center, as they did before. Citizens will question the authority of government or simply ignore it (John 2011). Nevertheless, some studies defend that when it comes to environmental issues, externalities might justify a mandate (Sunstein and Reisch 2013), such as the case of putting a price on carbon.

1.3.3 Choice Architecture – the nudge approach

The word nudge is described in the American Heritage Dictionary (2000) as "A gentle push". Nudging is the name given to this third behavior change approach, which has its roots in the field of behavioral economics. Nudges use behavioral science to investigate and better understand some aspects of the human psyche and heuristics in decision making, such as biases and overconfidence (Kahneman 2011). Drawing from these 'failures' in human cognition, the 'nudge' approach aims at setting up a Choice Architecture, that will guide one's decision making in a direction that this individual should, ultimately, benefit from. In recent years, there has been an increasing interest in the approach, given its' applicability both in the public and private sectors. The nudge approach sets very specific objectives for the outcome of behavior change, and does not seek to influence values and attitudes. When screened beside the two previous strategies, the nudge can be seen as a third way, between libertarians and paternalists (Schlag 2010), called "Libertarian Paternalism" (Thaler and Sunstein 2008), a direction for behavior is nudged while autonomy and choice is maintained. The creators of the nudge approach argue that the complexity of modern life and the speed of development and change "undermine arguments for rigid mandates or for dogmatic laissez-faire" (Thaler and Sunstein 2008, 253).

1.4 Overview of Nudge Theory

A further investigation of the overall elements of the Nudge Theory is offered below.

1.4.1 Definitions and Characteristics

The term nudge was coined by Prof. Cass Sunstein, from the Harvard Law School, and Prof. Richard Thaler, from the University of Chicago Booth School of Business. In their 2008 book "Nudge - Improving Decisions About Health, Wealth, and Happiness", Thaler and Sunstein give no specific definition of the theory. However, they define a nudge intervention as: "any aspect of the Choice Architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid" (Thaler and Sunstein 2008, 6).

Other pieces of literature suggest similar definitions: "Nudges are ways of influencing choice without limiting the choice set or making alternatives appreciably more costly in terms of time, trouble, social sanctions, and so forth". (Hausman and Welch 2010, 126)

In addition to the original definition, in a subsequent article Sunstein (2014) clarifies that a nudge intervention must have the following characteristics:

- **Freedom of choice:** Nudges should always preserve the possibility for people to deliberately diverge from it.
- **Transparency:** It should never be used as a manipulative maneuver, and it should be possible for the public to review nudges in the same manner as other governmental actions.
- **Effectiveness:** If properly implemented, nudges should lead to protecting people against economic and physical harm.
- **Evidence:** Much like in any policy work, practitioners must rely on evidence in order to build a relevant Choice Architecture.
- **Testing:** When applied, nudges should be tested and prototyped, to anticipate and measure adverse consequences, allowing for iteration and avoiding extra expenses and efforts.

1.4.2 How people think and decide

Nudge Theory is based on two important insights about human behavior and cognition derived from the work of Nobel Prize winner Daniel Kahneman: the distinction between Humans and the Homo Economicus, and how human Reflective and Automatic Systems impact human decision making.

Homo Economicus and Humans

The biggest distinction between Behavioral Economics and Neoclassical Economics is the one regarding the way humans choose. While Neoclassical Economics sees the human being as the *Homo Economicus*, who are rational individuals capable of maximizing utility and act

independently on the basis of full information (Weintraub 1993), it fails to consider the caveat of how human forecasts tend to be not only imperfect, but also highly biased (Thaler and Sunstein 2013).

Conversely, Behavioral Economics discards the notion of the *Homo Economicus* and defend the idea that the earth is rather populated by Humans, who are imperfect information processors, emotional beings who get easily influenced by the context, are shortsighted and myopic, very inconsistent and cognitively lazy (Thaler and Sunstein 2013, Schlag 2010).

This lack in computational capacity, which leaves humans acting on autopilot part of the time, may not always serve a conscious purpose and has led to unintended consequences contributing to the sustainability challenge, as previously mentioned.

Reflective and Automatic Systems

Nudge derives from the dual-process theory in the work of Daniel Kahneman. According to Kahneman, there is the need to distinguish two kinds of thinking: "System 1 operates automatically and quickly, with little or no effort and no sense of voluntary control. System 2 allocates attention to the effortful mental activities that demand it, including complex computations. The operations of System 2 are often associated with the subjective experience of agency, choice, and concentration" (Kahneman 2011, 20-21).

Thaler and Sunstein refer to these modes of thinking as automatic thinking and reflective thinking. Automatic thinking would usually not be associated to thinking, for being fast and instinctive. Reflective thinking, however, is a much slower and deliberate way of processing information. The main characteristics are described on the table below:

Automatic thinking	**Reflective thinking**
Uncontrolled	Controlled
Effortless	Effortful
Associative	Deductive
Fast	Slow
Unconscious	Self-aware
Skilled	Rule following

Table 1-1: Automatic Thinking and Reflective Thinking (Thaler and Sunstein 2008)

The automatic system tends to prompt the reflective system and inform reflective thinking, meaning they interact with each other. However, even though the reflective system depends on the automatic signals to start running, the opposite is not true (Hansen 2013).

1.4.3 Choice Architecture

In Nudge Theory, a choice architect is defined as anyone who organizes the context in which people make decisions (Thaler and Sunstein 2008). The authors use traditional forms of architecture as a metaphor, to make a point that there is no such thing as a "neutral design".

They give an example that a particular arrangement of food options at lunch will, with or without intentions, influence what people eat. Thus, a choice architect is someone who indirectly influences the choices that other people make.

Given that Choice Architecture cannot be avoided, the authors defend that the golden rule of nudging is to "offer nudges that are most likely to help and least likely to inflict harm" (Thaler and Sunstein 2008, 72). In order to setup a Choice Architecture that will help people improve their capacity to map and select optimally, choice architects first need to understand how humans behave and choose. They add: "The potential for beneficial nudging also depends on the ability of the Nudgers to make good guesses about what is best for the Nudgees. In general, Nudgers will be able to make good guesses when they have much more expertise at their disposal" (Thaler and Sunstein 2008, 247).

1.4.4 Philosophy: Libertarian Paternalism

Libertarian paternalism, as coined by Thaler and Sunstein, sits in the middle ground between libertarianism and paternalism – which is an enriching contribution to the democratic debate. A democracy, as derived from the Greek dēmos ("people") and kratos ("rule"), literally means ruled by the people (Smith 2007). Ergo, democratic governments are expected to rule without over-riding people's freedom, and without abusing its power to control.

In their approach, the authors propose that policy makers mitigate human cognitive biases by making use of Choice Architecture as a third way in policymaking, guiding decision while maintaining or increasing freedom of choice. The authors defend that "Libertarian Paternalism is a relatively weak, soft, and non-intrusive type of paternalism because choices are not blocked, fenced off, or significantly burdened" (Thaler and Sunstein 2008, 16). The central point in their argument is the importance of guiding people to act in their own self-interest, and "make choosers better off, as judged by themselves" (Thaler and Sunstein 2008, 5).

It is not surprising that less than a decade after the publication of Cass and Sunstein's book, Libertarian Paternalism became increasingly popular in political circles, and the nudge approach gained major recognition, particularly in the western liberal democracies of the United States and the United Kingdom. In the United States, behavioral findings have provided an important reference point and informed many initiatives in various areas, involving fuel economy, energy efficiency and health care. In the United Kingdom, a behavioral Insights Team was created within David Cameron's conservative government in July 2010, with the aim of incorporating behavioral insights into policy initiatives. The Team, also known as the Nudge Unit, is now independent of the UK government, operating as a social purpose company. (Hansen 2013, Sunstein 2014a).

As described by Dolan et al., behavioral approaches can be a powerful set of tools for policy-makers facing challenges such as crime, obesity and environmental sustainability, for they "can lead to low cost, low pain ways of nudging citizens – or ourselves – into new ways of acting by going with the grain of how we think and act" (Dolan et al. 2010, 7). Meanwhile, The approach has also been successfully implemented in the private sector, for example with interventions in hotels that employ descriptive norms (e.g., "the majority of guests reuse their towels") instead of solely displaying an environmentally oriented appeal. (Goldstein et al. 2008).

This momentum seems to have reached an unprecedented peak with the European Brands Association formally launching a program named 'AIM - Nudge' on the 6th of May of 2015. The group, comprised of the leading brand manufacturers in Europe, is now willing to "inspire marketers to use their deep consumer and behavioral insights to make it easy and desirable for people to adopt healthier and more sustainable lifestyles." (Weber 2015). AIM plans to create a code of conduct and toolkit that will set the rules of the game.

1.4.5 Most common types of nudges

It is only because of our frequent reliance of the automatic system that humans can be nudged. Without diving deeply into examples, here is a list of a few nudge techniques.

- **Default rules:** Setting people in a specific program, such as default double-sided printing in university printers or default choices of retirement plans in governmental policy.
- **Simplification:** To simplify information in order to avoid misunderstandings and facilitate navigation, and making complex navigation more intuitive.
- **Uses of social norms:** Emphasizing what most people are doing (eg: "most of your neighbors have insulated their attics") is an effective nudge to engage people in a certain behavior.
- **Increases in ease and convenience:** The aim with this type of nudge is to make things easy: making healthy foods more visible is going to increase the possibility it gets picked.
- **Disclosure:** To make information accessible, for example, by demonstrating the environmental cost associated with energy on the energy bulb packs.
- **Warnings, graphic or otherwise:** Nudges can also be more explicit in describing the risk of some behavior, like the warnings that you can find in cigarette packaging.
- **Pre-commitment strategies:** To encourage people to engage in a specific course of action in order to reach their goals.
- **Reminders:** To avoid procrastination or forgetfulness, people can be nudged by being alerted of their upcoming obligations or commitments by email or text message.
- **Eliciting complementation intentions:** When asked about their intention to engage in a certain activity, people are more likely to do so, for example: "do you plan to vaccinate your child?".
  Informing people of the nature and consequences of their own past choices: Much like the disclosure nudge, however with emphasis on the individual's data. Eg: "your electricity consumption has been following a trend (…)" (Sunstein 2014b).

1.4.6 Potential for nudging towards Sustainability

This increase in popularity within policy making circles, as well as in private organizations suggests that nudging can be a promising approach to be adopted within societies to make citizens lives simpler, safer, or easier. Moreover, the characteristics of the nudge approach have the potential of making sustainable behaviors much more attractive, effortless and rapid. A simple example of using nudge for sustainability could be switching the default in flight purchases by making carbon offsetting a default, with the possibility to opt out if people desire to do so. Recent research has shown that even simple comparisons could be used to

"decrease energy consumption (Nolan et al. 2008; Ayres et al. 2009; Allcott 2011; Costa and Kahn 2013) and water waste (Goldstein et al. 2008), and promote environmentally friendly agricultural practices (Chen et al. 2009)" (Egebark and Ekström 2013).

Given this potential alongside the novelty of the nudge approach warrants further research in its value as a mechanism for behavior change to meet the Sustainability Challenge.

1.5 Research Purpose

The purpose of this research is to explore if nudge as a tool can be used to bring society towards sustainability. The intention is to take a step back and strategically investigate the design of nudges, in order to evaluate if this is a valuable approach towards the complexity of the sustainability challenge. If so, then the aim is to introduce nudge practitioners to a structured and strategic framework to complement the nudge tool and inform the design of nudges towards sustainability.

The secondary purpose is to introduce sustainability practitioners to a new concept that can potentially be used to change behavior for sustainability.

1.6 Research Scope

This thesis will focus on nudge and it's applicability as a tool for behavior change towards sustainability. The emphasis of this research sits on understanding the translation from the Nudge Theory into the field of practice, followed by its strategic application for sustainability purposes. The researchers opt to focus on the design of nudges, thus refraining from analyzing the specific outcome of nudge interventions.

1.7 Research Questions

Main Research Question (MRQ):

What is the role of nudging in changing behavior towards a sustainable society?

Supporting Research Questions (SRQ):

1. *How do Nudge Theory guidelines inform the design of nudges towards the betterment of the individuals and society?*
2. *How are nudge practitioners operationalizing the Nudge Theory into practice?*
3. *What is the potential of nudging towards sustainability, and what is lacking?*
4. *How can sustainability be strategically integrated into the nudge design?*

2 METHODS

This section outlines the methods and stages of this research. In order to explore how nudge can be used to bring society towards sustainability, a document content analysis was conducted, followed by semi-structured qualitative interviews. A Generic Model was created, which was then assessed according to the Framework for Strategic Sustainable Development (FSSD). The research design and methods are detailed below.

2.1 Research Design

The fields of sustainability science and behavior economics are both situated at the intersection of various academic disciplines. While the sustainability science draws from ecology, economics, politics and culture, the field of behavioral economics brings together cognitive psychology, social theory, anthropology and economics. Given the interdisciplinary nature of this study, and considering the emerging nature of the nudge concept and field of practice, a Qualitative Analysis seemed the most appropriate way to design and conduct this research.

Moreover, the design of the research evolved and shifted throughout the process, which characterizes as an iterative research design. Maxwell's Model for Qualitative Research Design was used to map those changes and to constantly re-evaluate the components of the research: goals, conceptual framework, research questions, research methods and validity (Maxwell 2013).

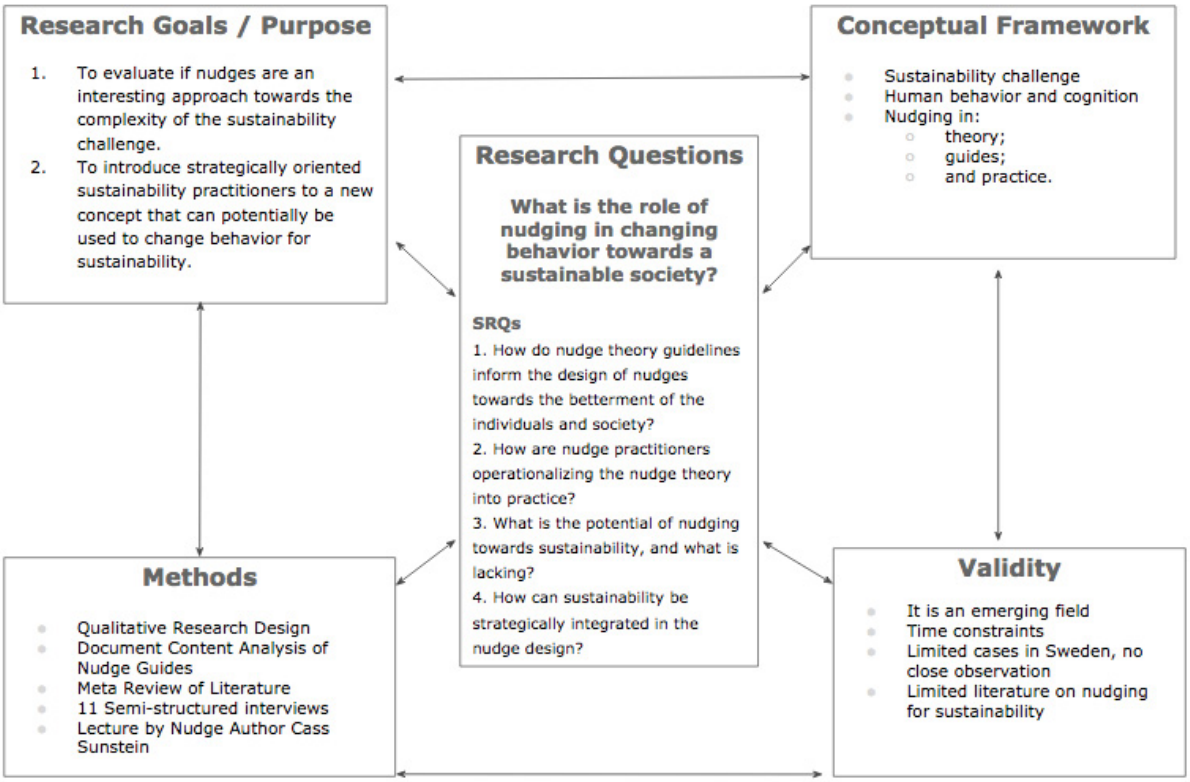

Figure 2-1: Maxwell's Interactive Model of Research Design

2.1.1 Strategic Sustainable Development

To effectively evaluate the role of the nudge in changing behavior towards a sustainable society, a tool was needed that offers both a clear definition of sustainability as well as guidelines for how to take steps towards a sustainable society. Approaches such as as the Planetary Boundaries, which offers a set of boundaries to limit humans' harm on Earth's natural environment, or the Brundtland definition, which refers to meeting the needs the present without compromising the ability of future generations to meet their own needs, are commonly used as definitions. However, while the first lacks aspects of social sustainability and guidance for sustainable development, the second misses tangible, scientifically based metrics and steps. Therefore, for this study the researchers have chosen to analyze the nudge as a tool through the lens of the Framework for Strategic Sustainable Development. The FSSD provides both a clear and operational definition of sustainability based on the eight Sustainability Principles presented in the introduction as well as guidelines for taking strategic and systematic steps towards a sustainable society.

The FSSD is an analytical and planning tool that takes a systems thinking approach in coordinating responses and resources used in finding solutions to complicated sustainability problems (Robert et al. 2013). It is comprised of five levels of analysis which guide practitioners through a process that will inform decision-making towards a sustainable society, which are given below:

Systems Level	This level helps users frame and understand the interplay and interdependence of the systems on Earth in relation to the Sustainability Challenge. If done effectively, this process will illuminate how a particular topic or focal point interacts with society, the Earth's biosphere and other subsystems.
Success Level	This level helps users either evaluate a current vision for success or create a new one using the eight Sustainability Principles. If done effectively, the outcome from this level is a vision for success that does not systematically contribute to the violation of the Sustainability Principles.
Strategic Level	This level helps users prioritize actions toward the vision for success created in the previous level. This is done using the following prioritization questions: 1. Does the action proceed in the right direction with respect to the Sustainability Principles? 2. Does this action provide a 'stepping stone' (flexible platform) for future improvements? 3. Is the action likely to produce a sufficient return on investment to further catalyze the process?
Actions Level	This level helps users realize all concrete actions that are, and can be, planned and implemented to move towards sustainability.
Tools Level	This level helps users compile a list of tools or concepts that can be utilized in concert with the FSSD to move towards sustainability. These can include tools such as management systems and assessment programs for the current

	situation, etc. Zero Emission, the Ecological Footprint and Natural Capitalism are a few well-known examples in the field of sustainable development (Robèrt et. al 2010).

Table 2-1: The Five Levels Framework

Backcasting: To choose effective actions and measures to address the complexity of the Sustainability Challenge in a way that takes into account the many systems at play, we in society need to focus our attention upstream, to the sources of the problems that brought us to our current reality, rather than simply fixing them (Robèrt 2000). Backcasting is an effective approach that supports practitioners in doing this. Backcasting begins by identifying a clear definition of the future, which serves as the guide that strategically aligns action steps, so that each step can be a logical platform for those that follow (Robèrt 2000). A more frequently applied strategy is 'forecasting' through which practitioners begin planning based off of the present reality, projecting current problems and trends and apply realistic solutions (by today's standards) to future problems; however, this approach risks worsening the problems experienced today by supporting the trends and approaches that brought us here (Robèrt 2000). Backcasting is a major component of both the FSSD and the Strategic ABCD Planning Process.

The Strategic ABCD Planning Process: This process was designed to offer a clear, four-step process, which guides users through backcasting. The steps are illustrated and designed below:

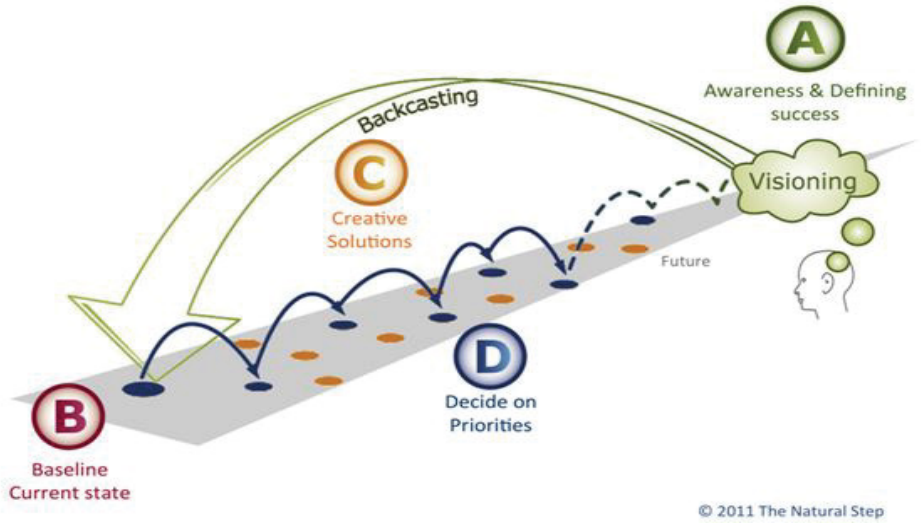

Figure 2.2: ABCD Process (The Natural Step 2015)

The process consists of the following steps:

A-Step - Awareness & Defining Success: Building a shared understanding of the socio-ecological system and sustainability challenge, and creating a vision for success that aligns with the Sustainability Principles.

B-Step - Baseline Current State: Analyzing the current practices and operations through the lens of the Sustainability Principles, highlighting aspects that are aligning or contributing to violating the Sustainability Principles, or aspects that require more research.

C-Step - Creative Solutions: Brainstorming an extensive list of potential actions that will lead towards sustainability as defined by the Sustainability Principles.

D-Step - Decide on Priorities: Prioritizing the actions generated in the C-Step using the three prioritization questions included in the Strategic Level of the FSSD.

(Robèrt et. al 2013)

2.2 Research Methods

The design of this research followed four stages. Each stage was informed by a specific Supporting Research Question and had its singular purpose; however they were connected and built on from each other. This section outlines the utilized methods for data collection as well as sample criteria for selecting documents and interview subjects.

2.2.1 Supporting Research Question #1

How do Nudge Theory guidelines inform the design of nudges towards the betterment of the individuals and society?

The purpose of the first Supporting Research Question was to illuminate the translation of the Nudge Theory into action, and investigate it through the lens of the Framework for Strategic Sustainable Development.

Document Content Analysis

In order to gain an introductory understanding of the current reality of the field, a meta-analysis of literature was conducted. Meanwhile, a set of nudge guides was preliminarily identified. Using the following sampling criteria, 6 guides were selected:

- Documents should be originally presented in the English language.
- Documents available online and free to download.
- Documents that were published between 2008 and February 2015.
- Documents that support practitioners in the process of designing and applying a nudge intervention.
- Documents that present a process/action steps for designing nudge interventions and/or behavioral aspects informing the nudge intervention design.
- Documents that supported, presented considerations from, and filled gaps in Nudge Theory.

The selected guides were:

Nudging: a Tool for Sustainable Behaviour? 2014, Sweden	**EAST: Four simple ways to apply Behavioural Insights** 2014/04/11, United Kingdom	**B. Galbraight: The Designer Nudge** 2013/04/23, Canada
The Swedish Environmental Protection Agency has commissioned this study which offers four types of tools and four methods to test behavior change, and uses the nine principles model developed in the UK by Dartington.	The EAST framework was developed by the Behavioral Insights Team in 2012 that supports users in applying behavioral insights to policy in communities. It is comprised of both methodology for developing projects and four simple principles to encourage behavior change.	This tool compiles interviews and case studies in a guide geared towards Nudge Design, posting a set of six questions that can be used to plan an intervention.
Rotman: A Practitioner's Guide to Nudging 2013/05/13, Canada	**The Design Incubation Centre Toolkit** n.d., Singapore	**MINDSPACE: Influencing Behavior through Public Policy** 2010/03/02 ,United Kingdom
A guide from a team of behavior economists at the University of Toronto's Rotman School of Management that aims to help practitioners develop effective nudges. Drawing on research on this area of behavioral economics, the guide demonstrates how nudging influences behavior by changing the way choices are presented in the environment.	The Nudge Toolkit created by the Division of Industrial Design and Environment of the National University of Singapore. It is a process based design that blends behavioral principles and the design thinking process. It is aimed at facilitating a workshop process, guiding participants from investigations to strategies.	MINDSPACE was developed by the Behavioral Insights Team in 2010 to offer policymakers a checklist of things to consider when making policy to increase behavior change. This checklist is comprised of nine robust and non-coercive influences on human behavior. Additionally, MINDSPACE offers a policy design framework that draws from the '4E's originally developed by DEFRA.

Table 2-2: Selected guides for Document Content Analysis

A preliminary analysis of each document was conducted to confirm their match to the criteria cited above. The sets of process/action steps and/or behavioral aspects from each document (hereafter called 'guides') were extracted and examined in order to gain understanding of the nudge design and behavioral considerations. These guides were utilized as the foundation for the document content analysis.

The behavioral aspects in the guides were first checked in terms of conformity with the Nudge Theory. Then, the action steps (hereafter called 'guidelines') from all different guides were extracted separately, in a comprehensive map of the process (see Appendix A.)

Generic Model

All separate guidelines were then sorted and organized according to similarities, while unique contributions were also kept as a single code. This compilation of guidelines resulted in the creation of Generic Model for the design of nudges, drawing from every process step presented in each guide. The steps in the Generic Model do not represent a definitive order of execution to follow. This Generic Model represents a general overview of the practice suggested by the guides. The initial results of this phase informed the subsequent phases, providing insight on the design of the interviews.

2.2.2 Supporting Research Question #2

How are nudge practitioners operationalizing the Nudge Theory into practice?

The aim of this phase was to map the operationalization of the Nudge Theory when applied in the field of practice. That was achieved by interviewing two sets of subjects: experts and practitioners.

Subject Criteria

Experts were classified as academic researchers publishing in the field of behavioral Economics, while practitioners were the ones working with the implementation of the Nudge Theory in the private and public spheres.

Subject Spectrum

It is important to highlight that a majority of the subjects was a hybrid between the two groups, being researchers who are equally active in the field.

Interviews

The target was to interview a minimum of 4 subjects in each group. An informative website about the research was created and published in January 2015, and disseminated on social media platforms (Twitter and Facebook). The initial identification of subjects was done online, from January 26th to February 22nd. Once identified, 26 subjects were contacted via e-mail. This created 15 initial positive responses, which were then scheduled for interviews using the Doodle platform. Some of the subjects also offered to extend their own network, therefore, expanding the number of subjects. The final sample consisted of five experts and six practitioners, mainly based in Scandinavia (Denmark, Sweden and Norway) as well as two subjects from the UK and one from Singapore. Gender was equally distributed (5 women and 6 men). A Research Collaboration Description was sent to all subjects, with the offering of a Confidentiality Agreement that was not taken by any subjects.

Interviews followed a semi-structured format, divided in four parts: 1) the practitioners history and experience, 2) the design of nudges, 3) sustainability and 4) the potential in the field (for all interview questions see Appendix B). The choice for a semi-structured format derived from the fact that the range of subjects was wide, and minor adjustments were made to the questions that referred to specific contexts.

Transcription and coding

All interviews were transcribed and sent to the subjects for their perusal. The transcripts are available upon request.

In order to answer Supporting Research Question #2, the researchers used the first two parts of the interviews, about the practitioners' experience, and the design of nudges. Each of the three researchers coded the transcribed data for specific practitioners, identifying and numbering the steps mentioned during each interview. The generic model created from the

guides was purposefully not used or mentioned in any way, with the intention of identifying possible divergences to show up between the literature and the field of practice.

All sets of steps from individual practitioners were grouped on an Excel document, and the steps were aligned by similarities. Steps that only showed up once were left as their own line. Also, a final step was added, resulting in a list consisting of 11 steps, which were used to assess the operationalization of the Nudge Theory in practice, and its discrepancies to the steps described on the generic model. The steps were debated until consensus was reached on a general step-by-step procedure that would comprehend every step mentioned by every subject (See Appendix C).

Final model for the generic nudge design

To improve clarity in the results, the steps in both the generic model and the practitioners experience were ordered in a non-overlapping manner. However, to close the first and second part of the results the steps were grouped into phases that refer to time stages of a project. In phases that have separate steps, they may or may not happen in parallel.

2.2.3 Supporting Research Question #3

What is the potential of nudging towards sustainability, and what is lacking?

The second part of the interviews, about sustainability and the potential in the field, provided information to answer SRQ3, which aims at the landscape of nudges and its potential for sustainability. The researchers identified key themes that emerged during the conversations and gathered the information according to the following codes:

1. Sustainability;
2. Opportunities associated with nudging towards sustainability;
3. Challenges associated with nudging towards sustainability;
4. What is needed for nudges to play a major role in sustainability?

2.2.4 Supporting Research Question #4

How can sustainability be strategically integrated into the nudge design?

The fourth supporting research question was answered by integrating a strategic approach to sustainability into the nudge design; this was done by using elements of the SSD to analyze the data and illuminate the strengths and gaps of nudge as a tool. Finally, the steps in the Generic Model were informed with elements from the Strategic ABCD Planning Process. Furthermore, other core concepts of SSD were used to provide recommendations to the bigger nudge landscape. These results are found in the discussion.

2.3 Validity

Not only is the field being researched emerging, but also the three researchers were new to the Nudge Theory. In one hand, this eliminates the researchers own theories, beliefs and perceptual lens. On the other hand, however, despite the intensive involvement of the researchers with the topic, the time constraint made it difficult to acquire a depth of understanding of the theory. Moreover, there was no opportunity to test and confirm the observations in the field. Instead, triangulation between data from the literature, guideline documents, interviews and a lecture by author Cass Sunstein was assured on an attempt to reduce the risk of systematic biases and associations (Bryman 2012).

The design of the research was based on an adapted version of Maxwell's Validity Matrix, and informed by a critical perspective on the researchers' assumptions, results and discussions. To reduce the potential distortions in the representativeness of the interviewed sample (Bryman 2012), the researchers reached out to a wide range of experts and practitioners, crossing cultural perspectives in order to construct the data. However, the researchers are aware that an interview of 45 minutes does not offer the ultimate representation of a practitioner's experience, and that the sum of all interviews might not do justice to all opinions in the field.

2.3.1 Assumptions and Biases in Data Analysis

Even though the three researchers come from different countries and diverse cultural backgrounds (U.S.A., Brazil and Sweden), the diversity of perspectives is still limited within the Western context. Moreover, the researchers' initial interest in both human behavior and sustainability might have caused an initial tendency to consider the nudge and SSD as useful for solving the world's sustainability challenges. These biases could have influenced the coding and informed the researchers when making general interpretations.

3 RESULTS

"Developing nudges is an interdisciplinary process that is project-based and experimental in nature" (Ly et al. 2013, 16).

In this section the three first supporting research questions are answered by describing the results found by using the previously outlined methods.

3.1 Results from Document Content Analysis

As mentioned in the methods, a selection of nudge guides was compiled into a Generic Model in order to gather data. The Generic Model was then analyzed to answer the first research question: *How do Nudge Theory guidelines inform the design of nudges towards the betterment of the individuals and society?*

This chapter presents the insights from the Generic Model in a stepwise fashion.

In this section, the following terminology applies:

Generic model	Is a compilation of the guides into phases and steps, selected through the application of specific criteria based on their insight into the process of creating nudges and or aspects from Nudge Theory.
Guides	Refers the original selection of guides.
Guidelines	These are the content of the guides i.e. the stepwise instructions or aspects to consider that are specified within the guides. If an individual guide is discussed due to caveats or unique properties it will be referred to by name.
Nudge as a tool / interventions	Refers to the actual result or implementation of the Nudge Theory.

3.1.1 Steps of nudge design from the guides

By compiling the selected guides into a Generic Model, a comprehensive view of the process emerged. Informed by all the guidelines in the individual guides, this model provides descriptive steps to design a nudge intervention. The steps do not indicate a subsequent order and may be iterated within the process.

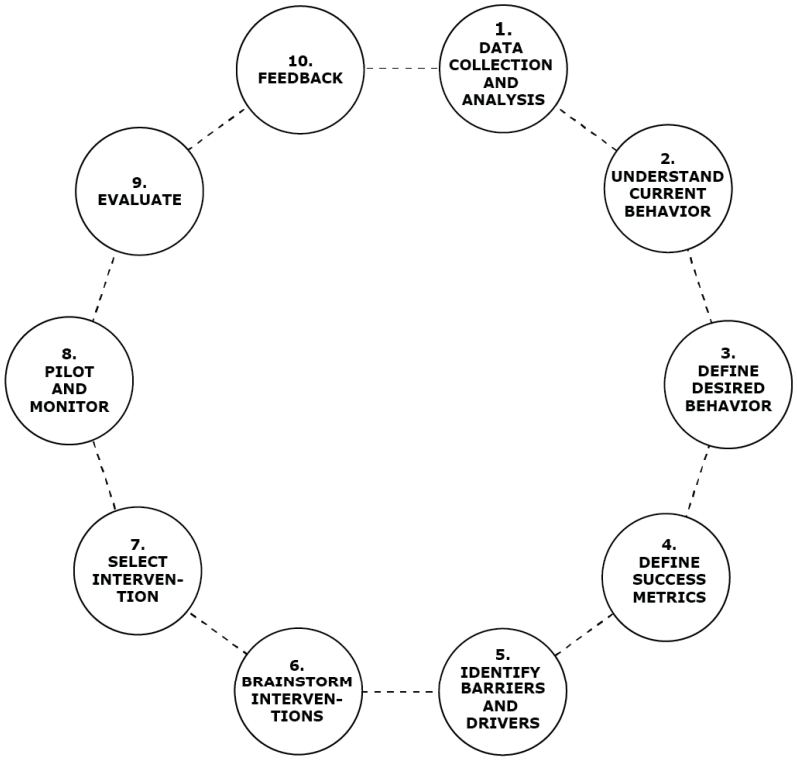

Figure 3-1: Steps in nudge design process according to guides.

Step 1: Data collection and analysis.

A successful intervention overcomes barriers, leverages the audience group's needs, desires and priorities, and adheres to the given social context. All guides included in the generic model include elements of behavior analysis where current behavior and situational context are examined. Scientific research, interviews, and observations are tools that are encouraged to inform the user to gain insights into the current decision making process. If the situational context is too complex, it is suggested to break it up into smaller elements. Leaving this stage yone should have answers to the following questions: what behavior you are trying to change, what context is influencing the behavior, whose behaviors are you trying to change, and how are the mindset and attitudes different between the affected audience groups? "What is the observed behaviour that needs to be changed?" (Galbraight 2013, 24), "If behaviour is too complex it should be broken into simple behaviours or elements" (Mont, Lehner and Heiskanen 2014, 63).

Step 2: Understand current behavior.

All guides recommend that behavioral insights are consulted to gain information regarding both individual and social models distilling from the analysis a shortlist of prominent influencing factors that may be helpful to developing objectives for the intervention strategy/policy option. "identify relevant behavioural models including both individual and societal models and make a short list of the most prominent influencing factors" (Mont, Lehner and Heiskanen 2014, 63). In order to understand the barriers that are keeping the

audience from the target behavior, wider context and choices available to people should be considered, rather than having a narrow focus on the desired behavior. “Is the individual aware of what they need to do but are unable to accomplish it, or does a desired behaviour / action need to be activated?” (Ly et al. 2013, 16). By the end of this stage users have answers to why the audience groups are exhibiting the current behavior: what heuristics and biases are at play, what barriers and levers are present that prevent the audience to follow their intentions. “What is the motivation behind the observed behaviour…?” (Galbraight 2013, 24).

Step 3: Define desired behavior.

Whether the target behavior is assigned or developed, having a clear definition of the goal is key in setting success parameters that may be measured reliably and efficiently to evaluate the behavior change later. Leaving this stage, users have the answers to what behavior they would like the audience to exhibit. The majority of the guides explicitly mention establishing target behavior, whereas the others implicitly refer to a behavior change goal although there is no guidance in how to reach that understanding. “What is the target behaviour we would like the [audience] to exhibit?” (Galbraight 2013, 24).

Step 4: Define success metrics.

A benchmark for measuring the effectiveness of the intervention is determined. How large a change would make the project worthwhile and over what period of time? Some of the tools have specific elements of establishing such a benchmark. Other guides include measuring elements in other steps but no specific mention of what to measure against. “How can the behavior change be measured for effectiveness?” (Galbraight 2013, 24).

Step 5: Identify barriers and drivers using behavioral insights.

A few guides suggest consulting behavioral insights at this stage to inform the user on how to motivate the target behavior in the audience group(s). The results from the analysis should provide a list of prominent influencing factors that may be helpful when developing objectives for the intervention. “What are the barriers that are keeping the [audience] from the target behaviour?” (Galbraight 2013, 24).

Step 6: Brainstorm interventions.

Knowing the context of the current reality and having examined the barriers and motivators for reaching the target behavior, the next step is to pair the context to matching nudges that will help the audience to their intended behavior or choice. The Design Incubation Centre has cards guiding a brainstorm session where sticky notes are placed on a poster to represent different ideas on how to reach the target behavior. Additionally, by examining previous interventions that have been evaluated and proven successful, the user may identify effective intervention techniques for the specific influencing factors. Leaving this stage the user may have an additional perspective on to how to design an intervention that will successfully motivate the target behavior as well as a shortlist of potential interventions: “identify effective intervention techniques that have worked and were effective in the previous interventions that targeted specific influencing factors” (Mont, Lehner and Heiskanen 2014, 63).

Step 7: Select an intervention.

All the guides include steps to design or select intervention(s). The design is an iterative process that may circle back to previous steps to be successful. A suggestion made by one guide at this stage is to involve stakeholders in the design process. A particular recommendation for choice architects working within governments is to either enhance current policies, or design new ones influenced by behavior insights/interventions. Prioritizing at this point means choosing what nudge(s) from the list of possible interventions will be subject to piloting. "Several nudges may have been identified as being possible intervention devices. While it is always possible to combine nudges, it is useful to prioritize. One factor that needs to be considered is the operational costs associated with implementation." (Ly et al. 2013, 16).

Step 8: Pilot and monitor.

This stage, recommended by most guides, calls for a prototype intervention being setup and monitored. By using tools such as for example randomized controlled trials and control groups, the effectiveness of the intervention may be analyzed and concluded. "develop a prototype intervention and evaluate it against relevant policy frameworks and assessment tools" (Mont, Lehner and Heiskanen 2014, 63).

Step 9: Measure success.

By applying an evaluative tool/approach to identify causality of outcomes most guides recommend measuring success against the previously determined baselines. At this stage users should map relevant information to the broad context to use as a baseline in future interventions. An evaluation may be performed using the baseline established in the target behavior stage, in order to determine the level of success of the intervention: "evaluate impacts and processes against the objectives developed in step 3 linked to the factors influencing behaviour" (Mont, Lehner and Heiskanen 2014, 63). Leaving this stage the user is better equipped to prioritize nudge interventions considering cost, reach, and long term effectiveness. The outcome may be used for prioritizing future intervention options. "document the results and share them widely. This will allow for the creation of a database of what works and under what conditions" (Ly et al. 2013, 16). Furthermore, it is recommended to be transparent with the public and work to gain public approval before moving forward in deploying the intervention.

Step 10: Applying lessons learned.

Most of the guides encourage applying lessons learned. Adapting the intervention based on the previous evaluation stage allows the user to iterate and create a stronger pilot by feeding back lessons learned and acquired understandings of the intervention and the target. "feedback the lessons learned in order to deepen understanding of the intervention and the target behaviour" (Mont, Lehner and Heiskanen 2014, 63).

To conclude, the following table represents the researchers interpretation of with which steps were mentioned in each one of the guides.

	SEPA	EAST	Designe Nudge	Rotman	Design Incubation	MindSpace
Data collection and analysis	X	X	X	X	X	X
Understanding behavior	X	X	X	X	X	X
Define desired behavior	X	X	X		X	
Define success metrics	X					
Identify barriers and drivers using behavioral insights.	X		X			
Brainstorm interventions	X				X	
Select intervention	X	X	X	X	X	X
Pilot and monitor	X	X		X	X	X
Evaluate	X	X	X			X
Feedback	X	X		X		X

Table 3-1: Frequency of mentions of each step in the guides.

3.2 Results from interviews, Part 1.

3.2.1 Steps of nudge design from practitioners

A major part of the interview with practitioners aimed at answering SRQ2, *"How are nudge practitioners operationalizing the Nudge Theory into practice?*", and elucidating if there is something in regard to the field that the guides do not show (see Appendix C for interview questions).

In total, 11 semi-structured interviews were conducted. Nonetheless, for this part of the results three subjects were left out since they expressed they did not have relevant experience to speak about the implementation of nudges. The eight remaining subjects had a minimum of one year of experience with the Nudge Theory, and in average 4 years of experience with the field of practice. Five of the subjects worked with nudges in the private sector, while two worked in the public sector and one had experience with academic experiments.

In order to receive an outline of their practice, subjects were asked the question: "*How do you design nudges?"*.

The step-by-step compilation procedure is outlined in the Methods section. Below are the final steps identified in that process:

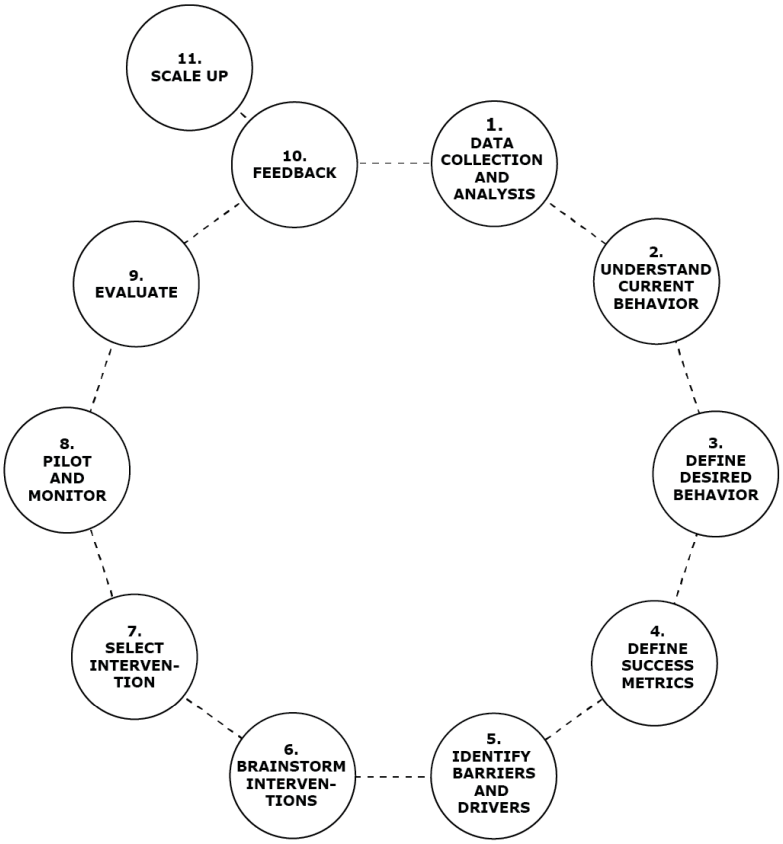

Figure 3-2: Steps in nudge design process according to practitioners

Step 1: Data collection and analysis.

All subjects explicitly mentioned that the process starts with observing the current reality. In this step, practitioners seek to understand the context of the problem, seeking out for data and observing the field. For example, one subject explained that it "starts out by mapping human behaviors by creating observation, collecting data, so there is a lot of collecting data" (Krukow 2015), while another said "when we are sort of approaching problems, we always look for data. We mostly look for quantitative data" (Schmidt 2015). One of the subjects brought the current reality as the third step of the process, however the practice aligns with the remaining practitioners.

Step 2: Understand current behavior.

Seven subjects highlighted the importance of consulting the existing knowledge on field, saying that "the whole idea of a diagnosis is to sort of look at a behavior problem from a viewpoint of cognitive psychology, behavioral economics social psychology and certain psychology design" (Schmidt 2015), and that "you have to be very aware of those cognitive biases and do a great analysis there" (Lemoine 2015). Even though this step was often combined with the step above, there seems to be a clear distinction between the analysis of the context and the analysis of the behavior itself.

Step 3: Define desired behavior.

Five out of eight subjects mentioned the need for clearly identifying the target behavior, stating for example that "you should have a hypothesis about the outcome you are expecting and why you are expecting a shift in behavior in a certain direction." (Gravert 2015).

Step 4: Benchmark the success.

Two subjects mentioned the relevance of setting up a goal/metric in order to assess the effectiveness of the intervention, mentioning for example that "if you do a properly designed experiment, you can clearly say if the nudge was successful in changing behavior or not (...) if you are sure that the nudge works on a small scale and you use the same intervention again on a larger scale, you can be quite confident, that it will work again (...) In order to measure the success of your Nudge it is really important that you define your outcome measure before the experiment and that you are sure you can precisely measure it." (Gravert 2015).

Step 5: Identify barriers and drivers using behavioral insights.

Half of the sample stated the necessity of investigating triggers and barriers target behavior through the lens of psychology and economics. One of them says: "but we know that humans aren't always rational, so what do we already know about his biases, time preferences, risk preferences, and social preferences, the major areas in which he might deviate from this rational behavior and which one of these could play a role in the situation I am trying to change through the nudge?" (Gravert 2015).

Step 6: Brainstorm interventions.

Five subjects emphasized the relevance of thinking about solutions to change current behavior, and bring about the desired target. One subject explains: "When you know your barriers, you know exactly what your nudge has to overcome. Then you can start creating a solution that will overcome the barriers." (Krukow 2015). Another says: "How can we successfully target these anomalies to help the person to behave in a way that is better for him and society? A number of studies on nudging have been conducted and when I am thinking about new nudges, I like to compare them to other nudges that have been effectively used and tested. But often it is also great to be creative in your approach, as long as you properly evaluate the nudge in an experiment." (Gravert 2015).

Step 7: Select intervention.

Five subjects briefly touched upon the selection of the intervention, mentioning things like "we decide on the idea we would like to test" (Pelenur 2015) and "You may come up with a range of ideas, and they, you know, the fact is that you probably won't find very strong empirical evidence to support or deny any of them, so then you need to make a judgment call on which ones you need to go with and it needs to be balanced by the cost as well as the feasibility and also the policy applicability" (Pelenur 2015). A criterion for selection was not specified.

Step 8: Pilot and monitor.

It was often said that designing and prototyping a controlled experiment is an essential part of the nudge design process. The subjects defend that "the trial/testing aspect of it is so integral, and you will find that most practitioners will speak that it is very important to actually test"

(Schmidt 2015) and that “It is crucial to the successful use of Nudging that the intervention is tested in a controlled experiment. That means you randomly (through the "toss of a coin") implement the nudge for half of your observations and change nothing for the other half and observe behavior in both groups during the same time period.” (Gravert 2015).

Step 9: Evaluate.

Three of the subjects mentioned the importance to evaluate the intervention and understand what worked and what did not. They do it in different ways, such as: “most of the work when doing this is actually in defining and diagnosing and testing” (Schmidt 2015), “If you had a clear hypothesis in the beginning about how the nudge should affect behavior and this hypothesis is confirmed in your experiment, then you might be even able to make a broader statement about why people are behaving in a particular way and why this type of nudge makes them change their behavior” (Gravert 2015), “we applied a randomized sample to indicate results” (Dyson 2015).

Step 10: Feedback.

Three of the subjects mentioned the importance to iterate and adapt the experiment by applying lessons learned. They explain that: “you have to take everything else into consideration like holidays, like weekends, routines… the first in the month you buy more of the healthy stuff because we have more money and so forth. And obviously you have to put this into your test data” (Krukow 2015). One subject says that “you have to do controlled experiments on nudging (...) otherwise you don't know if you are actually changing behavior through your intervention or it might just be that for example the weather got better and that is why there are less people eating meat, because they felt more like eating a light salad. If you just compare meat consumption before and after the intervention without a control group for whom nothing changed then you won't know if the change in behavior was due to the new setup of the canteen or if it was just a correlation, i.e. the behavior change just naturally happened to occur at the same time of your intervention.” (Gravert 2015)

Step 11: Scale up.

The last step explicitly came up twice in the interviews as a step, adding a scalability step that did not occur on the findings from the Generic Model. The step also seems to be closely related to the overall definition of a successful nudge, as explained below. It was brought up that “if you have a significant treatment difference in your controlled experiment and a good explanation why the nudge worked the way it did, you can then use the same intervention on a larger scale. Say for example you found that smaller plates reduced food waste in one hotel, it is highly likely that they will also reduce food waste in other hotels.” (Gravert 2015). Another continues: “Analyze and see and evaluate: ‘ok, we have actually diminished 20% of people doing this’, for example. That is interesting to scale up.” (Lemoine 2015).

When asked the question: “How do you create your vision for success and how do you measure success?”, a significant portion of the subjects highlighted the need to replicate, scale up and roll out interventions. “Doing specific experiments in a situation and in a specific context and creating evidence based design which can then be transferred and implemented all over the world where the same situation takes place” (Krukow 2015) “(...) the ambition is to run an initial pilot which then feeds information into creating a second, better pilot, or if it goes very well, into information for a wider role” (Dyson 2015).

3.2.2 Nudge design: project phases.

When comparing the comprehensive list of steps outlined by the practitioners to the steps in the compiled generic model, it was found that with exception of the scaling out step, which is not represented in the guides, the elements and steps are closely aligned, adhering to the characteristics of a nudge as defined by Thaler and Sunstein.

In order to add an element of time to the process, steps were grouped into phases that refer to the stages of the project, meaning that steps grouped into each phase happen in parallel.

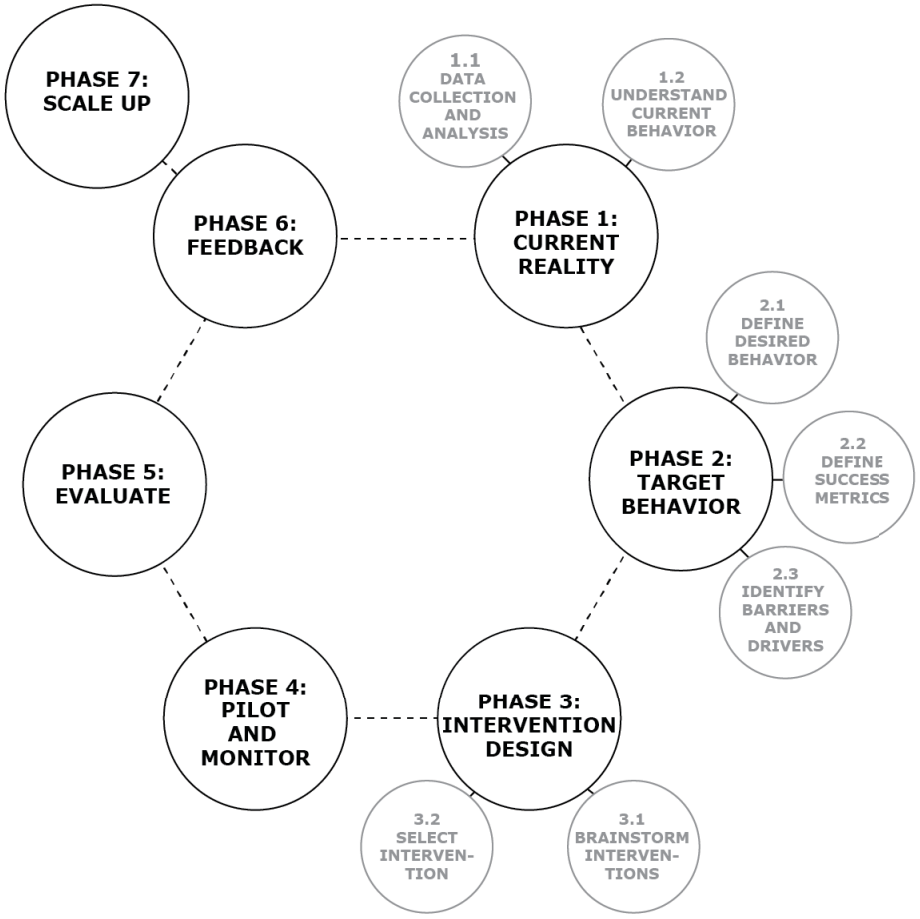

Figure 3-3: Phases of a combined nudge design process.

3.3 Results from interviews, Part 2.

A significant portion of the interviews was dedicated to gaining an understanding about the field of practice, and gathering data to answer SRQ3: *"What is the potential of nudging towards sustainability, and what is lacking?"*. A series of questions guided the subjects on documenting the opportunities and challenges associated with nudging towards sustainability, as well as what is needed in the field for this to happen.

3.3.1 Sustainability

All of the subjects interviewed offered different definitions of sustainability and subjects' levels of confidence in their knowledge of sustainability varied. However, all respondents were able to offer some definition of sustainability. For example, one subject explained, "we have not landed in that completely in the lab, we are doing it in the normal way of saying people, planet, profit, where you can find a solution that is a *win win win.* And that is something that we integrate also in the way that we do it, where you combine those three different aspects, then you are creating sustainability" (Lemoine 2015).

Definitions used by several of the subjects included the Triple Bottom Line, while others use the Brundtland Commission's definition, the Oxfam Donut and Planetary Boundaries. Aside from the models, definitions included aspects such as social, cultural and economic sustainability, Zero Waste, and the preservation of both human and environmental capital.

Several subjects voiced concern and criticism regarding the use of the term 'sustainability', and suggested using more tangible language. One subject explained, "Sustainability has come to be so watered out. Everybody from British petroleum to us talk about sustainability, so it doesn't mean much anymore. But we try to use more precise language when we talk about particular issues" (Westin 2015). Most of the subjects expressed that 'sustainability' is a too big, intimidating, and intangible term that most people have difficulty understanding. "we can't work towards sustainability, because it is such a big issue and we don't have a clue where to start or when we are actually being successful. So the first thing I think we need to do when working with sustainability is to cut it into specific situations" (Krukow 2015). One subject even suggested that practitioners avoid using the term 'sustainability' in their work all together.

3.3.2 Opportunities associated with nudging towards sustainability

The subjects interviewed expressed that there are many opportunities presented with the notion of nudging towards sustainability since there is a rise in interest in coupling both, and a growing portfolio of successful interventions is forming which includes nudges regarding the environment and social wellbeing. Many of the subjects shared that there is a growing interest in nudge's ability to create significant behavior change by using small interventions which are quick, easy, cheap and simple to understand. One subject explained how nudging is unique and intriguing to people in multiple sectors because it is offering an intersection of different fields and can work when other approaches are ineffective: "That is something that is different from most approaches, it [nudging] can be used across the public and private sector. Many other instruments belong more clearly in one category or the other. Companies do marketing, but government can't, because then it's propaganda. Government uses taxes, companies are not allowed to" (Kallbekken 2015).

Several subjects said that since nudging helps people follow through with their intentions, nudges can increase more sustainable behavior in the situations where people are distracted or lack time, and can combat procrastination without conscious effort or guilt. Fortunately, "(...) it is well regarded that many people do agree with the sustainability agenda, and they do

want to help people and themselves in the future, however that might be. So the opportunity is that we now have a set of tools at our disposal that can change people's behaviors in line with their intentions" (Dyson 2015).

Finally, despite sharing the notion that 'sustainability' is an intimidating subject, several subjects explained that nudge is well positioned to assist in breaking down 'sustainability' into smaller, more tangible behavior changes. One subject explained, "There are so many things involved [within sustainability]… so working with nudges is very much working with behavior and it has a huge advantage to boil a very broad concept such as sustainability down to specific individual behaviors that you can actually work with and actually show the effect when you try to change things in that area" (Schmidt 2015).

3.3.3 Challenges associated with nudging towards sustainability

In considering the challenges associated with nudging towards sustainability, many of the subjects touched on the ethical concerns of nudging as being a kind of manipulation. Most of the subjects asserted that nudging is an ethical practice if done properly, arguing, "you cannot avoid to manipulate certain decisions, and why not make sure those are healthy and pro-environmental decisions rather than the opposite?" (Kallbekken 2015). However, one subject spoke critically of the nudge, asserting that regardless of the process, practitioners are manipulating the target audience.

Several of the subjects explained that for a nudge to be an ethical intervention, it depends on whether or not it is transparent; or rather, whether or not the target audience is aware they are being nudged. "for statistical reasons you might keep the experiment or pilot more secret, but using it on a larger scale it should be transparent, what you are doing, what you are trying to achieve" (Kallbekken 2015). The subjects' opinions differed in this regard. Some subjects asserted that transparency inhibits a nudge's ability to change behavior: "think if you do a huge announcement saying 'Ok, we are going to nudge people now to eat less meat in the canteen' they are going to be very angry about it, they will say 'that is unfair', and then the nudge is not going to work at all" (Gravert 2015). However, in considering nudges in public policy, and one subject explained, "If you are going to implement nudges on a governmental level, you need to pay attention to (...) how much are you manipulating the individual. Even though it is freedom of choice, it is important that you are critical about the transparency" (Lemoine 2015).

There was also a shared concern that the nudge is a buzzword or hype that might disappear if its field of practice is not broadened. One subject said, "I think it is up to people who work this way [nudging] and if they are able to use this as a way to create value for companies as well. Because otherwise it is just going to be a buzz and then it is going to die." (Krukow 2015).

Finally, the majority of the subjects interviewed clearly asserted that nudging is not appropriate for all problems, and is not the 'silver bullet' for solving the sustainability challenge; however, nudging is effective at making incremental change in concert with other approaches. One subject expressed, "critical voices are pretty much saying, you know, is this really going to make the big change that is needed [for sustainability]? And to answer that, I'd say, no, it won't, but it will help a little bit on the way. It's not going to move a mountain,

but it will help (…) we need complements from other tools and other methods" (Marzelius 2015).

3.3.4 What is needed?

When asked about what is needed for nudges to play a major role in sustainability, the subjects offered a variety of ideas that address the newness of nudging across a variety of sectors. Several subjects believe that good, local stories and examples of nudges are needed to prevent nudging from fizzling out as an approach. One subject explained, "We need good stories, good examples to show why it is working (...) so people understand how cool it is to work with this to create sustainable change" (Lemoine 2015).

Additionally, the subjects asserted the need for more academic expertise in the field, since nudges should be developed by teams of practitioners and experts in behavioral economics and psychology using experiments to inform nudge designs. Similarly, one subject expressed the need for stakeholders and practitioners from across sectors to collaborate and inspired each other: "[it is] multidisciplinary, you use many different insights when you are creating behavior change, you can't just look from one perspective. And I think that is a major power." (Lemoine 2015).

To achieve broader, more visible change, several subjects believed nudging must be designed to be scaled up and incorporated into the corporate sector, requiring value creation. One subject explained this by saying, "I would say if we should nudge to a more sustainable lifestyle, we should do it with corporate companies, because they have the power, if we really want to have an impact we have got to start working with (...) all the big corporations and, so and the trick here is to figure out what are their visions or ambitions" (Krukow 2015). Likewise, several subjects stressed the importance of integrating nudging into public policy to address areas where traditional policy is not so effective. One subject stressed this point: "In order for nudge to play a major role, I see that we need to get, maybe not nudging as such but more 'behavior economics' up on the agenda, more on a political level. So that when we are talking about policy making and the rest of it, we need to get it up on the political agenda" (Marzelius 2015).

Lastly, a practitioner asserted that overall, most importantly a paradigm shift is needed: "That accepting that behaving in a sustainable way has nothing to do with us being aware or conscious about it. It is about helping us to having sustainable automatic and unconscious behavior." (Krukow 2015).

4 DISCUSSION

In this section, the findings from the research will be discussed, starting with the overview of the field. Then, the first and second research questions on guidelines and the practitioners experience are answered by exploring the intersection between the guides, the practice and the theory itself. Finally, the third and fourth questions will be brought forth in pointing out at the potential and gaps of nudging towards sustainability, as well as an investigation of how sustainability can strategically be integrated into the nudge design. The Main Research Question is addressed in the Conclusion.

Supporting Research Questions (SRQ):

1. How do Nudge Theory guidelines inform the design of nudges towards the betterment of the individuals and society?

2. How are nudge practitioners operationalizing the Nudge Theory into practice?

3. What is the potential of nudging towards sustainability, and what is lacking?

4. How can sustainability be strategically integrated into the nudge design?

4.1 An overview of the field

Throughout the research, it was identified that three defining elements form the nudge landscape: the Nudge Theory, the published guides and the field of practice.

The Nudge Theory is still evolving and being refined. The concept was born in academia, which makes it scientifically accurate, and academically credible. Even though Thaler and Sunstein (2008) defend that any person is a choice architect, they add a disclaimer that choice architects first need to understand how humans behave and choose, making it unclear how much understanding of the human behavior would be enough to experiment with the concept without causing harm to the people being nudged. Additionally, the book does not present a step-by-step process of how the interventions should be conducted, which leaves choice architects and practitioners to their own devices. Even though this liberty maintains the autonomy of practitioners to develop their own process, it leaves the theory open for a wide range of interpretations that might progressively lead to various non-aligned nudge practices. There has currently been an effort by researchers working closely with the European Nudge Network to discuss and polish a clearer definition of the nudge, however to this date these results remain unpublished. Over and above that, the theory utilizes the concept of externalities to refer to social problems and ecological degradation, while the researchers believe that economy is nested in and dependent on the surrounding biosphere.

There is a range of step-by-step guidelines for designing and implementing nudge interventions available, which are easily accessible to the public. An overview of a few of these guidelines have led the researchers to conclude that most publications have been created in efforts to guide choice architects in designing interventions. These publications, however, are generally not peer-reviewed, and most often represent the context in which they were produced (i.e. the MINDSPACE guide is geared towards policy instruments), neither offering a guide broadly geared towards sustainability, nor offering a process that would be easily replicable elsewhere. The later indicates that these guides should not be considered as

a practical addendum to the original literature on nudge. When interviewed, most of the subjects were aware of the existence of these guides, however none was using them in their work; practitioners create their own process and develop their own tools for designing and implementing nudge interventions. This raises questions about what audiences are these guides targeting, and to which extent do they add new insights to the practice. On the other hand, the sample interviewed might not be sufficient to represent all practitioners in the field. Furthermore, when it comes to the sustainability practitioners, these guides can be preliminary source of information on how humans behave and choose.

Most practitioners advocate for making use of behavioral insights on interventions for positive behavior change. Their experience spectrum runs from experts who have performed academic research and have solid experience with experiments, to enthusiasts who see the value of nudging as a tool but have no background in research or in testing interventions. The practitioners who are more academically inclined have a tendency to defend the idea that the people implementing such interventions should have the right knowledge and expertise to do so. The researchers defend that in order for sustainability practitioners to adhere to this concept, nudge academics and practitioners would need to take a clear stand on what the requirements are in order to engage in the field. Furthermore, some practitioners who work with behavioral insights do not adhere to the use of the term ‘nudge’, which might again point to the fact that this concept could still benefit from a clearer definition of it’s true nature and applicability.

Overall, neither in the Nudge Theory, nor in the interviews did the researchers find any mention of a nudge governing or auditing body, or anything that acts in efforts to align theory and practice. In terms of strategic efforts, that could be interpreted as a lack of a systemic overview, which can also mean that nothing is regulating the practice, monitoring interventions and guiding practitioners, as well as ensuring that the practice is coherent and harmless.

4.2 Strategic Nudge Design

The findings from the document content analysis and the interviews were structured and analyzed using the five levels of the FSSD to identify what is needed for nudge to be used as a strategic tool towards sustainable development. To illustrate the outcome of the analysis and the resulting recommendations, the Strategic ABCD Planning Process (described in section 2.1.1) was used. In short, the process is guiding a strategic approach to defining a vision of success, framed by the Sustainability Principles and employing a systems perspective, then analyzing the current reality with the same lens to establish contributions and liabilities of the here and now. The tension between the vision of success and the current reality is subject to an action brainstorm in order to produce actions that will close the gap between the two. These actions are prioritized to create an action plan for reaching the vision with deadlines, responsibilities etc. In this section we will explore what a framework for sustainability can add to the nudge design.

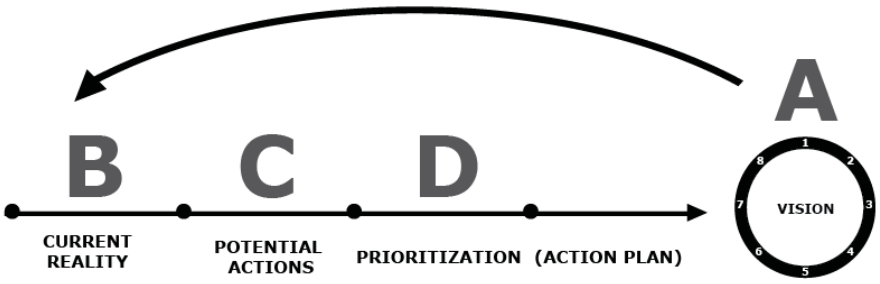

Figure 4-1: Strategic ABCD Planning Process

4.2.1 Target behavior

This analysis has shown that when designing a nudge, practitioners set up a vision for success for the intervention by completing three steps: define the desired behavior that will constitute the target for the intervention, create a benchmark of success of the intervention, and gain a good understanding of the motivations and barriers to the target behavior.

When defining the success for the intervention the practitioner also takes into consideration that the intervention falls within the principles of Nudge Theory: a good nudge intervention is for the betterment of the individual and society, leaves freedom of choice, does not significantly alter the economic incentives, is easy and cheap to opt out of, and is tested and measured for effectiveness (Thaler and Sunstein 2008). In theory, these principles leave ample room for creativity by only defining the outer limitations of what is allowed when working with nudges. In practice however, the nudge principles do not offer guidance as to how to ensure the nudge is actually offering betterment for the individual or society, and part of the critique on the Nudge Theory is precisely regarding who gets to decide what is best for the individual and society.

The theory states that a good intervention is in the interest of the person being nudged as judged by the person him/herself. In the interviews conducted for this thesis, a spectrum of opinions were voiced: from the opinion that nudges will lose its effect if the individual is consulted, to the perspective that democratic processes should determine general consent. Furthermore, some add that in order to ensure the individual may opt out if he/she does not agree to the nudge, the intervention should be transparent. The researchers will further explore the subject transparency and consent in a separate section.

At this point, the researchers conclude that the outline of nudge design may be insufficient in guiding practitioners toward successfully designing nudges for the betterment of the individual and society. The first recommendation is to complement the nudge design process with the social Sustainability Principles, which would offer concrete limitations to the nudge intervention, supporting the individual's best interest. These principles state that people should not be subjected to systematic barriers to integrity, influence, competence, impartiality, and meaning.

Furthermore, in accordance with the general consent to the sustainability agenda and to enable the design of nudges for the betterment of society, a practitioner may want to look at a

broader perspective of success to ensure that the success of the intervention also falls within the vision of a sustainable society.

Results from the interviews suggest that practitioners work from varying degrees of definitions of sustainability: some very general and some more concrete, although perhaps not complete. The A step of the Strategic ABCD Planning Process brings awareness of socio-ecological system boundaries and requires the vision of success to be defined within the Sustainability Principles, in an attempt to ensure that the outcome(s) of the process will lead towards sustainability (Robèrt et al. 2013). The SSD offer scientifically based principles (See table 4.1), which specify what not to do in a sustainable society. By adhering to these principles a practitioner may work from a broad platform of scientifically based knowledge rather than trying to counteract specific details in a complex system where everything is connected.

In a sustainable society,	
nature is not subject to systematically increasing…	and people are not subject to systematic barriers to…
1. …concentrations of substances extracted from the Earth's crust, 2. …concentrations of substances produced by society, 3. …degradation by physical means,	1. … integrity, 2. … influence, 3. … competence, 4. … impartiality and 5. … meaning.

Table 4-1: The eight Sustainability Principles

Framing the vision of success within the Sustainability Principles will not only guide the solution for the specific context of the intervention for the betterment of society, but also help prevent that adverse effects are introduced elsewhere in the system. Once that vision of success integrates the desired behavior into the envisioned sustainable society, it can be compared to the current reality (figure 4-2).

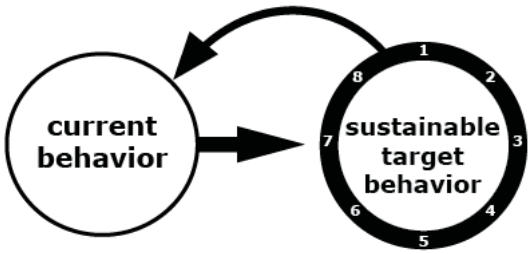

Figure 4-2: Illustrating a Sustainable Nudge

4.2.2 Current reality

When examining the current reality, practitioners obtain a solid understanding of the behavior and the relevant context in which the behavior is displayed, and analyze the results using behavioral insights. Furthermore, a benchmark is set to measure success against by the end of the intervention.

However, the current reality analysis of the nudge design process is limited to the specific behavior and context that need to be changed. The B step in the Strategic ABCD Planning Process offers a deeper understanding of current reality by analyzing not only the immediate focus area but also how the current practices and operations are aligning with or contributing to violations of the Sustainability Principles in the larger system.

When implementing nudges towards sustainability, there are two relevant things that practitioners could consider doing: 1) analyze not only the specific context where the behavior is displayed, but also the larger system surrounding it. That way, it is possible to determine the impact the intervention is having in regards to sustainability. 2) Utilizing the Sustainability Principles as a lens when conducting that analysis, in order to clearly identify if and how current behavior is contributing to unsustainability. The adoption of these steps, in combination with a systems perspective, could ensure the issue is not just moved elsewhere or that the nudge creates contributions to violations of principles in other areas.

4.2.3 Design intervention: Brainstorm interventions.

Once the target behavior is established and the current reality is known, the next step in the nudge design process is to brainstorm interventions.. The purpose of this step is designing an intervention that will close the gap between the current and target behavior. This step in the process specifies brainstorming possible interventions that may guide the target audience toward the desired behavior. There may be barriers to overcome or levers that may be employed to motivate the behavior. The practitioner may consult previously successful interventions in similar contexts to identify cases of success and create a list of possible nudge techniques that may be explored. In some occasions, completely new interventions need to be designed to reach the desired behavior.

To better facilitate a brainstorm session for the ideation of nudges for sustainability, a practitioner may want to frame this brainstorm session with the question of what nudge intervention would help us close the gap between the current reality and a sustainable society as framed by the Sustainability Principles.

4.2.4 Design intervention: Select intervention.

The step “Select Intervention(s)” situated in the “Design Intervention” phase of a nudge design calls for a selection by evaluation and prioritization. During this step the practitioner considers the ideas for possible nudge interventions generated in the previous stage, and evaluate them through the lens of nudge design criteria and documented cases of previous interventions. Prioritizing criteria for potential nudge interventions include, but may not be

limited to: potential for long-term effectiveness, reach, and estimated cost. Results from this prioritization would indicate what intervention(s) to pilot.

The researchers pose that, when designing nudges towards sustainability, the FSSD prioritization questions offered in the D step of the Strategic ABCD Planning Process could complement the three nudge selection criteria, offering a critical evaluation tool to assess if the selected nudge may provide a strategic step towards a sustainable society.

Nudge Prioritizing Criteria
1. possible long-term effectiveness.
2. breadth of reach.
3. operational cost and cost efficiency.
FSSD Prioritization Questions
1. Does the nudge proceed in the right direction with respect to the Sustainability Principles?
2. Does this nudge provide a 'stepping stone' (flexible platform) for future improvements?
3. Is the nudge likely to produce a sufficient return on investment to further catalyze the process?

Table 4-2: Prioritization questions

4.2.5 Further Steps

The output from the Strategic ABCD Planning Process is an action plan with all prioritized actions lined up and planned. Starting with short term actions that may be considered low hanging fruit and ending with long term actions that are closely connected to strategic goals.

The nudge design process contains additional steps that expand and enrich the process by including guidelines for 1) testing (pilot and monitor) 2), evaluating (evaluate and measure), 3) learning from feedback and 4) scaling up successful interventions. These steps may have been included as specific actions in the action plan on the Strategic ABCD Planning Process. For the nudge design process, they will be examined individually.

Pilot and monitor

Both guides and practitioners emphasize the importance of piloting interventions and monitoring the outcome. Only after seeing the pilot in action can the practitioners know if the intervention led to the intended result. The guides give little advice on how to set up a pilot due to the contextual nature. The practitioners stress the importance of having teams comprised of people with a background in research and experience with tools such as randomized control trials or control groups, which may be used to evaluate the effectiveness of the intervention.

Evaluate and measure

An evaluation of the pilots will determine which nudge designs should be developed further. This is important both to determine an actual effect on the behavior and to be able to evaluate operational cost, long term effect and cost effectiveness.

To assess the success of a pilot intervention in regards to sustainability, practitioners could consider including the FSSD's Sustainability Principles as well as the prioritization questions (outlined in the D-Step) in the metrics of evaluation.

The results are recommended to be communicated in such a way that other practitioners may utilize them to draw conclusions that may assist in prioritizing future interventions. One subject mentioned the need for cross-sector collaboration for nudges to have a bigger impact on society. Sharing conclusions from previous projects may cultivate ideas and inspire future interventions.

Feedback

Both guides and practitioners mention the value of feeding back lessons learned from the pilot and evaluation phases. Some iterations can be made to improve a pilot once a it has proven successful. Feedback may also be valuable to re-assess the current reality and make adjustments. In the case the intervention is successful, the practitioner may want to scale up the intervention to have a larger effect on society.

Scale up

A successful nudge may be scaled up to bring about change in a larger scale, and have a broader impact. Scaling up came up in several of the interviews as a way for nudge interventions to move beyond producing small, incremental changes, to making significant shifts in behavior in society. The guides assessed do not provide insight regarding how to scale up or scale out a nudge intervention, and few examples of success are available for practitioners to learn from. The practitioner working within the sustainability sector would benefit from guidelines for strategically planning interventions and other tools/measures to complement and leverage each other toward a shared vision and larger goal. Such guidelines will be explored further in section 4.3.

4.2.6 A conclusion on Strategic Nudge Design

After evaluating the steps using the Strategic ABCD Planning Process the researchers reached a consensus that the nudge design process is a tactical method, regardless of the unique differences presented by the guides and practitioners. Additionally, a strength of this process is that it is flexible, providing guidance rather than pre-determined actions. This allows practitioners to methodically explore the stages, choosing actions that cater to the given situation to reach a unique and effective intervention design. Below is a summary of how a framework for sustainability can add to the nudge design.

Nudge process: phases and steps.		ABCD Step.	Guidelines for a sustainable nudge design.
Target behavior	Define desired behavior	A	Frame the Target of the intervention with the Sustainability Principles to enable nudges that lead society towards sustainability and help prevent adverse effects.
	Define success metrics		
	Analyze behavior using behavioral insights		
Current reality	Data collection and analysis	B	Relate behaviors to the larger sustainability scope. Ensure nudge is not contributing to violations in other areas or that issue is moved elsewhere.
	Understanding behavior		
Design intervention	Brainstorm interventions	C	Frame the brainstorm with the question: "what nudge intervention would help close the gap to a sustainable society?"
	Select intervention	D	Apply an evaluation to assess if the selected nudge intervention will provide a strategic step towards sustainable society.
Project phase	Pilot and monitor	N/A	
Evaluate	Measure success		
Feedback	Apply lessons learned		
Scale up/out	Repeat intervention in larger scale	ABCD	Adopt a systems thinking approach, use back-casting to strategically plan and coordinate nudges with other behavior change tools, create a shared vision of success with stakeholder engagement and policy buy in.

Table 4-3: How a framework for sustainability can add to the nudge design.

4.3 Nudging towards a Sustainable Society

If these nudge design processes adopt a strategic approach (i.e. the Strategic ABCD Planning Process) the researchers see an opportunity to gain a more robust systems perspective and shared vision for success, and to generate nudge designs that lead towards a sustainable society. This presents great potential for moving nudges beyond making small, incremental changes, to support the large-scale, systemic change that is needed to address the Sustainability Challenge. The following chapters explore how nudges could be strategically scaled up to make sustainable change on a societal level, and what is needed for this to happen.

4.3.1 Convergence of the practice

A clear and rather systematic understanding of the practice of nudges is still lacking, which disintegrates the field and decreases the tool's potential to promote behavior change towards sustainability. A convergence of the nudging networks in Europe could be indicating the beginning of the process to strategically coordinate the nudge practice as a whole. It would be valuable to have an anchor point to centralize complaints from civilians, authorities or organizations who feel harmed by a nudge intervention, or who identify nudges that can be harmful to other individuals. The researchers believe that such a platform could be a leverage in embedding sustainability into the nudge practice, as well as in introducing practitioners to the FSSD and presenting cases of success.

A recent study by the Beijer Institute categorized 76 articles written about nudges, 13 of which were about the environment, focusing on subjects such as food waste, water consumption, and energy conservation. (Lindahl and Stikvoort 2014). These interventions spread across both the private and public sectors. However, it is not surprising that the literature on nudging focuses on its application as a complement to policy tools, since Thaler and Sunstein's book strongly advocate for Libertarian Paternalism as third way in policy making. In environmental policy, however, most examples are still related to energy conservation and most relied on social norms (Lindahl and Stikvoort 2014), leading to the conclusion that the possibilities to use nudges for sustainability are probably more vast than what has been explored to this day.

The researchers believe that, despite being on an early stage, the experiences in the field set a basis for implementing nudges towards environmental and social sustainability both in the public and private sectors. It seems to be a promising tool, and, if the steps of the nudge design are followed as outlined previously, it can be applied effectively and strategically towards sustainability.

4.3.2 Social sustainability and ethics

Through the FSSD analysis of the nudge design process, the researchers concluded that on a conceptual design level, none of steps contribute to any of ecological SP's or create barriers to the social SP's; however, this does not guarantee that all practitioners and nudge interventions are ethical. When considering scaling-up nudge interventions into the public policy and corporate sectors, the concern regarding the ethics of the nudge becomes more imperative given their broad influence. Public servants as well as CEO's will have the responsibility of identifying what is best for a multitude of individuals. What steps can practitioners in these sectors take to design an intervention that successfully nudges the target audience towards behavior that aligns with their intentions?

Public Sector: The subjects interviewed that have experience integrating nudges in public policy explained that there is limited maneuverability and freedom regarding the goals of the nudge interventions. Oftentimes the practitioners work with pre-existing policies and the target behavior is government mandated. Despite this, the practitioners assert that target behaviors and the nudge intervention must not only be made visible to the public, but public feedback and approval is required to move forward. By providing this level of transparency and including key stakeholders in the design works to ensure nudge interventions in public policy are ethical approaches to increasing sustainable behavior.

Private Sector: The central question raised when considering nudges in the private sector is what differentiates nudging from marketing? One subject interviewed, a practitioner working in the private sector, explained that nudging requires people in the private sector to define the target behavior according to both what the target audience wants and what will raise their public image; rather than only focusing on achieving the vision and ambition of the company (Krukow 2015). To do this, companies must gain a good understanding of what the target audience wants, requiring rigorous data collection and experimentation through pilot interventions, beyond traditional marketing methods. Finally, similarly to the private sector, the researchers suggest practitioners in the private sector include key stakeholder (target audience) input and approval in the design process to ensure it is ethical.

Despite this challenge, the researchers suggest two considerations that would assist in maintaining an ethical approach when designing a nudge intervention:

The first suggestion is for practitioners to strive to align both the nudge design process as well as the nudge intervention, itself, with the Social Sustainability Principles. By doing so, the practitioner would be able to assert whether or not the nudge creates barriers for individuals to have integrity, influence, competence, impartiality or meaning; the most relevant principle being influence, implying that target audiences would have decision-making power over their own behavior.

The second suggestion references the research of Pelle Guldborg Hansen and Andreas Maaløe Jespersen, in illustrating the role of transparency (i.e. individuals being made aware that they are being nudged) in nudging ethically. Hansen and Jespersen have developed a framework for the responsible use of the nudge approach to behavior change. The framework takes into consideration a nudge's level of transparency and the degree it engages individuals' automatic and reflective decision-making systems to determine whether it is ethical.

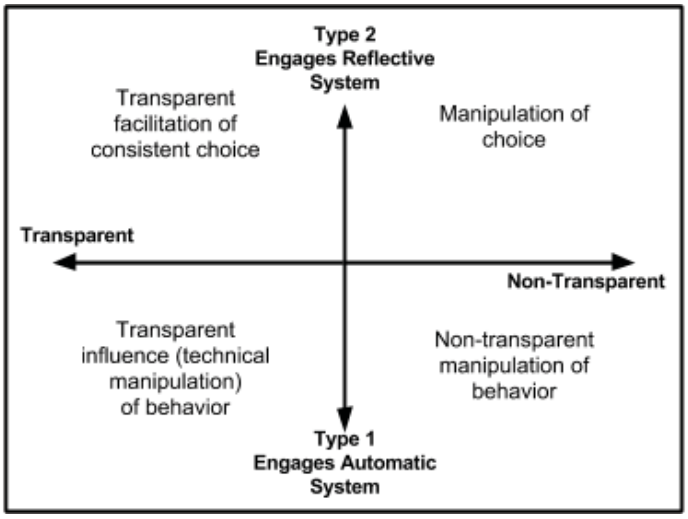

Figure 4-3: A framework for the responsible use of the nudge approach to behavior change (Hansen and Jespersen 2013).

According to Hansen's framework, nudges range from most manipulative (Non-transparent Type 1 nudges) to least manipulative (Transparent Type 2 nudges). Non-transparent Type 1 nudges are those in which individuals are unaware they are being nudges and act automatically without thinking. This prevents one's ability to 'opt out' from the target behavior and thus gives nudge practitioners control over individuals' decision-making (Hansen and Jespersen 2013). The researchers recommend this type of nudge is avoided.

Conversely, Transparent Type 2 nudges alert individuals of the nudge and engage their reflective systems, allowing individuals to easily 'opt out'. This ensures the target behavior is one that individuals intend to do, and because the reflective system is activated, the target behavior has a higher chance of being repeated in other contexts. A good example of a Transparent, Type 2 nudge is how the streets of London have "Look Right" painted on the ground to help travelers cross intersections safely. These signs prompt people to stop, read, make a conscious decision to look right and avoid oncoming traffic (Hansen and Jespersen 2013). Furthermore, there is a chance that the same people will look right at future intersections without the sign on the ground. The researchers recommend nudge practitioners (especially those scaling up nudge interventions in the public policy and private sectors) strive for this type of nudge above the others both for ethical reasons and for its potential for teaching healthy and sustainable behavior that will translate into other situations.

4.3.3 Vision of a sustainable society

As we continue to explore what is necessary for nudging as a tool to make macro-level change towards sustainability, the researchers suggest taking a systems thinking approach. According to the FSSD, a systems thinking approach is needed to better understand how the many systems on Earth interact and impact one-another (i.e. the biosphere, the ecosystem, society, the economy, etc.). This understanding allows for innovative solutions to emerge, leveraging the relationships between these systems when addressing the Sustainability Challenge. Having a good understanding of how a nudge intervention interacts with different systems will elucidate its potential for sustainable development as well as avoid negative counteraction.

The results of this research reveal that most nudges are designed with a specific behavior and context in mind; only a few of the interviewed subjects start their designing process from a broad issue (i.e. sustainability), later narrowing the focus to a particular behavior. That being the case, and according to the FSSD, it can be said that the general nudge design process fall short in taking into consideration the interplay of broader systems related to the behavior they seek to change. This approach may cause practitioners to overlook potential leverage points within the relative systems, and miss opportunities to have an extensive impact on sustainability by only applying small nudge intervention. It also does not aid practitioners in planning or measuring how a target behavior will contribute to sustainability on a macro-level.

Additionally, the lack of a systems thinking approach increases the risk that a nudge intervention will cause unintended negative results within the broader, and perhaps global, context (e.g. a nudge may be effective at getting people to pay a little extra for their plane ticket to offset the Carbon emissions footprint; however, this could ultimately result in an increase in air traffic since travelers feel less guilty about polluting). Even though subjects gave cautionary advice to avoid adverse effects when designing a nudge, they did not explain how that could be done. The researchers agree that adopting a systems view of the intervention can be helpful to avoid rebound effects.

The researchers recommend that a systems thinking approach is integrated throughout the entire nudge design process to increase the success of scaled up nudge interventions, regardless of the sector. This would mean practitioners could create a vision for success that not only identifies a target behavior framed by the nudge principles and the Sustainability Principles, but also takes into consideration the impacts on society, and the ecosystem. When working to understand the current reality, the practitioners could examine how the relative systems impact the current behavior as well as behavioral insights. Through the use of backcasting, nudge designs would be generated in order to both leverage the interplay among relative systems, avoid potential rebound effects and negative counteraction in other systems.

The final recommendation—to nudge practitioners working with sustainability is to strategically coordinate nudges, connecting multiple interventions to contribute to a shared goal. Planning and coordinating nudges aiming at reducing single occupancy transportation, for example, may require a cascade of related nudges that encourage the community to increase cycling, public transport, carpooling, car sharing, etc.

Furthermore, other approaches such as provision of information (eg: a campaign in partnership with the vehicle inspection authorities that informs citizens about carbon dioxide emissions) as well as direct and indirect regulation (eg: restraining vehicle traffic in metropolitan areas, and subsidizing parts of the taxes on electric vehicles) could create a holistic picture to approach the CO_2 debate. This strategic nudge design process that utilizes a systems thinking approach towards sustainability can be summarized by the following diagram:

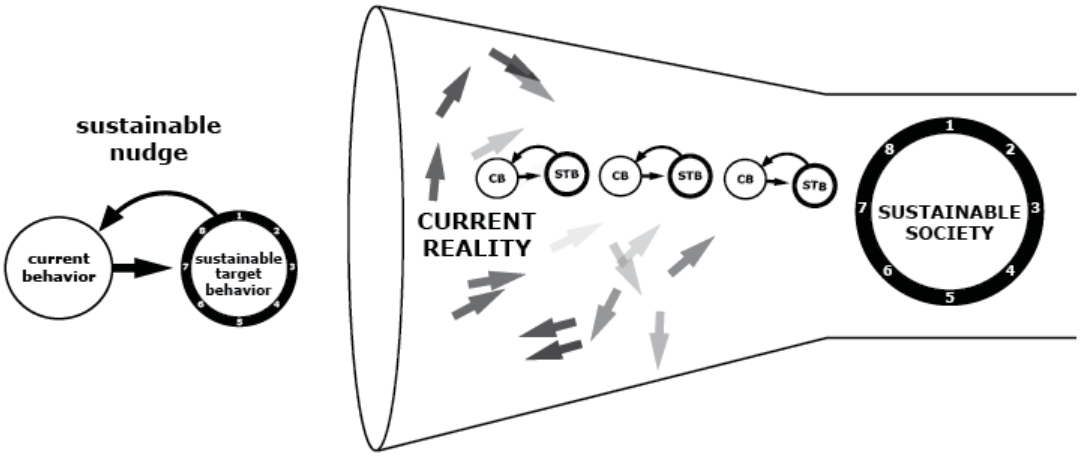

Figure 4-4: Sustainable nudges towards a sustainable society.

The researchers believe that, by utilizing this system thinking approach, nudge designs that point towards systemic sustainability can be generated.

5 FURTHER RESEARCH

Given the emergent and explorative nature of field of Choice Architecture and nudge design, the researchers discovered numerous interesting and meaningful aspects that could not be included in this thesis. A few areas the researchers recommend for further research are given below.

- As discussed in this thesis, the researchers believe nudge interventions have the ability to make extensive behavior change for sustainability if they are effectively scaled up and scaled out broadly. Several of the nudge practitioners interviewed believed the corporate sector offers the most potential in this regard. What is needed for this to happen is corporate buy-in of both nudges and sustainable development. The researchers suggest that further research be dedicated to the creation of a sustainability/nudge hybrid business case that expresses the value added both internally and externally for companies and organizations.

- This thesis focused on exploring the nudge's potential for sustainability in relation to the design of nudge interventions. An area for future research could be studying and evaluating specific nudge interventions and their ability to be scaled up and scaled out towards sustainability.

- One of the indirect outcomes/purposes of this thesis was to introduce sustainability practitioners to the Nudge Theory and practice in hopes that they might consider this approach in their work. The researchers recommend that additional research is dedicated to developing nudge design guides and support for sustainability practitioners.

- The researchers found that there were a multitude of ways the nudge can support sustainable development. One very promising way was to explore how the nudge can assist people in attaining what Manfred Max Neef has identified as Fundamental Human Needs more effectively than other approaches.

- One point that could be further researched is understanding how human behaviors lead to unsustainability. Sustainability practitioners could benefit from investigating and how people deal with large complex issues such as the sustainability challenge through the lens of behavioral insights.

- One of the ideas produced in this thesis was potentially creating a governing body that would guide and grow the field of nudging and Choice Architecture, perhaps even certifying nudge practitioners. Exploring this concept would be interesting and timely given that nudge networks are forming more and more.

- Given the popular debate over whether or not nudging is an ethical practice, the researchers suggest that further research is committed to exploring how the preservation and provision of transparency within nudge interventions impacts their effectiveness for changing behavior.

6 CONCLUSION

What is the role of nudging in changing behavior towards a sustainable society?

Patterns in human behavior seem to be a contributing factor to the complexity of the sustainability challenge, and the traditional approaches for behavior change alone seem to be falling short in creating relevant change. Conversely, enough evidence and insights on systematic biases in human behavior have mounted to inform new approaches, such as Nudge Theory. Since this is an emergent field and the nudge tool can be applied in a variety of contexts, the authors of this thesis have set out to investigate the role of nudging in changing behavior towards a sustainable society.

Through studying the threefold foundation of nudge: Nudge Theory, the design guides and listening to the practitioners in the field, this research confirms that this is a new, emergent field. A small, yet growing body of literature is forming, and in recent years a growing number of practitioners have worked in implementing and improving interventions in the public and private sectors. After evaluating the steps by comparing them to the Strategic ABCD Planning Process the researchers reached a consensus that the nudge design process is a tactical method, regardless of the unique differences presented by the guides and practitioners. Additionally, a strength of these processes is that they are flexible, providing guidance rather than pre-determined actions. This allows practitioners to methodically explore the stages, choosing actions that cater to the given situation to reach a unique and effective intervention design.

If these nudge design processes adopt a strategic approach (i.e. the Strategic ABCD Planning Process) the researchers see an opportunity to gain a more robust systems perspective and shared vision for success, and to generate nudge designs that lead towards a sustainable society.

Researchers see immense potential in applying the nudges towards sustainability, and point out that exploration is still necessary in order to fully understand the role of this tool in changing behavior, in general and for sustainability. However, the research also identifies that the approach is successful in breaking down large, abstract and complex issues such as sustainability, into smaller, tangible, measurable actions. It also proves efficient in changing behavior where other approaches (provision of information, direct and indirect regulation) fall short.

This study identified a common design process indicated by the guides and used by the practitioners, that when compiled in a generic model is composed of eleven steps, and grouped in seven phases. By conducting a strategic analysis of this process of nudges, the researchers explored how it can be assessed with/informed by the core concepts of the SSD in order to make recommendations for nudge practitioners interested in designing nudges strategically towards sustainability. Sustainability practitioners might also benefit from these insights.

Because the magnitude and urgency of the Sustainability Challenge requires macro-level solutions, the potential for nudges to be scaled up and implemented in the public and private sectors was explored.

Through the integration of a systems thinking approach and the strategic application of backcasting from a robust vision of success that is framed by a shared definition of sustainability (offered by the FSSD), nudge designs that point towards systemic sustainability can be generated. Once strategically prioritizing, coordinating and connecting multiple interventions, nudges can be designed in combination, supporting each other in reaching a sustainable society.

This thesis should serve only as a modest contribution to understanding the role nudging can play in sustainability. Further work is required beyond this research to explore how to effectively design, test and evaluate nudges on a broader scale. This will entail the combined efforts of practitioners, policy makers, researchers and other stakeholders and a shared passion for changing behavior for a sustainable future.

References

American Heritage Dictionary of the English language. 2000. (4th ed). Houghton Mifflin Company New York.

Botsman, Rachel and Rogers Roo. 2010. *What's Mine Is Yours: The Rise of Collaborative Consumption.* New York: Harper Business.

Bryman, Alan. 2012. *Social research methods*. 4th ed. OUP Oxford.

Dyson, Pete. 2015. Interviewed by researchers. Karlskrona, Sweden. 9 March.

Deane, Phyllis. 1979. *The First Industrial Revolution*. 2d ed. Cambridge England: Cambridge University Press.

Design Incubation Centre. 2014. Design Incubation Centre - Tool Kit. http://designincubationcentre.com/nudge/toolkit/ (Accessed 12 February 2015).

Dobson, Andrew. 2014. Sustainable Citizenship. *Open Citizenship,* Vol. 5, issue 1: 2014.

Dolan, Paul, Michael Hallsworth, David Halpern, Dominic King, Robert Metcalfe, and Ivo Vlaev. 2010. *MINDSPACE: Influencing Behaviour Through Public Policy.* London: Institute for Government.

Engbark, Johan, and Mathias Ekström. 2013 "Kan passiva människor göra världen grönare?." *Ekonomisk Debatt 3* (2014): 63-71.

French, Jeff. 2011. "Why nudging is not enough", *Journal of Social Marketing*, Vol. 1 Iss 2 pp. 154 - 162.

Galbraith, Bree. 2013. The Designer Nudge: Defining the role of design in behavior change. http://breegalbraith.com/wp-content/uploads/2013/04/The-Designer-Nudge-Bree-Galbraith.pdf (accessed 10 February)

Gravert, Christina. 2015. Interviewed by researchers. Karlskrona, Sweden. 9 March.

Goldstein, Noah J., Robert B. Cialdini, Vladas Griskevicius. 2008. “A Room with a Viewpoint: Using Social Norms to Motivate Environmental Conservation in Hotels.” *Journal of Consumer Research,* Vol. 35 (August) 10.1086/586910

Hansen, Pelle. 2013. *Nudge back in fashion at the White House.* Time Magazine. 09 August. *http://swampland.time.com/2013/08/09/nudge-back-in-fashion-at-white-house/ (accessed 20 April 2015)*

Haub, Carl and James Gribble. 2011. The World at 7 Billion. *Population Bulletin,* 66, 2 (July): 2.

Hatch, J. A. 2002. *Doing qualitative research in education settings*. SUNY Press.

Holmberg, J, and Robert K-H. 2000. Backcasting- A framework for strategic planning. *International Journal of Sustainable Development & World Ecology,* 7:4, 291-308.

Hungerford, Harold R. and Volk, Trudi L. 1990. Changing Learner Behavior Through Environmental Education. *The Journal of Environmental Education.* Vol. 21, Iss. 3.

Heimlich, J.E., and A. Harako. 1994. Teacher values in teaching recycling. *Environmental Education and Information* 13, no. 1: 21–30.

John, Peter, Sarah Cotterill, and Liz Richardson. 2011. *Nudge, Nudge, Think, Think.* Huntingdon, GBR: Bloomsbury Academic. ProQuest ebrary. (accessed 17 February 2015).

Kahneman, Daniel. 2012. *Thinking, Fast and Slow.* London: Penguin.

Kallbekken, Steffen. 2015. Interviewed by researchers. Karlskrona, Sweden. 11 March.

Krukow, Sille. 2015. Interviewed by researchers. Karlskrona, Sweden. 24 March.

Lindahl, Therese, and Britt Stikvoorta. 2014. Nudge for environmental protection. *DISCUSSION PAPER Beijer Discussion Paper Series No. 248* The Beijer Instituteof Ecological Economics.

Ly, Kim, Nina Mažar, Min Zhao, and Dilip Soman. 2013. *"A practitioner's guide to nudging."* Rotman School of Management, University of Toronto 15.

Maxwell, Joseph. 2013. *Qualitative research design: An interactive approach.* (3rd ed.) Sage Publications Inc.

Missimer, Merlina. 2013. The Social Dimension of Strategic Sustainable Development. Licentiate Dissertation in Mechanical Engineering, School of Engineering Blekinge Institute of Technology, Sweden.

Lane, Robert. 2000. *The Loss of Happiness in Market Democracies*. Yale University Press, 2000. Quoted in Kleanthous, Anthony. and Jules Peck. n.d. *Let them eat cake*. 13. http://www.wwf.org.uk/filelibrary/pdf/let_them_eat_cake_full.pdf (accessed 1 March 2015).

Lemoine, Ida. 2015. Interviewed by researchers. Karlskrona, Sweden. 26 March.

On Amir; Orly Lobel. 2009. Stumble, Predict, Nudge: How Behavioral Economics Informs Law and Policy (January, 13 2009). *Columbia Law Review, Vol. 108, 2009;* San Diego Legal Studies Paper No. 09-006.

Ostrom, Elinor. 2000. *Collective Action and the Evolution of Social Norms.* The Journal of Economic Perspectives, Vol. 14, No. 3 (Summer, 2000), pp. 137-158

Oxford Dictionaries. 2015. "Anthropocene." http://www.oxforddictionaries.com/definition/english/Anthropocene?q=anthropocene (accessed 13 May 2015).

Pelenur, Marcos. 2015. Interviewed by researchers. Karlskrona, Sweden. 10 March.

Reese, William. 2010. The Human Nature of Unsustainability. In *The Post Carbon Reader: Managing the 21st Century's Sustainability Crises.* Richard Heinberg, 4-5. Healdsburg, CA: Watershed Media.

Robèrt, Karl-Henrik, B. Schmidt-Bleek, J. Aloisi de Larderel, G.Basil, J. L. Jansen, R. Kuehr, P. Price Thomas, M. Suzuki, P. Hawke, and M. Wackernagel. 2002. Strategic sustainable development- selection, design and synergies of applied tools. *Journal of Cleaner Production* 10, (October):197-214.

Robèrt, Karl-Henrik. 2000. Tools and concepts for sustainable development, how do they relate to a general framework for sustainable development, and to each other? *Journal of Cleaner Production* 8 (February) 244-254.

Sandberg, Åsa. 2015. Interviewed by researchers. Karlskrona, Sweden. 23 and 24 March.

Samson, Alain (Ed). 2014. The Behavioral Economics Guide 2014. 1st Edition. www.behavioraleconomics.com (accessed 20 April 2015).

Service, Owain, Michael Hallsworth, David Halpern, Felicity Algate, Rory Gallagher, Sam Nguyen, Simon Ruda, Michael Sanders with Marcos Pelenur, Alex Gyani, Hugo Harper, Joanne Reinhard and Elspeth Kirkman. 2012. EAST: Four simple ways to apply Behavioural Insights. http://www.behaviouralinsights.co.uk/sites/default/files/BIT%20Publication%20EAST_FA_WEB.pdf (accessed 10 February 2015).

Mont, Oksana, Mathias, Lehner, Eva Heiskanen. 2014. Nudging - a tool for sustainable behavior?.http://www.naturvardsverket.se/Nerladdningssida/?fileType=pdf&downloadUrl=/Documents/publikationer6400/978-91-620-6643-7.pdf (accessed 15 February 2015).

Schlag, Pierre. 2010. Working Paper Number 10-14 April 6, 2010*; Michigan Law Review, Vol. 108, pp. 913-924, 201*0 U of Colorado Law Legal Studies Research Paper No. 10-14.

Schmidt, Karsten. 2015. Interviewed by researchers. Karlskrona, Sweden. 10 March.

Smith, Scott. 2007. "What is democracy, and is it the one?". *The University Dialogue*. Paper 30. http://scholars.unh.edu/discovery_ud/30 (accessed 22 March 2015).

Steffen, Will, Wendy Broadgate, Lisa Deutsch, Owen Gaffney and Cornelia Ludwig. 2015. The trajectory of the Anthropocene: The Great Acceleration. *The Anthropocene Review* 2(1): 81-98.

Sunstein, Cass R. 2014a.*"Nudging: A Very Short Guide."* Journal of Consumer Policy 37, no. 4 (2014): 583-588.

Sunstein, Cass R. 2014b. *Why nudge? : the politics of libertarian paternalism*. USA. Yale University Press.

Sunstein, Cass R. and Lucia A Reisch. 2013. *"Automatically Green: Behavioral Economics and Environmental Protection"* (September 19, 2013). Harvard Environmental Law Review, Vol. 38, No. 1, 2014.

Thaler, Richard and Cass Sunstein, 2008. *Nudge: Improving Decisions about Health, Wealth, and Happiness*. USA: Penguin Books.

The Natural Step. 2015. The Funnel - Society is Being Squeezed. http://www.naturalstep.org/en/the-funnel. (accessed 1 March 2015).

UNESCO-UNEP. 1976. The Belgrade charter. Connect: U*NESCO-UNEP Environmental Education Newsletter* 1, no. 1: 1–2.

United Nations Environment Programme. 2014. UNEP Year Book: Emerging Issues in our Global Environment. http://www.unep.org/yearbook/2014/PDF/UNEP_YearBook_2014.pdf. (accessed 1 March 2015).

Vlek, Charles, and Ling Steg. 2007. Human Behavior and Environmental Sustainability: Problems, Driving Forces, and Research Topics. *Journal of Social Issues* 63 (No. 1): 1-19.

Weber, Hubert. "Introductory Remarks to 'the future of behavioural change, public or private nudging?'." 2nd AIM Brand Lecture, European Brands Association, Brussels, 6 May 2015. http://www.aim.be/uploads/brand_events_documents/AIM-NUDGE_one_pager_-_April_2015.pdf (Press Release - accessed 14 May 2015)

Weintraub, E. Roy. 1993. *"Neoclassical Economics." The Concise Encyclopedia of Economics. David R. Henderson, ed. Originally published as The Fortune Encyclopedia of Economics, Warner Books.* Library of Economics and Liberty http://www.econlib.org/library/Enc1/NeoclassicalEconomics.html; a 2013 (accessed 28 February 2015).

Appendices

A) Step by step – guidelines

Steps in Nudge Design Process	SEPA	EAST	Bree	Rotman	Design incubation Centre	MindSpace
Data Collection and Analysis	Understand Behavior	Understand Context	Observed behavior to be changed	1) Map the context	1) Identify Nudge Opportunities	Explore - understanding who´s behavior your are changing
Understand Current Behavior	Identify Key factors		Motivation for behavior, and understand barriers	3) Identify the levers for nudging	2a) Understand Behavioral principles	Enable - Where people are
Define Desired Behavior	Agree on Objectives/ Success Measures	Define Outcome	Target behavior		FMN: Element of desired behavior on worksheet, no specific actions to establish this vision.	
Define Success Matrix			What can be done to motivate new behavior example feedback			
Identify Barriers and Drivers					2b) Apply Behavioural Principles	
Brainstorm Interventions	Interrogate evidence of interventions		Develop nudge with Genuine involvement of stakeholders	2) Select the Nudge	3) Design Strategies	Encourage - Apply mindspace to change behavior + Engage - Public debate and approval
Select Interventi	Develop prototype with actors	Build your intervention				Exemplify - change governement behavior
Pilot and Monito	Pilot and Monitor	Test	How can interventions be measured for effectiveness	4a) Experiment	4) Test Strategies	
Evaluate	Evaluate pilot/Intervention	Learn	How can interventions be measured for effectiveness			Evaluate
Feedback	Feed outcome back into loop	Adapt		4b Iterate		

B) Step by step - practitioners

Steps in Nudge Design Process	Pelenur	Sandberg	Gravert	Lemoine	Dyson	Schmidt	Krukow	Steffen
Data Collection and Analysis	1. identify clearly what is the problem	1) Conduct studies and analyisis	3. Current reality -	2. Current reality, observe and get data	2. Current reality, obser	1. Identify Sympt [1]	1. Map Current Behavior	1. Receive/Identify problem behavior(s)
Understand Current Behavior	2. Break down different contributing behaviours 3. identifying what is the existing policy in place to deal with that		2. Behavior analysis, there are all of these biases, time preferences, risk preferences, and social preferences are kind of the big areas in which you might deviate	1. Current Reality, insights	1. Current reality, insight	2. Consult Background Knowledge	1. Map Current Behavior	2. Collect Data
Define Desired Behavior		2) Identifying target behaviour	1. Target Behavior, idea of what to achieve	3. Target behavior		3. What is the behavior on the other side?	2. Set up Target Behavior	
Define Success Matrix			what is your unit of outcome, and how can you measure that.				3. Identify a goal	
Identify Barriers and Drivers	4. take advantage of the insights from psychology	3) Understand what triggers the behaviour	what do we know, deviations from rational-background from psychology, or from economics.				4. Map the barriers to target behavior	
Brainstorm Interventions	5. think about solutions - that are not too cost prohibitive		So then, the next thing is to come up with an idea of how to change this,	4. Solution design		4. . Set a Diagnosis	5. Create/brainstorm nudge solutions	
Select Intervention	6. decide that one idea we would like to test	4) Do a study / field experiment			3. Nudge design	5. Treament		3. Design
Pilot and Monitor			it it is always important to design a controlled experiment	5. experiment - And I think the best way to do that is random control experiment, a field experiment.	4. Evaluation	4. Testing	6. Prototype	4. Test
Evaluate			this is what worked, and this is what did not work	5. Evaluate	5. Feedback		7. Test/Evaluate	5. Learn
Feedback			And then, also with the nudging, and measuring, really also think about the adverse effects it can have... using exactly these things again on a larger scale				8. Iterate findings	6. Adapt
Scale-up			it had a positive effect, and it wasn't so expensive to implement, then you can extrapolate on the larger level	6. Scale up				

C) Interview Questions

INTRODUCTIONS

Who are we?

Rules of the game/parameters: 45 minutes; covering your experience, nudge, sustainability; citing/quoting (confidentiality agreement), interview transcript is available upon request.

SECTION 1 - Meeting the Interviewee

1. This is what we know about your work:
2. What attracted you to ___ (eg: behavioral economics) + sustainability work? What has led you to doing this work?
3. How long have you been doing this?
4. Can you describe your field of work related to nudges (and sustainability, if applicable)?

SECTION 3 - Nudge as a tool

5. In your own words, how do define nudge? (Is nudge a theory or a tool? Or both? Elaborate.)
6. (depending on answer #4) Do you have any experience in planning and implementing nudges? (action)
    a. YES: jump to #7.
    b. NO: What is the best nudge story you have heard of / are related to?
7. How do you design nudges?
    a. How do you create your vision for success and how do you measure success? (How do you know when you reach success?) (success)
    b. Which behaviors do you seek to intervene through nudging? How do you identify these behaviors? (success)
    c. Stakeholder input - how do you ensure that you are actually protecting and reinforcing what is best as defined by the nudgees.
    d. Do you have any guidelines or considerations for how to incorporate or use nudges for sustainable behavior, and if so, what are they? (strategy)
    e. Do you use any tool/methods for your work with nudges, and if so, which? (E.g. toolkit for working with nudges.) (tool)
    f. Can you share stories of success and failures? What was the learning? (If they haven't already) (strategic).

SECTION 2 - Definition of Sustainability and Potential

8. Do you work with a specific definition of sustainability? If so, which?
9. As we think about using nudging towards a more sustainable society, what are some of the opportunities and challenges this presents? (system)

CLOSING

10. Are there any other things you would like to add about nudging for sustainable behavior?
11. What else do you think is needed for nudges to play a major role in sustainability?
12. Do you believe a possible model/framework/recommendations for moving towards sustainability would be valuable? (practitioners x experts) (sustainability guides)
13. Would you be interested in providing feedback on it?

Master's Programme in Strategic Leadership towards Sustainability
Blekinge Institute of Technology, Campus Gräsvik
SE-371 79 Karlskrona, Sweden

Telephone: +46 455-38 50 00
Fax: +46 455-38 55 07
E-mail: sustainabilitymasters@bth.se