

THE EFFECTIVENESS OF EU POLICIES ON INCREASING RECYCLING OF PLASTIC
PACKAGING WASTE

Milka Karhu

International Business
Bachelor's Thesis
Supervisor: Susan Grinstead
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Objectives

The main objectives of this thesis were to find out how the EU's plastic packaging waste policies have evolved over time and what the overall situation of plastic packaging recycling is now in Europe. One objective was also to investigate how satisfaction with recycling facilities affects people's recycling behavior and what factors would motivate them to recycle more of their plastic packaging waste.

Summary

With secondary research, literature about EU policies effects to increase recycling and move towards a circular economy was reviewed. A web survey was then conducted where respondents were asked to answer different questions about plastic packaging recycling. Main themes in the survey were satisfaction with local plastic packaging waste collection and attitudes toward recycling. After these questions, respondents were asked to list reasons, why they do or do not recycle plastic packaging waste and what would motivate them to recycle more. The web survey was shared on social media and different thesis survey groups.

Conclusions

In recent years plastic packaging has been taken into consideration more when updating different EU policies and implementing new strategies for recycling. The EU introduced Plastics Strategy and the amount of plastic packaging recycled has increased over the years.

The survey's results supported previous findings that satisfaction with local recycling facilities indeed affects people's recycling behavior. Even though many agreed that recycling plastic packaging waste is important, dissatisfaction with local facilities affects how often they separate plastic packaging from other household waste.

Key words: *EU, Europe, recycling, circular economy, behavior, plastics*

Language: English

Grade:

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1. INTRODUCTION

1.1 Background

Over the years more information about the negative effects plastics have on the environment and human health have been discovered. To prevent plastic packaging from getting released to the environment there are a few ways that it can be done: reduce, reuse, recycle. This thesis will focus more on the recycle aspect of preventing plastic packaging from being dumped to landfills and entering the environment.

Plastics ending up in the environment has become a global problem. This is because the plastics end up in nature and into oceans around the world. When the plastics start to dissolve they can in the worst-case scenario end up in people's food and negatively affect human health.

1.2 Research Problem

The research problem of this thesis is what is the role of EU policies on increasing recycling of plastic packaging waste and how effective they have been. When assessing this research problem, it is important to take into consideration that plastic packaging recycling can be considered to be a fairly new concept. Especially, since it was not until last year that the EU released an independent strategy for plastics and amended a previous directive to take into account plastic packaging usage and recycling.

1.3 Research Questions

How the policies have evolved over time and what can be expected for the future? It is important to understand the policies that the European Union (EU) implements and what is the member states' responsibilities to achieve the set goals. The EU's current and future actions and strategies will determine the future of its policy development regarding plastic packaging recycling.

How has the possibility to recycle plastic packaging in households affected people's behavior with recycling? Where do people get the knowledge of recycling plastic packaging and how to encourage them to do it? This research question is the most important one in this thesis. Researching people's satisfaction with the plastic packaging recycling facilities in their area and finding out what would motivate them to recycle more could affect how the EU, member states and local waste management companies develop new policies and improve their practices.

What are some aspects that prevent plastic packaging recycling from being as effective as possible? For future policies it is important to know what are the possible aspects that prevent plastic packaging recycling policies from being as effective as possible. What are the areas that need improvement to make sure there will be an increase in recycling of plastic packaging?

1.4 Research Objectives

To find out how EU policies regarding recycling of plastic packaging waste have changed and improved over time. Also, it is important to find out how recently these changes have occurred and what have they meant for the member states.

To investigate how the possibility to recycle plastic packaging and knowledge of the subject has affected people's recycling behavior. In addition to these objectives, it would be wise to find out what factors would increase recycling of plastic packaging waste on an individual level.

To find out what are some of the causes that prevent plastic packaging recycling from being as effective as possible in some member states. The objective with this one is to especially find out possible differences that may occur between the EU member states.

2. LITERATURE REVIEW

2.1 Introduction

Plastic has been an important topic in the news for a few years. The effects plastic has on the environment and on people is constantly researched and new policies are implemented to prevent even more plastic from leaking to the environment. The European Union (EU) has tried to move away from the current “take, make, dispose” type of model in resource consumption – especially with plastics – by making efforts to move towards a circular economy and “reduce, reuse, recycle, regenerate” system with different strategies and policies (Rhodes, 2018). This literature review will focus on the recycle part of the system in plastic packaging waste management.

The EU introduced Directive 94/62/EC in 1994 which aimed to improve quality of the environment, protect human health and protect resources (Eur-Lex, 2018). However, it was later amended in 2018 with Directive (EU) 2018/852 that has updated measures to prevent production of packaging waste but most importantly to promote reuse, recycling and other ways to recover packaging waste. The targets set for recycling of plastic packaging are 50% by the end of 2025 and 55% by the end of the year 2030 (Eur-Lex, 2018). The amending directive has applied since 4th of July 2018 and it has to become law in member states by two years later. In addition to the directive, the EU came up with a Plastic Strategy in the beginning of 2018 which also aims to increase recycling of plastic packaging by making it profitable for business (European Commission, 2018). However, the new strategy takes into account that increased recycling requires improvements across the EU so that the strategy can be successful.

The aim of this literature review is to find whether there are gaps in the subject, what needs to be researched more and to provide recommendations together with the primary research that will be done in the thesis. The key themes for this literature review will be people’s behavior with recycling, waste management of recycling plastic packaging and the policy aspect of recycling.

2.2 Behavior with recycling

Household plastic packaging recycling depends on the behaviors of people. Alriksson & Stoeva (2017) conducted a questionnaire for Swedish and Bulgarian university student that studied their waste separation behavior. The reason why these countries were chosen for the research is because they both have different levels of performance in their waste sector. The authors' study shows that an essential part of recycling behavior is the respondents' satisfaction towards waste separation possibilities in the residential areas. Alriksson & Stoeva (2017) used an extended model of Theory of Planned behavior which they visualized with Figure 1. Alriksson & Stoeva (2017) cite Ajzen (1991) that Theory of planned behavior framework helps to understand waste separation behavior and it uses motivation and ability as predictors when studying behavior in specific situations.

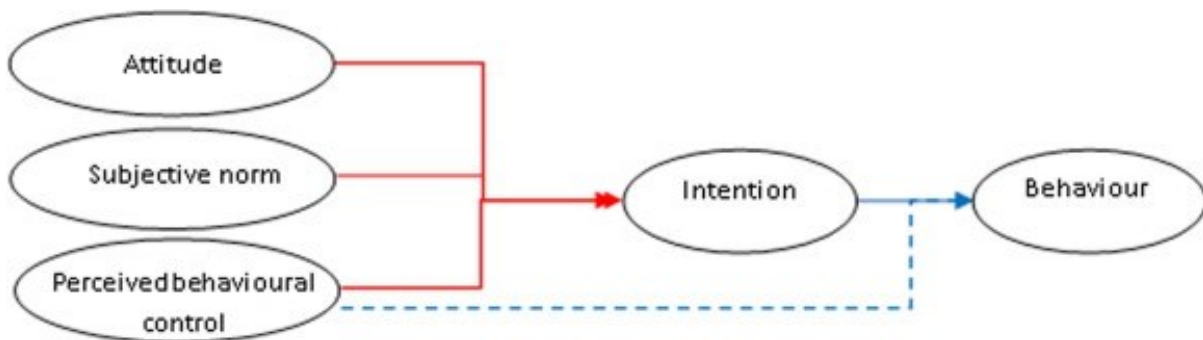


Figure 1: Original model of theory of planned behavior (Ajzen, 1991)

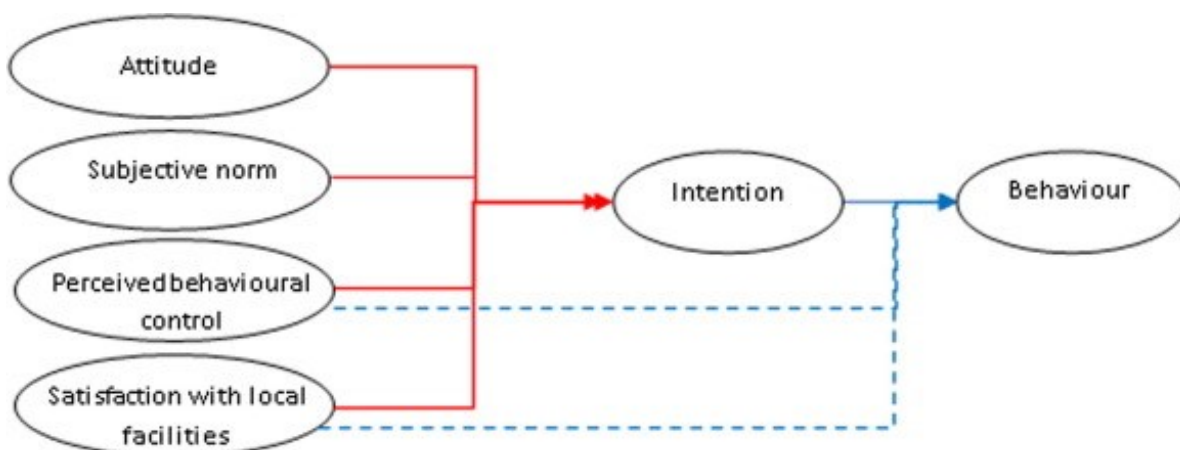


Figure 2: Extended model of theory of planned behavior by Alriksson & Stoeva, 2017 (Ajzen, 1991)

Hage et. al. (2016) had similar findings when they studied and compared household recycling behavior in Lithuania and Sweden. Their analysis of the results also showed that

one of the most important factors in household recycling is the convenience of it. The article states that people who had easy access to a waste collection system are more likely to sort their packaging waste compared to those who do not have such possibility. This means that in order to increase plastic packaging recycling, the end-consumers, or in this case the households, require easy access to these recycling services.

Hage et. al. (2016) point out in the conclusion of their study that another important factor for improving household recycling is better communication and additional information. In the article they give an example to do this with regular awareness-raising efforts. The article's main focuses are convenience of recycling and communication of additional information as a way to affect people's recycling behavior. Farinelli et. al. (2018) include in their study of motivations for recycling the aspect of waste minimization behaviors. The article suggests that if we would want to move from policies based on recycling towards policies that aim to increase reduction of waste, interaction between waste policies and waste behavior should be paid more attention to. Criticism in literature towards the EU's way of focusing more towards the recycling aspect rather than prevention is reviewed later in this literature review. Both of these articles conclude that communication is the key to effective policies to increase recycling, but it needs to be taken into consideration that both of these studies including the one by Alriksson & Stoeva (2017) do not specifically focus on recycling of plastic packaging waste in households.

In addition to improving communication, raising awareness and providing end-consumers with access to recycling possibilities and providing services that help households to recycle effectively, policies need to be a part of trying to change recycling behavior. Cui & Susic (2019) offer some insight on effective policies for increasing recycling. With the results of their study Cui & Susic (2019) conclude that one way to expect a higher yield rate is to have policies that have high costs or penalties for non-recycled materials disposal into the environment and landfills. They also found out that the cost of materials and landfills affect the collection rate. Haro et. al. (2018) studied the efficiency of packaging waste management in EU candidate countries and found out that one way to increase recycling and prevent more packaging waste from ending up in landfills is to introduce landfill taxes. The only downside for this type of policy is that if the tax rate is set too high it could lead to illegal dumping (Haro et. al., 2018). When it comes to trying to affect consumers' behavior on recycling, one way to try and increase collection rate is with deposit or refund model which

supposedly would promote recycling and encourage the end-consumers to recycle more (Cui & Susic, 2019). With all these aspects to try and affect the behavior in recycling, the literature seems to focus more on recycling of many different materials and not solely on plastic packaging. However, the literature that does not solely focus on plastics still include the material as part of a bigger picture. It seems that the recycling behavior of plastic or plastic packaging in households could be studied more in the future.

2.3 Waste management and recycling plastic packaging

According to the statistics from Eurostat (2018) on recycling rate of plastic packaging waste the overall trend across the EU over the years has been that there is a steady increase in the recycling rate. In 2006 the recycling rate was estimated by Eurostat to be 26,4% and in ten years the percentage has increased to the estimated number of 42,4%. According to other statistics by Eurostat (2019), the amount of recycling of domestic packaging waste has been on the rise. However, there seems to not be any data on the tonnes of recycled packaging across the all member states but only data on the individual countries. Still the overall trend seems to be that more tonnes of packaging waste is being recycled in majority of the EU. With these statistics we could make an assumption that there has been an increase in recycling of plastic and other packaging waste and that part of it stems from the actions of the EU with its policies.

One of the distinctive theme in the literature regarding plastic packaging recycling and waste management was the differences in the evolvement of waste management in different countries. Iacob et. al. (2018) focus on the present recycling system in Romania and how it has enabled Romania to achieve the recycling targets set by the EU. The article concludes that in addition to Romania there are member states in the EU with similar situation and that Romania's case is just an example how reaching the set targets is more difficult for poorer countries. This raises a question of how the EU should make sure that every member state achieves the set targets and what it could do to help those countries that do not have the required resources. Cioca et. al. (2019) suggest that in Romania's case innovation should be improved in addition to education of the population on recycling could be the first steps to improve Romania's changes on achieving future targets. However, according to Beccarello & Di Foggia (2016) higher recycling targets offer positive impacts on the member

states. Their study found that higher targets lead to positive effects on things like “job creation, production and added value net of the increasing management costs” (Beccarello & Di Foggia, 2016).

Kranzinger et. al. (2017) did a study about the waste management system in Lower Austria where they introduced the idea of a catch-all-plastic bin. Their analysis of the residual waste composed in the area shows that residual waste includes a considerable amount of potential recyclable materials such as plastics. Kranzinger et. al. (2017) gained results with a quantity flow model they constructed that the catch-all-plastics bin would realistically increase the amount of plastics collected of 33,9 wt%. With these results the authors suggest that the catch-all-plastics bin could be an option for the EU member states to achieve higher recycling rates and for the EU to move towards the Commission’s Circular Economy strategy. However, there is one article that contradicts this idea. Mendenhall (2018) points out that because waste disposal and waste management is usually managed locally, and the waste management infrastructure varies broadly, it is not possible to find a “one size fits all” solution.

There seems to be one problem after the process of plastic packaging recycling and how to further increase it. Christensen et. al. (2018) conducted interviews with different stakeholders in different stages of the plastics value chain to gather knowledge about factors that affect the demand for recycled plastics and plastic recycling in the regional value chain. Their study found that the most significant reasons were “the costs of recycling and transportation and the lack of demand of recycled plastic, which makes it difficult to justify the costs” (Christensen et. al., 2018). According to the authors, a conclusion can be drawn from their results that in order to increase plastic recycling there should be more demand for recycled plastics from producers, costs should be lower and lack in the design of recyclability of plastics should be solved. The EU has decided to tackle this problem when it announced its new plastics strategy in the beginning of 2018. One of the points in the strategy is to create new rules that aims to improve the plastics used in packaging to make them more recyclable and increase the demand of recycled materials (European Commission, 2018). However, in addition to putting effort into trying to increase the demand for recycled plastics, Dangis (2018) states that reliable knowledge and information is crucially needed for the future development of the industry for plastics converting. In addition to this he makes a point that the recycling targets set by the EU and governments are harder to reach if there

is not a stronger market for recycled plastic material which in result could lead to a halt in trying to move towards a circular economy.

Waste management systems should be modernized and effective now, but they should be improved over time so that member states can achieve the future targets set by the EU. In a study about Austria's waste management for plastic packaging in 2013 done by Fellner & Van Eygen (2018) the authors found out that even though the country reached the goals set by it and the EU, Austria needs major technological advancements in plastic packaging collection and sorting for it to reach future targets. The European Commission (2018) has a similar understanding of the future challenges for plastic waste recycling and management:

“With more plastic being collected, improved and scaled up recycling facilities should be set up, alongside a better and standardized system for the separate collection and sorting of waste across the EU.” (European Commission, 2018).

With this statement we come back to the problem if the EU should try to come up with a harmonized waste management system for plastic packaging recycling across the EU area or take into consideration that the systems should be modified according to the current situation in each member state. What we can conclude from the literature available is that research and development is an important factor in increasing recycling of plastic packaging waste both by the end consumer and the plastics converting industry.

2.4 Policy development of plastics recycling

Right now, the EU has implemented the Directive (EU) 2018/852, that amends Directive 94/62/EC, for packaging and packaging waste. The directive gives member states targets on recycling of different materials and what are all the things they should achieve but it does not specifically say how the targets should be achieved just that that needs to happen. This means that governments need to work closely with their waste management system providers to come up with suitable policies to encourage end users to recycle and improve their current infrastructures. This part of the literature review aims to gather different strategies and effective ways to increase plastic packaging recycling and determine if there are gaps in knowledge and what aspects could be researched more in the future.

Penca (2018) reviews the new EU's Plastics Strategy policy which objective is to move away from the linear system where plastics are made, used then disposed to landfills towards a circular economy. However, Penca (2018) addresses in the article that plastic pollution problem is complex, and it needs people to adjust their behavior, authorities to take action and social trends everywhere in the world. Even though developing recycling practices of plastic packaging is important across the EU area to avoid plastics from being dumped to landfills or leaked to the environment the EU policies have gotten criticism. Many articles state that the EU policies focus too much on the recycling aspect rather than focusing on tackling the problem at the early stages which is the product development.

Römph & Van Calster (2018) point out that the EU waste legislation encourages converting waste into materials with recycling but on the other hand REACH's main point is to substitute the harmful substance, in this case plastic, without exclusively encouraging recycling. REACH stands out for Registration, Evaluation, Authorisation and Restriction of Chemicals and its aim is to substitute harmful substances to ensure and improve the protection of health and the environment (European Commission, 2016). A study using web survey was conducted by Takeuchi & Yamaguchi (2016) in Japan to evaluate consumer preferences about packaging with less material. According to them and based on their results, they claim that recycling policies weaken the promotion of reducing the amount of material used in the production and delivering of a product. Milios (2018) further proves that the EU seems to focus too much on recycling and states that "policies affecting material efficiency in the production and consumption stages of a product have been found to be poorly utilized so far in the EU".

In addition to this, Milios (2018) concludes that the EU's policies are rather waste centric which are supposed to increase reuse and recycling but still says that the current situation appears to be the opposite. According to the article the situation is as it is because of a gap in policies related to consumption which has led to products becoming waste and e. g. repair and reuse actions remain marginal (Milos, 2018). An article by Hardesty et. al. (2018) where they study waste abatement strategies in Australia and found out that a model that included different programs (recycling, prevention and illegal dumping) was more effective at reducing waste at coasts than a single term model which only uses one specific program. However, they also found that there seemed to be larger reductions in the amount of waste

in the environment when investments were directed in campaigns rather than policies. This further supports the idea that the EU has room for policy development and raises the question if the EU should start considering the idea of investing in highly visible campaigns on plastic packaging recycling and plastics in general.

Because the literature suggests that the EU focuses too much on the recycling and the recyclability of plastic packaging, it would be a good idea if it would create more prevention policies. Brambilla et. al. (2016) studied emerging trends of prevention policies in 11 countries of which 7 are from Europe. According to the results they found three main trends: improving packaging, informing the final consumers by making firms more accountable and lastly increasing collaboration within the supply chains of plastic packaging (Brambilla et. al., 2016). However, the authors note that prevention policies are still a newer concept but at the same time possible options for effective policies can be identified for policy makers.

A paper by Bush et. al. (2018) gives suggestions for future plastics policies that it is important that they focus on three aspects which are producers, consumers and the government. According to them this would be done by having producers take responsibility of the affects plastics have on the environment and human health, but their study found that plastic converting companies think that the EU legislation does not support the use of recycled plastic material enough.

As mentioned in earlier, the end-consumers can affect their plastic packaging recycling behavior and Bush et. al. (2018) states that they are the ones that can create an effective recycling scheme. With the evidence that plastics indeed are harmful, the governments should classify the material as hazardous to further ensure that plastic packaging waste does not end up in the environment (Bush et. al., 2018). In addition to these measures, the article suggests that governments could also pressure producers to start favoring and developing biodegradable plastics, bioplastics or other substituting materials. It seems that the EU and many of the member states have made efforts to create strategies to move towards a renewable resource-based bioeconomy according to Bedtke et. al. (2018). They examine the importance of policies in shaping an innovative system such as the wood-based bioeconomy in Germany that they focus on in their article. Bedtke et. al. (2018) state that policies are an important factor in supporting the transition to a bioeconomy and that

effective policies do not focus solely on innovation and technology support but rather implement them to a wider strategy.

2.5 Conclusion

It has to be taken into consideration that solid conclusion cannot be made because the literature on this subject is still a bit narrow and further research is definitely needed. There is literature on the topic of EU's policies on waste management and packaging but policies on plastic packaging specifically seem to be in an earlier stage. Also, even though the data from Eurostat implies that recycling of packaging waste indeed has increased in the EU there are still some member states that do not achieve their targets.

People's behavior with recycling of plastic packaging depends on many things. One of them is providing consumers additional information about recycling and knowledge on how to do it. Providing information about the benefits of recycling plastic packaging and the harms plastics have on the environment would encourage people to change their recycling behavior. In addition to this a way to affect people's recycling behavior is with policies that have some type of reward systems or penalties. Rewarding recycling could work as an incentive to encourage recycling and financial penalties could work for illegal dumping and letting plastic waste to enter the environment. Another is people's happiness with the waste separation system in their area. This topic is tied the development phase of a country's recycling system. When people have access to convenient recycling they will do it but if they do not they will be more likely to not do it.

Another thing that limits the conclusion if the EU policies have effectively increased recycling of plastic packaging waste is that according to the literature suggests that member states have the freedom to create their own policies regarding the subject as long as they reach their targets. The fact that recycling waste management systems are in different stages in different countries and depending on their economic situation and possibilities to improve them sets the EU in an awkward situation. Policies alone are not a solution to force countries with less developed infrastructure but must be implemented with capital investment (Iacob et. al., 2018).

Research and development, improved technology and innovation are needed to develop recycling systems for them to be able hold larger amounts and recycle all plastic packaging that is collected. However, forcing a harmonized recycling waste management system across the EU seems to be a difficult task and literature on the subject suggest that because of local waste management systems there is not a solution that would fit all member states (Mendenhall, 2018).

Future policy makers of the EU seem to be starting their efforts to increase recycling of plastic packaging in a good way, but they still need to be developed and adjusted to fit the different situations in its member states. This would need more research done on the subject to be able to provide reliable information and strong suggestions for best policies that are effective.

2.6 Conceptual Framework

Here is the conceptual framework based on the secondary research done for the literature review. The conceptual framework is based on the extended model of theory of planned behavior that Alriksson & Stoeva (2017) used in their study. This will help with the primary research where the objective is to find out why people recycle their plastic packaging waste and what would motivate them to recycle more. The conceptual framework is illustrated in Figure 3. The methodology will be based on this framework to achieve the set objectives and to find out what is these aspects' part in affecting plastic packaging recycling behavior on individual level. Satisfaction with local facilities and the orange box are considered to be independent variables in this case.

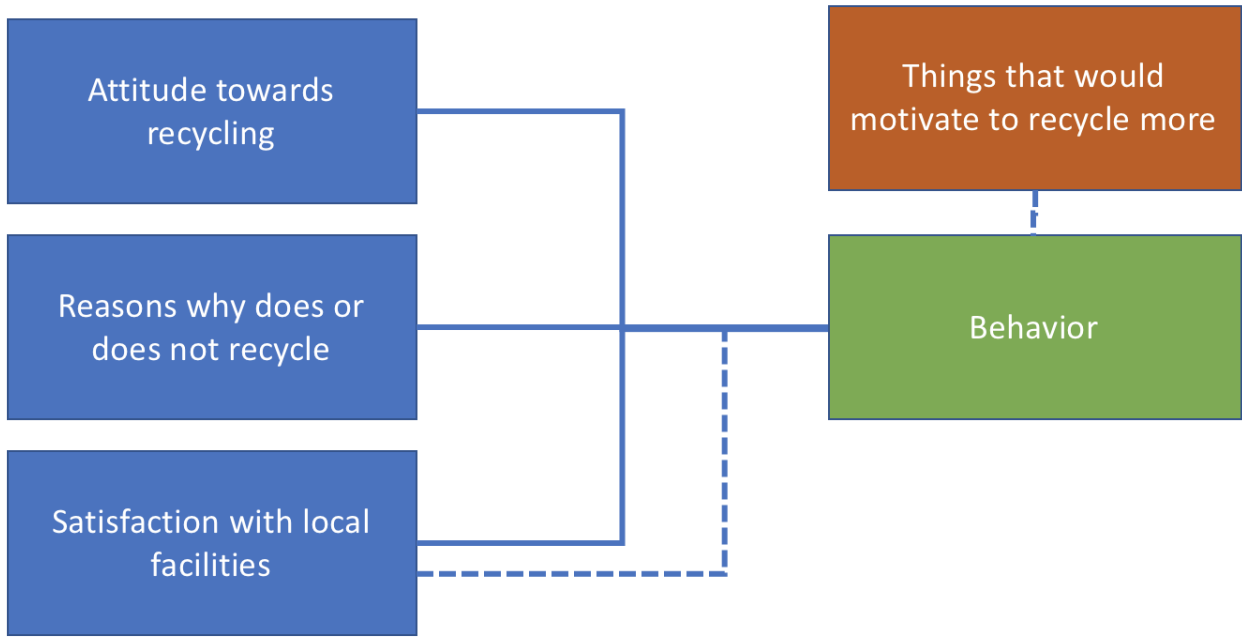


Figure 3

3. METHODOLOGY

3.1 Secondary Research

Secondary research and primary research were both used in this bachelor's thesis. Secondary research was used to review existing articles about the subject. According to the research done for the literature review there seems to be a gap in knowledge about plastic packaging recycling behavior in households. With the help of the conceptual framework the primary researches objective is to find out what affects peoples' behavior with plastic packaging recycling. What are peoples' attitudes towards recycling? Can explain the reasons why they either recycle or do not recycle plastic packaging waste from household waste? Does satisfaction towards facilities affect recycling behavior? What would motivate people to recycle more of their plastic packaging waste?

3.2 Primary Research

Because the topic of this thesis is quite new and there were not that many specific articles, collecting primary data was necessary. Survey seemed like the best option because it gives an efficient way to collect large sample of responses and possibility to receive responses from people who live in different countries (Saunders et. al., 2015). Specifically, a web survey seemed like the best option because of the easiness of sharing it to others. Also, people are more likely to fill in the survey through web because they can do it independently, in their own time and anywhere they are.

3.3 Primary data collection

Some other methods that could have been used to collect primary data for this bachelor's thesis could have been interviews with people who don't recycle plastic packaging waste at all and with those who do it always. With this method it would have been easier to select people that live in different density areas: highly populated city, medium sized city or town and countryside. However, this method would better suit a situation where all respondents are from the same country, so this would not have made it possible to acquire international

outlook on things. This is why web survey was chosen as the method for acquiring primary data.

The survey was done with Google Forms due to previous positive experiences with using the said platform. The survey consists of a mix of open questions and closed questions. The purpose of the open questions is to acquire variety of detailed answers to see what is mainly on the respondent's mind when answering the question (Saunders, 2015). However, the down side for using an open question instead of giving a set of options is that people can easily leave the questions as blanks or just answer I don't know. The purpose of closed questions is to provide alternative answers to choose from which makes them faster and easier to answer because there is no writing involved (Saunders, 2015). The entire structure of the survey and questions can be seen in Appendix 1. Closed questions were used in the first three questions which ask the respondents' country of residence, nationality and age. In these questions the respondent has to choose their answer from given options. Closed questions were also used when discussing the topic of satisfaction with local waste management system for plastic packaging, how often does the respondent separate plastic packaging from other household waste and what are the respondents' opinions regarding the subject. In these questions respondents had to choose the best option from a Likert scale that has five options ranging from strongly disagree to strongly agree.

Open questions were used in the survey in three questions. It was used in a question where respondents have to estimate the distance from their house to the nearest plastics recycling facility in kilometers. The last two questions in the survey were open questions that ask about some of the reasons why the respondent does or does not recycle plastic packaging waste and what would motivate them to recycle more. Open question format seemed like the best option for these types of questions to make the respondents think thoroughly about their reasoning and motivation. However, using closed questions by offering the respondents a set of choices and having them tick all boxes that apply did not seem like a better idea. This is because then people can just tick some boxes and do not have to see the effort to express their own thoughts.

The survey was shared on different groups on Facebook, Reddit and PollPool. PollPool is a platform where people can acquire responses in exchange for doing others' surveys. This was done to increase chances of getting international responses in addition to responses

from residents of Finland. Even though efforts were made to acquire as many responses outside of Finland as possible, 50% of the respondents were residents of Finland.

3.4 Data analysis

After collecting all the data, the next step was to analyze them by coding the responses and entering all the data into SPSS. Open questions were coded into broader categories to make it easier to analyze them.

4. FINDINGS

The survey received 101 responses. After going through the data two responses needed to be deleted because one of them was inappropriate and one response was a duplicate of a previous answer. In the end, there were 99 valid responses to be analyzed.

SurveyMonkey's (n.d) margin of error calculator is used to determine if the sample size is large enough to get accurate data that matches the population that is studied for this thesis. To do this the population size needs to be estimated. The current population of the EU is around 508 million people (European Union, 2019). From these people children aged 0-14 years accounted for 16% of the population in 2016 (Eurostat, 2017a). In 2011, 1,3% of the population lived in institutional households or were homeless (Eurostat, 2017b). These percentages will be used in trying to estimate the population size for the margin of error.

$$(0,84 \times 508 \text{ million}) + (0,987 \times 508 \text{ million}) \sim 420 \text{ million}$$

With the population size of 420 million, confidence level of 95% and sample size of 99 the margin of error according to the calculator is 10%. SurveyMonkey (n.d.) explains the concept of margin of error clearly that if in the survey 75% of respondents answer yes to a question then 65% of the general population would say yes too

4.1 Country of residence and age

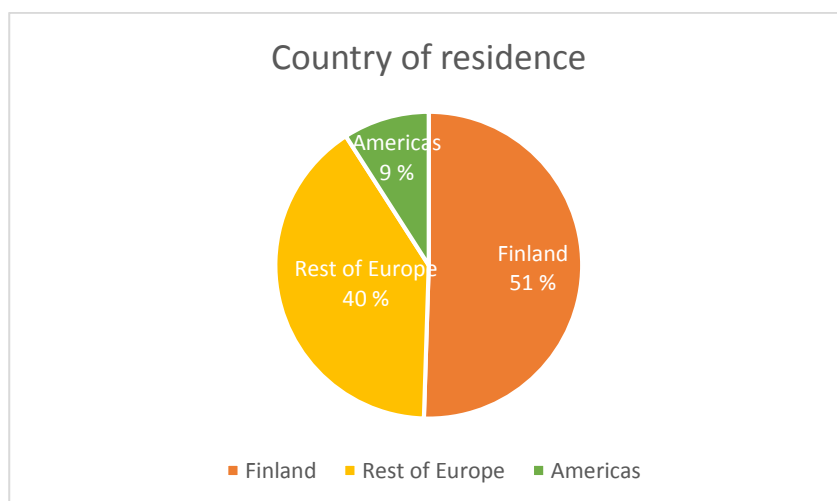


Figure 3

The survey was launched in Finland and in international survey groups on web and Facebook. From the 99 respondents 90 of them were residents of Europe. From these 90 respondents 50 were residents of Finland. This means that the other 40 respondents were residents of varying European countries. The nine respondents that were not residents of an European country were all from the Americas with seven living in the USA, one in Canada and one in Chile.

Age

99 responses

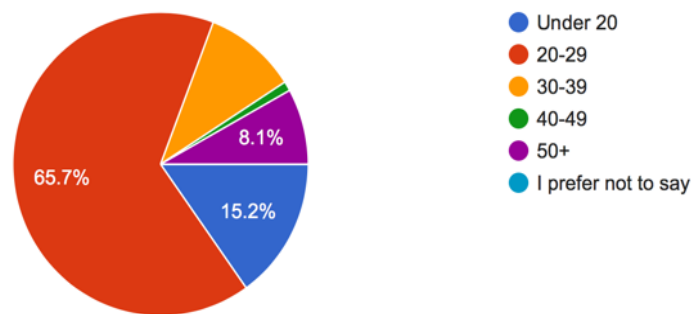


Figure 4

A significant majority of 80,9% of the respondents are under 30 years old with 65,7% of respondents aged 20-29 and 15,2% aged under 20. The reason why most of the respondents are in their twenties is because the survey was shared on social media in groups that had younger users. Also, the survey was shared in thesis survey groups where people most likely are aged 20-29.

4.2 Plastic packaging waste recycling

Do you recycle plastic packaging waste from your other household waste?

99 responses

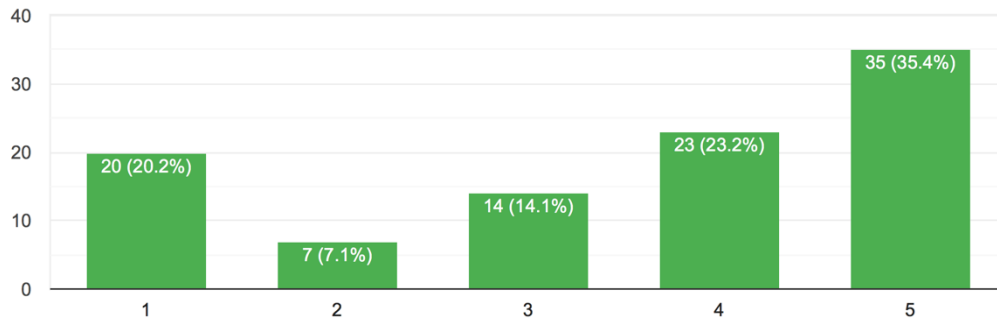


Figure 5

	N	Minimum	Maximum	Mean	Std. Deviation
Do you recycle plastic packaging waste from your other household waste?	99	1	5	3.46	1.527
Valid N (listwise)	99				

Table 1

The distribution of the responses for the question about respondents' habits of plastic packaging waste recycling can be seen on Figure 3. Likert scale was used where 1 means never and 5 means always. In this case 2 means seldom, 3 means sometimes and 4 means often. As can be seen in Figure 3, 58,6% of respondents recycle their plastic packaging waste from their other household waste at least often. In addition to this, Table 1 indicates that respondents recycle their plastic packaging waste quite often because the mean of the answers is 3.46.

4.3 Attitude towards recycling and satisfaction with facilities

		There are enough plastic recycling bins near my home	The activities for plastic packaging waste collection in my area are well organized	There are satisfactory resources for plastic packaging waste collection provided in my area
There are enough plastic recycling bins near my home	Pearson Correlation	1	.725**	.756**
	Sig. (2-tailed)		.000	.000
	N	99	99	99
The activities for plastic packaging waste collection in my area are well organized	Pearson Correlation	.725**	1	.741**
	Sig. (2-tailed)	.000		.000
	N	99	99	99
There are satisfactory resources for plastic packaging waste collection provided in my area	Pearson Correlation	.756**	.741**	1
	Sig. (2-tailed)	.000	.000	
	N	99	99	99
** Correlation is significant at the 0.01 level (2-tailed).				

Table 2

Pearson correlation was used to determine if there is a correlation between these three statements. Sig. (2-tailed) appears to be .000 which means that the correlation is statistically significant ($p < .001$). The Pearson Correlation with all of the statements are $.7 < x < .8$ which indicates that there is a strong positive correlation between the statements.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
I think that recycling plastic packaging waste is important	99	2	5	4.68	.636
I think everyone should recycle their plastic packaging waste	99	2	5	4.66	.641
My friends and family recycle their plastic packaging waste	99	1	5	3.39	1.150
I recycle more plastic packaging waste now than I did a few years ago	99	1	5	3.87	1.360
I am interested in recycling more of my plastic packaging waste	99	1	5	4.48	.850
Valid N (listwise)	99				

Table 3

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
There are enough plastic recycling bins near my home	99	1	5	2.96	1.484
The activities for plastic packaging waste collection in my area are well organized	99	1	5	3.08	1.330
There are satisfactory resources for plastic packaging waste collection provided in my area	99	1	5	3.02	1.355
Valid N (listwise)	99				

Table 4

The first two means 4.68 and 4.66 in Table 3 show that respondents almost strongly agree with the statements. It shows that they are aware that recycling plastic packaging is important that everyone should do it. The mean 4.48 of the last statement in Table 3 indicates that respondents are interested in recycling more of their plastic packaging waste. Even though it is clear that people that respondent agree that recycling is important Figure 3 and Table 1 show that not all of them are avid recyclers. This can be explained with Table 4 which shows that there is some dissatisfaction with the organizing of waste management for plastic packaging collection in their area. Respondents lean a bit on the disagree side with the statement *There are enough plastic recycling bins near my home* because the mean is 2.96. The reasons why respondents do or do not recycle their plastic packaging waste are explained in the next section.

4.4 Reasons why respondents do not recycle

		Too difficult		Total
		0	1	
Do you recycle plastic packaging waste from your other household waste?	1	12	8	20
	2	5	2	7
	3	10	4	14
	4	22	1	23
	5	34	1	35
Total		83	16	99

Table 5

Respondents explained different reasons that can be categorized into a new category named Too difficult. Some answers put into this category were that it is inconvenient for the respondents, takes too much time and effort to clean the plastic packaging and plainly without any elaboration that it just is too difficult. 16/99 respondents do not recycle plastic packaging because of this reason and 14/16 of them answered that they either recycle sometimes, seldom or never. Those who answered that they recycle often or always explained that even though they do recycle, it can sometimes be a bit difficult especially if the respondent is not at home.

		Facility too far or non-existent		Total
		0	1	
Do you recycle plastic packaging waste from your other household waste?	1	10	10	20
	2	2	5	7
	3	12	2	14
	4	22	1	23
	5	35	0	35
Total		81	18	99

Table 6

18/99 respondents answered as one of the reasons why they do not recycle that the bins for plastic packaging waste are too far or that there is not one in their area to their knowledge. Those who responded that they never or seldom recycle plastic packaging were the ones listed this as their main reason.

		Laziness or don't care		Total
		0	1	
Do you recycle plastic packaging waste from your household waste?	1	17	3	20
	2	7	0	7
	3	14	0	14
	4	23	0	23
	5	35	0	35
Total		96	3	99

Table 7

Even though only three people said that the reason why they do not recycle plastic packaging is because of their laziness or that they just do not care it was still worth to mention.

After reviewing the data of the reasons respondents listed on why they do not recycle plastic packaging we can see that dissatisfaction with the plastic packaging waste collection in their area was the main reason. Either the bins are too far away from their homes or that recycling was too difficult in their area.

4.5 Reasons why respondents do recycle

		Good for the environment		Total
		0	1	
Do you recycle plastic packaging waste from your other household waste?	1	19	1	20
	2	5	2	7
	3	6	8	14
	4	5	18	23
	5	12	23	35
Total		47	52	99

Table 8

The reason why respondents do recycle their plastic packaging was because they knew that it is good for the environment and decreases the amount of waste ending up to landfills. This was clearly the main reason because 52/99 respondents listed this as their reason.

		Easiness/already habit		Total
		0	1	
Do you recycle plastic packaging waste from your other household waste?	1	20	0	20
	2	7	0	7
	3	13	1	14
	4	18	5	23
	5	22	13	35
Total		80	19	99

Table 9

The second most popular reason listed by the respondents that do recycle was that recycling is so easy that they do not find any reason to not do it and that they already have the habit

of recycling. 19/99 listed this reason from which most of them always recycle their plastic packaging waste.

		Economic reason		Total
		0	1	
Do you recycle plastic packaging waste from your other household waste?	1	20	0	20
	2	7	0	7
	3	14	0	14
	4	21	2	23
	5	32	3	35
Total		94	5	99

Table 10

Even though only five respondents answered that they recycle plastic packaging due to economic reasons it was still worth mentioning. This is because these people were aware that recycling plastic packaging decreases the amount of mixed waste that they produce which leads to decrease in the fee they have to pay for the collection of mixed waste. Some other economic reasons respondents listed were that recycling plastics saves resources and that “It's economically stupid to keep on producing from non-renewable resources” as one responded stated.

		Conscience		Total
		0	1	
Do you recycle plastic packaging waste from your other household waste?	1	20	0	20
	2	7	0	7
	3	13	1	14
	4	18	5	23
	5	30	5	35
Total		88	11	99

Table 11

The third most popular reason why respondents that sometimes, often or always recycle their plastic packaging waste was their conscience. 11/99 respondents thought that recycling is important, they are concerned of the future and that they would feel bad if they did not recycle plastic packaging. One respondent said that they do not feel as bad for buying products made of plastic because they will recycle it in the end.

4.6 Things that would motivate to recycle more

		Bin for plastic waste closer		Total
		0	1	
Do you recycle plastic packaging waste from your other household waste?	1	5	15	20
	2	4	3	7
	3	6	8	14
	4	20	3	23
	5	27	8	35
Total		62	37	99

Table 12

37/99 of respondents said that they would be motivated to recycle more of their plastic packaging waste if the plastic packaging collection bins were closer to their home or that their housing cooperative was the one that organized the collection. The respondents that stated they always recycle plastic packaging waste mainly respondent this reason because even though they did recycle and felt motivated they still wished that the facilities were closer.

		Money or compulsory		Total
		0	1	
Do you recycle plastic packaging waste from your other household waste?	1	18	2	20
	2	7	0	7
	3	12	2	14
	4	19	4	23
	5	34	1	35
Total		90	9	99

Table 13

9/99 responded that they would be motivated to recycle more if they either earned money or benefits from doing it, had to pay fees for not recycling or if it was compulsory. This reason was the one that was mentioned least by the respondents.

		Better knowledge		Total
		0	1	
Do you recycle plastic packaging waste from your other household waste?	1	19	1	20
	2	7	0	7
	3	13	1	14
	4	19	4	23
	5	28	7	35
Total		86	13	99

Table 14

13/99 respondents answered that they would be motivated to recycle more if they had better knowledge. Some responses that were included in this category were wishes to know about the recycling processes in their area and the knowledge that the plastics are actually recycled, better knowledge about the harms of plastics and overall better knowledge on how to recycle plastic packaging waste.

		If it was easier		Total
		0	1	
Do you recycle plastic packaging waste from your other household waste?	1	20	0	20
	2	7	0	7
	3	11	3	14
	4	16	7	23
	5	25	10	35
Total		79	20	99

Table 15

20/99 respondents answered that they would recycle more if it was easier. Respondents thought that clearer instructions in product packaging would make it easier to recycle them. Some said that they would recycle more if recycling in their area was easier and more convenient and that if they did not have to wash the plastic packaging they wanted to recycle.

		Nothing or don't know		Total
		0	1	
Do you recycle plastic packaging waste from your other household waste?	1	20	0	20
	2	5	2	7
	3	13	1	14
	4	20	3	23
	5	25	10	35
Total		83	16	99

Table 16

16/99 of respondents could not come up with ways that would motivate them to recycle more of their plastic packaging waste. Most of these respondents said that because they already recycled everything they did not need the extra motivation.

		Other solution or reason		Total
		0	1	
Do you recycle plastic packaging waste from your other household waste?	1	17	3	20
	2	5	2	7
	3	12	2	14
	4	23	0	23
	5	28	7	35
Total		85	14	99

Table 17

The responses that were categorized into *Other solution or reason* category were ones that could not clearly be put into the other main categories. Answers that stuck out most were suggestions to have campaigns and commercials to remind people why recycling is important. Someone said that if their friends and family recycled plastic packaging waste they would also feel pressured to do so too or if the plastic packaging collection was organized in a different way in their country or area. A few people did not necessarily say what would motivate them but rather wished that producers and manufacturers would take more responsibility by using recycled plastics in their products or using alternative materials instead of plastic.

5. DISCUSSION AND ANALYSIS

5.1 Comparison with expectations from literature review

The findings are for the most part in line with previous literature. However, the results indicate that positive attitude towards plastic packaging recycling does not automatically mean that a person will recycle all of their plastic waste. Just as in the literature review, Alriksson & Stoeva (2017) found out in their study that satisfaction with facilities and convenience were the most important factors that determined if households separated their household waste or not. Even though the survey only focuses on plastic packaging waste separation the results supported Alriksson & Stoeva's (2017) findings about how satisfaction with recycling facilities affect recycling behavior. This can be explained with the means in Table 4 which indicate that respondents were not that satisfied with the facilities and waste management in their area for plastic packaging waste. In addition to this, the main reasons that respondents listed when asked why they do not recycle plastic packaging waste is because the facilities and bins are too far and that it is too difficult in their area to recycle plastics conveniently. It is also mentioned in the literature review that it is important for countries to offer the possibility to recycle conveniently and that is exactly what respondents said that they wanted. They wished that plastic packaging waste bins would be closer to them or that there was one in their yard. In the literature review in the behavior part articles stated that communication is important factor in increasing recycling which can be seen in the survey's results as respondents said that they would be motivated to recycle more if they had better knowledge about the subject and were informed about the benefits of recycling plastics.

Haro et. al. (2018) stated that one way to increase recycling is with taxes but as was found with the survey only few respondents mentioned fees as way to motivate them to recycle more of their plastic packaging waste. Cui & Susic (2019) mentioned refunds and benefits as a way to increase recycling but this solution was not a popular way of motivation for the respondents. This could be explained with the results about how respondents agreed that plastic packaging recycling is important and how everyone should do it, and that they were interested in recycling more. These things could indicate that the respondents are already concerned with the effects of not recycling plastics as could be seen from the answers people gave to the question *Why do you recycle plastic packaging waste?* The main reason

why respondents do recycle is because it is good for the environment and they are more aware of the negative effects of plastics than earlier.

It was mentioned in the literature review that the overall trend with plastic packaging recycling is that it has increased over the years and that the tonnes of plastics recycled is on the rise in majority of the EU member states. The same trend could be seen in the survey in Table 3 where the mean for statement *I recycle more plastic packaging waste now than I did a few years ago* is 3.87. This means that respondents agree to some extent with the statement and think that they do recycle more now than previously.

The results from the web survey further proves how important it is that the EU work together with the governments of the member states. This way they can create and improve policies that take into consideration how waste management and collection for plastic packaging waste should be organized. This would ensure that every household has the possibility to take part in their community's and country's efforts in increasing recycling and moving towards a more environmentally friendly economy. The EU could also use the information from the survey to their advantage where respondents said they would recycle more if the plastic products had clearer instruction on what can be recycled. One way for the EU to also try to increase recycling is by having campaigns to increase awareness. In addition to this the EU could require waste management companies that are responsible for collecting plastics to make sure households are well informed how to recycle plastic packaging and where they can find clear instructions and more information about the subject.

5.2 Achieving objectives

The objectives set for this bachelor's thesis were achieved with the research done for the literature review and by conducting the web survey. The objectives of finding out about the evolution of EU policies about plastic packaging waste and finding out what are some of the aspects that prevent plastic packaging recycling from being as effective as possible. The primary research conducted for this bachelor's thesis helped to find out about the behavioral aspect of plastic packaging recycling behavior. It worked well in collecting data about attitudes and motivations at the same time in the same survey. It also worked quite well in

acquiring answers from different EU member states and survey worked well in this situation because the population size that is researched in this thesis is so large.

Overall, the results gathered from the primary data contributes to a clearer understanding of individuals' plastic packaging recycling behavior. Especially because most of the available literature discusses people's behavior with recycling of all household waste. The data will help future policy makers in governments of the EU member states to take into account the households' opinions about waste management in their area and contribute to improving it.

5.3 Limitations

There are still some limitations in this thesis. For example, the primary data that was collected consisted mostly of people under the age of 30 which does not reflect population structure of the EU. Also, there were few respondents that were not residents of EU member states but other countries in Americas and one respondent was a resident of Norway. This might affect the results because of possible cultural differences in attitudes towards plastic packaging recycling outside of the EU and within the EU area. These cultural differences cannot be concluded from the results alone.

The primary research also does not take into consideration the fact that waste management is usually organized locally and that there are differences in waste management systems when comparing different countries.

The 10% margin of error could be considered to be a limitation because the smaller the margin of error the more confidently respondents answers can be considered to reflect the attitudes and opinions of the whole population.

The most significant limitation of this thesis is how new the subject of recycling plastic packaging waste still is. There is not enough literature on this specific subject that could have been used in a convenient way.

6. CONCLUSIONS

6.1 Main Findings

The primary research was conducted in order to try to fill in some of the gaps in literature and better understand plastic packaging recycling behavior. The findings indicate that satisfaction with organizing of local plastic packaging waste collection affects individuals' recycling behaviors in households. Attitude towards plastic packaging recycling alone does not ensure that plastic packaging waste will be always recycled.

Answers for the open questions about why an individual does not recycle their plastic packaging waste and aspects that would motivate them to recycle more further support the theory that satisfaction with local facilities and waste collection of plastics affect behavior. In addition to this, better knowledge about recycling and it being more convenient and easier were some other aspects that respondents thought would motivate them to recycle more of their plastic packaging waste.

6.2 Implications for International Business

As mentioned in the beginning of this bachelor's thesis, plastic packaging waste can be considered to be a global problem. It affects every country in the world which is why it is an important subject to research more about to find out ways and strategies to move towards a circular economy. Resources are also becoming scarce so finding out ways to improve the use of recycled plastics in products could be one way to help solve this problem. Since this thesis' objective is to provide more information about plastic packaging recycling for policy makers in the EU and of the EU, it could encourage the EU to set an example for other countries in the world.

Penca (2018) states the significance and the implication plastic packaging waste has on International Business with this:

“The complexity of the plastic pollution problem, both on land and on seas, requires adjustments in individuals’ behaviour, the actions of all authorities, and social trends across multiple economic sectors and countries.”

It summarizes well how severe and complex the whole problem with plastics waste is and how far it reaches. It clearly affects every sector of the economies of different countries and requires everyone’s attention so that it can be solved.

6.3 Future Research

As was mentioned in limitations the plastic recycling subject is still quite new and requires further research in many parts. It might take a few years before the effectiveness of the newer EU policies can be researched.

When researching people’s plastic packaging recycling behavior in the future, it would be a good idea to focus on one country at the time with larger sample size to get more accurate results about a specific country’s populations behaviors. This would also help the countries government to acquire relevant information for them to improve waste management locally. An interesting aspect that could be looked into in future research would also be to compare differences in plastic packaging waste collection in urban and rural areas.

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APPENDICES

Appendix 1: The structure and questions of the survey about people's plastic packaging recycling behavior

Question #	Topic	
1.	Country of residence	Drop down list
2.	Nationality	Drop down list
3.	Age	Choose from options
4.	Do you recycle plastic packaging waste from your other household?	Likert scale (5): Never - Always
5.	There are enough plastic recycling bins near my home.	Likert scale (5): Strongly disagree – Strongly agree
6.	The activities for plastic packaging waste collection in my area are well organized.	Likert scale (5): Strongly disagree – Strongly agree
7.	There are satisfactory resources for plastic packaging waste collection provided in my area.	Likert scale (5): Strongly disagree – Strongly agree
8.	How far (km) is your nearest plastic packaging recycling facility?	Short answer
9.	I think that recycling plastic packaging waste is important.	Likert scale (5): Strongly disagree – Strongly agree
10.	I think everyone should recycle their plastic packaging waste.	Likert scale (5): Strongly disagree – Strongly agree

11.	My friends and family recycle their plastic packaging waste.	Likert scale (5): Strongly disagree – Strongly agree
12.	I recycle more plastic packaging waste now than I did a few years ago.	Likert scale (5): Strongly disagree – Strongly agree
13.	I am interested in recycling more of my plastic packaging waste.	Likert scale (5): Strongly disagree – Strongly agree
14.	Write down max. 3 reasons why you do or do not recycle plastic packaging waste.	Short answer
15.	What would motivate you to recycle more plastic packaging waste?	Short answer