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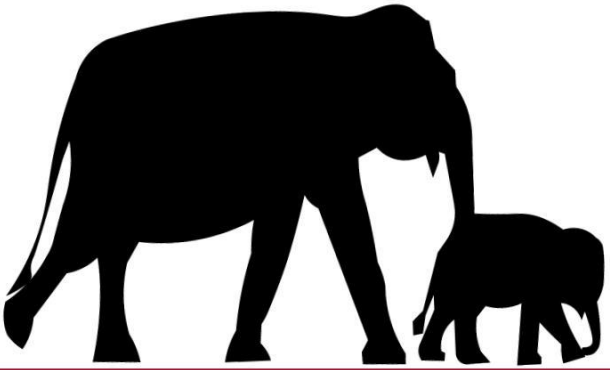
Nudging – A Way to Encourage Public Tenants to More Sustainable Behaviour?

A study on how public landlords can make the sustainable choice easier

Albin Haglund



ROYAL INSTITUTE OF TECHNOLOGY DEPARTMENT OF REAL ESTATE AND CONSTRUCTION MANAGEMENT

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Abstract

The public sector owns and manages approximately 90 million square meters of premises. One of the toughest challenges today is managing both climate-friendly and energy efficient buildings. For the landlords who facilitate these properties to reach national targets by 2020, they will need well thought out strategies.

New technology and installations are not enough. Tenants also have to change their behaviour. A relatively new way to influence behaviour without changing values of people is nudging. The term nudging was coined by researchers Richard Thaler and Cass Sunstein. Situations are designed to encourage individuals to choose an individual and society-beneficial alternative. Nudging can be used to help people make choices that are better for the environment and their overall health. To be considered as a nudge the action, per the definition, does not allow the forbidding of options or change of economic incentives. Hence, it respects people's freedom of choice.

The purpose of this thesis is to examine how nudging methods impact public tenants' daily energy consumption. This is explored by looking into what work has been done based on the nudging toolbox; (1) simplification and framing of information, (2) changes to the physical environment, (3) changes to the default option, and (4) the use of social norms. Can nudging be a way to encourage public tenants to behave more sustainable?

The thesis studies how three public landlords work with influencing behaviour to reduced energy consumption and as well as their view on nudging as a strategy. Six interviews were conducted, three with three different public landlords and three with one tenant representative from each landlord. To be able to introduce sufficient behavioural actions or nudges, consideration must be given to the organisational context. All landlords gave examples of the challenges facing their buildings such as staffed facilities and technical systems running around the clock, patient security, vandalism and historical heritage.

All respondents had a positive attitude towards nudging but only one of the tenant representatives was familiar with the term since before. The possibilities for the landlords to work with nudging must be considered as favourable and that some of the already implemented measures could classify as nudging. Research shows that nudging works best as an enhancement of other measures, therefore, more research is still needed to investigate how effective nudging is to affect tenants' energy consumption.

Acknowledgement

"Sooner or later, we will have to recognise that the Earth has rights, too, to live without pollution. What mankind must know is that human beings cannot live without Mother Earth, but the planet can live without humans." - Evo Morales, President of Bolivia

This master thesis was written as the final part of the Master's program in Real Estate and Construction Management during the spring of 2017 at the Royal Institute of Technology.

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Albin Haglund

Albin Haglund
Stockholm, June 2017

Examensarbete

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Sammanfattning

Den offentliga sektorn äger och förvaltar tillsammans cirka 90 miljoner kvadratmeter lokalyta. En av de tuffaste utmaningarna är att hantera både klimatsmarta och energieffektiva byggnader. För att de fastighetsorganisationer som hanterar förvaltningen av dessa byggnader ska kunna nå de nationella målen till 2020 krävs utstuderade strategier.

Ny teknik och nya installationer räcker inte, även hyresgästerna behöver ändra sitt beteende. Ett relativt nytt sätt att påverka beteenden utan att förändra människors värderingar är nudging. Konceptet myntandes utav forskarna Richard Thaler och Cass Sunstein. Situationer är utformade för att uppmuntra enskilda personer att välja ett individuellt och samhällsfördelaktigt alternativ. Nudging kan användas för att hjälpa människor att göra val som är bättre för miljön och deras hälsa. För att betraktas som en nudge tillåter åtgärden enligt definitionen inte förbjudandet av andra alternativ eller en drastisk förändring av ekonomiska incitament. Den respekterar människans valfrihet.

Syftet med denna uppsats är att undersöka hur nudging påverkar de offentliga hyresgästernas dagliga energiförbrukning. Detta undersöks genom att studera följande nudgingverktyg; (1) förenkling och inramning av information, (2) förändringar i standardalternativ, (3) förändringar i den fysiska miljön och (4) bruk av sociala normer. Kan nudging vara ett sätt att uppmuntra offentliga hyresgäster till mer hållbart beteende?

Uppsatsens studerar hur tre offentliga hyresvärdar arbetar med att påverka beteenden för att minska energiförbrukningen i deras fastigheter samt deras syn på nudging som strategi. Totalt genomfördes sex intervjuer, tre med tre olika offentliga hyresvärdar och tre med en hyresgästrepresetant från varje hyresvärd. För att kunna införa effektiva beteendemässiga handlingar eller nudges måste hänsyn tas till det organisatoriska sammanhanget. Alla hyresvärdar gav exempel på de utmaningar som deras byggnader ställer, så som dygnet runt bemanning och tekniska system, patientsäkerhet, vandalisering och historiskt arv.

Samtliga som intervjuades hade en positiv inställning till nudging som verktyg men bara en av hyresgästföreträdarna var bekant med termen sedan tidigare. Möjligheterna för hyresvärdarna att arbeta med nudging måste betraktas som goda och att vissa av de redan genomförda åtgärderna kan klassificeras som nudging. Forskning visar att nudging fungerar bäst som ett komplement till andra åtgärder därför behövs mer forskning för att undersöka hur effektiv nudging faktiskt är för att påverka hyresgästens energiförbrukning.

Förord

"Sooner or later, we will have to recognise that the Earth has rights, too, to live without pollution. What mankind must know is that human beings cannot live without Mother Earth, but the planet can live without humans" - Evo Morales, Bolivias president

Denna masteruppsats skrevs som en avlutande del av masterprogrammet Fastigheter och byggande under våren 2017 på Kungliga tekniska högskolan.

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Nomenclature

Choice Architecture - The design of different ways in which choices can be presented to consumers, and the impact of that presentation on consumer decision-making.

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.

Libertarian Paternalism - The idea that it is both possible and legitimate for private and public institutions to affect behaviour while also respecting freedom of choice, as well as the implementation of that idea.

Motivation - Internal and external factors that stimulate desire and energy in people to be continually interested and committed to a job, role or to try to attain a goal.

Nudging - A behavioural method that aims to help people make better choices for their health and the environment with the support of a friendly push. Nudging is the systematic and evidence-based development and implementation of nudges in creating behaviour change.

Public Landlord - All participating landlords in this thesis are either owned by the city of Stockholm, the Stockholm County Council or the government of Sweden. They are all organisations who manage and facilitates Sweden's public property portfolio.

Significant - Characteristic, momentous, meaningful, assured and not random.

Social Norms - Customary standards that govern behaviour in groups, cultures, or societies. They reflect what a group deems acceptable in a social context in terms of appropriate and inappropriate values, beliefs, attitudes or behaviours.

Sustainable Development - The Brundtland Commission report from 1987, Our Common Future, offers the following definition: "*Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs*."

System 1 - Fast and automatic system of the brain. Fast, unconscious and everyday decisions.

System 2 - Slow and reflective system of the brain. Slow, effortful and complex decisions.

Tenant Representative - General definition, *"Someone who gives support during the dialogue with the landlord. They offer services and knowledge in property related issues".* In this thesis, it refers to a person who is daily present in the property and who got interviewed to back up the information which emerged during the first round of interviews with the landlords.

List of Abbreviations

CO_2 - Carbon Dioxide

EC - Environmental Controller

ESO - The Expert Group for Studies in Public Economy

EU - The European Union

FAQ - Frequently Asked Question(s)

IPCC - Intergovernmental Panel on Climate Change

LED - Light Emitting Diode

MRI - Magnetic Resonance Imaging

OECD - Organisation for Economic Co-operation and Development

OVK - Obligatory Ventilation Control

PT - Preschool Teacher

REM - Real Estate Manager

SFV - The National Property Board of Sweden

SISAB - School Properties in Stockholm AB

SKL - Swedish Association of Local Authorities and Regions

SLL - Stockholm County Council

Swedish EPA - Swedish Environmental Protection Agency

TREM - Technical Real Estate Manager

UN - The United Nations

UNCED - The United Nations Conference on Environment and Development in 1992

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1. Introduction

1.1 Background

According to the Swedish Environmental Protection Agency's (Swedish EPA) report from 2016, the residential and the service sector account for 40 percent of Sweden's total energy consumption. The segment consists of households, public administrations, commercial facilities, agriculture, forestry, fishing and construction. Thus, a reduction in building energy usage would make a significant difference in society's total energy consumption. One way tto reduce energy usage in a building is enhanced cooperation between the landlord and its tenants. Since energy is partly due to the building's performance and on how much the tenants consume, by turning on lights, computers et cetera (Eerikäinen & Ödman 2013).

The public sector owns and manages approximately 90 million square meters of premises. One of the toughest challenges for the public sector today is managing climate friendly and energy efficient buildings. The Swedish target for climate and energy states that energy efficiency shall increase by 20 percent and that at least 50 percent of Sweden's energy should be renewable by 2020 (SKL, 2013). For the landlords who facilitate these properties to reach national targets by 2020 and 2050, they will need well thought out strategies.

Society and the environment are intertwined in a complex system that depends on each other to function. To cope with this complexity and avoid a potentially irreversible damage to the environment, the Swedish EPA (and at a higher-level EU) are pushing for policy decisions that reduce the adverse effects that people have on the environment (Swedish EPA, 2012). In addition to the objectives mentioned above, the Government, in its climate proposal (Prop. 2008/2009: 162), describes the vision that Sweden will have sustainable and resource-efficient energy supply without net emissions of greenhouse gases in the atmosphere by 2050. Some examples of individual contributions that can help Sweden achieve these targets are; changes in energy consumption habits, the choice of transport and an increase in recycling (SKL, 2012). However, change typically requires convincing arguments backed by data and encouragement through extrinsic motivation.

A relatively new way to influence behaviour in a sustainable direction without changing values of people is "nudging". The term nudging was coined by professors and researchers Richard Thaler and Cass Sunstein (2008). Situations are designed to encourage individuals to choose an individual and/or society-beneficial alternative. Nudging can be used to help people make choices that are better for the environment and their overall health. Nudge-like efforts have been used by various public actors in Sweden for a long time, often without the efforts being called a nudge. In a report, on behalf of the Swedish EPA, entitled N*udging - A Tool for Sustainable Behaviour?* written by Mont et al. (2014), nudging was pointed out as a useful method for getting citizens to change their everyday habits. Nudging has attracted interest at a policy level in modern construction because these tools have promising potential to contribute to the achievement of policy goals without restricting individuals' freedom of choice (Ramsberg, 2016).

1.2 Purpose

The purpose of this thesis is to examine how nudging methods impact public tenants' daily energy consumption. This is explored by looking into what work has been done based on the nudging toolbox; (1) simplification and framing of information, (2) changes to the physical environment, (3) changes to the default option, and (4) the use of social norms.

Can nudging be a way to encourage public tenants to behave more sustainable? To examine this requires explanations to the following:
a) What influences a certain behaviour?
b) What is nudging?

To apply these skills to a more practical level, the following questions were raised:
c) Are the participating landlords familiar with the term nudging and are opportunities and obstacles for sustainable behaviour identified today?
d) What work has been done based on the four nudging tools?
e) What are the landlords' impressions of nudging as a tool to change behaviour? Are there situations where prohibitions or regulations are better than nudging?

1.3 Delimitations

Nudge scenarios have been delimited to treat tenants with public landlords with the belief that a small effort can have a significant impact on these tenants' behaviour. The purpose is not to test any hypotheses but instead to explore the views and working methods of the public landlords. Four types of nudging tools are explored, all of them are currently and previously studied, these are; (1) simplification and framing of information, (2) changes to the physical environment, (3) changes to the default option and (4) the use of social norms. The data collection was limited to tenants within the region of Stockholm due to mobility and accessibility.

A building's energy consumption depends on several factors (Lindberg et al., 2008). For instance; types of roofing, wall systems, total window area, local climate conditions, size and locations of buildings. These will not be considered because this thesis focuses on tenant behaviour and these factors are not usually impacted by tenant behaviour. To cite Lindberg (2008, p. 8); *"The most effective overall means to reduce energy consumption, however, is to influence the occupants to save energy."*

This study will investigate how tenants behave in public properties, however, make note that occupants may act differently in a work environment versus home, which will not be studied in this thesis. Energy usage, water consumption and waste management can be directly linked to a property and represents observable behaviours. In addition, methodological boundaries that concern the interviews, the sample size limits the ability to generalise the findings since the research can never be executed outside the bounders of the methodology (Yin, 2013). A larger number of respondents would have been desired to increase the validity and credibility of this study. A balance between quality and quantity was made where the time aspect of one semester also was crucial.

1.4 Outline

The thesis is divided into seven chapters.

Chapter 1 provides an introduction including background to the chosen research topic, clarification of the purpose, and delimitations to the scope of this study.

Chapter 2 presents the foundational theoretical framework that is needed to investigate nudging and behavioural modification further. The definition of nudging is clarified, and voices against nudging are raised.

Chapter 3 declares the methodology used in this study. First, the overall approach and design of this study are explained. Secondly, the specific methods used are presented, as well as a description of the actual research process. The reliability and validity of this study are discussed in regards to the aim of this paper. Lastly, ethical research conflicts are discussed to reflect upon ethical issues that might arise.

Chapter 4 contains the information from six semi-structured interview. Firstly, three with the public landlords and the latter three pertain to those representatives of tenants. All of them taped and transcribed.

Chapter 5 highlights the discussion points of the findings from the previous section. It emphasises important discoveries and applies the theory presented in chapter 2.

Chapter 6 summarises the conclusions of this study, the thesis purpose is answered, and a discussion about potential further studies is being conducted.

At the end, all references and appendices are presented.

2. Theoretical Framework

2.1 Sustainable Development

Throughout the last two decades, sustainable development and sustainability have been primary subjects for debate. Sustainable development was pioneered in 1981 by the American environmental analyst, founder and former president of the Earth Policy Institute, Lester R Brown. In the ground breaking essay *Building a Sustainable Society* (Brown, 1981), he encouraged people to see that many of the outdated approaches to policy needed to be revised and reconceived to meet the challenges of becoming a sustainable civilisation. Sustainable development received its international recognition in 1987 when the World Commission on Environment and Development, also known as the Brundtland Commission, wrote about the concept in the report *Our Common Future* (WCED, 1987). The commission, led by Gro Harlem Brundtland, former Prime Minister of Norway, outlined the concept as follows:

'Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.' - Brundtland Report, WCED 1987: 43

The report explained the concept of sustainable development as something that would imply limits or restrictions set by existing natural resources, modern technology and the biosphere's ability to withstand the effects of human activities (WCED, 1987). The report served as a foundation for the decisions made by the United Nations Conference on Environment and Development (UNCED), also known as the Rio de Janeiro Earth Summit, in 1992. The conference gave international recognition to the principle that all development should be sustainable by adopting the action program, Agenda 21 (UN, 1992). The program set goals and guidelines for achieving sustainable development through eliminating threats to the environment. Agenda 21 stated three dimensions of development for society, see figure 1. These three dimensions are environmental, economic, and social sustainability, all of which must be made to interact to achieve long-term sustainable development (UN, 1992).

Figure 1. The three spheres of sustainability.

2.2 What Influences Certain Behaviours?

In environmental psychology, there are various methods to investigate what influences certain human behaviour. Why do people act in certain ways? Our behaviour is affected by motivation, values, norms and habits (Jackson, 2005). These phenomena can be influenced to try to change people's behaviour. According to the Intergovernmental Panel on Climate Change (IPCC) report from 2013, the evidence that humans affect the climate is strengthened through more and better observations and models. Individuals' behaviour, therefore, becomes crucial. Environmental problems including global warming, air pollution and water scarcity are linked to individual behaviour. In other words, change in behaviour can result in a reduced burden on the environment (Steg & Vlek, 2009).

2.2.1 Intrinsic and Extrinsic Motivation

Motivation is a driving force for human behaviour, and it can be either intrinsic or extrinsic. Intrinsic motivation is when someone is doing an activity because it provides an inner satisfaction rather than leading to a physical result (Ryan & Deci, 2000). Ryan and Deci (2000) define intrinsic motivation as an activity driven by people's natural need to act independently, raising their competence and gaining experience. The behaviour is engaged in out of free will, and the act itself is the reward. Extrinsic motivation is when one is influenced by their surroundings, see figure 2.

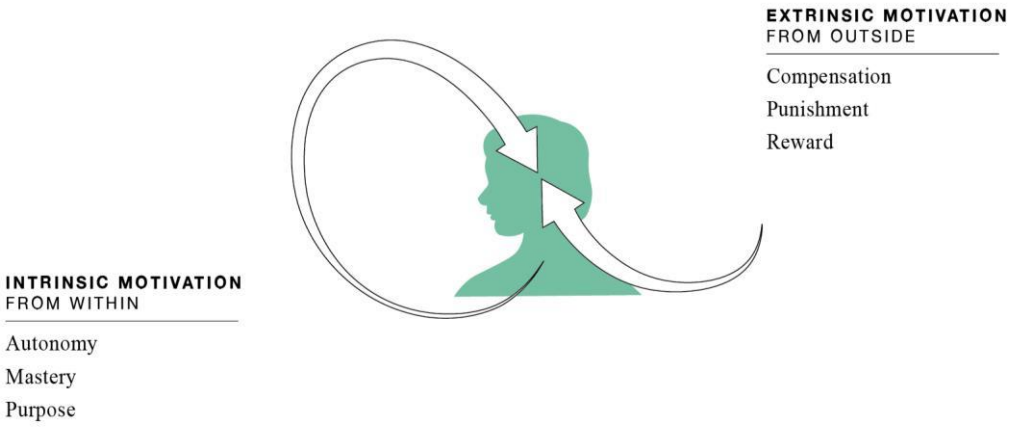

Figure 2. Intrinsic and extrinsic motivation.

Independence is based on the individual's free will and responsibility, to achieve this requires support from people in the surrounding. Work environments that provide positive feedback help to strengthen the development of individuals' opportunities and in turn, increase the internal motivation of the employees (Reeve, 2009).

Ryan and Deci (2000) states that most activities based on extrinsic motivation, which is often driven by money, rewards, or positive attention. Actions or demands that are not of personal interest can be steered with extrinsic motivation (Reeve, 2009). Instead of experiencing the intrinsic motivational satisfaction, the extrinsic focuses on action planning, where the momentum is the reward the individual receives by the demand behaviour. However, it is hard to separate the two since they may affect each other and occur simultaneously.

2.2.2 Values

Values are often thought to be the foundation for motivation, and as such, it can influence attitudes and behaviour. Shalom H. Schwarts, the social psychologist and creator of *The Theory of Basic Human Values*, concluded that values are guiding beliefs which vary in importance and controls the individual towards a desirable goal (Schwarts, 1992). Schwarts further explains that a person's values are relatively constant over time and they establish rules for how to behave.

In addition, values can be defined by what the individual perceives as necessary in his or her life (Schwarts, 2012). The trade-off between different values creates behaviour and attitudes. To make a value influence an action it needs to be prominent and active (Verplanken & Holland, 2002). This is done by reminding people that their values are important in a particular situation. An individual who values a reduced environmental impact can, therefore, choose to adjust their footprint. Thus, values in this case steer the individual towards a specific goal, to act more environmentally friendly.

2.2.3 Norms

Norms are expectations of how to behave in certain situations (Schwarts, 1977). They often indicate what humans think or do, i.e. accepted behaviour within a group. Personal norms are often formed through values, and refer to a person's views about what is right and wrong, therefore also known as moral norms (Arvola et al., 2008).

According to Schwarts's Norm Activation Theory (1977) moral norms have to be activated to influence behaviour. This theory is one of the most widely applied models of moral behaviour (Jackson, 2005). De Groot (2009) finds this model to be successful in explaining a variety of environmentally important actions. A moral norm is activated on the condition that a person is aware of the consequences of the act, and that he or she accepts ascription of responsibility for the behaviour. Only under these circumstances, the person perceives the conduct as moral. Figure 3 illustrates the relationship between these variables. For example, if one is aware of the consequences of energy consumption and is prepared to accept the responsibility for her/his consuming behaviour, the theory then assumes that one is more likely to develop a personal norm to reduce this consumption.

Figure 3. Schwarts's norm activation model.

2.2.4 Habits

Habits have long been used to explain human behaviour. They are defined as cognitive structures that automatically decide an individual's future behaviour (Steg et al., 2012). A person might be aware that he or she is acting according to a habit, even though the behaviour is automated and requires little cognitive effort. A habit's strength depends on how fully automated the behaviour is, and the strength predicts how difficult the practice is to break (Jager, 2003). Thøgersen and Ölander (2006) states that three requirements need to be fulfilled for a habit to develop. Firstly, behaviour needs to be repeated many times. Secondly, the behaviour should take place in a comfortable and stable environment. Lastly, the behaviour needs to generate positive rewards. However, fulfilling these three requirements does not have to mean that the behaviour is a habit. Each time a pattern of behaviour leads to the desired outcome, it is more likely that this behaviour will be automatically applied the next time the situation arise (Steg et al., 2012).

Habits might be what is standing in the way of a change in behaviour even if we express a desire to change our behaviour. Studies show that people who are governed by habits also show less interest to take part in information about alternative behaviour (Ibid). Habits are thus nothing that occurs without reason. Habits are the individual's best-planned strategy to carry out their everyday lives. The behaviour that works and gives the best impact is established as a habit. Habits are therefore difficult to break (Verplanken, 2006). The importance of breaking unsustainable routines and introducing new more sustainable habits becomes evident.

2.3 Nudging

The level of ambition of environmental policies currently in place to reduce environmental pressures may not enable Europe to achieve long-term environmental goals in accordance with the European Environment Agency's report (2015). Although humanity has managed to solve some environmental problems, we are not solving all problems in the period we have set for ourselves; for that, additional measures are needed (Lindahl & Stikvoort, 2015).

On the 15th of December 2016, the ESO-committee in Sweden released the report *When the Right Choice Becomes the Easy Choice - an ESO Report about Nudging* (Ramsberg, 2016). The report goes in depth on nudging and draws lessons from countries that more specifically chosen to use behavioural interventions as a policy tool. Nudging has been implemented on a political level in the UK. David Cameron formed the Behavioural Insights Team in 2010, also known as the Nudge Unit, to guide citizens towards more healthy choices in their daily lives. Obama also saw the benefits from working with nudging and in 2015 started the Social and Behavioural Sciences Team. The report states that we are rarely as rational as we think. Cognitive obstacles and short-term thinking often lead to bad decisions. The conclusion is that nudging should be tested more often in Sweden. To pursue and coordinate efforts a new function within the Swedish Government Offices is proposed. So, what does nudging mean?

2.3.1 Libertarian Paternalism and Choice Architecture

Before the concept of nudging is described more thoroughly two other concepts need introduction; libertarian paternalism and choice architecture. Thaler and Cass (2003) introduced libertarian paternalism in the essay with the same title in the American Economic Review in 2003. The authors states that there are never any original options; they are always shaped by someone from the start. It is ultimately defined as; *"…an approach that preserves freedom of choice but authorises both private and public institutions to steer people in directions that will promote their welfare."* (Thaler & Cass, 2003, p. 42)

The ones developing the choice architecture are people possessing the knowledge to help others, whose judgement whether a situation or decision is better or worse for individuals (Vallgårda, 2012). Some policy interventions are of a more generic nature, such as sustainability or climate change, others aim to assist people in avoiding individual problems, such as alcohol consumption or smoking. According to Thaler and Sunstein (2003) the paternalistic aspect lies in the claim that it is legitimate for choice architects to try to influence people's behaviour to make their lives longer, healthier, and better.

By making the better alternative (for example the most environmentally friendly one) the standard option, the chances are that the better option is also the one being chosen. Victoria Campbell-Arvai, researcher and PhD at Michigan State University, performed studies on restaurant guests whom were given menus with vegetarian dishes as the standard meal and guests who were not. She concluded that the guest who was given the vegetarian standard options menu tended to choose greener options. Change in choice architecture where the healthier option becomes the standard option is thus a useful instrument for change in human behaviour (Campbell-Arvai et al., 2014).

2.3.2 How We Think: Two Systems

To understand the foundation of nudging, one must also understand the two systems of how humans think. Nobel Prize winner Daniel Kahneman describes the two in his book, *Thinking, Fast and Slow,* as; System 1 – Fast and System 2 – Slow. The author's portrayal of the two systems diversities is shown in figure 4 on the following page. While System 1 guides our daily routines, e.g. brushing or teeth, System 2 relies on greater thoughtful mental effort when we need to make important choices in life. Thus, System 1 relies on rules of thumb and mental shortcuts while System 2 relies on detailed multi-criteria evaluations, e.g. buying an apartment (Kahneman, 2011).

Thaler and Sunstein (2008) imply that human behaviour can be changed and that we can learn how to change our way of thinking, reacting and acting. The existing tools for improving system 2 relies on the availability of information and our capacity to process it and make rational choices. Studies, however, demonstrate that providing information does not necessarily lead to changes in behaviour (Mont et al., 2014). Take alcohol consumption as an example, all are aware of the harmful effects, yet a substantial share of the population drinks several days a week. Nudging could, therefore, be a tool to reduce behavioural biases and lead to choices that are better for us.

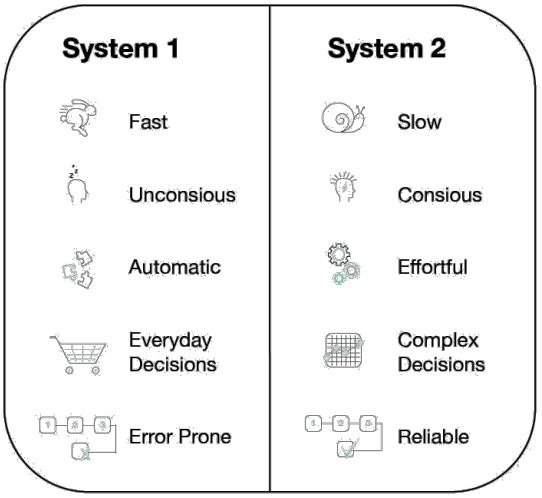

Figure 4. System 1 vs. System 2, decision making.

2.3.3 Definition of Nudging

To nudge, or to gently lead someone in a different direction other than the one they initially would have taken works better than using the stick and carrot approach, according to Danish behavioural researcher Pelle Guldborg Hansen and chief executive at iNudgeyou (2016). The term in relation to behavioural change was according to the Swedish EPA's report on nudging from 2014 first mentioned in the book *Nudge: Improving Decisions about Health, Wealth and Happiness*, written by University of Chicago economist Richard H. Thaler and Harvard Law School Professor Cass R. Sunstein, 2008. To be considered a nudge, according to the definition; does not allow the forbidding of options or drastic change of economic incentives. Hence, it respects people's freedom of choice. The authors define nudging in the following way:

'...any aspect of the choice architecture that alters people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates. Putting fruit at eye level counts as a nudge. Banning junk food does not.' - Thaler & Sunstein, 2008

Some have criticised the original definition for being too broad and vague (Mont et al., 2014). Pelle Guldborg Hansen (2016) has therefore formulated an alternative definition to give the term a sharper definition. Hansen objects to the equalisation between libertarian paternalism and nudging and that the definition allows the nudge to be unintentional. Hansen also believes that the original definition focuses too much on economic incentives. He, therefore, defined the following definition:

'A Nudge is a function of any attempt at influencing people's judgements, choice, or behaviour in a predictable way, that is made possible because of cognitive boundaries, biases, routines and habits of an individual and social decision-making posing barriers for people to perform rationally in their own declared self-interests and which works by making use of those boundaries, biases, routines and habits as integral parts of such attempts. Thus a Nudge works independently of forbidding or adding rationally relevant choices, changing incentives whether regarded in terms of time, trouble, social sanctions, economic and so forth, or the provision of factual information or rational argumentation.' - Hansen, 2016

Growing interest in nudging the latest year's stems from the fact that it usually imposes low or even no costs, they deliver immediate results and maintain freedom of choice. Nudging is composed of four types of tools; (1) simplification and framing of information, (2) changes to the physical environment, (3) changes to the default option, and (4) the use of social norms. Human beings base most of their daily choices on habits. We do as we always have done - status quo, and tend to avoid time-consuming or difficult choices, which makes the default option an effective nudge. Framing is another way. Thus, the portrayal of information can trigger us to act if it is formulated in a certain way. Thaler and Sunstein (2008) also mentions peer pressure and social norms as striking characteristic. Choice architects can achieve nudges by just informing people about how other people behave. Using social norms has been found to have larger impacts than significant economic incentives (Sunstein, 2014).

A compulsory instrument such as a law, prohibition, or financial measure is not a nudge (Thaler & Sunstein, 2008). To be able to create meaningful nudges it is, therefore, important to understand our relation to the world around us and why we act as we do. Thaler and Sunstein (2008) highlight several human characteristics that influence our behaviour. People generally hate losing and are unwilling to make a change, this fear and laziness can, therefore, stop us from changing our behaviour, even if it is in our best interest.

2.3.4 Voices against Nudging

Who should decide on what is the "right" behaviour? What is enough to save the planet? Is it enough to just lower our emissions and impact? Some are raising scepticism against the use of nudging. The thought that people are not as rational as we think and that society tackles the consequences of psychological manipulation is indigestible to many (House of Lords, 2011). The House of Lords report further states that there is no evidence of the long-term effects of nudging only the short-term. The closeness to manipulation has been put forward as the reason for the method not living up to the ideals of democracy, where the free human takes responsibility for his or her actions (Marteau et al., 2011).

Goodwin (2012) argues that even if nudging is based on paternalism, it is resulting in too much liberty to be an efficient method. It is not enough to influence humanity's great problems such as health issues and climate change. Schlag (2010) claims that freedom of choice should not be the primary goal to strive for; instead, a reduction in total emissions must be the goal, regardless of how this influences the freedom of choice of the individual. Nudging should first and foremost be a complement to the traditional policy instruments and not as a substitute for laws, regulations or financial instruments. Nudging and green nudging represent interesting tools which can be used with other tools for behaviour modification (Mont et al., 2014).

2.4 Examples of Successful Nudging

Several nudging studies show that you can achieve change with limited funds. The following checklist is inspired by a presentation made by Åsa Sandberg, initiator of the network "Nudging Sweden" and previously CEO of "A Win-Win World", at the conference "Mötplats Huddinge" in Huddinge on the 16th of February 2017.

Advice for finding and implementing the right nudge (Sandberg, 2017):

- ✓ Define the behaviour that you are trying to influence and map out the decision situation. Identify which steps are prioritised to seek to change behaviour.
- ✓ Idea phase, creative workshop. Take advantage of existing social norms and community practices to make your nudge stick.
- ✓ Priority and selection of nudge. Take the perspective of the decider - which choice is best according to them?
- ✓ Develop the chosen nudge. Simplify the number of alternatives and reduce the complexity of the options. When possible, set the default for the best decision.
- ✓ Perform experiments to test it.
- ✓ Implement!

2.4.1 Simplification and Framing of Information

"Click"

Roskilde University had a problem with its energy expenses but didn't have the budget and the time to solve it by upgrading to more advanced energy saving technology e.g. light sensors. A pilot experiment was set up by the Danish professor Pelle Guldborg Hansen and his student aimed at getting students to turn off the lights after leaving the room. The trial combined a descriptive norm: "*More than 85 percent of the students at Roskilde University remember to put out the lights. Do you*?" with a sticker placed next to the light switches, see figure 5.

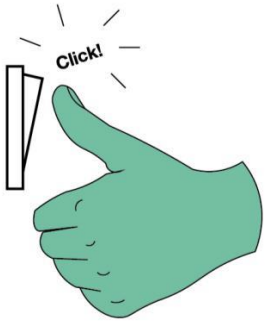

Figure 5. Click!

The use of descriptive norms has proven to be an effective tool for changing people's behaviour (Cialdini et al., 2009). The intervention was put up in two buildings for two weeks and then compared with two buildings without the implementation (the control group). A security guard counted the number of lights he had to turn off when making his nightly rounds. Compared to the control groups the buildings with the Click intervention had a 26.4 percent reduction in the number of lights turned on (Maaløe Jespersen, 2014).

Ingenious Translations

An experiment was conducted to determine if the effectiveness of a home energy audit program could be improved by training auditors to use social-psychological principles. The auditors were trained to personalise their recommendations to homeowners by framing their proposals in terms of loss rather than gain. The effectiveness of the trained auditors was compared with a control group of experienced advisers who did not receive the specific training. The findings demonstrate that in which a statement is framed can have a potential effect on the behaviour of the perceiver. Psychologically, a crack under a door or in a window might be minor, but a gap the size of a basketball feels devastating. (Gonzalez et al., 1988)

2.4.2 Changes in the Physical Environment

Make it Easy to Do the Right Thing

A good recycling room should be designed in a way that makes it easier for both tenants to throw away garbage and for those who collect it. If it is a dark and unpleasant place, the risk of the waste getting into the wrong vessel, on the floor or even outside the door increases. One of the most important factors for getting well-functioning waste management is letting the tenants know what to do and why. Therefore, all instructions should be clear and straightforward. Figure 6 below also illustrates the option of placing everyday disposal further away from the entrance and vessels such as metal, electricity and hard plastic closer. This could decrease the risk of all waste ending up in everyday disposal since it would be more comfortable to throw it away there. Framing the waste after the type of tenants using it in a similar way as Locum did also increase motivation to do right.

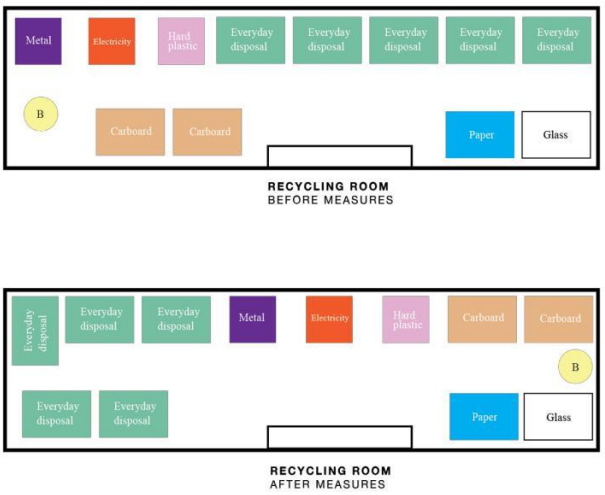

Figure 6. Recycling room, before and after measures.

Green Footprints
Guldborg Hansen and his students also tested an experiment in 2011 to nudge people to throw litter into bins instead of on the street. Firstly, they handed out wrapped caramels to pedestrians. They then counted the number of wrappers on the street, in the street's garbage bins, on side streets and in bicycle baskets. Finally, they placed green footprints that led up to the bins, see figure 7, handed out caramels again and repeated the counting exercise. The result was a startling 46 percent decrease in wrappers ending up on the streets. (Maaløe Jespersen, 2012)

Figure 7. Footprints leading up to a bin.

Bad habits often cause littering. Even if there's an economic penalty for littering, it would need to be enforced daily and everywhere to impact people's habits and automatic behaviour really. This isn't exactly the cheapest solution. The footprints, on the other hand, work as a visible reminder for pedestrians who aren't acutely aware of their actions when they litter and so end up being a far more useful tool than empty threats.

2.4.3 Changes to the Default Option

Lower Heating Settings and Setting Gadgets to Green Default
An experiment in France wanted to test default settings on office thermostats in an OECD building. The settings were manipulated during the winter and employees' chosen thermostat setting was observed over six-week period. The researchers found that a 1°C decrease in the default caused a reduction in the selected setting by 0.38°C on average and 65 percent of this effect could be attributed to office tenants' behaviour. They also found that office occupants who are more prone to adjust their thermostats before the intervention were less susceptible to the default. The study concluded that using lower-than-usual temperature settings, and lowered temperatures during the night, pre-programmed on thermostats can increase the buildings energy efficiency. (Brown, 2012)

Sunstein and Reisch (2014) argue that climate-friendly power saving settings activated by default in appliances are likely to emerge as a significant contributor to efforts to protect human health and the environment – potentially more efficient, in many cases, than either information and education or substantial economic incentives.

Researchers at the University of Kansas confirmed this with an experiment. Their study highlights a successful cost-cutting application of default energy savings settings in a campus computer-testing laboratory. Default settings applied by the research team did not require effort on the part of users and resulted in computers powering down after a relatively short period of inactivity. (Hirst et al., 2013)

Better Lighting Propositions

Another study examined participant's choice between either a cheap, but inefficient incandescent light bulb, or an efficient, but expensive compact fluorescent light bulb (CFL). The researchers found that queries formulated by defaults can produce differences in constructed preferences and further that manipulating queries can also mitigate default effects. Having contractors present a greener alternative as the default during remodelling jobs may result in significant savings when counting on larger volumes. (Dinner et al., 2011)

2.4.4 Use of Social Norms

Reducing Gas Consumption

Dolan and Metcalfe (2013) tested how the impact of descriptive norms, with and without information on energy-saving behaviour, affected gas usage. The field experiment was based on 569 homes which were randomly split into three groups. One received basic energy statement as usual (control group), the second one received additional information about the average consumption of similar sized homes in the neighbourhood (the descriptive norms treatment) and the last one to receive further information demonstrating how to change energy use (the descriptive norm plus information treatment). The researchers found that social norms reduce consumption by around 6 percent. It had greater impact on the day the information was received and then decreased over time. The reduction in energy consumption was also longer lasting among those households that received a combination of norms and information (Dolan & Metcalfe, 2013).

Appliances for Energy Goals

Appliances and software today can visually and saliently give real-time energy consumption feedback. Harding and Hsiaw (2014) present evidence from a Northern Illinois goal-setting program, aimed at reducing residential electricity consumption. The study suggests that goal setting can be an effective behavioural nudge for reducing residential electricity consumption. While on average consumers saved 4 percent, savings are very heterogeneous. Consumers choosing realistic goals persistently save substantially more, achieving savings of nearly 11 percent, than those choosing very low or unrealistically high goals (Harding & Hsiaw, 2014). Other product examples are the Wattson Clock which is connected to the electricity meter of the building and measures the total energy usage in real time. It can also calculate the costs and glows in different lights that correspond to the energy usage, blue for low energy consumption, purple for average and red for high.

3. Method

3.1 Research Strategy

This study aims at investigating how different public landlords work with influencing behaviour through interviews to highlight their views on nudging and the tools when using it. Thus, this study was conducted with a qualitative research strategy because it aims to create a deeper understanding of the social phenomenon in specific contexts. The qualitative research places more emphasis on perceptions and interpretations of social reality, while quantitative research emphasizes quantification of data and analysis (Bryman, 2015). The alternative could have been to make a quantitative study in the form of a survey. However, a survey would have made it difficult to ask supplementary questions for the answers and go deeper into the reasons that respondents respond as they do. Also, it becomes harder to put the answers in broader context regarding physical environment, demographics and prevailing conditions. That a qualitative method should be performed when studying these issues is also verified by Miles et al. (2013) who argue that good qualitative data are more likely to lead to random findings and new perceptions. Qualitative data enables researchers to go beyond initial impressions to create or revise conceptual frameworks.

The application of theory in research can be managed in different ways; the most common of these are known as the deductive approach and the inductive approach. While the deductive approach develops a theory that is then tested through research, the inductive method uses data collection to develop a theory from the results (Saunders et al., 2015). The study has been performed with inductive reasoning, which the premises seek to supply strong evidence for the truth. This means that the research has emanated from interview material collection of empirical data, where the result is combined with previous scientific research. While the conclusion of a deductive argument is absolute, the truth of the conclusion of an inductive argument is probable, based on the evidence given (Copi et al., 2006).

In this thesis, consistent theory on behavioural influences and nudging has been studied, which then led to the interviews with the public landlords and their tenants. Space for flexibility and openness was provided in the interview questions, to see how the landlords work with behavioural impact. Finally, links between theory and empirical studies have been investigated. In this way, it can be said that this study is based on both a deductive and an inductive approach. Bryman (2015) emphasizes that the approach should be perceived more as tendencies and not as a clear distinction that always applies.

A research design can be characterised as exploratory, explanatory, or descriptive. However, in some cases, the research design will be multifaceted and have more than one of the previous characteristics. The nature of this paper can best be compared with an exploratory study; it seeks to clarify an understanding of a problem that is, to some extent, imprecise. The advantage of exploratory studies is the flexibility to change direction depending on the findings of new data or insights. Although the focus might be broad at an early stage, it becomes narrower over the course of the research. (Saunders et al., 2015)

This study also has a hermeneutical approach. Thurén (2007) writes that hermeneutics is about not only grasping but also understanding. In this way, hermeneutics builds not only on empirical and logic but also on tuning. Furthermore, Thurén argues that hermeneutic interpretation is necessary for understanding people, human actions and the consequences.

3.2 Interviews

3.2.1 Selection of Respondents

In this study, respondents were selected from three different public property companies which were responsible for the operation and maintenance of large public property portfolios - one representing, healthcare, another one education and the last historical buildings. An email of interest was sent to each sustainability department which in turn connected me with, what they thought were, appropriate interviewees. I pre-called the interviewees to give a brief explanation of this study and to book a time for the interview. I later asked each landlord representative to connect me with a suitable tenant that could answer some questions about the projects and ideas that emerged in their interview. The snowball effect is useful to get in touch with a person or group who is difficult to reach. Also, by the help of an informer, one can get in contact with a suitable candidate. A setback using this method was that the informant decides which the next interviewee should be and risks only reflecting his or her image of the problem (May, 2013).

The number of interviewees required depended on the purpose of the study. Qualitative interview studies tend to have either too few or too many respondents, if there are too few respondents the result from the study risk being difficult to generalise and hard to test against hypotheses. If the number is too large, you cannot make any accurate interpretations of the interviews (Kvale & Brinkmann, 2014). Only a few interviews have been conducted to focus more on context and careful preparation for the interviews. Had more respondents been interviewed; it could have highlighted more examples of how companies previously worked with behavioural influence and perhaps other approaches to nudging as tools. Therefore, a balance between quality and quantity as made where the time aspect was also crucial. It should also be added that respondents were interviewed in the role as professionals, which means that much of what was said applies to the company although some questions also touched the respondents' personal opinions.

In total, six interviews were conducted - three individual ones with the landlords and three individual ones with the tenants. The landlord representatives operate in similar roles and parts of the organisations whereas the tenant representatives had some differences. The importance of actively being in the building and seeing the implementations weight heavier than the tenants' profession. The first rounds of interviews (interview A to C) were intended to focus on the nudging tool set and the interviewee's perception of the concept of nudging, with the purpose of exploring the subject of interest. The second rounds of interviews (interview D to F) were focused on the tenants' experience of the implemented work that had been done and their perception of the concept of nudging. The interview guides for both rounds of interviews can be found in Appendix I and Appendix II, respectively. Figure 8 below provide information regarding the interviewees sector, profession, place of interview, date and duration:

PUBLIC LANDLORDS	WHOM	SECTOR	PROFESSION	WHERE	DATE	DURATION
A	Locum	Healthcare Properties	Energy Controller	Östgötagatan 12, Stockholm	23rd of March, 2017	Approx. 1h
B	National Property Board of Sweden	Cultural Heritage	Technical Real Estate Manager	Riddargatan 13, Stockholm	28th of March, 2017	Approx. 1h
C	SISAB	School Properties	Real Estate Manager	Förmansvägen 11, Stockholm	22nd of March, 2017	Approx. 1h

TENANT REPRESENTATIVES	WHOM	SECTOR	PROFESSION	WHERE	DATE	DURATION
E	Karolinska University Hospital in Huddinge	Healthcare Properties	Energy Controller	Medicingatan 8, Huddinge	7th of April, 2017	Approx. 1h
D	Restaurant at the Royal Opera	Cultural Heritage	Manager	Karl XXII:s Torg, Stockholm	21st of April, 2017	Approx. 1h
F	Fölet Preschool in Farsta	School Properties	Preschool Teacher	Torsbygatan 31, Stockholm	11th of April, 2017	Approx. 1h

Figure 8. Overview of the interviews with the public landlords and the tenant representatives.

3.2.2 Interview Structure

Semi-structured interviews were conducted to allow the interviewees to reflect upon the subject more freely, see appendix 1 and 2. An advantage of using semi-structured interviews is that respondents have the opportunity to speak about their perceptions and opinions while being able to follow up this by asking more in-depth questions. This makes it possible to get a great deal of information from the interview while at the same time it is possible to clarify potential uncertainties. (Saunders et al., 2015)

All six interviews were conducted face-to-face. Phone interviews might provide lower reliability than face-to-face interviews, as participants in telephone interviews are often less willing to participate in discussions and difficulties to ask personal questions make it hard to establish trust by phone (Ibid). All six were emailed the questions some days in advance to be given time to prepare for the interview. Warm-up questions related to their position and the company's sustainability work in general were asked before going deeper into their previous knowledge about nudging and what their respective companies do today to influence sustainable behaviour.

Saunders (2015) also explains it is important that the respondents feel safe and comfortable to accomplish such a good interview as possible, therefore, were all six interviews conducted in quiet spaces at each respondent’s workplaces. According to Saunders (2015), the advantage of individual interviews is that one reaches a deep level of conversation, which may result in details concerning the studied area. In addition, it is an advantage that the respondent's opinion is more likely presented, so that the respondent cannot be affected by any other respondents in the room. The disadvantage of individual interviews is that the discussion that appears is limited to the interviewer and the respondent.

Since these interviews were non-standardised, it was deemed suitable to use audio recordings together with note taking, primarily, because note taking would be insufficient in capturing every answer to its full extent, but also since it would enable the interviewer to engage in the dialogue fully. Note that audio-recording was captured only with the consent of the respondent.

3.3 Reliability and Validity

To evaluate the credibility of this study, reliability and validity must be taken into consideration. Reliability refers to how good findings and analysis can be consistently achieved if this study was to be repeated. Validity refers to how good findings reflect what the research is intended to capture. (Saunders et al., 2015)

Threats to reliability could be based on either the participant or the observer. This can further be expanded to error or bias; for example, observer bias or participant error (Ibid). Participant bias will hopefully be avoided to some extent by assuring the respondents that their input will be anonymous to others than the author. However, the nature of a qualitative study infers that findings will not be possible to duplicate to the full extent if this study were to be repeated. One obvious threat to validity in this study is generalisability; since this study is limited to certain organisations, findings might not be applicable to other organisations. Therefore, the author of this paper intends to be transparent about the context of results. By conducting further studies on the subject, one would be able to test the robustness of the results better.

Bryman (2015) describes four criteria that a study's reliability consists of in qualitative research; credibility, transferability, trustworthiness, and ability to confirm. All respondents could take part of their transcribed interview and were given a chance to invoke possible mistakes or misinterpretations, which enhances the credibility of this study. Qualitative research tends to focus more deeply than widely; the result is usually focused on the contextual uniqueness and the importance of the aspect of the social reality studied. Transferability is therefore ensured through extremely detailed descriptions providing other researchers with information to help them assess how passable the results are to another context. To live up to the criterion of trustworthiness an exploratory approach was adopted. This study has been reviewed by supervisors, other students, friends and relatives, to be later clarified and improved.

3.4 Interpretation of Data

When the material was to be processed, and analysed, the ambition was to avoid subjective evaluation of the material. The interview material was transcribed in its entirety. How much of an interview that needs to be written down depends on the purpose and the availability of time (Kvale & Brinkmann, 2009).

Since data of this study mostly consisted of the interview material, it was considered necessary to produce transcripts of the interviews. However, the interviews were later translated into written language. In the case of direct citation, the respondent's exact wording was retained and the interviews were written down ordinarily to the extent deemed sufficient.

At the times the respondent referred to the municipality's website or other sources of information for more information on projects, the information was sought after the respondent's advice. This information then worked as an in-depth explanation of what the respondent told during the interview.

The results of the interviews were set in separate sections so that the results of the public landlords and their tenants were presented separately. After consideration, it was decided that this method would give the readers better opportunities to understand the situations than if the result from all would have shown in one and the same section. The material was finally categorised according to the questions of this study, which created better opportunities to compare the different landlords.

3.5 Methodological Criticism

A common criticism towards qualitative studies is that they are all too subjective and that the researcher ties personal connections to the ones being investigated (Bryman, 2015). Prior to this study, none of the respondents had previously been known to the interviewer. The occurring communication has solely circled around the purpose of this study to avoid relationships that may affect this study's objectivity. Another criticism highlighted by Bryman (2015) is transparency and the difficulty in replicating qualitative studies since they are often unstructured and based heavily on the researcher's inventiveness. Therefore, analyses have been attempted to be described as comprehensively as possible to allow the reader to follow the course of this study. The quite narrow study might encounter problems with generalisation. Consequently, are all conditions in this study described as detailed as possible to create an understanding of the context in which the results are given.

Another criticism highlighted by Larsen (2009) is that the disadvantages of qualitative studies are that the researcher or researcher's method can influence the interview result. For example, the interviewee can respond according to what he or she believes the researcher wants to hear in order to make a good impression or hide any shortcomings. To counteract this, the interviewer tried to be as neutral as possible, so that the respondents would feel free and invited to speak freely.

3.6 Research Ethics

Social science has four main ethical principles for the protection of individual participants in empirical research: the principles of information, concurrence, confidentiality and utility. Every principle includes specifications that can be divided into several recommendations (The Swedish Research Council, 2002). The participants need to be well informed and have a consciousness of how they are participating in the research for the data to be relevant (Lichtman, 2012). That is why the interviews started with giving the interviewees information about the purpose of this study, project and time frame. The participants then got the opportunity to read the transcription from the interview and the final product of the research to avoid any misunderstandings but also to remain the highest of concurrence. Maintaining confidentiality, participants retained the right to choose to be anonymous in the research (Ibid). The participants had the choice to be completely anonymous or dis-identified in this research.

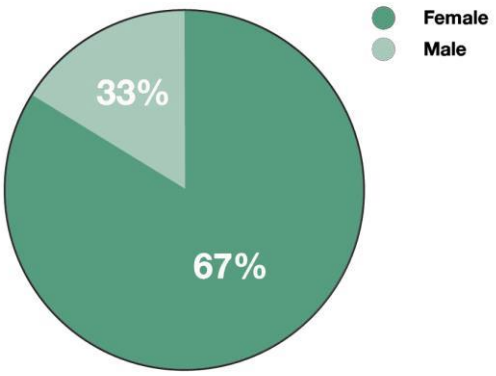

Figure 9. Pie chart showing the distribution in terms of the interviewees' gender.

None of the participating interviewees chose to be anonymous, most likely due to insignificant risk of being exploited. Furthermore, the importance of including names of the respondents was minimal with regards to the purpose of this paper. The gender of the interviewees was not considered when choosing them but a clear majority were female, see e figure 9. Generally speaking, women and highly educated persons are more environmentally conscious, just as the environmental commitment is usually greater in the cities than in rural areas (Boman, 2011). This could be an explaining factor behind the distribution of female majority in this study.

4. Findings

4.1 Landlords

4.1.1 Locum - Healthcare Properties [A]

Locum AB is owned by Stockholm County Council (SLL) and is one of Sweden's largest real estate managers with a property stock totalling 2.1 million square metres in the county of Stockholm. Healthcare, both public and private, is their largest tenant. Hospitals are very complex properties. Many of the technical systems must work around the clock, all year. Locum has specialist competence in asset management, project management and development of healthcare environments. (Locum, 2017)

A major challenge in their new environmental program for 2017-2021 is to reduce the climate impact of the construction process on climate change. The program includes three major areas of focus: health care, transport and facilities. The County Council's strives to be a green inspiration on a local, national and global level. The commitment means that emissions of greenhouse gases should decrease by at least 50 percent until 2021 compared to 2011 and by at least 75 percent compared to 1990. Stockholm county shall by 2050 be entirely carbon neutral and not affect the environment negatively. (Locum, 2016)

The environmental controller (EC) being interviewed has worked within the SLL since 2003 and is currently working at Locum and makes sure that environmental requirements compliance in all construction projects. EC is also involved in the decision making of certifying new and existing building through the criteria's of Miljöbyggnad. As an environmental controller, the EC monitors possible target areas that should be strengthened in the future.

A substantial energy audit of the entire property stock has been under the process during the last couple of years and proposed profitable actions will be presented later this year. The energy audit will give Locum a clear picture of what landlord and tenant can do together to reduce energy use. Locum is also trying to implement green leases as an appendix to their contracts with interested tenants. Reduced energy consumption, better waste management and an ongoing dialogue in local related environmental issues are some of the advantaged Locum have experienced with these leases.

Previous Knowledge about Nudging

EC had not heard the designation before but had read an article somewhere about Opower's experiment in the USA where the idea was to influence households' energy consumption by providing information on the homes use of energy related to the 100 nearest houses of similar size.

Nudge 1 -Simplification and Framing of Information

Waste management can be quite tricky at a hospital. Therefore, Locum decided to let the generated waste reflect the information shown inside recycling rooms. To simplify it clear pictures represents what is thrown where. A plastic fraction is too vague, but a package of

aluminium acetotartrate solution is graspable for the staff. The project has shown great results. Lighter and well-designed rooms have kept up the motivation to do right. Earlier waste ended up in the wrong vessels or on the floor.

EC further lifts difficulties with engaging tenants in their energy usage. Firstly, hospitals are manned around the clock and have many hot spots where activities take place all the time. An individual effort like continuously shutting down computers might feel like a drop in the ocean, and if energy meters were installed the next question arises, who will consistently read them? EC is intrigued to learn more about the actual energy usage within hospitals but fears expensive investments.

EC also mention that the price tag steers most procurements, but sometimes it renounces the cost. When new white goods are being bought, its annual consumption is being considered. To communicate it, the energy label is clearly displayed to the user. EC expresses their concern over the vast range of classes, A+++ to G, and believes it would be better if the system is tightened up and clearer to understand. When there are three levels of green, EC believes many might lower peoples' requirements, see figure 10 below.

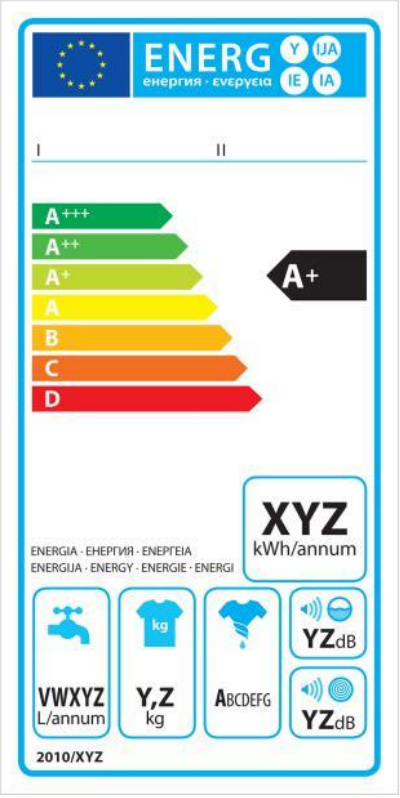

Figure 10. The EU energy label.

Nudge 2 - Changes to the Default Option

The more modern machines at hospitals today shut down by themselves after some time of inactivity. For example, Magnetic resonance imaging (MRI) machines dated from 2003 took hours to restart; therefore, no such function was installed. The different premise today is that the devices are used more often, and are more in numbers than just a decade ago. Even though they are better in an energy performance perspective, they produce more energy than their forerunners.

Hospital wards are complexed buildings because of the diverse range of user requirements and because they are occupied 24/7. Using absence control is not beneficial in most areas, instead daylight linking sensors are installed during reconstruction and new construction to save energy by dimming lights down in a room if there is adequate natural light.

Nudge 3 - Changes in the Physical Environment
Hospitals can sometimes be experienced as a labyrinth and Locum is constantly working with its design of environments to easier lead its visitors and personnel where they are supposed to go. Welcoming and open environments are projected, and closeness to public transportation is always being considered, as well as the possibility to reach the facility with a bike.

EC believes Locum can do more when it comes to changes in the physical environment to steer visitors and personnel to more sustainable behaviour. Letting energy controllers be a part of the process at an early planning stage is where it should begin since they tend to trundle fast after a decision on whether to reconstruct or construct have been taken.

Nudge 4 - Use of Social Norms
As for today, Locum is not working actively with the use of norms to encourage sustainable behaviour, but is no stranger to the method and is eager to learn more. Every ward has a person in charge of environmental issues, which EC sees as an advantage.

Since what kind of heath care being performed at each ward differentiates, competitions in between wards are most likely not the way to go. But for now, no ward is aware of their impact, what should be done, or how to reach the goals. Measurements and monitoring are missing.

Concluding Questions
EC is confident that goodwill and being involved is ten times better than regulations and penalties. To implement a nudge one must be aware of the behaviour first. Locum would like to show healthier and more sustainable options instead of bans. One of their prime focuses for 2017 is “Satisfied Customer”, as a tool to reach the targets within this goal, EC is certain that nudging could be of help.

4.1.2 National Property Board of Sweden - Cultural Heritage [B]
The National Property Board of Sweden (SFV) was formed in 1993. SFV’s task amongst other is to maintain state-owned historic buildings, such as castles, theatres, museums and embassies. SFV manages 6.4 million hectares of land, representing one-seventh of the surface area of Sweden. The appropriation direction indicates that the authority should manage their properties efficiently with useful resources. The buildings should be preserved, nurtured and developed at an “appropriate” level. SFV must meet several requirements; these apply to the cultural and historical value as well as public access to the cultural heritage. (SFV, 2017)

The foundation of SFV’s environmental and energy work is based on the national objectives such as reduced climate impact, sustainable forests, healthy urban environment

and non-toxic environment. A concrete strategy for 2017-2020 is being released later this spring; the following data is collected from SFV's plan for 2013-2016. Several EU-directives point out that the public sector should set an example. SFV should dare to try and demonstrate new technologies and methods; this provides an innovative learning process. The choice of the building and the tenant should then be chosen with care. (SFV, 2013)

The Technical Real Estate Manager (TREM) has worked at SFV since 2013 and oversees tenant accommodations, maintenance and investment projects and implementation of project routines. TREM has daily contact with tenants like the Royal Opera, the Royal Dramatic Theatre, the Royal Library, Restaurant Operakällaren and the Swedish Museum of Performing Art. SFV's tenant relationships are built with a long-term perspective, which in turn makes the tenant more involved in many processes.

To understand the buildings and tenants' behaviour SFV started night walks a couple of years ago. The walk takes place when the building has gone into an unoccupied mode. The walk encompasses the entire building, critical spaces to visit includes the mechanical rooms, areas near the top of the building, stairwells, the main lobby and elevator lobbies to name a few. The ones doing the night walk listen for sounds of operating equipment that should not be on. Often, these issues are quickly addressed, leading to immediate improvements of efficiency, comfort, and performance.

Previous Knowledge about Nudging

TREM had not heard of the concept before this meeting but when TREM read the interview inquiry TREM soon understood what is was all about. Influencing tenants' behaviour is something SFV continuously works with and simplifying maintenance and operation information to their tenants.

Nudge 1 -Simplification and Framing of Information

To measure and document energy use in buildings is a prerequisite for energy efficiency work as per the TREM. To raise awareness among their tenants about the connection between behaviour and energy consumption SFV tries to visualise the usage. At meetings, tenant representatives take part of simplified detailed information about the operations and processes which are most energy intensive, for example how much is being consumed during a particular period. Through coloured graphs information is given about increased or decreased consumption and it is easy to switch between displaying energy, CO_2 or SEK.

SFV has for almost a decade worked and investigated possibilities to install solar panels on suitable roofs or facades. The Museum of Ethnography became the first museum in Stockholm to have them installed on their roof in late 2011. Due to cultural value, thoroughly studies are always conducted to make sure that no harm on the existing building is done. Through a panel by the entrance, both visitors and staff can see how much electricity is produced.

Nudge 2 - Changes to the Default Option
After the night walks that were executed, it came to their attention that a clear majority of the lights were still on entire nights. Difficulties in shutting them off (a remote electrical cabinet) and not knowing who left the premises last were mentioned as the causes. To change the behaviour, light sensors that could either react to movement or sounds were installed. To save water, all facilities when undergoing renovation got IR censored sinks installed. It has been audited, and conclusions drawn from it says that it does not save that much money since water is cheap, but it feels morally right.

Nudge 3 - Changes in the Physical Environment
Where kitchen environment exist SFV have worked a lot with optimisation of fans and ventilation. The focus emerged after noticing that fans had been on during entire nights several days a week after working hours until the morning the day after. SFV took a wholesome grip of the problem and installed a system which regulates the fans. The fans are manually started when the day starts on a display by the kitchen entrance which is easy to manoeuvre. They are set to run for a couple of hours but must be rebooted to not be shut down. A green light lights up when it is one hour left before that happens. To convince the tenants of the advantages of the system, visualisations over the saved costs and watt-hours were handed to them.

TRM also mentions a nudge that SFV together with the Royal Library successfully implemented a couple of years ago to counteract extensive problems with urination close to the main building at night time. The project was called “Sheltered Nooks”, referring to the hidden dark spots in corners around the building. By using light spots that enlightened these corners and removed some hedges both landlord and tenant noticed positive results.

Nudge 4 - Use of Social Norms
TRM wishes that more was done in the field of comparing similar tenants or areas to each other to encourage them to become more efficient. On a smaller scale, TRM who is responsible for the Royal Dramatic Theatre and the Royal Opera has noticed a “brother complex” between the two; they compare themselves to each other. The strongest argument when trying to convince the Royal Opera to install LED was telling the success that the Royal Dramatic Theatre had experienced with the switch. This strive makes them more aware and open to new ideas in their “rivalry” to become the best.

Concluding Questions about Nudging
TRM acknowledges that sustainability easily can become a drained concept when everyone is working with it and actively communicates about their work. TREM is eager to learn new strategies and is happy to receive some advice of possible nudges that could be implemented in the facilities. Many visitors’ yearly visits SFV premises and TREM thinks more can be done within this subject. To not only be inspired by nudging but also to see how other landlords are working with it today.

4.1.3 SISAB - Educational Properties [C]

School Properties in Stockholm AB, SISAB, is a municipally owned company that owns and manages most preschools, elementary and secondary schools in Stockholm. In total, SISAB owns and operate 1.8 million square meters, where more than a hundred thousand people are present daily. The City of Stockholm rents most of their properties. Approximately 16 percent are leased for other purposes, including to independent schools, housing, parking garages and commercial premises. (SISAB, 2017)

SISAB strive for long-term sustainability and works with a three-year environmental program. The program is divided into different target areas and stretches from 2016 until the end of 2019. The objectives and follow-up measurements are selected based on national and local objectives and the company's focuses. The city shall through energy efficiency reduce its energy consumption by at least 10 percent until 2020. According the program should also far-reaching energy efficiency installations be carried out with every major reconstruction. (SISAB, 2016)

The Real Estate Manager (REM) has been working for SISAB during the last 16 years and is currently responsible for preschools, primary schools and secondary schools in the districts of Stockholm called Farsta and Skärholmen. REM oversees the long-term maintenance of the facilities and has one foot in the head office and one out in the daily activities where REM meets principals, janitors and teachers. For support or questions concerning sustainability, there is a whole department working on these issues. They are also involved in every new- or reconstruction project.

Most buildings were constructed in the 60's and 70's, and several of them are today undergoing complete reconstructions. The problem earlier has been accessibility and time, when the only time no one is in the facilities is during the summer. In 2012 a digital monitoring and control program was launched. The objective was to gain monitoring of the energy and heating costs and minimise fire and vandalism. Since the project started, it has saved 190 million kronor as per the REM.

Previous Knowledge about Nudging

As for nudging the concept is nothing REM was familiar with since before taking part of this interview. REM is in favour of the idea and believes that the idea of influencing behaviour on an unconscious level can be useful since the person thinks he or she has made their own decision, which he or she has, but with some outside help.

Nudge 1 -Simplification and Framing of Information

Conceptual protocols are presented at tenant meetings. A summary of what energy usage, vandalism and shattered glass amongst others are costing are handed to the tenant. SISAB has also since early 2015 worked with a customised digital real estate system called *FasIT,* produced by GreenCon, see figure 11. It is manly used for management of official inspections, patrols, and energy statistics over SISABs' approximately 600 properties. The system is web-based, and can be reached by anyone with a username and password. One of

the systems' unique advantages are the map. Buildings placed on the map are coloured per their current maintaining status depending on which module is selected and what is filtered. Through the map, you can quickly navigate, click on a pin, and read transparent information for everything related to a property. The idea is to use it more in the future when meeting tenants.

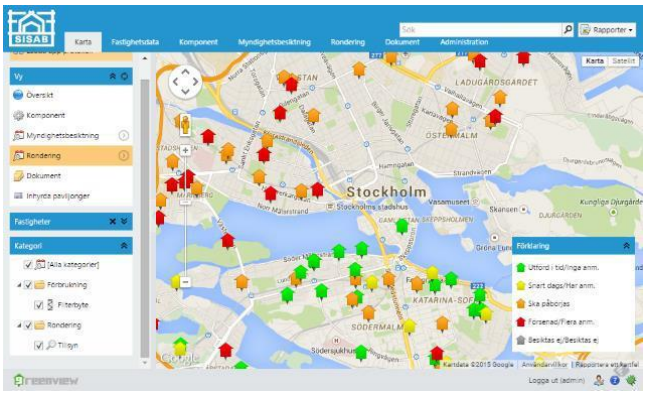

Figure 11. FasIT, the map view of patrol statuses.

When solar panels on SISABs' facilities are installed, they get wired to screens that are placed in the entrances for everyone to see the capacity. REM explained that understanding how much kWh or MWh they are generating might be difficult for youths and younger children; instead they frame the information to something that is more relatable, for example, what that amount could have been used for instead. The information is kept up to date and signals modernity and is used to engage the ones using the building daily.

Nudge 2 - Changes to the Default Option

SISAB continuously works with implementing improvements regarding sustainability to offer the city's schools and preschools healthier learning environments. In accordance with the company's guidelines REM mentions that SISAB always installs lighting with absences and daylight control during reconstruction or new constructions. Presence sensors cause the lights to turn off automatically after a certain time when no one is in the room. Daylight control controls the brightness by daylight - if it is dark outside, it shines stronger and vice versa.

Nudge 3 - Changes in the Physical Environment

Installations and systems supplied by contractors should be planned and constructed as "vandal-proof". Instead of using infrared sensors in bathroom sinks, or buttons that you push once for water, SISAB reversed the function so water floods when you release the button. Less water is used, and the risk of vandalism and flooding is avoided.

To encourage more people to bike or to take bus to the premises, SISAB is aware of the importance of placement and design of bike racks and bus stops. Possibility to place it under shelter from rain and to have enough places is considered. Distance to target and security is also important for most people who choose to take the bike. REM also mentions that art installations which are interactive, pedagogical and encourage the children and youths to think or act are preferred during procurements.

Nudge 4 - Use of Social Norms
SISAB conducted a feasibility study during 2013 to examine how the company could work with their tenants to save energy. The study identified several key success factors in the work of energy-saving behaviour in preschools. A pilot project named *The Energy Agents* was launched the year after, an innovative approach to explore energy and the environment together with the children and teachers in preschool settings. The pilot project was a huge success and last year, 2016; The Energy Agents certified more than 50 preschools, 1000 children and 200 teachers in the city of Stockholm. The positive attention surrounding the method continues, and in October 2016 it was awarded the "Two Becomes More" prize for excellent cooperation between the landlord and its tenants.

The demand for participating is massive, and a new round will start in the spring of 2017. The purpose is, from a child's perspective, in preschools, to explore energy-saving behaviour. Children receive assignments by agent Power but must also keep their eyes open because the thief of Electricity can pop up at any given time and make a mess. Play and curiosity drive the children forward, and by the end of the project, there are many lessons and experiences gathered. The project has also given ripple effect where children have taken their knowledge home and taught their parents on how to behave to save energy.

On the question of arranging competitions in energy efficiency and saving water between schools REM tells that no such plan exists today. What other kinds of incentives that could trigger such a contest, more than goodwill, would have to be further discussed.

Concluding Questions
REM is overall curious to learn more about nudging and in what ways it could be further implemented in their facilities around the city. He became aware during the preparation for this interview that SISAB has done a great deal of projects already. Instead of regulations and prohibitions, he believes that nudging could be a complementing tool to get everyone aboard to save more energy.

4.2 Tenants

4.2.1 Karolinska University Hospital in Huddinge [D]
The Environmental Coordinator (EC) is currently involved in the process of moving the laboratory facilities to the newly constructed part of the hospital. The organisation is bound to follow the same environmental program as Locum for the coming years. When working with environmental issues within the hospital, the EC have noticed that the older staff is harder to convince and get on board. Most staff members are exclusively academics and hard facts must be put forward to bring about change. Through their internal web page, FAQ and instructions about waste management, pharmaceutical waste and energy is reached. EC points out that the information about waste is better connected to activities than energy reduction. Every six - week the EC puts together an information sheet which reaches out to all wards within the hospital's walls.

The EC had earlier heard about the concept of nudging through a college that had attended a seminar about it. As for today, no systematic work that resembles nudging on a larger scale is in place. Abnormalities are examined and corrected through word of mouth and placement of information is frequently being reviewed.

The EC explains that hygiene controls everything at a hospital. Lighting with absences and daylight control and simplified pharmaceutical waste instructions are things that have been received well, but more can be done. The limitations of resources and money have stopped good ideas before. In summer, walls facing the sun become extremely warm and patients and staff members start opening windows which then put the indoor climate out of function. A request was sent to Locum to put up sun filters on the glass, but it had to be added to next year's budget. The need was urgent, so fans were instead bought which was also bad in a hygienic sense for the patients.

Energy rounds occurred more frequently some years ago, the issue that arose was that the shortcomings and defects also became a cost issue. If the ward wasn't undergoing reconstruction nothing was done. The rounds woke expectations that could not be met. The lack of instruments to measure electricity usage is also an issue that the EC mentions.

Hospitals are usually pro regulations and prohibitions, but nudging is something the EC sees as a potential tool to shepherd visitors, patients and staff at the hospital. A crucial part to convince medical staff is to be able to prove evidence. Also, there cannot be too many visual prompts; thus, many wards must be completely clinically clean. The common long-term goals are tough, and hospitals are complex facilities, but the EC is convinced that they can be reached together.

4.2.2 The Restaurant at the Royal Opera [E]

Within the same walls as the Royal Opera is the restaurant Operakällaren situated, which has SFV as its landlord as well. In January of 2009, the restaurant became the first Swedish, and Nordic, Michelin-starred restaurant to receive the Swan Licence. To receive it, the restaurant had to take a holistic grip for their environmental work to manage Swan's strict requirements. It is actively working to reduce waste volumes, and water consumption and the products used are highly eco-labelled.

The Manager attends both the bigger quarterly maintaining meetings with SFV and the smaller operational ones that occur monthly. During the quarterly ones, SFV brings key figures of the past month's water, electricity, gas, heat usage and where the trends seem to be heading. Coloured charts compare it to the past three year's usage that same month which facilitates when the Manager later shows it to his staff. It has been much appreciated. Findings from controls such as the OVK (Obligatory Ventilation Control) are also presented during these meetings which make the tenant more involved.

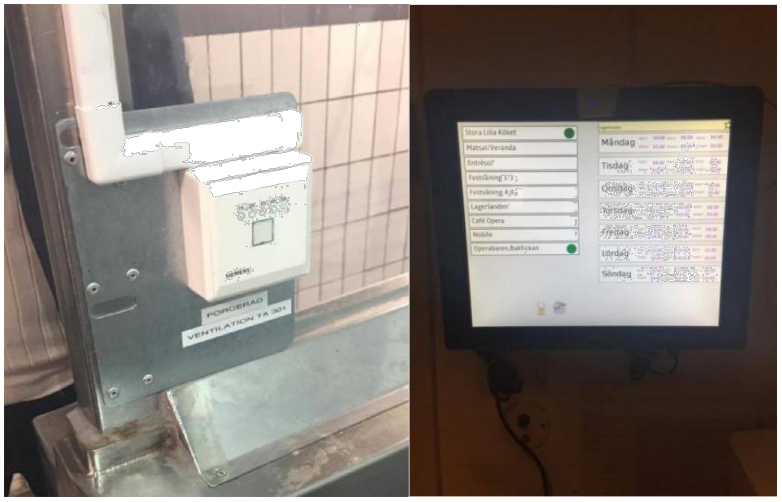

Figure 12. Manually forced ventilation panel together with a display over the entire venue.

Since the forced ventilation had a manual timer installed, they are no longer running entire nights, see figure 12. At weekly meetings, if there are changed opening hours, the time setting is decided. SFV took the installation cost and added it to the rent. Consumption was earlier unnecessarily high, and the restaurant has already retrieved the money that the installation cost. Also, for fire safety, if the kitchen forgets to put on the ventilation with the physical button, the fire alarm will go off automatically.

Since the restaurant got its Swan licence lots has been done to the physical environment to make it easy to make the right decision when it comes to waste management. All stations are equipped with food disposal units, and they actively work to be better at recycling. At first, the Manager feared resistance from the employees for making their job more difficult but it turned out to be the opposite. Most people already think sustainable at home and many of the employees are young with a different mind-set. Older adults are not practising what they are preaching according to the Manager.

The building is K-labelled, which means it is considered to be of such great value that it is a national matter to preserve for the future. Sustainability and the history of the building are continuously up for trade-off. When renovations or new installations are being installed it first must go through several authorities, such as the Beauty Council of Stockholm and the Swedish National Heritage Board. Earlier the building only had one central meter station, and the division between the different activities in the house was hard to discern. Split measuring instruments were set up in connection with the ventilation investment.

The Manager understands what the concept of nudging is about but says he has not encountered the concept before when it comes to energy efficiency. However, what they are doing now is encouraging their guests to try vegetarian and vegan options from the menu through symbols. If it is done in a positive spirit, the Manager thinks it is alright, if not, he believes it could have adverse consequences. Evidence and straightforward communication should lead the way. He concludes by saying that he believes that negative behaviour can be prevented if it is prepared or built right from scratch.

4.2.3 Fölet Preschool in Farsta [F]

The Preschool Teacher (PT) has worked as a teacher for the last 40 years with main responsibility to instruct children between the ages of five and six. Awareness about sustainability for the older generations does not come as easy as it does for the younger ones. PT mentions that reminders and information help to stay up to date but PT is lacking the educational foundation as the newly graduated pedagogues have when they start working. Last time they had a common environmental education at the workplace was late spring of 2016 when they were moving into the newly renovated facility. A thoroughly inventory was done to detect toxic plastic toys.

PT had no previous knowledge about nudging. Explicit and transparent information is crucial for both the children and the teachers; PT sees possibilities for nudging to become a tool for teaching about being energy efficient. One of the preschool's assignments is, according to the curriculum from the National Agency for Education from 2016, that *"...preschools shall help children to adopt a careful approach to nature and the environment and understand their participation in the cycle of nature. Activities will help the children to understand how everyday life and work can be designed to contribute to a better environment, both in the present and in the future."* (National Agency for Education, 2016)

The energy agent's project was initiated by PT's closest Unit Manager and was conducted during the autumn of 2016 in the entire district of Farsta. PT asked earlier today what the children still remember from that day, to which they replied the three following things; water from the tap should never be left on, if it is light outside it should be dark inside and to shut windows if the elements are heated. PT wishes that the school could have been given some material to use in the education continuously, but no original games or templates were handed out.

The organisation is still to this day incapable of recycling since no storage exist to execute it. Everything is thrown into a large black bin in the kitchen, which is later towed by someone at the ward to a remote waste station for combustible materials. PT is certain that if it was prepared and simple to separate, both inside and at the waste station, there would be no argumentation about it and it would work by itself.

The preschool's in Farsta are somewhat similar in size and have the potential to be compared to each other for the competitive purposes. The teachers at Fölet are not currently taking part of energy consumption information; this communication flows between SISAB and the Unit Manager. PT says that there probably are younger enthusiasts working at Fölet that would like to take part of such information at the regular monthly meeting with the Unit Manager.

5. Discussion

5.1 An Engagement in the Matter

Commercial companies have used marketing strategies that resemble nudging to attract consumers to maximise profit. The concept of nudging, however, aims to help people make choices that are more beneficial to themselves or society. None of the three landlord representatives had previously heard about nudging. Before being given the brief explanation, nudging was a vague term that became clearer with exemplification. Most likely since the development of the concept has been driven by actors that researches in the field and that nudge projects are often closely linked to the research.

Mont et al. (2014) and Lindahl and Stikvoort (2015) state that nudging could be a useful tool to use when encouraging sustainable behaviour and energy efficiency, which also proves to be in line with the respondents' views on nudging. They expressed positive attitudes and saw opportunities with its strategies. During the interviews, several actions were noted that measures are already being taken to influence tenants' behaviour which indicates that the landlords not only have the opportunity to nudge but also that they already do so to a certain extent.

Energy efficiency and the work on finding sustainable solutions is no longer an isolated issue, but an integrated part of both property management and the society as a whole, since the work has synergy effects on all sides. From the interviews and the environmental program, good results are reported because of systematic and long-term work. This shows that knowledge about the methods that work is available. Furthermore, there is great optimism amongst the landlords on working actively towards the long-term goals set by their organisations and the government. There is a commitment on the matter.

The Swedish ESO-committee's report from 2016 about nudging states that cognitive obstacles and short-term thinking often lead to bad decisions. Tenants base most of their daily choices on habits. They do as they have always done – the status quo, and they tend to avoid time-consuming or difficult choices. Nudging could be a way to counter these characteristics, such as our unwillingness to change or our fear of losing things, and thus constitute a more successful way of changing people's behaviour.

All landlords saw their role as behavioural influencers as important and legitimate. The landlords also highlighted their curiosity about how others are working with nudging, as this is an important way to move forward with the concept. With consistently, everybody can move forward. It does not have to mean unreasonable costs or significant restructuring within the organisation. It does not require hiring more employees or major educational efforts; the key is to act.

5.2 The Nudging Toolbox

Influencing tenants' behaviour is something all three landlords continuously work on, see chapter 4. The landlords mentioned several examples of simplification and framing of information. SFV sees the graphical presentation of energy usage to raise awareness among their tenants. Seeing what operations and processes are most energy intensive and how much it is costing has proven to be an effective way to lower their tenants' energy consumption. Legislation and cultural aspects prevent SFV from installing solar panels to the same extent as Locum and SISAB. To explain how much the panels are generating SISAB tries to translate and frame the information into something children are capable of understanding. Using framing was also successful for Locum when they change the appearance of information inside their recycling rooms, vague instructions became clear photos.

Presumably, people do not usually "choose" to leave the light on when leaving a room. People often succumb to bad habits despite having made an explicit choice to avoid these behaviours, since behaviour is error-prone (Thaler & Sunstein, 2008). It is reasonable to assume that people do not take the environment into account when making this decision as their private action will have a little global impact anyway. In such situations, there is the potential to create default options. All three landlords have installed light sensors to varying degrees depending on the circumstances. In accordance with SISAB's guidelines they always install lightning with absences and daylight control during reconstruction or new construction. SFV noticed their problem after a night walk and they encourage other landlords to do the same, the more modern machines at hospitals shut down by themselves after inactivity.

A change in the physical environment was the tool that the landlords could show less concrete energy efficiency examples of. REM at SISAB mentioned that all installations supplied by contractors must be "vandal proof". Consequently, their sinks are eco-flush and the risk of flooding is avoided. In SFV's buildings where kitchen environments exist a lot has been done to optimise fans and ventilation. Since forced ventilation had a manual timer installed, the fans are no longer running entire nights at the restaurant at the Royal Opera.

Sunstein (2014) highlights the usage of social norms and finds it to have a greater impact than significant economic incentives. Information about how other people behave often has a greater impact on people's behaviour rather than information about environmental impacts. TRM at SFV sees the strength of using social norms and wishes more was done. On a smaller scale, TRM takes advantage of the "brother complex" between the Royal Dramatic Theatre and the Royal Opera. Through SISAB's feasibility study, the Energy Agents project was launched. The purpose is, from a child's perspective, to explore energy-saving behaviour through fun and games in preschools. The project had a ripple effect where children have taken their knowledge home and taught their parents about how to behave to save energy.

Finally, it can be said that the landlords have worked on projects that could be classified as nudging and that there is support for these efforts in environmental psychology theory. There is still room to use even more of the knowledge and research available on behavioural impact to improve the results of these projects. One difficulty, however, is that many of these projects and measures are hard to evaluate.

5.3 Opportunities and Challenges

Changing tenants' daily behaviour is complicated, partly because of the psychological aspects mentioned in chapter two, but also because of the landlords' pre-existing conditions. Often when talking about the environment, energy and long-term approaches, it is easy to get into a negative spiral. Things that do not exist and areas that do not work are often mentioned. It is often about the lack of political visions, the lack of funding or a lack of competence. It is, of course, necessary to talk about threats and weaknesses to develop an area further, but nevertheless, it is also important to highlight the positive aspects.

To implement effective nudges the building's environment and its function must be considered. All respondents gave examples of the challenges their operation was facing when working with energy efficiency, such as staffed facilities around the clock, historical heritage and vandalism. All three also works profoundly with security but have different availability requirements, which also set limitations. A hospital must guarantee patient security for all visitors. A person who visits the premises is likely to be emotionally unstable, maybe sad, scared or anxious. Museums and the buildings SFV maintains are to be preserved for posterity and can be closed and renovated for several years. Whereas school facilities also have several thousand visitors daily and struggle with wear and tear, but they have the possibility to incorporate energy efficiency into the pedagogy.

Individual efforts like shutting off computers might feel like a drop in the ocean. EC at Locum would like to see more energy meters installed and is intrigued to learn more about the actual energy usage within hospitals, but fears the large cost item to installing them and measuring it. EC also believes that more can be done when it comes to shaping the physical environment and to steer visitors and staff to more sustainable behaviour. Construction and reconstruction processes tend to happen quickly after a decision has been made. By letting energy controllers participate in an early planning stage, more can most likely be done.

Much research has focused on directly improving one's behaviour. But how one behaves at work compared to home might differ. The workplace is a non-personal and non-domestic environment which creates many unique issues for the ideas behind nudging behaviour. An individual may be committed to pro-environmental behaviour when at home but is forced to engage in negative practices at work such as using inefficient energy-intensive equipment or sitting in an overheated environment. Some can also have the opinion that the workplace is not their own and not their responsibility since their energy consumption at work won't be affecting the private economy. The EC from Locum also touched on this subject when explaining the increased use of MRI machines. The workplace or type of work has its requirements. Some businesses need three or more machines running per individual, but it is unusual for others to have a computer at all. These kinds of external constraints might make people feel out of control of the environment and its consumption, leading to a lack of motivation. Given these limiting and influential factors, it was difficult to consider how one can utilise the same nudging technologies that typically apply in domestic contexts.

5.4 Manipulation or a Smart Tool?

All three landlords stand unanimously in their belief that goodwill and being involved is ten times better than regulations and prohibitions, and that nudging could be a complementing tool to get everyone on board to save more energy.

Nudging is used to affect decisions in ways that are transparent, and thus the manipulating element is eliminated. The discussion about the possible manipulative features of nudging are in line with other sustainability issues such as; what rights do individuals have to live as they wish if they affect the ecosystems? Although there are some who criticise it, it is still difficult, at least in a Swedish context, to see nudging as a controversial strategy. However, there might be a need to debate how to use tools like nudging, who should be able to use it and for what purpose? What should also be discussed is if nudging should only focus on system 1 behaviour (fast) or targeting system 2 behaviour (slow), or a combination of both.

Sweden has a long tradition of a strong welfare state which has given us a high degree of acceptance of government intervention. The kind of cautious paternalism which nudging implies in a Swedish policy context is relatively weak since regulations and laws are used than in a country like the USA where all kind of government intervention is seen with greater scepticism.

It will be exciting to see if Sweden will follow the same path and implement a similar unit at a political level as the ESO report from 2016 suggested. Perhaps the absence of a Swedish "nudge unit" depends on the criticism usually expressed, namely, whether the government should interfere in matters that the individual can independently make decisions on, regardless of it is a guide to more sensible choices concerning health, the environment or the economy.

5.5 Limitations

This study has its limitations: Attitudes towards nudging are problematic to investigate since nudging interventions is not designed to call for reflection. Nudging interventions tend to work best in the obscure. However, in this study, the respondents were asked to present implemented nudge-like projects and their attitude towards nudging as a tool in general. These somewhat biased questions could have positively affected their perception of nudging.

When using the snowball effect to get in contact with respondents, it is usually impossible to determine sampling error or make inferences about populations based on the obtained sample. Sampling bias could occur when using the snowball sampling technique. Initial interviewees tend to nominate people that they know well. Because of this, it is possible that the whom they nominate share the same traits and characteristics. Thus, it is possible that the sample that the researcher will obtain is only a small subgroup of the entire population.

Another limitation of this study is the relatively small number of interviewees. Great caution must, therefore, be exercised in the generalisation of the results. Since qualitative research occurs in the natural setting, it is tough to replicate such studies. It is impossible to make sweeping generalisations about groups of people based solely on a few interviews. You can

find general patterns or trends, but should never assume that what you have found is what exists or what will always exist. In fact, it is hard to make accurate generalisations about any occurrence that relates to people because people themselves are dynamic and situations are always changing.

Self-report studies have many advantages, but they also suffer from distinct disadvantages due to the way that subjects behave. A major problem with interviews is demand characteristics. This includes the interviewer's biases and response biases. An interviewer may influence the respondent through, for example, leading questions or subtle reinforcements of 'right' or 'wrong' answers. Response bias may happen when, for example, respondents give socially acceptable answers.

There was initially a wish to experiment at least one nudge but time constraints, the lack of resources and impossibility to do several repeats set restrains. Testing nudges on public tenants are therefore mentioned as recommendations for further research.

5.6 Further Research

Many questions were raised during this study which would require further investigation. To advocate nudging as a tool that affects tenants' daily behaviour more concrete facts are needed to support its effect, especially if one wants to convince landlords to work with nudging. By using the earlier mentioned recommended steps and testing potential nudges with random sample selection and control groups could lead to more definitive evidence. To be entirely sure that an implemented nudge leads to a changed behaviour requires careful evaluation of intended and unintended effects and gathering additional data before being approved. The one implementing the nudge needs to know when and with whom an intervention works well enough to justify its side effects.

What should be important to keep in mind is the context of the sites for the results to be comparable. As shown in this study, all three public landlord deals with different restrains and a tested nudge at a hospital may not work at a preschool. Future experiments should also determine actual consequences of implemented nudges in numbers and savings.

A better understanding of the ethical perspective and concerns that nudging resembles manipulation also needs to be developed for the ongoing debate. Examining risks and opportunities more thoroughly could be further researched. Should there be any guidelines, prohibitions or restrictions put in place? A question that grew stronger as nudging was examined from an environmental perspective is what leads to unstainable behaviour from the beginning? Do we only act environmentally friendly if it's easy to make the right choice?

Earlier studies indicate that women are more environmentally conscious. This could explain the distribution regarding gender in this study. It raises the question, are women more inclined to work with nudging as a tool to achieve sustainability? And where are we more open minded to be nudged, in public spaces, at work, or in our homes?

6. Conclusion

By returning to the initially stated research question at the beginning of the study, it is now possible to conclude that a lot is being done to encourage public tenants to behave more sustainable. All interviewed landlords are working with behavioural influencing to some extent to reach established organisational long-term energy efficiency goals. All respondents had a positive attitude towards nudging as method, but only one of the tenant representatives was familiar with the term since before. Most likely because the development of the concept has been driven by actors that research in the field and that it has not reached the public eye yet.

The possibilities for the landlords to work with nudging must be considered as favourable and that some of the already implemented measures could classify as nudging. To raise tenants' awareness about the connection between behaviour and energy consumption simplified coloured graphs at maintenance meetings have been a powerful tool and using lighting sensors is evidentially an effective example of a default option. When making the right choice easier, through simplified or framed information, findings from the interviews shows that more people are inclined to do the right thing. SISAB's Energy Agents Project also shows an innovative course of action to make preschool children and people in their surroundings aware of their energy consumption.

To be able to introduce sufficient behavioural actions or nudges, consideration must be given to the organisational context. All landlords gave examples of the challenges facing their buildings such as staffed facilities and technical systems running around the clock, patient security, vandalism and historical heritage.

The landlords saw their role as choice architects as legitimate and important, but it is important to discern for whose interests nudging is performed and what one wants to achieve. There was also a genuine interest to be inspired by tips and ideas on earlier implemented nudges with good results and to hear what other landlords have done within the subject.

This study has shown that nudging could have the potential to create more concrete strategies for the landlords, or even the tenants, to work further with. However, more research is needed on how nudging can be used to influence tenants' behaviour and habits. The energy issue will most likely be even more integrated into public real estate organisations in the future, and it will still be a competitive advantage to save energy in 2050. The willingness to strive to become better exists within all the interviewed landlords and their tenants. Nudging is still relatively unexplored in Sweden, and there is plenty of room for experimenting on all four different nudging tools combined with energy efficiency projects. There is also an indirect effect by engaging more people in environmental issues. From environmental psychology, we have learned that behavioural changes often come before attitudinal changes. This way, one can imagine using nudging to create broader acceptances for a more ambitious climate policy.

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Appendices

Appendix I: Interview Guide Landlords

Warm-up Questions

- Is it alright to record this interview for transcription purpose?
- Do you wish to be anonymous in this interview?

Organisationally and Professionally

- What is your professional role? Key tasks?
- How is the organisation around you built?
- How are you informed at work about sustainability and environmental issues today?
- What are your long-term sustainability goals? How does your organisation work to reduce its climate impact?

Nudging and Behavioural Change

- Are you since before our meeting and phone call familiar with nudging?
- What is being done to encourage tenants to more sustainable behaviour today?
- How are obstacles and opportunities for sustainable behaviour identified today? And where does your responsibility start and end?

Nudge 1 - Simplification and Framing of Information

- What is being done to facilitate information to the tenants? Is there an example of when it is given at the right time and place? Are environmentally friendly choices highlighted somehow?

Nudge 2 - Changes to the Default Option

- People are generally comfortable and prefer to run with the default option. Do you have examples where your organisation works with such settings?

Nudge 3 - Changes in the Physical Environment

- How the physical environment is designed also affects our daily choices. Do you have any examples of where you made any efforts or changes?

Nudge 4 - Use of Social Norms

- People willingly follows the herd and don’t want to be worse than others. Are there any existing conditions were similar properties could be compared and "compete" against each other in, for example, energy efficiency?

Concluding Questions about Nudging

- What is your impression of nudging as a tool to change behaviour? Are there situations where prohibitions and regulations are better than nudging?
- Do you think you have the skills and resources to work with behavioural impact?
- Would a checklist of implementable nudges be of value for your organisation?
- May I return with more questions if they would arise? Is there anything you would like to add before we end this interview?
- Can you recommend a tenant representative who can answer and explain how the changes as mentioned earlier have been experienced in their organisation?

Appendix II: Interview Guide Tenants

Warm-up questions

- Is it alright to record this interview for transcription purpose?
- Do you wish to be anonymous in this interview?

Organisationally and Professionally

- What is your professional role? Key tasks?
- How is the organisation around you built?
- How are you informed at work about sustainability and environmental issues today?
- What are your long-term sustainability goals? How does your organisation work to reduce its climate impact?

Nudging and Behavioural Change

- Are you since before our meeting and phone call familiar with nudging?
- How are obstacles and opportunities for sustainable behaviour identified today? And where does your responsibility start and end?

Unique questions to the Environmental Controller at Karolinska University Hospital in Huddinge

Nudge 1 - Simplification and Framing of Information

- Have the put-up photos in the recycling room solved the earlier sorting problem?
- Are there other examples of simplified or framed information that visitors and staff take part off daily?

Nudge 2 - Changes to the Default Option

- Lighting sensors and self-turnoff MR-cameras amongst other instruments was mentioned as an example where Locum is working to reduced energy consumption, do these settings work well?

Nudge 3 - Changes in the Physical Environment

- How the physical environment is designed also affects our daily choices. Locum mentioned the visible and accessible placement of bicycle racks to encourage the more sustainable behaviour. How is this perceived? Do you have other examples where your organisation has made efforts?

Nudge 4 - Use of Social Norms

- People willingly follows the herd and don't want to be worse than others. Do you think knowledge about other wards energy usage could motivate the staff to implement efforts to reduced energy?

Unique questions to the Manager at the restaurant at the Royal Opera Nudge 1 - Simplification and Framing of Information

- At meetings with the landlord, it was stated that you as a tenant are shown graphically visualised operating numbers. How is this information perceived?
- Are there other examples of simplified or framed information that visitors and staff take part off daily?

Nudge 2 - Changes to the Default Option

- After night walks in the properties, SFV noticed that there was lighting on around the clock. Lighting sensors were mentioned as an example where SFV is working to reduced energy consumption, do these settings work well?
- People are generally comfortable and prefer to run with the default option. Do you have other examples where your organisation works with such settings?

Nudge 3 - Changes in the Physical Environment

- How the physical environment is designed also affects our daily choices. SFV mentioned the manually steered ventilation system with the installed displays because of around the clock turned on fans. What is the overall view of this system?
- Do you have other examples where your organisation has made efforts?

Nudge 4 - Use of Social Norms

- People willingly follows the herd and don't want to be worse than others. Do you think knowledge about similar properties energy usage in the surrounding area could motivate your organisation to implement efforts to reduced energy?

<u>Unique questions to the Preschool Teacher at Fölet Preschool in Farsta</u>

Nudge 1 - Simplification and Framing of Information

- Does the property have solar panels installed? If so, have the digital screens led to interest and awareness?
- Are there other examples of simplified or framed information that the children, visitors and staff take part off daily?

Nudge 2 - Changes to the Default Option

- Lighting sensors were mentioned as an example where SISAB is working to reduced energy consumption, do these settings work well?
- People are generally comfortable and prefer to run with the default option. Do you have other examples where your organisation works with such settings?

Nudge 3 - Changes in the Physical Environment

- How the physical environment is designed also affects our daily choices. SISAB mentioned low flushing sinks which are also vandal proof and a will to place out more bicycle racks to encourage the more sustainable behaviour. How is this perceived?
- Do you have other examples where your organisation has made efforts?

Nudge 4 - Use of Social Norms

- SISAB has been actively working with a project called "Energy Agents" during the past year. Have they visit Fölet and what is your opinion about its impact?
- People willingly follows the herd and don't want to be worse than others. Do you think knowledge about similar properties energy usage in the surrounding area could motivate your organisation to implement efforts to reduced energy?

Concluding Questions to All Tenant Representatives about Nudging

- What is your impression of nudging as a tool to change behaviour? Are there situations where prohibitions and regulations are better than nudging?
- May I return with more questions if they would arise? Is there anything you would like to add before we end this interview?

Appendix III: Transliteration Key

Interviewer
A - Albin Haglund

Landlords
An - Male, Real estate manager, SISAB
El - Female, Energy controller, Locum
Em - Female, Technical real estate manager, National Property Board of Sweden

Tenants
Ew - Female, Energy controller, Karolinska University hospital in Huddinge
Le - Female, Preschool teacher, Fölet preschool
Ma - Male, Manager, the restaurant at the Royal Opera

(C: example)	Concurring speech
(D: example)	Disaccording speech
?	Questioning tone
[ ]	Something is going on outside the conversation
xx	Disruption
##	Phone rings
::	Speaking in long letters for example e::
(pause)	Long pause
(.)	Short pause
’	Shorten word in speech for example I’m
1, 2, 3 etc.	New person speaking
,	New half sentence
.	New sentence
F:	Follow-up question
P:	Planned question

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