Consumer behavior analysis through nudging

A study on nudging of single-used hospital garments in healthcare sector of Region Östergötland

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1. Abstract

Region Östergötland has encountered issue in ecological and economical overconsumption of single-used garments in healthcare sector among medical staff in Universitetssjukhuset Linköping. Proper approaches to reach solutions towards decrease of usage of single-used garments were targeted to be implemented for employees of healthcare sector. Two goals were established for this study. First of all, it was aimed to analyse consumer behaviour of employees in healthcare sector of Östergötland region to find out reasons that lay behind increase of single-time garments by employees. Secondly, the aim was targeted to examine what nudging techniques, if any, are feasible to use in positively changing current consumer behavior. The findings showed that nudging has a strong potential to be regarded as an effective tool in influencing healthcare workers of Linköping University Hospital disposable garments usage. Main behavioural reasons that triggered increase of disposable garments usage were detected as lack of information and old habits of medical staff. Application of information disclosure, framing, feedback and social norms nudging techniques were identified to have promising possibilities in impacting current behaviour and raise healthcare workers awareness about their consumption patterns.

Key words: choice architecture, healthcare sector of Region Östergötland, libertarian paternalism, medical staff, nudging, single-used garments, reusable garments

2. Introduction

Consumer behavior change is often identified as one important aspect of sustainable social transition. Some consumers confess their responsibility, however when it comes to action where it necessitates changing behaviour to be more environmentally-friendly, consumers take actions more reluctantly (Ölander, F. and Thøgersen, J. 2014). Change in people’s consumer behaviour often requires not only information about the need of their change, but also motivation, reasons and encouragement for real action (Lindahl and Stikvoort, 2015).

Behavioural change of individuals occurs at different levels, that can be discerned with behaviours affected by fast-decision making with long-term consequences, or continual repeated behaviours such as everyday shopping or repetitive but less frequent types of behaviours such as equipment sustenance (Ölander and Thøgersen, 2014).

Human behaviour has been studied for long by behavioural sciences such as psychology, marketing and behavioural economics and has been detected as a compound subject, which is influenced by various determinants such as values, needs, motivations, social standards. Insight that policy makers gain from behavioural sciences push them not only to perceive human behaviour itself as well as features influencing it, however also devising efficient policies to raise sustainable behaviour. It was discovered that rationality is frequently held back by people, when they exclusively reckon on mental shortcuts and habits instead of choosing consciously.

Based on this research, policies could be created in a way that recognize and apply knowledge of human behaviour and not in a way economic models portray human behaviour. One of the perspective tools that can have an impact on sustainable and environmentally-friendly consumption behaviour is nudging (Lehner, Mont and Heiskanen, 2015).

Nudging tool is progressively getting well-known among economists, marketers and scientists. Swedish Environmental Protection Agency releases reports regarding nudging and
Vetenskapsradion dedicates distinctive programs to the perception of nudging (Lindahl and Stikvoort, 2015). In the field of sustainable development, nudging approach is to an increasing extent executed among politicians, since nowadays policies are not often ample enough to aim environmental objectives such as cutting down greenhouse gas emissions. Nevertheless, nudging is not altogether evident as a term or a concept and for some it is difficult to differentiate what might or might not be carried out as nudging. Undoubtedly, nudging symbolizes approach that influences people behaviour, nevertheless not all methods impacting human behaviour are viewed as nudging. It is essential to broaden knowledge and provide scientific description of the concept of nudging (Lindahl and Stikvoort, 2015).

Overconsumption from economic and ecological perspective of single-used garments among medical staff in healthcare sector of Region Östergötland has been acknowledged to play substantial role in unfavorable ecological footprint of greenhouse gas emissions of Östergötland Region. Therefore, suitable ways to attain resolutions to diminish usage of single-used garments should be implemented among healthcare workers. Reasons that lay behind the over usage of single-use garments are yet obscure and should be investigated as well as how actual behavior can be altered to achieve goals of this study.

The aim of this study is to analyze consumer behavior of employees in healthcare sector and evaluate attainable nudging techniques in Linköping University Hospital of Region Östergötland. Prospective research outcomes can decrease usage of single-used garments and therefore contribute to reduction of greenhouse emissions and lead to cost efficiency of Region of Östergötland. Research questions of this study are following:

1) What are behavioral reasons that lay behind increase of disposable garments usage by employees in healthcare sector of Region Östergötland?

2) What is the view of implemented nudging projects at Linköping University Hospital, Region Östergötland?

3) What nudging techniques, if any, are feasible to employ to decrease the usage of single-use garments at Linköping University Hospital, Region Östergötland?

3. Background

Region Östergötland consists of 456,550 inhabitants of Östergötland County. It encompasses a large responsibility for environmental impacts of the business including potentials for enhancing sustainable development. Region Östergötland has a concern regarding rise of greenhouse emissions, specifically in the care sector. In proportion to Greenhouse Protocol as it shown on Figure 1, 65% of greenhouse emissions of Region Östergötland emanate from indirect emissions, which are: procured material, waste management, procured transport, commuting and job travel (Johansson et al., 2017).
One of the causes of indirect emissions increase implicate rise of hospital garments use in healthcare sector. Since 2013 to 2016 as it demonstrated in Figure 2 the volume growth reached to 80% of hospital garments and the cost as displayed in Figure 3 of hospital garments since 2014 to 2016 augmented from 65,914 kr to 1,077,194 kr (Johansson et al., 2017).

Figure 2 Region Östergötland single-use garments volume increase
Source: Johansson et al., 2017
Figure 3 Region Östergötland total procurement amount in 2016 within categories
Source: Johansson et al., 2017

Linköping University Hospital garments of Region Östergötland comprises two types: single used garments and reusable ones. Single used garments have bigger input than multiple garments in the overall cost and volume increase, which in its turn adversely impacts environmental and economic status of Region Östergötland.

According to Nordic Councils of Ministers, among all European consumption, textile consumption embodies 4 to 6% of all environmental impacts. Such impacts are caused by both: production and consumption (Watson, 2017). Textile industry of natural fibers and synthetic fibers comprises social and environmental risks. According to The European Commission fundamental environmental hazards of textile industry are water consumption and chemicals that are exploited for irrigation and cultivation of material production. Nonetheless, it is critical to review other ecological impacts, such as energy consumption, air emissions and waste generation (Kaarlenkaksi, 2015; Swedish Competition Authority, 2015). Besides severe environmental hazards, manufacturing of textile material is associated with social risks which are: poor and unsafe working conditions, child employment, long working hours with low salaries, ethical risks of bribery and corruption in textile business environment (Kaarlenkaksi, 2015). To decrease negative environmental impacts of apparel manufacturing, it is essential to prolong usage life of apparel to the maximum, that meanwhile also gets economically beneficial. Apparel recycling is not as environmentally beneficial as compared to extending its lifespan. When reusable garments are examined in contrast to disposable ones, disposable apparel show to have much more negative environmental impact. Studies made in 2012 show that, several used apparels represent 2 to 3 times in a less degree carbon footprint than disposable ones and asserted to be environmentally preferred. Another research demonstrates that through comparative analysis of disposable and reusable garments life cycle it is apparent that reusable clothes have undoubtedly inferior environmental impact than disposable ones by virtue of prolonged lifespan (Mikusinska, 2012).
Figure 4 Environmental impact of reusable and disposable garments

Source: Mikusinska, 2012

In the figure 4 it is possible to see comparative analysis of reusable and disposable apparel lifespan within categories, which displays that within all studied categories life cycle of single-used clothes has higher adverse environmental impacts than multi-used garments. Furthermore, the same study shows that if wearing reusable garments just one time, it issues identical environmental impact as disposable apparel (Mikusinska, 2012).

4. Theoretical framework

4.1 Definition and concept of nudging

The most generally agreed upon definition of “nudging” is explained by behavioural economist Thaler and law scholar Sunstein Nudge, where nudging is “…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” (Thaler and Sunstein, 2008). Many researchers determine concept of nudging from rational and irrational context, which is affected by behavioural science.

For a long period of time behavioural science, basis of which was rational decision-making, was grounded on general and neoclassical economics. Nevertheless, behavioural science, foundation of which lies within cognitive and social psychology, believes that it is necessary to keep in mind that individual is limited in being rational and it is important to regard behavioural prejudices and milieu which have possibility to impact decision in human behaviour (Lehner, Mont and Heiskanen, 2015). Otherwise stated, sometimes human-beings do not completely employ their brain to obtain the best result, however, rather stand on their decisions on first available alternative or satisfying outcome, than optimal. Therefore, individuals are not always apt to make their choices and behave rationally (Lindahl and Stikvoort, 2015). Commonly people lack time, motivation and are exposed to unfavourable circumstances to think attentively and make careful decisions. Research has found that more than 200 day-to-day food preferences of human-beings are not based on consciousness but affected by habits and routines (Marchiori, Adriaanse and De Ridder, 2017).
Characteristic of nudging lies within concept of choice architecture that is important to highlight. Choice architecture is the structure that helps individuals to construct reasonable decisions. The scope of choice architecture influences human behaviour and his choices in one way or another (Lindahl and Stikvoort, 2015).

In order to understand concept of nudging, it is important to comprehend two systems of human thinking, where rational and irrational way of thinking is differentiated. System 1 involves fast way of thinking (automatic and intuitive), while System 2 represents slow (conscious and rational) mindset. System 1 directs people daily routines that occur in our everyday life frequently automatically such as brushing teeth and taking shower while System 2 relies on conscious choices made by individuals, that necessitate deliberate thinking and mental effort (Lehner, Mont and Heiskanen, 2015). It is believed that nudging interventions are more efficient when targeting people with System 1 type of behaviour that implies low level of conscious deliberation. (Mont, Lehner and Heiskanen, 2014). However, studies demonstrate when targeting System 1 behaviour, it should be highlighted that provision of information doesn’t surely conduct to change of behaviour due to the reason that choices of people often rely on procrastination, lack of self-control and habitual patterns (Lehner, Mont and Heiskanen, 2015). Nevertheless, this presumption is opposed by proposition of Ölander and Thøgersen (2014) where authors argue that provision of information is core characteristic of nudging choice architecture and thus plays vital role for positively influencing consumer behaviour.

Lehner, Mont and Heiskanen (2015) indicate that nudges are targeted not to specifically impact persons value system, or distributing better information, but enabling behaviours to set personal choices that are socially beneficial with goal to last for a long time. Lindahl and Stikvoort (2015) bring further suggestion that nudging is targeted at individual behaviour, and not individual attitude. Nudging aspires to influence human-beings to make actions differently, but not to think differently, despite the fact that nudging interventions are still prone to impact the way of thinking of individuals. Attitude-behaviour interrelationship should be remembered in implementation of nudging intervention. People often assume that thoughts influence our actions, however our actions are also able to affect our thoughts, otherwise stated people opinions are reposed on behaviour that is discovered in ourselves. For instance, when people procure eco-label products, people might get the feeling that they care about the environment and sustainable development, by virtue of that people search for consistency between mind and action. In cases when attitudes are not interacted to behaviour, people may feel embarrassed or confused (Lindahl and Stikvoort, 2015).

It is important to highlight in the concept of nudging another essential term “libertarian paternalism” that was created by Thaler and Sunstein (2008) and restated later in their nudge book as typical feature of nudging (Lindahl and Stikvoort, 2015). Practically, it means that nudging retains freedom of choice (libertarianism) but stimulates public sector to guide individuals on the way to improve their own well-being. The precise definition of libertarian paternalism is “…a relatively weak, soft and nonintrusive type of paternalism because choices are not blocked, fenced off, or significantly burdened [...] better governance requires less in the way of government coercion and constraint, and more in the way of freedom to choose. If incentives and nudges replace requirements and bans, government will be both smaller and more modest” (Thaler and Sunstein 2008; Mont, Lehner and Heiskanen, 2014).

4.2 Nudging tools

Five main types of nudging tools have been identified as effective interventions that are prone to positively change human behaviour. They are: 1) information disclosure 2) framing 3) feedback and social norms 4) default options 5) changing physical environment. Each type of nudging tool will be briefly reviewed.
4.2.1 Information disclosure

Information disclosure as nudging tool highlights significance on the content of information (Lehner, Mont and Heiskanen, 2015). Lindahl and Stikvoort (2015) point out that information disclosure involves furnishing proper quality of information that will impact people to choose one way of behaviour over another. Disclosure of information should not include overloaded information to prevent overthinking of individuals but should act in heuristic manner with the “rule of thumb”. Eco labels are good examples of disclosure of information that bring awareness to consumers that the product beneficial for the environment inducing the feeling of the individual that he is sustainably-friendly. Another example of information disclosure nudging intervention, is employee implication, where provided information about the rate of their lifetime investment savings plan enhanced propensity of these employees to engage in this plan (Lindahl and Stikvoort, 2015).

4.2.2 Framing

Framing of information highlights importance on how information is provided. Framing of information is a reasonable method of signifying information that inchoates some sense and attitudes of a person. Authors Lehner, Mont and Heiskanen (2015) describe example of improving number of sales in school cafeterias by 27%, when school cafeteria menus with vegetables were renamed in a different manner from “Zucchini cookies” to “Grandma’s Zucchini Cookies”. Lindahl and Stikvoort (2015) show an example where participants received opportunity to select between two distinct healthcare programs of “definitely saving 200 out of 600 people” or just “one-third possibility of saving all 600 people”. Experiment participants picked first option. However, when question was paraphrased to “definitely allowing dying 400 people” or “one-third chance possibility that nobody dies”, participants selected second choice. Despite the fact that these proposed options were similar in meaning, Tversky and Kahneman’s suggest theory that people have disposition to endorse losses more firmly than gains. People tend to choose possible losses over clear losses, nonetheless, go for clear gains than for just assumed gains (Lindahl and Stikvoort, 2015).

4.2.3 Feedback and social norms

Authors Lehner, Mont and Heiskanen (2015), Lindahl and Stikvoort (2015), Ölander and Thøgersen (2014) bring meticulous explication of social nudges as nudging tool. According to Lehner, Mont and Heiskanen (2015), who points out that individuals are social-beings, assumes that social norms have to a large extent impact on behaviour of people. Social norms are principles that people stick to for two main reasons: because of believing that these regulations are right and acknowledged by other choice norms, or because other people act in accordance with these norms. Moreover, people might follow nudging tools in form of social norms to gain social approval.

4.2.4 Default option

According to Ölander and Thøgersen (2014), default option is the result of how people proceed limitations. Because of various reasons such as procrastination, lack of information, people are not willing or not able to make a decision and thereby select default option. Individuals can also presume that the default option was selected to be “default” without critical reasoning why (Ölander and Thøgersen, 2014). Default option is one of the most cost-efficient and effective nudging tools. Effectiveness of default option can be linked to people’s habits. Selecting the default option can turn into a habit, without accentuating attention alternate options (Lindahl and Stikvoort, 2015). One study has shown that inducing from one-sided paper as default option in printers, to double-sided default option, has decreased paper consumption by 15 % (Lehner, Mont and Heiskanen, 2015).
4.2.5 Changing physical environment

The best example of changing physical environment as nudging represents reducing plate sizes and portion sizes in public places, that leads in energy saving and cutting down food waste. Recent research has demonstrated that reducing plate size of guests from 24 to 21 cm in 90 Nordic Hotels, has provided decrease of 15 % of total food waste (Lehner, Mont and Heiskanen, 2015). Another interesting example of changing environment nudging tool is implementing painted footsteps to impact people behaviour. For example, the store Coop in the train station in Stockholm applies footsteps, to motivate people shopping in the store. Another example of green footsteps that guided people to trash bins were installed in Copenhagen, that stimulated to throw into bins, instead of leaving waste in the streets (Lindhal et al.,2015).

4.3 Weaknesses and criticism of nudging

Despite of numerous advantages and opportunities of nudging tools, nudging possesses number of weaknesses and prone to be criticised. To start with, it is believed to be challenging to conceive policy intervention in the proper manner and to assure that it would work in certain intervention environment and result in desired outcome. The complication is that previous research has been done on relatively small sample of people, and only few studies of nudging have been focused on entire population as a sample. Another weakness of nudging is deficiency of evidence if nudging is truly cost effective and has a long-term consequence (Mont, Lehner and Heiskanen,2014). Nudging tools can show efficiency in the beginning of its implementation, however reduce its effectiveness in the long run. With increase of nudging use frequency, individuals can conceivably be more aware through time with designed effect and of their own choice biases (Voyer, 2015).

In addition, it is challenging with nudging to be sure how different group of individuals in various kinds of environments recognize and perceive the same nudge. For making rewarding outcomes, it is necessary that nudge is targeted to a large extent understanding of what human-being decision process consists. The incentive that is proven to be successful with one nudge of one group of individuals at specific time and location, might lose its effectiveness with same nudge at another time and place. (Mont, Lehner and Heiskanen, 2014). Moreover, outcomes of nudging tools might be incompletely or not fully predictable, thus it is burdensome for choice architects to perceive the outlook of people in which manner they prefer to be nudge (Lindahl and Stikvoort, 2015).

Criticism of nudging begins with its connection of being paternalistic. Even though the conception of paternalism that Thaler and Sunstein (2008) assert that nudging “tries to influence choices in a way that will make choosers better off, as judged by them- selves”, critics declare that even without overt coercion, individuals are still forced to accomplish specific action. Boundaries of paternalism is challenging to detect (Kasperbauer, 2017). Nudging is blamed to manipulate people due to the reason that individuals not always possess reasonable ability to make rational choices. Thereby, critics believe choice architects have to create atmosphere for people where they are inspired to make decisions using cognitive capacity and rational thinking, otherwise people might act negatively towards nudging if they feel being manipulated (Lindahl and Stikvoort, 2015).

Another objection to nudging is that it decreases individual autonomy. When nudging tools are targeted to impact human behaviour, it diminishes human capability to live life and act in a way how they want to. However, proponents of nudging affirm that nudging in the contrary in some cases enhances autonomy of individuals by stimulating people to be more responsible in
their life, since nudges are only well-meant regulators and aimed for the own benefits of people (Kasperbauer, 2017).

Furthermore, nudging is criticised by term of freedom of choice, claiming that is difficult to define boundaries of what is real freedom of choice. Thaler and Sunstein (2008) advocate that tolerable alternative possible choices should be always provided along with preferable decision option and with minimal cost. Nevertheless, it is arguable what exactly minimal costs should be, how many alternatives should be provided and what is the definition of reasonable alternative notion (Lindahl and Stikvoort, 2015).

Lastly, nudges are objected by some opponents to be insulting, since people are treated as helpless and unskilful in making decisions. The risk of nudging is that people might feel insulted as if choice architects are choosing what is best for them, instead of making choice by themselves (Kasperbauer, 2017).

4.4 Nudging in public sector

It is important to keep in mind that people might respond differently to nudging tools in private versus public sector, and home versus working environment. The main difference of nudging interventions has been highlighted by Mont, Lehner and Heiskanen (2014), is that public places are run up with comparatively controlled environment, where contradicting influences hardly exist compare to private organisations. According to authors nudging tools are mostly efficient in the public places with low number of intervention control of opposing forces of marketing. In the example of Swedish state-owned alcohol stores (Systembolaget) with high controlled environment, tools permit efficient level of nudging that aims responsible alcohol consumption, compare to countries where private retail stores control the market. In such environment, nudging is hardly feasible due to the reason that other marketing influences exist. Similar situation of efficient nudging appliance and implementation can be observed in public canteens, where one authority, such as city council, public hospital, school or university has the power to determine features of consumption behaviour with low level or no intervention of other actors (Mont, Lehner and Heiskanen, 2014).

Importance of differentiating nudging tools between private and public sector stands within the fact, that some people might confuse marketing tools with nudging ones. Despite the fact that marketing and nudging appear to have many similarities, one crucial difference between their two approaches exist, which can be observed in the Table. Nudging tools aim to help people make decisions that are favourable for themselves and society around, while marketing principally targets to influence people’s behaviour for the sake of company or business profit. Nonetheless, it is possible that businesses obtain benefits and improve consumers life at the same time. Private companies may prompt people to use green, low-fat, energy-saving products that favour both businesses and consumers (Mont, Lehner and Heiskanen, 2014) .
Table 1 Traditional marketing vs. choice architecture and nudge

Source: Mont, Lehner and Heiskanen, 2014

<table>
<thead>
<tr>
<th>Traditional marketing</th>
<th>Behavioural economics and nudge approaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aims to first of all maximise profits and benefits of businesses</td>
<td>Aims to first of all benefit people/consumers</td>
</tr>
<tr>
<td>Focus on what needs to be sold, not necessarily on the best alternative for consumers</td>
<td>Focus on options that are best for people leaving possibility for people to opt-in or opt-out</td>
</tr>
<tr>
<td>Reliance on marketing experts (including behavioural experts) in corporate decision-making</td>
<td>Reliance on behavioural experts in the process of policy planning</td>
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4.5 Nudging perceptions in hospitals

Nudging has been previously implemented in healthcare. Incentives such as stimulating healthy diet of people, boosting physical activity, decreasing alcohol overconsumption and tobacco use and promoting blood donation are broadly used. Nevertheless, these nudging tools are mostly targeted to hospital patients and citizens using healthcare system. Nudging of healthcare workers in hospitals has just been recently focused on in previous research, where few studies, showed how different types of nudges positively and favourably influenced medical staff behaviour. Examples of these nudges will be shown in this section (Caris et al., 2018).

Nudging experiment has been implemented in the University Medical Centre of Amsterdam that aimed to improve hand hygiene of healthcare workers to reduce amount of infections in the hospital. Two hospital wards have been selected for the place of study, which were clinical, non-intensive care unit wards with adult and surgical patients. Two posters with different message have been placed near ward’s entrance near dispensers for two weeks each. Poster 1, showing message “Half of all healthcare workers perform well in hand hygiene. Which category do you belong to?” and Poster 2 showing message “40% increase in hand hygiene, 40% decrease in healthcare-associated infections”. Research has shown that Poster 2 had a better effect in increase of alcohol-based hand rub usage among medical staff and showed result in both wards, compare to Poster 1 showing efficient results only in one hospital ward. Authors believe that this outcome might be explained by the fact that Poster 2 was addressed as a loss aversion message compare to Poster 1 with bandwagon effect, where individuals are assumed to adopt their behaviour by surging their activity knowing that other people have made the same. Loss aversion message showed better result in the research, however authors cannot guarantee the same outcome in other nudges due to the fact adoptability of the nudge is leaned on characteristic of the nudge, “who nudges and who is nudged” (Caris et al., 2018).

Similar nudging intervention has been implemented in the Danish hospital for hand hygiene compliance. Through first nudging tool original placement of hand sanitizers was changed. Previously hand sanitizers situated above sinks of the hospital. New placement of hand sanitizers took place at the entrance of Medical Department, which were freestanding. Second nudging tool was changing the colour of sanitizers from transparent to red, to increase visual salience of hand sanitizers. Colour red according to authors indicates signal to attract attention compared to other colours. The final nudging intervention was placement of text message, which stated “Here we use hand disinfectant in order to protect your relative”. The first part of the message was composed as informative message and the second part was designed to
show concrete outcomes of hand hygiene compliance, thus targeted audience could be
stimulated to a greater extent to use hand sanitizers at the hospital. The results have shown that
using these nudging tools separately increased hand hygiene compliance by 20%, however
combination of all nudging tools together resulted in 67% increase of hand sanitizers usage.
Therefore, according to authors nudges are effective by modifying default placement and by
supplying a salient sign with positively framed statement (Aarestrup, Moesgaard and Schuldt-

Another nudging tool to target hospital employees for encouraging healthy eating habits was
applied in Niguarda Cà Granda Hospital in Italy. Nudging tools in two such as green labelling
nudges were experienced in two lunchrooms of the hospital: northern and southern lunchroom.
The research has shown that use of green labels near products in northern lunchroom didn’t
show significant results in change of health workers behaviour. Nonetheless, nudging tool such
as increasing salience of healthy items was launched in the southern lunchroom. The visibility
and saliency of whole wheat bread products were changed and placed near the entrance of the
lunchroom, so that employees see those products in the beginning of their visit. In addition to
whole wheat bread salience increase, healthy salads were placed in conspicuous location of
hospital southern lunchroom. Fresh fruits were placed in more visible places also, while sugary
less healthy products were located behind healthy items. The results showed that rising
visibility and accessibility of healthy items, significantly increased their consumption
(Victoria, 2017).

5. Materials and method

5.1 Research structure

For this research study that intends to examine reasons of behavioural change in increase of
disposable garments usage by employees in healthcare sector of Region Östergötland and what
role could nudging possibly play in positively impact current consumer behavior, qualitative
research with semi-structured interviews have been performed. Interviews have been focused
on perceptions and held with two sides: managers from several departments of Östergötland
Regions involved in organization of reusable and disposable garments and medical staff
working in Linköping University Hospital that are wearing disposable or reusable clothes at
work.

Qualitative research with semi-structured interviews have been prepared after literature review,
that has been important to determine essential aspects and limitations for interview subject
matter and to classify what type interview questions should “interview guide” consist of. Method
of qualitative research has been chosen for this study because it determines understanding of how people’s experiences correspond, that is difficult to study within other
research methods. It has been proved that data in qualitative research is reliable since it brings
evidence of findings from the point of view of people that have been investigated, rather than
displaying findings from the researcher’s personal attitude and mindset (Liamputtong & Ezzy,
2006). Qualitative research has been conducted based both on inductive and deductive
approach. Deductive approach develops theoretical or conceptual framework that is
consequently tested during research, while inductive approach employs data for theory
development from the results (Saunders, Lewis and Thornhill, 2008). Relationships between
theory and empirical research have been examined in this thesis. Interview questions have been
formulated in connection with theory and research – thus deductive approach had been used.
However, results are incorporated with previous research -thus inductive approach had been
also applied.
5.2 Interviews

5.2.1 Semi-structured interviews

The semi-structured interview method has been chosen as the qualitative method research for several causes. To start with, semi-structured interviews assist in analysing perceptions, opinions and attitudes of interviewees that concern in some cases difficult and delicate problems and questions. Moreover, semi-structured interviews have been selected for facilitating process of getting more information by probing and getting more cleared up answers (Barriball and While, 1994). According to Saunders, Lewis and Thornhill (2008), non-standardised qualitative research interviews possess various advantages, which summarize four main benefits. The first point that is defined by the author is purpose of the research. Saunders, Lewis and Thornhill (2008) explain that semi-structured interviews give the researcher possibility to “probe” answers of respondents, that in its turn permits to include significance and insight to the acquired information. Secondly, Saunders, Lewis and Thornhill (2008), claim that semi-structured interviews allow the researcher to evolve personal relationships with respondents that enables for interviewees to feel more secure and give more meaningful information, than while interacting through questionnaires. Thirdly, the nature of questions where the results depend on the quantity of questions, complexity and openness of questions influence the answers depth of interviewees. Fourthly, the author highlights reasons why semi-structured interviews are more beneficial than questioners, due to the fact that respondents are willing to a greater extent to accept in participating in the interview when the time length and aim of the research is informed beforehand to the respondent, which helps to set up personal contact (Saunders, Lewis and Thornhill, 2008).

5.2.2 Qualitative research process

Hanna Axelsson who is Environmental Business Developer in Östergötland Region significantly helped me during the whole process of doing this research and finding valuable contacts for conducting interviews. The main mean of correspondence with Hanna Axelsson was through emails and personal meetings. In total I had three meetings in Östergötland Region before starting to conduct interviews for getting useful information for composing proper aim and research questions of thesis and for preparation of applicable interview questions. First meeting was held on 1st of February 2018 with Hanna Axelsson and other employees involved in Environmental Department of Östergötland Region, where we discussed all together general topics and potential possibilities of the research that is necessary for Östergötland Region regarding sustainable development. After the topic was agreed upon, second meeting was held with Annelie Frick, mobility coordinator in the department of Environment and Security of Östergötland Region, on 5th of April in Linköping University Hospital. Annelie showed me the placement of dressing rooms of medical staff in Linköping University Hospital with lockers downstairs, as well as I was shown current nudging projects implemented with two mannequin dolls and poster “Climate hero”. We discussed how the process of changing reusable and disposable garments works for medical staff in Linköping University Hospital, where they take clothes before and put them after working day. Additionally, Annelie has informed about recent renovation and centralisation of dressing rooms in Linköping University Hospital and gave me contacts of Malin Laberfinger and Pia Vange for the interview, who are development managers of Linköping University Hospital construction projects and took part in decisions regarding centralisation of locker rooms. Third final meeting, that Hanna Axelsson kindly accepted, has been held on April 17th in the office of Östergötland Region main building. During the meeting roles in the decision making of Östergötland Region interview representatives and system organization in Linköping
University Hospital were discussed for the aim of a more appropriate composition and preparation of questions during semi-structured interviews.

5.2.3 Interview participants

Respondents for semi-structured interviews were partly selected by given contacts of Hanna Axelsson and Annelie Frick and partly by personal selection of respondents near North Entrance of Linköping University Hospital. In total thirteen interviews have been conducted. Two different categories of interview audience have been emphasized for the research: three interviews with representatives of Östergötland Region departments in the first category and ten interviews with doctors and nurses of Linköping University Hospital in the second category. Representatives of Östergötland Region, contacts of which were kindly communicated to me by Hanna Axelsson and Annelie Frick, have been contacted by me through email. Brief description of the study has been explained to each potential interviewee with information of approximate time length of the interview. In total five employees of Östergötland Region representatives have been contacted. One person, unit manager for Infection Control has declined invitation for the interview. Out of four employees that have accepted the invitation in interview participation, some have expressed an aspiration to invite their colleague for interview or to make group interview together with colleague.

Second category of interview participants that is represented by medical staff of Linköping University Hospital has selected both by given contacts of Hanna Axelsson and by my personal physical approach near entrance of the hospital. Out of six provided contacts by Hanna Axelsson of medical staff of Linköping University Hospital that I have sent request by email and phone call, three people have responded and agreed to participate. The intention of the research was to conduct interviews with chiefs of Linköping University Hospital Clinique’s, however unfortunately they didn’t respond. Other seven interview participants have been selected and asked to participate near entrance of Linköping University Hospital during lunch time. I have tried to reach those medical staff who seemed to wear disposable garments, nevertheless majority of them declined invitation to participate in the research. Thus, after that I started to ask medical staff that seemed to wear reusable clothes also. Out of twenty people that I have approached to invite in the interview participation, seven medical staff have agreed to participate, others declined. Table 2 provides information with all interview participants, where date, place, profession, duration is presented. Each person has been asked suitable time and place available for them for the interview conduct. Some of respondents preferred phone interview instead face-to-face. One interview has been held though email correspondence by answering interview questions in the written form. In total five thousand healthcare workers are employed in Linköping University Hospital. It was not possible to discern from the public record exact number of how many doctors, nurses and assistant nurses work in Linköping University Hospital.

Table 2 Categorization of interview participants

<table>
<thead>
<tr>
<th>Representatives of Östergötland Region Departments</th>
<th>Profession</th>
<th>Place</th>
<th>Date</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malin Laberfinger and Pia Vange</td>
<td>Development managers of Linköping University</td>
<td>Linds cafeteria in Norra Entre of Linköping</td>
<td>24th of April, 2018</td>
<td>Approximately 20 min</td>
</tr>
<tr>
<td>Medical staff in Linköping University Hospital</td>
<td>Profession</td>
<td>Place</td>
<td>Date</td>
<td>Duration</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
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<td>-------------------</td>
</tr>
<tr>
<td><strong>Max Bergkvist</strong></td>
<td>Doctor at surgery department</td>
<td>At the office of surgical department in Linköping University Hospital</td>
<td>8&lt;sup&gt;th&lt;/sup&gt; of May</td>
<td>Approximately 20 min</td>
</tr>
<tr>
<td><strong>Sefika Alagic</strong></td>
<td>Assistant nurse</td>
<td>At the office in Linköping University Hospital</td>
<td>8&lt;sup&gt;th&lt;/sup&gt; of May</td>
<td>Approximately 12 min</td>
</tr>
<tr>
<td><strong>Hanna (Last name is anonymous)</strong></td>
<td>Doctor at surgery department</td>
<td>Outside of Linköping University Hospital in front of Norra entre</td>
<td>16&lt;sup&gt;th&lt;/sup&gt; of May</td>
<td>Approximately 15 min</td>
</tr>
<tr>
<td><strong>Marie Göransson</strong></td>
<td>Assistant nurse at surgery department</td>
<td>E-mail</td>
<td>17&lt;sup&gt;th&lt;/sup&gt; of May</td>
<td>-</td>
</tr>
<tr>
<td><strong>Adam Burhan</strong></td>
<td>Doctor at pain department</td>
<td>Phone interview</td>
<td>17&lt;sup&gt;th&lt;/sup&gt; of May</td>
<td>Approximately 17 min</td>
</tr>
<tr>
<td><strong>Johan Eriksson</strong></td>
<td>Doctor at radiology department</td>
<td>At the office of radiology department in Linköping University Hospital</td>
<td>30&lt;sup&gt;th&lt;/sup&gt; of May</td>
<td>Approximately 13 min</td>
</tr>
<tr>
<td>Name</td>
<td>Position</td>
<td>Location</td>
<td>Date</td>
<td>Duration</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>------------</td>
<td>------------</td>
</tr>
<tr>
<td>Arash Moosavi</td>
<td>Doctor at neurology department, specialist in cardiology</td>
<td>Outside of Linköping University Hospital in front of Norra entre</td>
<td>30th of May</td>
<td>Approximately 10 min</td>
</tr>
<tr>
<td>Viktor Bergmann</td>
<td>Doctor at Neurology Clinique</td>
<td>Outside of Linköping University Hospital in front of Norra entre</td>
<td>31st of May</td>
<td>Approximately 10 min</td>
</tr>
</tbody>
</table>
| Anonymous group interview | Doctor 1 – Department of infection diseases  
Doctor 2 – department of internal medicine | Outside of Linköping University Hospital in front of Norra entre           | 31st of May| Approximately 13 min |
| Carola (Last name is anonymous) | Nurse at gastrointestinal clinic                                         | At the office of gastrointestinal clinic in Linköping University Hospital | 8th of June| Approximately 13 min |

**5.2.4 The interview guidelines**

Prior to conducting interviews, four different interview guidelines with questions have been created. One interview guideline was aimed for medical staff in Linköping University Hospital. Other three interview guidelines have been established for representatives of Östergötland Region departments. Nevertheless, due to the reason that representatives Malin Laberfinger and Pia Vange, Henrik Möller and Anna Dahlgren, Emma Johansson have different professions and role performance in Östergötland Region, questions in the interview guidelines have been correlated accordingly. Interview questions were aimed to have a clear social scientific angle. Questions have been formulated in the manner that have connection with established theory and research, that are linked to each other and attempted to be neither too broad, neither too narrow (Bryman, 2012). Interview guidelines have been prepared in English language. However, because some medical staff wished to have an interview in Swedish, guidelines for doctors and nurses have been translated into Swedish for them. Despite the fact that interview guidelines have been prepared beforehand each interview, the interviews were held in semi-structured manner rather than structured. Questions during the interview as it is usually known for structured interviews weren’t followed in the exact form for each participant but were sometimes asked in more flexible terms of the questions sequentially with participants (Pajo, 2018). During interviews I was open to ask follow-up questions in response to replies that were given by the informants, due to the reason that follow-up questions are part of semi-structured interviews characteristics.

**5.3 Analysing interview material**

After conducting interviews, all recorded interviews have been transcribed into written text. Transcription of interviews has been literally typed with word by word. Two interviews that
have been held in Swedish, have been consequently translated into English language. After interview transcription, categorization of data has been created. Everything that did not pertain directly to the research questions or could be used to create a general understanding of behavioral preferences among hospital staff were deemed to irrelevant for the purpose of the study and therefore eliminated from analysis. Afterwards after reading though all information in transcribed interviews, categories have been defined and objects have been accorded to specified categories. During analysis stage, corresponding coded information has been compiled and arranged into larger categories for the purpose that approach of different participants can be observed in the same topic of interest (Pajo, 2018).

5.4 Ethical considerations

Ethical considerations have been carried during the course of conducting research. Information about anonymity and confidentiality have been provided to each participant of interviews. Before each interview, each respondent has been asked beforehand whether he or she would like to be anonymous in the interview. Clear assurances about anonymity agreement have been kept to those participants who desired to be anonymous in the research. Questions have been prepared before conducting interviews, in the form that will be understandable to each participant, therefore interviewee could feel comfortable during the interview. For example, the word "nudging" has almost not been used during the interviews, due to the reason that this term might have been unknown for interviewees. Instead words such as "tools that change human behaviour" or "environmental projects, posters or incentives" have been used during interviews (Saunders, Lewis and Thornhill, 2008). In addition, during the research ethical considerations such as no deception of research aim, full informed consent, no harm to participants and no invasion of privacy have been strictly taken into consideration during research (Bryman, 2012).

5.5 Criticism of semi-structured interviews

Regardless many advantages of semi-structured interviews that have been previously described, criticism towards using semi-structured interviews in the research exists. To start with, semi-structured interviews are condemned to be too subjective, meaning that it is very easy for the researcher to rely on personal point of view and opinion while making qualitative findings when the attitude of the research is based on personal assumptions (Diefenbach, 2009).

Second of all, qualitative research with semi-structured interviews are convicted that the range of findings of qualitative probing is constrained. Compare to quantitative research, findings of qualitative research usually rely on small number of participants. It is also believed that lack of transparency exists in qualitative research and it is sometimes obscure how participants are chosen for observations (Bryman, 2012).

5.6 Limitations of the study

Before discussing the results, imperfections of the study are acknowledged. The first limitation of the study is time restriction of interviewees especially for medical staff. Some doctors and nurses had only ten or fifteen minutes for the interview, claiming that their work is very busy and stressful, which led to the constraints of the study results and scope of the research, due to the reason that not all outlined interview questions have been asked. Moreover, some of potential interviewees declined entirely to participate in the interview due to their lack of time. The results of the study would be more fruitful, if two contacted potential interviewees, that are head of Clinique’s of Linköping University Hospital, contacts of which were given by Hanna Axelsson, would accept to participate in the interview.
The second limitation stands within language barrier. For all the interview respondents English is not native language, Swedish language is their mother tongue. It was hard and challenging sometimes for them to express their opinion or point of view in English. Unfortunately, for me as a researcher it was restraining to conduct interview in Swedish, as I don’t speak fluent Swedish. Nevertheless, it is important to highlight, that compliance of semi-structured interviews method thorough cautions usage of words secured validity and reliability of results (Barriball and While, 1994).

Third limitation consisted of difficulty in some cases of selection of research participants within those who work as medical staff in Linköping University Hospital. It was burdensome to find interview participants who wear disposable garments at their work. The results of the study would be more conducive if those medical staff who were wearing disposable garments in Linköping University Hospital during my selection of interviewees, agreed to participate in the interview. However, majority of them responded that they are not interested. It might be linked to the reason that recent studies have shown that there is a connection between interest in sustainable development and behaviour. Research has demonstrated that people are more environmentally friendly and have positive attitude towards sustainable development if they possess knowledge and interest about environmental issues (Wu, Zhou and Song, 2016).

6. Results

In this part of study results of semi-structured interviews and discussion will be presented. Linköping University Hospital went through major renovations during recent years, that partly allured usage increase of single-used garments among medical staff of Linköping University Hospital. In the first section perceptions of Östergötland Region Environmental, Procurement, Service and Logistics departments as well as Linköping University Hospital construction projects departments and marketing department of TvNo laundry owned by Östergötland Region are presented starting with general information of reusable and disposable garments management in Linköping University Hospital, discussions about single-used garments usage rise causes during recent past years, information about collaboration between different departments of Östergötland Region as well as communication with medical Linköping University Hospital stuff, discussions about nudging tools and current nudging project implemented in Linköping University Hospital. The second section gives analysis of perception of Linköping University Hospital medical staff starting with overview of attitude towards sustainable development and environmental protection, usage of single-used and reusable garments in Linköping University Hospital, nudging project in Linköping University Hospital and discussions of attitude towards nudging tools. Although repetitions within sections have been tried to be avoided, in some parts however they were necessary to show interconnection of the study.

6.1 Perception of Östergötland Region departments

6.1.1 Management of reusable and single-used garments at Linköping University Hospital

Interviews with business developers Pia Vange and Malin Labefinger, responsible for reconstruction project of locker rooms for medical staff in Linköping University Hospital, marketing executive at TvNo laundry that is owned by Östergötland Region and responsible for procurement of reusable garments Henrik Möller business developer responsible for environmental requirements in public procurement of both reusable and disposable garments
of Linköping University Hospital Emma Johansson and administrator of service and logistics in Östergötland Region Anna Dahlgren, have shown how management of reusable and single-used garments in Linköping University Hospital are conducted. During interview with Henrik Möller and Anna Dahlgren, it was possible to identify on which level stands management of reusable garments of Linköping University Hospital. All the reusable garments of Linköping University Hospital are washed separately at TvNo Textile Services AB in Norrköping that is owned by Region Östergötland and Jonkoping Region (Www2.texisys.com, 2018). Henrik Möller recognized that laundry TvNo has some specific environmental standards that should be followed according to ISO 14001 and is considered to be one of the first laundry in Sweden which is completely CO2 neutral in both production and transportation. Interviewee responded that TvNo uses reusable sources of energy, producing its own water by utilizing pellets and wood pellets and keep synthetic fuel that is CO2 neutral. By allowing all production water to pass large salt filters, TvNo laundry can wash the clean textiles with a small amount of detergent. Detergent chemicals are dispensed with the actual weight of the laundry. Henrik Möller also emphasized that TvNo focuses also on transportation as important environmental factor, where truck vehicles function with HVO synthetic diesel produced with vegetable waste and animal fat.

Henrik Möller asserted that procurement of reusable garments is executed according to high quality standards. Before purchasing a new garment, the informant has to follow checklist, analysing what kind of material should be the apparel that corresponds best for the environment. In some cases, when procurement of the most environmentally friendly clothing is not possible, and no other alternatives exist, Henrik has to give explanation what are the reasons that lay behind this choice, for instance due to infection control reasons, regulated by infection control department. Recycling is also taken care likewise, where in some cases used clothes are shipped to Africa that, compare to Sweden, where recycling goes through high environmental standards. Procurement of reusable garments is produced every 5th year and long-product life of the garment is ensured by focusing of good quality purchase of the apparel, which follows Swedish procurement criteria on what chemicals are allowed to use.

Interviewee Emma Johansson is responsible for procurement of both reusable and disposable garments that are delivered in and writes sustainable and environmental requirements in the procurement, where purchasing is aimed to be sustainable. Before the procurement of each material, information is examined of every article that is considered to be acquired, the best material is aimed to be chosen and corresponding requirements are set. Emma emphasized that in addition to their department, procurement of disposable garments is also provided by suppliers that can come to Linköping University Hospital and offer purchasing of disposable apparel to medical staff. In her point of view suppliers interest mainly consists in increasing profit reason, when they try to sell reusable garments to medical staff in Linköping University Hospital. They are not interested in environmental issues. According to Östergötland Region rules, before purchasing any apparel, official procurement should be executed. Nevertheless, in some cases, medical staff skip the procurement step and purchase garments from suppliers directly, because with purchase of a small amount of apparel, procurement process is not necessary. Interviewee explained that previously, the only information that medical staff could get, and voice heard was from suppliers, whose interest resides in merely making profit. Nonetheless, nowadays Östergötland Region environmental department tries to give information about apparel also, in order that their voice is also heard and not only suppliers, so that both environmental and economic issues are taken into consideration.
6.1.2 Reasons for single used garments usage increase at Linköping University Hospital according to informants

6.1.2.1 Habit

During discussions with all interviewees, results have shown that from their perception one of main reasons that intrigued single-used garments usage increase among doctors and nurses became old habits, lack of right information, loss of identity of some departments. Other reasons will be further provided. All respondents agreed that one of the main reasons that lead to increase of disposable garments usage in Linköping University Hospital is the habit of medical staff to be able to change reusable garments in their departments and offices. Henrik and Ana informed that several years ago, Östergötland Region made decision to reconstruct locker rooms that provide reusable garments where centralisation of dressing rooms have taken place. The main dressing room with locker rooms with reusable garments for all medical staff have been centralised downstairs on the 9th floor. According to Pia and Malin that were taking part in the reconstruction project, revealed that years back locker rooms were separate for each department, doctors and nurses also had separate dressing rooms. Nurses of Linköping University Hospital were always used to change down in the basement, while doctors changed in their Clinique’s and nowadays with centralisation of locker rooms downstairs it is hard for them to be used to change there. Nevertheless, nowadays all reusable garments can be taken from locker rooms that are downstairs, however single-used garments are available in each Clinique. For medical staff who were used of not going downstairs to take up clothes and change, started to wear single-used garments instead, because they are available right in their Clinique.

Pia during the interview disclosed that the main reasons that single-used garments are available at Linköping University Hospital is that since after the reconstruction locker rooms with reusable apparel are not available near the wardrobe of each Clinique anymore, for emergency cases, when it is not possible to change it was made available. This way has been established only for emergency cases, once or twice per year, with small amounts of single-used garments. Unfortunately, medical staff started using disposable garments not only during emergency cases. Through interview with Emma it became apparent that it was supposed for single-used clothes to be available in the wardrobes in each Clinique in very small amounts. Nevertheless, due to the cause that suppliers come to sell single-used garments in the Linköping University Hospital as it was previously described in Section 1, disposable garments became too available for medical staff in Linköping University Hospital with bigger amount of clothes to be provided than necessary.

The decision of locker rooms centralisation was made due to costs and better management of reusable garments laundry statistics reasons according to Pia and Malin. Emma Johansson during the interview added that before centralisation of dressing rooms, reusable garments could disappear or be thrown away, due to the reason that washing system had not been tracked before. Interviewees Pia and Malin responded that specific time studies have been made before allocating one centralised dressing room for all medical staff downstairs. These studies had shown that itinerary of doctors and nurses to go from their Clinique to take up clothes and change downstairs doesn’t take long time. Thus, in opinion of Pia and Malin placement of dressing rooms downstairs should not be the issue for medical staff in Linköping University Hospital.
6.1.2.2 Lack of proper information

Second reason that has led to the rise of single-used apparel according to all interviewees is lack of right information of medical staff or so called “false facts” about environmental and economic aspects of single and several-used garments. Ana Dahlgren through the interview responded that among medical staff there was a rumour that disposable garments are cheaper and better for the environment than reusable garments. Emma Johansson during the interview included that the rumour was influenced to a large extent by suppliers that come to sell disposable garments in the Linköping University Hospital, who are claiming that they are cheap and convenient for medical staff.

On the other hand, during the interview Pia and Malin have assumed that Swedish people are reasonably aware about environmental issues and what is best for the environment, thus medical staff is aware that single-used clothes are not environmentally friendly, but they should just be reminded about these aspects.

6.1.2.3 Loss of identity

It was interesting to discover during interviews that another reason that lays behind rise of single-used clothing usage in Linköping University Hospital in the perception of interviewees is connected to loss of identity among some medical employees. During the group interview with Henrik and Anna, Henrik has recognized the possibility of single-used clothing rise that occurred because when the centralisation took place standardised assortment has been cut down. Previously before centralisation took place, each department could choose type of clothing they could wear, what colour, shape. After the centralisation, the choice that type of reusable garments to wear is not possible anymore by medical staff. According to Henrik and Anna especially those doctors who work in intensive care, where the colour of reusable garments is standardised as white, think that they should wear blue clothes, to distinguish themselves trying to express that they are working in emergency. They try to be alike as surgeons, whose colour is currently standardised as blue for reusable garments. The colour of all single-used garments is blue, therefore doctors in intensive care most probably started to wear blue single-used garments instead of white reusable garments in order to accentuate their identity.

6.1.2.4 Ease of reusable garments usage

During the interviews comfort of wearing reusable garments has been discussed. According to all interview participants, in their perception wearing reusable garments is more comfortable than single used garments. According to Henrik, single used garments are not able to penetrate with flue or particles from the body and feel like wearing plastic bags which are not breathable.

It was also reported that some medical staff get cold while using reusable garments. For the reason that they want to keep warm, doctors and nurses use special vests that are only available in disposable material. Nevertheless, Anna and Henrik informed that Östergötland Region implemented couple of weeks before the interview took place vests produced with reusable material. Nevertheless, reusable vests are not available for all medical staff in Linköping University Hospital due to the fact that it is expensive, however were planned to be introduced in bigger quantity several weeks after the interview took place, as Henrik has mentioned during the interview.
6.1.3 Collaboration between Östergötland Region departments and communication between medical staff

All of the interview participants have discussed importance of collaboration with bosses of each Clinique of Linköping University Hospital about procurement of disposable garments and providing information about costs and environmental issues of single-used clothes. According to Emma Johansson, intensive department in Linköping University Hospital has considerably decreased usage of single-used garments among medical staff, because Emma and her two of her colleagues have visited and informed proper information about single used garments head of intensive department Clinique, which subsequently led to reduction of single-used clothes usage in intensive department. Emma has informed that meetings between environmental department and head of Clinique’s has been held every third month, where questions about all kind of environmental issues have been discussed. Information about single-used garments usage has been also placed on official website of Östergötland Region available for hospital staff.

Henrik and Anna during the interview have also emphasized significance of meetings and discussion about single-used garments with head of each Clinique. Anna believes that it is important to look and make observation of each department separately, because habits and needs of single-used garments of each department are different and vary among each other. Henrik has added that some medical staff in some department are indeed need usage of single-garments in emergency cases, while staff in other departments might overuse consumption of disposable clothes.

Nevertheless, Emma during the interview expressed opinion that it is quite difficult to track usage of each department and has presented an idea that it would be effective if head of each department provides information in the form of statistics how much single-used garments have been procured in each department. Emma emphasized the importance of contributing right information to chief of each Clinique, so that procurement of disposable garments can be reduced. Nevertheless, it is currently challenging to achieve these tasks, as environmental and infection control departments have abundant number of other environmental and infection control questions to resolve.

In the point of view of Pia and Malin, chiefs of each Clinique should be explicit about the rules of where medical staff should change and remind them the rules of not overusing single-used garments when it’s not necessary. “How hard can it be! Hopefully, it will change over time eventually”, replied Pia during the interview.

6.1.4 Managers’ views of potential and current nudging tools at Linköping University Hospital, Region Östergötland

During the interviews, all participants have declared that best efficient nudging tools for encouraging medical staff to not overuse disposable garments when it’s not necessary, is firstly to provide them the right information about costs, hygienic and environmental aspects of clothes. Secondly, it is necessary to supply medical staff with comfortable reusable garments in order to avoid them the intention of using disposable garments at work. All of interview participants are convinced that availability of disposable garments to medical staff should be decreased, Linköping University Hospital doesn’t need mass number of single-used garments.

During interviews with three managers Emma, Anna and Henrik feasible and current nudging tools have been reviewed. During interview with Emma, respondent has expressed an opinion
that potential implementation of disposable garments tracking system that currently is executed for reusable garments in Linköping University Hospital, is highly expensive for Östergötland Region and is not worth to invest. Tracking system of reusable garments is worth of financing according to Emma, by reason of long lifespan of more than 70 times usage of reusable garment, indicating contrast with usage of single-used garment which lifespan lasts no more than one usage.

While answering interview questions, Emma indicated that environmental guidelines for procurement of disposable garments should be improved and could be more detailed as they are nowadays, which infection control department can take care of in the future.

Moreover, during the interview another possible nudging tool has been discussed such as implementation of competition among medical staff of being “Climate hero” of Linköping University Hospital and wearing the least number of times disposable garments. From viewpoint of Emma Johansson introduction of contest in general is good idea but should be carefully looked at in the case of Linköping University Hospital together with infection control department in order to avoid probability of inappropriate misconception of not being hygienic and be environmentally friendly at the same time for medical staff in Linköping University Hospital.

Two current nudging tools (that were already implemented in the Linköping University Hospital prior interviews for doctors and nurses down in the basement with all locker rooms) have been discussed during interview with Emma and interview with Henrik and Anna. Two nudging tools represented carried out project with poster of “Climate Hero” and project with two mannequin dolls placed near locker rooms of medical staff. Interview with Emma and interview with Henrik and Anna have showed that these two environmental campaigns were introduced as nudging incentive for medical staff with information about costs and CO2 differences of reusable and disposable garments, which according to Anna have showed positive results claiming that medical staff became more aware about differences. “Climate Hero” poster and two mannequin dolls were placed for only two months during March and April 2018 on account of when campaigns are executed for a long time, they become not as efficient as within shorter duration of time. Emma during the interview expressed hope that this kind of campaigns will be applied again next year in Linköping University Hospital.

6.2 Perception of medical staff at Linköping University Hospital

6.2.1 Usage of single-used garments at Linköping University Hospital

Out of all ten respondents, only one-person Hanna replied that she uses single-used garments often. Hanna who works as a doctor at surgical department, would love to wear reusable garments more often, because she finds them to be more comfortable, however in some cases reusable garments at her department are not easy to get, which will be further discussed in the second section. Other respondents do not wear single-used garments often due to mainly two reasons: three out of ten interviewees were aware that usage of single-used garments is not beneficial either for economic or environmental reasons and principally want to make positive impact. Six out of ten respondents simply find reusable clothes more comfortable to wear than single-used ones. Two out of ten respondents wear often single-used jackets, because alternatives with reusable jackets do not exist at their departments.
6.2.2 Usage of reusable garments at Linköping University Hospital

One of the biggest aspects that has been discussed with all interviewees about usage of reusable garments in Linköping University Hospital is accessibility and availability of garments at work place. All of interviewees believe that reusable garments are convenient to use and made of enjoyable material. Nevertheless, four out of ten respondents described that it occurred to meet challenges with locker rooms in their dressing rooms.

Hanna during the interview expressed the wish, that the system with centralisation of locker rooms could be changed as it was previously employed before renovation. Even though she works only for two years in Linköping University Hospital, and didn’t comprehend previous system of Linköping University Hospital, nevertheless she has worked before in two other hospitals, where dressing rooms with lockers have been placed near her department and Hanna prefers that kind of changing system to the current one applied in Linköping University Hospital. Hanna mentioned lack of time during urgent operations to be able to go to dressing rooms and change reusable garments, therefore she and her colleagues pick up and wear single-used garments instead to avoid being dirty. Still one of the main challenges that Hanna highlighted several times during our interview, that taking reusable garments out of locker rooms was often not physically possible, even if she wanted to wear reusable garments. Reasons took place either because she didn’t return on time dirty clothes to the laundry, that caused non-availability of getting clean clothes in the locker, or either in some cases doors of locker rooms were jammed. On the contrary, disposable garments are always available in her department, thus her choice falls in favour of using single-used apparel. Hanna desires that number of reusable garments available in the circulation could be increased, thus similar cases would not happen in the future. “So, if people in Östergötland Region sort out that we get enough clothes, some surgeons they actually just go upwards, and they just pull the door so hard that they can get clothes anyways” – cited Hanna.

Viktor Bergmann during the interview responded that he and his colleagues in his department also encountered issues with opening locker rooms and getting reusable garments. “It didn’t occur often though, just “maybe once or twice per year” – cited Viktor. In these situations, interviewee replied that he picked up bigger sizes of reusable garments from another locker instead. Doctors in anonymous group interview mentioned issues with opening doors with their locker rooms. “They (technician staff) said this locker is maladapted for our Clinique and then I decided I don’t really need it (locker), so I started to take clothes upstairs” – cited doctor. Carola reflected that in her opinion her colleagues and medical staff in general wear disposable garments out of necessity, as a result of lack of quantity of reusable dresses provided in locker rooms in wardrobe.

While discussing distance from medical staff departments to dressing rooms four out of ten interviewees Hanna, Max – doctors at surgery department, Johan – doctor at radiology department, Arash – doctor at neurology department indicated that it takes long time to go and change, which becomes bit difficult occasionally for them. “If you get lots of blood stain, vomit or whatever, you want to go and change quickly and then the nearest place to change clothes is far away, so that can be a problem” – quoted Max. Nonetheless, Johan, Max narrated that they take extra pairs of resalable scrubs with them in the morning to their department in case they need to change for urgent situations for avoiding wearing single-used garments. “I bring clothes and change it in my room which I share with mostly women, so sometimes it’s not possible for me to change there, but if they’re not there, it’s not a problem for me” – told Johan. Max during our interview informed that he usually changes in the laboratory, in the operation
wardrobe when it’s urgent. Max and Hanna during interviews mentioned that medical staff is not allowed to change in their department rooms, nevertheless lots of employees do it anyways. Hanna as mentioned previously encounters regularly issues with accessing clean reusable garments from her locker room, thus grabs disposable scrub instead. Arash, who works as a doctor in neurology department doesn’t need to change working clothes for urgent situations and finds positive aspect of taking a long walk to change down in the basement in the dressing room. In respondent’s opinion walking down to the basement with dressing rooms substitutes his long sedentary days at work with doing at least some exercises while walking. It appeared the distance took long time for him in the beginning, but he got used to it and now it seems it doesn’t take much time ultimately.

Following aspect has been discussed of reusable garments usage as that they are not warm enough sometimes and Arash, Carola, Johan, Hanna and Marie feel cold wearing reusable garment especially during winter time. Carola and Marie feel cold even during summer time due to strong ventilation in the hospital. Johan and Marie responded that they used to put on blue single-used jackets on when it was the only choice available in their departments in the hospital, however currently single-used were replaced with white reusable jackets that they prefer to wear. Carola revealed that she would certainly wear jacket produced with reusable material, instead of plastic one, if it was available in her department. Arash replied that even if he gets cold sometimes, he is reluctant to put jacket on.

Last feature that has been reviewed during interview with using reusable garments is size of clothes. Johan and Carola have noticed that the size is not always suitable for medical staff in Linköping University Hospital. For Johan himself reusable garments are convenient to wear, but he knows that that the reason for his colleague who wears single-used garments at work is that reusable clothes with large size are not available for her. Carola in the contrary encounters challenge to find smaller size of reusable dresses in Linköping University Hospital. “The only problem is the size of my dress, because it is the most common size that women wear, so there are several bigger sizes available, but smaller sizes are not enough provided with reusable garments” – commented Carola.

6.2.3 Attitude towards sustainable development and environmental protection

Out of ten interviewees, five respondents replied that environmental issues are very important for them and try to make a positive impact themselves as individuals towards sustainable development. “We do choices in daily life, if we choose to take out car to work or go by bicycle or public transport, if we do recycling at home or if we choose to go to Thailand on holidays, so lots of these things matter and also what we do at work, like if we use single- used garments” -cited Max. For the other half of interviewees, issues of environmental degradation (or protection) do not play big importance and they are not considerably concerned about it. Despite, all ten respondents disclosed that it is meaningful for them to feel part of the society of having a positive impact for the environment. “I think everyone has their own responsibility, I want to be able to look at my children’s eyes and say I did what I could” – commented Hanna.

6.2.4 Awareness about economic and environmental differences of reusable and disposable garments

Two out of ten interviewees were aware about economic and environmental differences between reusable and disposable garments. Max Berkvist as he has replied, obtained knowledge by himself, by asking colleagues around and getting different kind of information from various sources. “It started sort of worrying me because in every surgery there is a lot of
single-used equipment that is used”. Marie Göransson responded that she was aware about differences through seeing poster of Climate hero and price tags on mannequin dolls in the dressing room downstairs. Four out of ten respondents among medical staff responded that they were aware that usage of single-usage garments costs more than usage of reusable garments for Östergötland Region. Respondents perceived information about costs through seeing cost tag comparison of mannequin dolls placed in dressing room of medical staff. Two of ten respondents suspected about environmental differences but didn’t know about economic differences between garments. The rest two out of ten respondents were not aware about any differences at all.

**6.2.5 Medical staffs’ view of implemented nudging projects at Linköping University Hospital, Region Östergötland**

In this section perception of implemented nudging projects by Östergötland Region in dressing rooms in the basement as “Climate hero” poster and two mannequin dolls wearing reusable and single-used garments with price tags comparison on them will be further observed through interviews with medical staff.

It was interesting to observe that perception of nudging tools with awareness about economic and environmental differences of garments didn’t correspond during some interviews with medical staff. Despite the fact that some doctors and nurses responded that they saw poster of “Climate Hero”, they didn’t grasp the meaning of it. Respondent Hanna, who wears often disposable garments at work, during our interview told that she noticed the poster near dressing rooms and understood the message, however she considered that usage of reusable garments is less environmentally friendly than usage of disposable garments by reason of chemicals and water usage in laundry service operated with reusable garments. Hanna replied that she didn’t notice mannequin dolls in dressing room, therefore didn’t know about costs differences among garments.

Respondents Sefika and Carola replied that they saw both poster and mannequin dolls, however had similar perception about environmental aspects of reusable garments as Hanna during our interview. Sefika and Carola knew that wearing disposable garments is more expensive than reusable garments in Linköping University Hospital through seeing price tags on mannequin dolls, nevertheless despite the fact that they saw the poster of “Climate Hero” and replied that they understood the message, they regarded that usage of disposable garments is better for environment than reusable garments due to chemicals and water consumption in laundry service. Interviewee Viktor was aware about costs through seeing mannequin dolls, but not environmental differences and didn’t see the poster. Anonymous respondents told that they were aware about economic aspects of garments and got to know about it through seeing mannequin dolls downstairs, nevertheless they didn’t understand the message of “Climate Hero” poster, by cause of not looking at it carefully, as in their opinion poster is placed in the wrong location, which will be discussed in the next section. Interviewee Adam replied he knew only about hygienical differences of disposable and reusable garments, however nothing about costs and environment. He noticed the poster in the dressing room but told that he didn’t understand the meaning of it and he doesn’t remember seeing mannequin dolls. Respondent Max who was notified both about economic and environmental differences of garments by asking colleagues around before seeing mannequin dolls and poster downstairs, thought that the message about costs differences was very clear to him, however facts about environmental aspects were not perfectly evident in his opinion.
Contrariwise, interview participants Johan and Arash didn’t see mannequin dolls in dressing room and were not aware about costs differences. Arash and Johan have responded that when they saw poster “Climate hero”, they understood the message that using reusable garments is more environmentally friendly than single-used scrubs. Lastly, only Marie Göransson revealed that she noticed both nudging tools and by virtue of them found out economic and environmental distinction of garments.

6.2.6 Suggestions and attitude towards nudging tools from medical staff

Nine out of ten respondents expressed positive attitude towards nudging tools in general and those (poster “Climate Hero” and two mannequin dolls wearing disposable and reusable garments with price tags comparison on them) currently launched in Linköping University Hospital and acknowledged that such tools are useful and necessary for influencing human behaviour to be more environmentally-friendly. Interviewee Hanna, on the other hand, responded that regardless the fact, that she saw poster “Climate hero” and understood the message, she would not stop using disposable garments when it’s unnecessary, for the reason that wearing reusable garments is not easily-accessible in her opinion. “It’s not that I don’t want to use reusable garments, it’s just that I can’t get them in an easy way. So in stressful situations, when I’m lack of time, when I use my card now, I can’t get new clean clothes” – commented Hanna.

All interviewees reacted that they didn’t feel controlled or manipulated in any way. Respondents experienced the feeling of receiving a recommendation, being provided with information and that they could have the choice up to them whether they should wear disposable garments or not.

Some respondents have been asked what in their opinion is more efficient and applicable in Linköping University Hospital: to influence medical staff behaviour through nudging tools by leaving choice or to ban usage of disposable garments at all or reduce amount of them to a great extent. Majority of interviewed medical staff replied that they prefer having the choice and being informed through nudging tools rather than having no access at all or little access to disposable garments. “I think posters are more effective. Because having less available plastic scrubs in Clinique’s will not necessarily resolve the problem. The person who wants to wear plastic scrubs will find its way” – said doctor during anonymous interview. Max Berkvist on the other hand, believes that even though implementation of nudging tools is favourable for affecting medical staff behaviour, cutting down number of available disposable garments is the most efficient solution in Linköping University Hospital. “I think that not offering single-used all together, because this is not open market. I mean people don’t need freedom of choice, it’s decided by employer which type of clothes we are supposed to use, and reusable garments are proven to be better than single-used ones, which are more expensive and have bigger environmental impact and so on. So why do we use them? We should have reusable ones more available to the hospital staff as it was before year 2014. So now disposable garments are quite unnecessary. It’s sort of too easy to get them.” – quoted doctor.

During interviews some respondents shared their opinion of what can be improved regarding nudging in their point of view. Max Berkvist declared that information with price tags comparison on two mannequin dolls was very useful and suggested that it could be helpful to do likewise with CO2 tags comparison on single-used and several-used item that mannequin dolls were wearing.
Interviewees Sefika Alagic, Johan Eriksson and Adam Burhan, highlighted importance of being provided with proper information, because medical staff tend to discuss various types of topics among each other, for instance during lunch in café Rasmusson according to Sefika, including environmental issues, thus chance of spreading knowledge increases. Johan Eriksson assumed that spreading right information would be effective my means of if head of the Clinique discusses such issues with medical employees. Johan has told that in radiology department, where he works, meetings are held once per week on Wednesday.

Doctor Adam believes that nature of information plays important aspect in nudging tools. In his viewpoint, as it was previously mentioned, even though he noticed poster “Climate hero”, he didn’t understand why exactly wearing reusable garments is better than disposable garments. For that reason, Adam suggested during our interview the following: “I mean if you explain the reasons, causes and consequences, not just that you should wear reusable clothes more often, then it’s easier to convince”.

Doctor Arash reflected that provision of information with nudging should be continuously repeated, because people tend to forget obtained information.

Last suggestion that has been proposed by Carola and anonymous doctors is to relocate poster “Climate hero” and to increase number of nudging tools for making them more visible. Respondents disclosed that from their perspective poster “Climate hero” is placed in the wrong location. According to Carola, poster should be located opposite the place where medical staff gets clean laundry, instead of where it is currently placed in front of laundry. “People are rushing to go to job, so sometimes they don’t see big sings. But if it will be placed near the cupboard where you get clean laundry, maybe there, they (medical staff) will see it better”-told Carola. Doctors during anonymous interview cited: “It doesn’t fit currently where it is located right now, because I think it should be placed when you’re going downstairs in the middle of the corridor, so when people go down from the stairs, they can see a big picture in front of them. That could be more noticeable and attracting”. Additionally, likewise Carola, doctors suggested to place posters near empty wardrobes. Doctors also gave recommendation to allocate more than one poster and use numerous screens of TV in Linköping University Hospital. In their consideration nudging tools can be installed not only downstairs with locker rooms, but in other rooms which are accessible only for medical staff and not patients, for instance in personnel room that is placed in each Clinique of Linköping University Hospital on each floor.

7. Discussion

7.1 Behaviour and nudging

Before discussing role that nudging could play in positively changing behaviour of medical staff in Linköping University Hospital, behavioural reasons that triggered increase of disposable garments usage should be considered. Thorough understanding of the target audience is substantial before launching any nudge intervention. Efficiency of nudging tools might considerably depend on knowledge of targeted audience behaviour patterns (Mont, Lehner and Heiskanen, 2014).

Interviews with representatives of Östergötland Region Departments showed that one of the main beliefs that triggers healthcare workers single-used garments increase consumption is lack of knowledge or so -called “false facts”, claiming that medical staff are not aware about economic, hygienical and environmental differences between usage of reusable and disposable
working garments of Linköping University Hospital. Lack of knowledge is recognized to be a crucial barrier in pro-environmental behaviour. Interviews with healthcare workers showed that more than half of interviewed employees were not aware about negative environmental impacts of disposable garments overconsumption in Linköping University Hospital. At the same time, majority of medical staff interviewees were aware that usage of single-used garments is more expensive than reusable ones, the information of which was mainly gathered through implemented nudge with price tags comparison on two mannequin dolls in common dressing room of Linköping University Hospital. Traditional model of behavioural change represents following patterns: information implicates awareness of the individual, which in its turn implies concern, which results in action. One of the most common nudging interventions for changing human behaviour in a positive manner is “dissemination of information”. However, several studies have shown that using knowledge-deficit information nudging tools cannot guarantee change of human behaviour. It can be explained by the fact that other aspects of human social psychological phenomena’s impact behavioural patterns (Samuelsen and Stoyle, 2012). In addition to lack of knowledge, people might lack of self-control, discipline, time resources and patience in fast paced environment (Mont, Lehner and Heiskanen, 2014). Behaviour is often driven or firmly impacted by automatic and intuitive reactions (Michalek et al., 2015).

Interviews have shown that majority of healthcare workers base their choice of wearing working clothes on habits with System 1 type of thinking. After major renovation in Linköping University Hospital, where centralisation of dressing room with lockers down in the basement and bigger availability of single-used garments near each department took place, habits of some healthcare workers seemed to change to consumption increase of disposable garments even in non-urgent situations. Majority of interviewed medical workers instinctively grab disposable or reusable garments and base their choice on how comfortable or easily-accessible working garments are for them, where they are seeking for first suitable option, rather than optimal one (Lindahl and Stikvoort, 2015). Most of interviewed healthcare personnel wear more often reusable garments because they are more comfortable for them than wearing single-used ones. One respondent Hanna wears single-used garments often, because reusable clothes seem not to be easily-accessible for her. Only two interviewees Max Bergkvist, Sefika Alagic explained their choice of garments usage in Linköping University Hospital based on reflective System 2 type of thinking, rather than “heuristic” automatic behaviour. Max Bergkvist deliberately chooses not to wear disposable garments, because he realizes negative environmental and economic aspects of single-used garments. Sefika Alagic used to wear disposable garments more often, until she has been informed by nudging intervention about costs differences and subsequently changed intentionally decreased number of usages of disposable garments, and now she wears single-used clothes only in urgent situations. Nevertheless, Sefika and some other medical staff respondents seemed to be confused about environmental aspects of disposable garments, which will be discussed later.

Nudging is assumed to be most efficient at aiming irrational and heuristic behaviour that implicates low level of conscious deliberation (Mont, Lehner and Heiskanen, 2014). Lindhout and Reniers (2017) assume that individuals with rational behavioural patterns or System 2 type of thinking might never require being nudged. This presumption proves to be in line with interview findings of Max Bergkvist, who responded that implemented nudges in Linköping University Hospital didn’t influence his pro-environmental behaviour as he was well-aware and worried about sustainable aspects of single-used garments before.
Another evidence validates change in behavioural patterns from behaviour to belief (Samuelsen and Stoyle, 2012). People tend to search for coherence between their beliefs or values and behaviours (Mont, Lehner and Heiskanen, 2014). During interviews attitude towards sustainability has been discussed with healthcare workers, where pattern between wearing disposable garments and concern about environmental issues could be observed. Majority of interview respondents who responded that they generally worry about environmental and sustainable issues, showed willingness to be more conscious in the future about what type of material clothes they wear in Linköping University Hospital. Carola, who is sustainably friendly was using during the interview single-used jackets, because she was feeling regularly cold in Linköping University Hospital. She knew about costs differences among several and single-used garments, however she lacked knowledge about environmental aspects. During our discussion, with provision of information from my side, Carola replied that as soon as single-used jackets would be replaced to reusable ones in her department, she would stop wearing disposable jackets, because she cares about environment. Thus, “motivation appears to be a more powerful determinant in changing behaviour than information” (Samuelsen and Stoyle, 2012).

Nonetheless, interview with Hanna, who responded to have positive attitude towards sustainability, demonstrated that coherence with her values and beliefs was not sufficient to impact her behaviour. Hanna replied that provision of right information would not change her disposable garments usage, due to the reason that aspects such as difficulty to access reusable garments at work play more significant role for her. This leads to thought that nudging tools alone are not enough for changing behaviour and other external factors that in certain way affect human behaviour should be regulated in order to avoid unnecessary usage of single-used garments of medical staff. During interviews, it was evident that some medical staff or their colleagues encountered difficulties in some cases with being sufficiently provided number of reusable garments. Those difficulties that have been demonstrated in more detailed manner in results part are jammed doors of lockers in dressing rooms, deficient number of appropriate sizes of reusable apparel (big or small) being provided for medical staff at times.

7.2 Managers´ and medical staffs´ view of nudging at Linköping University Hospital, Region Östergötland

Interviews with respondents from both categories: healthcare staff and representatives from Östergötland Region departments have shown that they have positive attitude towards nudging techniques. Respondents involved in implementation of nudging interventions recognized opportunities with its approach. Majority of healthcare workers interviewees perceived launched nudging interventions in Linköping University Hospital as favourable and useful way to receive information. Even though nudging is regarded by some critics as manipulative and as an infringement on person autonomy, none of medical staff respondents felt being controlled or manipulated from being stopped to wear single-used garments (Mont, Lehner and Heiskanen, 2014). All of healthcare respondents replied that they felt being provided with information and being left with option of making their own choice, when they noticed “Climate hero” poster and mannequin dolls.

While discussing usage of disposable garments in Linköping University Hospital during interviews, the question of disposable apparel usage prohibition has been raised. As previously mentioned in results part, one surgeon specialist Max Bergkvist expressed opinion that availability of plastic apparel should be totally banned due to their unnecessity. Other interviewed respondents on the other hand replied that it is still necessary that access of single-
used garments can be available for healthcare workers in urgent cases and for hygienical reasons. It is debated in previous studies that nudging is better as behaviour impact tool than obligatory or fiscal rules. Studies by Lombardini and Lankoski (2013) show that during experiment made in Swedish Umeå school lunches almost half of audience didn’t wish to participate and went to eat outside of school cafeteria, when only vegetarian dishes were provided. This proves to be in line with term of “libertarian paternalism” that nudging interventions cannot be restrictive and should preserve people’s freedom of choice (Lindahl and Stikvoort, 2015).

Another aspect that is questionable, whether number of available single-used garments should be declined for healthcare workers. Results have shown that all of interview participants from Östergötland Region departments representative category are convinced that availability of disposable garments to medical staff should be decreased, Linköping University Hospital doesn’t need mass number of single-used garments. However, first of all, it is arguable whether such nudging intervention, identical to interventions that target reducing food size portion or replacing bigger plate size with smaller ones, can be qualified as a nudge. According to Marchiori, Adriaanse and De Ridder (2017), it is still ambiguous whether and what amount of supplementary incentives considers as “preserving freedom of choice”, which is fundamental component of nudging definition. Second of all, it should be kept in mind, that nudging itself is not sufficient and additional methods should be integrated in order to contribute tolerable support for sustainable consumption (Kasperbauer, 2017). In the context of Linköping University Hospital, it means that additional regulations apart from nudges should be made such as more efficient collaboration between all Östergötland Region departments that are involved in single-used garments provision as well as better and more frequent communication between Environmental Östergötland Region department and head of each Linköping University Hospital Clinique, who are capable in influencing amount of purchased single-used apparel in their Clinique.

7.3 Nudging toolkit

Feasible nudging techniques in Linköping University Hospital that can decrease the usage of single-used garments among healthcare staff will be discussed in accordance with five main categorizations of nudging tools: 1) information disclosure 2) framing 3) feedback and social norms 4) default options 5) changing physical environment

7.3.1 Information disclosure

Information disclosure occurs to be strong motivator to affect individuals in positively changing behaviour (Thaler and Sunstein, 2008). Östergötland Region has implemented two informational nudging tools. During the group interview with representatives of Östergötland Region department Anna Dahlgren and Henrik Moller, Anna claimed that launched nudging tools have demonstrated favourable results. Henrik Moller added that demand of reusable garments among medical staff has surged. “We have more reusable clothes in circulation than ever in TvNo laundry” commented Henrik. Nevertheless, it seems that unnecessary usage of single-used garments by medical staff in Linköping University Hospital has not been entirely resolved.

During evaluation of interview results with medical staff, interconnection between knowledge about economic and environmental difference of disposable and reusable garments and perception of two information nudging tools, was made. Results showed that majority of interviewed medical staff were aware how usage of disposable garments is expensive for
Östergötland Region, information of which was perceived by many respondents through seeing mannequin dolls with price tags comparison on them in the dressing room. At the same time, more than half of healthcare staff respondents replied that they didn’t know about negative environmental aspects of single-used garments usage at work, however some of them who noticed information on the poster answered that they understood message and meaning of the poster “Climate hero” in the dressing room but didn’t understand what exactly means being “Environmental hero”. It can be assumed that respondents didn’t understand why wearing reusable garments would make them “environmental heroes”. Some respondents on the other hand, who were aware about environmental differences couldn’t remember seeing poster or replied that didn’t understand the meaning of it and replied that they got information from other sources or simply by guessing themselves.

As previously presented in results part, three respondents from medical staff category who answered that they understood the meaning of the poster “Climate hero”, during the interview assumed that using single-used apparel is more environmentally friendly than reusable apparel due to chemicals and water consumption in laundry service of reusable clothing. Interview with marketing executive of TvNo laundry that is operated in Linköping University Hospital Henrik Moller demonstrated that laundry, that is owned by Östergötland Region is completely CO2 neutral and uses own production of water and small amount of detergents. Therefore, it appears that big difference exists in perceptions about sustainability of reusable garments between some medical staff from one side and laundry service on the other.

Successful nudging tools are advised to be preceded by information and educational campaigns, where individuals are triggered to support underlying policy. Previous studies have shown, nudging tools that were aimed at improving sustainable food consumption by telling people to eat less meat without denouncing why such behaviour is desirable and what are internal convictions, didn’t result in audience compliance (Mont, Lehner and Heiskanen, 2014). This corresponds with interview findings with Adam Burhan, (who saw “Climate hero “poster but responded that he didn’t seize meaning of it), suggested that it is not enough to tell medical staff that they should wear reusable garments more often, however he assumed that it would be more efficient if healthcare workers are provided with facts what are the reasons, causes and consequences why they, as healthcare workers should wear reusable garments or stop using single-used garments when it’s not necessary.

It can be recommended that information about sustainability aspects of reusable garments and TvNo laundry service are provided in the disclosure information nudging tool. Another nudging technique as information disclosure tool, proposed during the interview surgeon Max Bergkvist who noticed mannequin dolls in the dressing room but didn’t see poster “Climate hero”. He suggested to equip information with CO2 tag comparison on mannequin dolls wearing several and single-used apparel to show environmental differences, the similar nudging tool that was made with price tag comparison.

7.3.2 Framing

Nudging through information disclosure matters, however it also plays significant role how information is introduced, which can remarkably impact people decisions (Mont, Lehner and Heiskanen, 2014). It is suggested that effective nudging tool that could be implemented additionally in the Linköping University Hospital is framing nudge. Even during times when people do not pay enough attention to the composition of the message, framing of the message can influence nudging outcomes (Lindahl and Stikvoort, 2015). It is believed that framing
nudging tool is mostly powerful with application of loss aversion mechanism. Message that is framed with using negative aspects has stronger effect that framing with positive terms (Mont, Lehner and Heiskanen, 2014). One of the psychological paradoxes of individual minds is that human beings “do not mind having, but do mind losing”. When trying to change healthcare staff disposable garments usage behaviour, representatives of Östergötland Region environmental department might first explain advantages and disadvantages of wearing single-used garments and make clear apparent and concrete comparison with advantages and disadvantages of wearing reusable garments in Linköping University Hospital. It is important to show benefits and gains for the audience in comparison with the losses (Voyer, 2015).

It is critical to mention that nudging frame also comprises improving salience of the information, where adding signifiers to provided message, increases effectiveness of the nudging technique. Signifier is attributed to the content of the message, to induce information of the message to be more salient (Lehner, Mont and Heiskanen, 2015). In the example of Swedish food retailer Ica Maxi Södertälje, reframing information has been implemented to prevent food losses. Managers in the store noticed that customers perceived products marked with red price reduction in a negative manner, relating them to low quality and probable health issues. Message from “Lower price” has been changed to “Lower price - eat soon. This product is approaching expiration date but is still fresh. Buy it and you will save the environment and money”. The retailer responded that outcomes of this nudging technique has shown impressive results (Mont, Lehner and Heiskanen, 2014). In the context of Linköping University Hospital, signifiers or visual markers could be placed near wardrobes where medical staff access single-used garments. For instance, message in red colour as a visual marker could be framed for single-used apparel as “I’m made out of plastic. I’m bad for the environment” to make aware medical staff of their consumption patterns. Visual markers bring attention of the consumer, contributing with extent of reference for their usage behaviour and prompts to discontinue such behaviour (Lehner, Mont and Heiskanen, 2015). Additionally, if necessary, information can be supplied with presumable message as “Replacing me with reusable apparel will save energy and decrease CO2 emission by certain percentage or amount per year”. Nevertheless, it should be remembered that using disposal garments is still necessary for medical staff in urgent situations for hygienical reasons, therefore this aspect should be taken into consideration and discussed with department responsible for hygienical matters of Östergötland Region while launching signifiers or visual markers.

7.3.3 Feedback and social norms

Another feasible nudging technique that can be launched in Linköping University Hospital to decrease the usage of single-use garments is through using feedback and social norms nudging toolkit. Combination of feedback and social norms can be strong tool in persuasion of individuals (Lindahl and Stikvoort, 2015). Thaler and Sustein (2008) point out that it is important to give prompt feedback to people so that they can recognize consequences of their actions. Feedback nudging tool is one of the ways to make energy use visible for people, which can be achieved through the following suggested feasible nudging implementation in Linköping University Hospital.

During the interview with medical worker Carola, respondent indicated, that it was alarming for her to see how much of single-used apparel is wasted daily in the trash bin of common dressing room. Feasible nudging technique could be suggested as temporarily introducing transparent trash bin in the dressing room of US healthcare workers, to bring feedback for them and make visible how much single-used garments are thrown away daily. This idea has been
taken from a pilot project “MindFull of Choices” run up by Master students of Science for Sustainable Development program at Linkoping University in April - May 2018, where I have been member. Several nudging interventions were launched with an intention to raise awareness about environmental consumption behaviour of visitors at Key building in Linkoping University campus. One of such nudging intervention was to bring attention of disposable coffee cups consumption. Transparent trash bin container near Café Ellen in Key building was located near the place where students and professors often purchase disposable coffee and tea cups with plastic caps. One of the walls of trash bin container was replaced with transparent wall, so that it can be visible to Key building coffee drinkers how much coffee cups are thrown away on daily basis. The sign on the container “Only paper cups” was placed. Moreover, several posters with signifying message “Bring your own cup or use a porcelain one” were located near café Ellen, that in addition contained information with what type and how much energy is used to produce one disposable coffee cup. Another poster provided feedback information for coffee consumers of how much disposable coffee cups were used daily in Key Building during time of implemented project. Due to the limited time frame of the project, it was not possible to examine if disposable coffee cups consumption has decreased after implemented nudging tools, however the evaluation with questionnaires of Key building visitors has been made where majority of respondents answered that they noticed nudging interventions and that provided information and feedback would positively influence their consumption behaviour. Similar feasible nudging technique in Linköping University Hospital can work more than just providing information for healthcare staff but can associate their actions to the common benefit in the local context that they can pertain to (Mont, Lehner and Heiskanen, 2014).

Implementation of social comparison feedback nudging technique could be also taken into consideration. The fact that people (in most cases unconsciously) are apt to follow the example of other individuals that surround them can play significant role to nudge medical staff in Linköping University Hospital. Consumption of disposable garments can be observed and compared to neighbouring institutions, hospitals or clinics within Linköping University Hospital to stimulate staff to improve their usage behaviour. Results of interviews with representatives of Östergötland Region departments have shown that one Clinique of Intensive care in Linköping University Hospital has tremendously decreased number of disposable garments being used. Therefore, comparative performance of Intensive care Clinique can be provided as feedback information to other departments of Linköping University Hospital to inspire positive change. It should be highlighted, that to assure efficiency of the nudging tool, varying message to apply nor ms to the situation in a specific manner is important. For example, message “80% of patients in this clinic arrive on time for the appointment” has bigger chances to boost arrival of patients on-time than general message “Please arrive on time” (Voyer, 2015).

Nudging incentive such as reward competition of decreasing single-used scrubs wearing consumption via prize, money or other direct benefits among medical staff of Linköping University Hospital has been considered during interviews. Reward incentive is regarded as a powerful technique, since individuals prefer rewards that happen in instant future, rather than getting benefits in the long run (Lindhout and Reniers, 2017). Nevertheless, interview results have shown that decision of launching such incentive depends also on external actors and should be closely reviewed with infection control department, so that hygiene regulations are still followed in Linköping University Hospital.
7.3.4 Default option

Interview results have shown that default option, that is considered to be one of the most efficient nudging tools (Lehner, Mont and Heiskanen, 2015), is not currently possible to set up as a nudging technique that can be implemented in Linköping University Hospital. Choice to wear reusable garments for medical staff can be given as a default option, allowing wearing single-used garments only as a second alternative, if they prefer. Nonetheless, as interviews with representatives of Östergötland Region departments have demonstrated that provision of single-used garments for Linköping University Hospital doesn’t only depend on procurement department of Östergötland Region, but also influenced by external competitor actors – suppliers, who come to each Clinique to persuade buying single-used garments. Another aspect that should be taken into consideration is that voice in questions of single-used garments usage also relies upon decisions of Infection control department, that take care about hygienical aspects of Linköping University Hospital. Thus, this nudging technique doesn’t seem to be achievable, since contradicting influences of other factors exist (Mont, Lehner and Heiskanen, 2014).

7.3.5 Changing physical environment

Implementation of changing physical environment nudging technique has been discussed during interviews. Facilitating accessibility of grabbing reusable garments for healthcare workers, for example locating locker rooms with reusable garments near each Clinique of Linköping University Hospital as it was before centralisation of dressing room downstairs could be one way to discourage medical staff wearing single-used garments, that are currently more easily-approachable than long-lasting apparel. Notwithstanding, interview results with representatives of Östergötland Region departments have displayed that changing location of dressing room with lockers is not possible, since the centralisation of medical staff dressing room with reusable garments has already taken place and that would mean to take step backwards. Furthermore, centralisation of locker rooms downstairs according to Pia Vange and Malin Laberfinger is more economically beneficial and more competent for Region, than how it was prior centralisation.

Changing blue colour of single-used apparel was considered as another way of changing physical environment nudging tool that could potentially influence choice of healthcare workers. Interviews have shown that loss of identity of some medical staff might be one of the reasons that triggered them to wear single-used garments more often. However, interview with Emma Johansson, who is responsible for procurement of single-used apparel demonstrated that purchase of single-used apparel in blue colour is the only best choice for the Linköping University Hospital due to environmental aspects. Therefore, changing colour as another feasible nudging technique can’t be implemented.

Launching tracking system of single-used garments usage has also been considered during interviews and presented in results part, but results show that such technique is not cost-effective for Region Östergötland. It is supported by previous research that found changes to physical environment to be effective, but expensive intervention (Lehner, Mont and Heiskanen, 2015).

Finally, changing placement of informational campaigns can be linked to the changing physical environment nudging technique. Suggestions of relocation of already existing nudging tools in Linköping University Hospital has been presented in results part.
8. Concluding remarks

From this study it is possible to determine that nudging has good possibilities to be implemented as a tool in influencing healthcare workers of Linköping University Hospital disposable garments usage, however several issues should be identified. Representatives from Östergötland Region departments recognized opportunities with its approach, while research has shown that implemented “Climate Hero” poster nudging technique was not effective and didn’t influence behaviour of medical staff, due to the fact that audience didn’t understand the meaning of this nudging technique. At the same time, majority of medical staff interviewees were aware that usage of single-used garments is more expensive than reusable ones, the information of which was mainly gathered through implemented nudge with price tags comparison on two mannequin dolls in common dressing room of Linköping University Hospital. Nonetheless, results have shown that provision of knowledge-deficit information nudging tool was not sufficient for positively influencing medical staff behavior because other aspects such as accessibility, availability and comfort of wearing reusable garments, impact consumer behavioral patterns.

Before concluding feasible nudging techniques to decrease the usage of single-use garments, main behavioural reasons that triggered increase of disposable garments usage were detected as lack of information and old habits of medical staff. Application of information disclosure, framing, feedback and social norms nudging techniques have shown to have promising possibilities in impacting current behaviour and raise healthcare workers awareness about their consumption patterns. Nevertheless, implementation of nudging interventions at Linköping University Hospital requires three aspects that should be kept in mind. First, it should be remembered that people act and behave differently depending on the environment they are surrounded. Nudging tools that work in private sector will not necessarily bring same results in public sector. Second, research pinpoints the importance of knowing the audience, therefore implementation of nudging techniques in Linköping University Hospital should be specifically applied according to needs, behaviour and knowledge of medical staff. Last but not least, nudging tools alone are not enough for changing behaviour and other external factors, that in certain way affect human behaviour should be regulated in order to avoid unnecessary usage of single-used garments of medical staff in Linköping University Hospital.

Finally, due to limitations of the study with little sample of respondents, further research is needed with bigger number of participants to raise validity and credibility of this research.

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