

TRASH TALK

Co-Creation in the Danish Waste Sector

An Interactive Qualifying Project Report submitted to
the Faculty of Worcester Polytechnic Institute in partial fulfillment of the
requirements for the Degree of Bachelor of Science by

DYLAN FELTY

KYLE HANLON

JEAN PHILIPPE MIRALDA

TYLER WILSON

Submitted to:

Niels Toftegaard
Project Sponsor
Dansk Affaldsforening

Holly Ault, Co-Advisor
Constance Clark, Co-Advisor
Worcester Polytechnic Institute

Date: April 30, 2018



Dansk Affaldsforening

Affald er ressourcer



WPI

This report represents work of WPI undergraduate students submitted to the faculty as evidence of a degree requirement. WPI routinely publishes these reports on its website without editorial or peer review. For more information about the projects program at WPI, see <http://www.wpi.edu/Academics/Projects>

Abstract

As Denmark moves towards a circular economy, the country must continue to improve its waste management system, including increased residential waste sorting. Increasing citizen participation in waste sorting can be achieved using co-creation, the process of working with citizens to improve the decision-making process of public utilities. In collaboration with the Danish Waste Association, this project used qualitative research methods to identify co-creative practices that can improve the Danish waste sector. The results showed that successful co-creation is a combination of outreach, citizen participation, and collaboration. A set of recommendations was developed to help the Danish waste sector improve waste management services through co-creation.



Acknowledgements

We would like to thank the following individuals and organizations for their support and insight throughout the course of our project.

- Our advisors, Professor Holly K. Ault and Professor Constance Clark, for their consistent guidance and support, which helped us to produce a coherent Interactive Qualifying Project.
- Our sponsoring organization, the Danish Waste Association, for providing a problem for us to help solve, and their consistent support throughout our time in Denmark. In particular, we would like to thank Niels Toftegaard, whose insight, field research scheduling, and personal company provided a strong base from which to successfully complete our project.
- Our preparation term professors, Steven S. Taylor and Seth Tuler, for guiding us through the cultural experience and social science aspects of our Interactive Qualifying Project in Denmark.
- The representatives of the municipal waste companies and other organizations that provided their time, knowledge, and hospitality to us and our project through interviews and site visits.
- Professor Adrienne Hall-Phillips and Professor Alexander Smith of Worcester Polytechnic Institute for providing academic theory on user engagement early in our research.
- Michelle Guiney and Thomas Henry of Waste Management, Inc. for providing insight on the operations of the U.S. waste and recycling sector.
- Gy Larsen, Marie Louise Jørgensen, and Katrina Lindegaard Juul of the Danish Board of Technology Foundation for introducing us to ways in which to co-create on a large-scale and helping us establish a base of knowledge for our project.
- Our university, Worcester Polytechnic Institute, for providing us with the opportunity to complete our Interactive Qualifying Project degree requirement abroad.



Executive Summary

Denmark produces some of the highest amounts of municipal solid waste per capita per year within the European Union (Kørnøv, Hill, Busck, Løkke, 2016). While Denmark's current waste diversion strategies are effective, goals put in place by the European Commission and the Danish Government push Denmark to improve their waste management strategies (Danish Government, 2013; European Commission, 2017a). The Danish waste sector is composed of a combination of public and privately owned companies that provide different types of waste management services for the municipalities (Danish Municipal Association (KL), 2018b; Dansk Affaldsforening, 2018a). Dansk Affaldsforening, or the Danish Waste Association (DWA), is an organization whose members consist of municipalities and municipally owned waste companies (Dansk Affaldsforening, 2018a).

In 2013, the Danish Government published a report entitled *Denmark Without Waste* which presented the country's goals for better waste management, and stated that a minimum of 50% of household waste should be recycled by the year 2022 (Danish Government, 2013). The household waste that is highlighted in *Denmark Without Waste* refers to seven specific waste focus fractions that are commonly generated in residential areas, which include food waste, paper, cardboard, plastic, metal, wood, and glass. Further, in December 2015 the European Commission introduced the Circular Economy Action Plan, an ambitious plan that outlined the goals and ways by which the Union's member countries could continue to develop their economies in a sustainable way (European Commission, 2017).

The Danish Waste Association has acknowledged the need for Denmark to move towards a more circular economy, and the role that the waste sector plays in this future plan. DWA acknowledges the role that citizen participation plays in the movement towards an increase in waste sorting (Dansk Affaldsforening, 2017). In their Circular Economy Report published in 2017, the DWA emphasizes strengthening citizen participation through the sharing of best practices, with one of those best practices being co-creation, as the first step in moving towards a circular economy (Dansk Affaldsforening, 2017).

The goal of this project was to identify co-creative practices that incorporate citizens in the design of waste systems that meet the preferences of both waste companies and citizens in Denmark. The project goal was achieved through the following objectives:

- Evaluate the ways in which resident feedback is gathered by waste companies.
- Identify ways to increase resident engagement with the waste sector.
- Identify the benefits and challenges of implementing co-creation in waste companies across Denmark.

Research Methods

Our objectives were accomplished through a series of personal interviews with representatives from waste companies, communications firms, private companies, as well as individuals with academic backgrounds in social science. We researched the impact that social media and other forms of customer outreach have on the co-creative process as well as the impact of citizen involvement in waste related activities. By conducting interviews and online research, we gathered best practices as well as considerations to be made with respect to co-creation in the waste sector. The information was analyzed using literature on co-creation we found in our background research. The analysis of our findings allowed us to develop recommendations for the Danish Waste Association and its member companies on the use of co-creation within the waste sector. These findings and recommendations were presented to DWA member representatives to share and discuss what the waste companies can do to improve their practices using co-creation.

Findings and Analysis

We found that co-creation is still a concept in development in the realms of public government, not just in Denmark. Because of novelty in the concept, there are multiple interpretations of co-creation within the waste sector and there is no single best way to co-create. In an attempt to synthesize the knowledge of co-creative practices in the waste sector, our research proposes that future co-creative projects in the Danish waste sector will involve a combination of three approaches: outreach, citizen involvement, and collaboration.

Our findings analyze the impact of citizen outreach in the co-creative process. We learned that social media platforms are useful ways to keep citizens informed about their waste service providers, but also useful platforms to facilitate co-creative projects. Additionally, our findings suggest that personal interactions with citizens and educational outreach are particularly important to increase the conscientiousness of citizens about proper waste treatment. We found that citizen involvement as ambassadors or citizens leading their own waste related initiatives are co-creative ways of using citizens to improve the sector but require monitoring and attention. With our research, we assess the benefits that collaborating with private companies and professionals from different backgrounds have in the co-creative process for the waste sector. We also conclude that collaboration is the most important aspect that drives future co-creation in the Danish waste sector.

Finally, our findings suggest that the two greatest challenges for co-creation in the Danish waste sector are the investment of time and human resources for co-creation and the effect that political influences have on the co-creative process.

Recommendations

In researching co-creation in the Danish waste sector, we determined that co-creation between citizens and Danish waste companies can be achieved most successfully through a combination of the following approaches: customer outreach, citizen involvement, and collaboration. Based on our research and findings, we developed recommendations for each approach to co-creation for the members of the Danish Waste Association.

In terms of customer outreach, we have four recommendations. Based on the current use of social media platforms, we recommend that waste service providers strive to use pages like Facebook or YouTube as two-way communication channels and involvement opportunities. Further, companies should continue to capitalize on existing public events, spaces, and holidays to reach customers and take advantage of the opportunities to gather more feedback. We also recommend that companies utilize existing academic spaces and resources to reach broader audiences. Finally, we recommend using diverse online and offline outreach strategies for youth involvement with the waste sector.

For citizen involvement, we have three recommendations. We recommend waste companies empower citizens to become ambassadors or lead users of the company's services. Further, we recommend waste companies support citizen-led initiatives but consider that monitoring might be required. Lastly, we recommend that waste companies involve citizens in the decision-making process by exploring different public engagement methods.

With regard to waste companies' collaboration with both private and interdisciplinary organizations, we have three recommendations. We recommend waste companies consider the benefits that partnerships with private sector companies can bring to the co-creative process. Additionally, we recommend waste companies expand the waste sector's innovative competence by collaborating with experts from diverse backgrounds. Finally, we recommend waste companies consider the impact that an innovation unit could have for the waste sector.

Our general assessment is that co-creation is still a concept in development in the realms of public government, and not just in the Danish sector. Because of complexity in the concept, there are multiple interpretations within the waste sector of what co-creation is and that there is no single way to define the best way to do it. Our research is an attempt to synthesize the knowledge of co-creative practices in the Danish waste sector, and sets the baseline for waste service providers to continue to innovate through citizen participation and involvement.



Authorship

The authorship as well as editing and revising of this research report was shared by all members of our group.

MEET THE AUTHORS

DYLAN FELTY

B.S. CIVIL ENGINEERING
SYRACUSE, NEW YORK



JEAN PHILIPPE MIRALDA

B.S. INDUSTRIAL ENGINEERING
TEGUCIGALPA, HONDURAS



KYLE HANLON

B.S. CHEMICAL ENGINEERING
MARLBOROUGH, MASSACHUSETTS



TYLER WILSON

B.S. MECHANICAL ENGINEERING
DERRY, NEW HAMPSHIRE

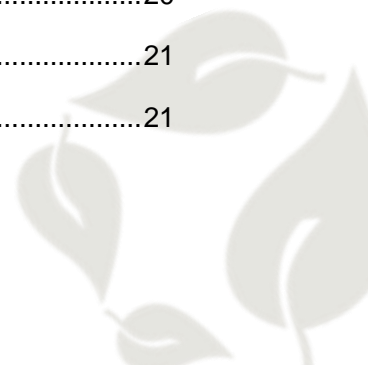


Our analysis and research would not have been possible without the comprehensive compilation of field research sources in the form of interview notes and cases of co-creation detailed in the Appendices section of the report. The compilation of sources from field research was led by Dylan Felty, Kyle Hanlon, and Tyler Wilson. Additionally, the design of visuals and graphics as well as the final presentations delivered to the DWA and WPI were led by Jean Philippe Miralda.

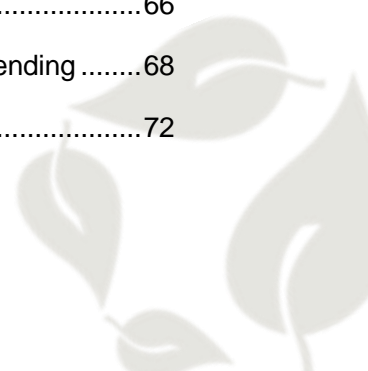


Table of Contents

Abstract	i
Acknowledgements	ii
Executive Summary	iii
Authorship	vi
List of Figures.....	x
Chapter 1: Introduction	1
Chapter 2: Background	4
2.1 Waste Management in Denmark.....	4
2.1.1 Structure of the Public Services and the Danish Waste Sector	4
2.2 Co-Creation as a Means for Innovation	7
2.2.1 Relevance of Co-Creation in the Public Sector.....	7
2.2.2 Improving the Public Sector through Innovation	7
2.2.3 Defining Co-Creation in the Public Sector.....	8
2.3 The Process of Co-Creating in the Public Sector	9
2.3.1 The Roles of Citizens in the Co-Creation Process.....	10
2.3.2 Methods for Implementing Co-Creation - How to Decide	11
2.4 Applications of Co-Creation	14
2.4.1 Effective Public Engagement	14
2.4.2 Citizen Involvement in Co-Creation.....	14
2.4.3 Partnership Opportunities and Resources for Co-Creation	15
2.5 Summary	16
Chapter 3: Research Methods	19
3.1 Evaluate the Ways in Which Resident Feedback is Gathered by Waste Companies.	19
3.1.1 Exemplar Co-Creation Project in the Waste Sector	19
3.1.2 Assessing Co-Creation at Waste Companies	19
3.1.3 Social Media in the Waste Sector	20
3.2 Identify Ways to Increase Resident Engagement with the Waste Sector.	21
3.2.1 Communications and Public Relations Companies	21



3.2.2 Co-creation between the Public and Private Sectors.....	22
3.2.3 Anthropological Observation	22
3.2.4 Internal Co-Creation in the Public Sector	23
3.3 Identify the Benefits and Challenges of Implementing Co-Creation in Waste Companies Across Denmark.....	23
3.3.1 Analysis of Benefits	23
3.3.2 Analysis of Challenges	24
3.3.3 Developing Recommendations	24
3.4 Methods Summary	25
Chapter 4: Findings and Analysis	27
4.1 Public Outreach: Talking with People about Waste.....	27
4.2 Citizen Involvement: Working with Citizens for Waste Projects	34
4.3 Collaboration: Diversifying the Waste Sector	38
4.4 Challenges to Co-Creating in the Waste Sector	42
Chapter 5: Conclusions and Recommendations	47
Conclusions	47
Recommendations	48
Recommendations on Customer Outreach.....	48
Recommendations on Citizen-Involvement.....	50
Recommendations on Collaborations	51
Reflections: Lessons Learned in Technology and Society	52
References.....	54
Appendices	60
Appendix A – OPIN Guidelines for Youth Participation	60
Appendix B – 57 Methods for Citizen Engagement by Engage2020	61
Appendix C – Summary of Interview with Sofie Lauritsen of Glostrup Forsyning	62
Appendix D – Summary of Interview with Stinne Stokkebo of Arwos	66
Appendix E – Summary of Interview with H. Dalgaard and A. Laumann of Vestforbrænding	68
Appendix F – Summary of Interview with Henriette Jensen of Renosyd.....	72



Appendix G – Summary of Interview with Niels Toftegaard of Dansk Affaldsforening.....	74
Appendix H – Summary of Interview with Marie Nielsen of The Green Embassy	76
Appendix I – Summary of Interview with Lone Misfeldt of Katzen-Mark	79
Appendix J – Summary of Interview with Stener Glamann of Tankegang	81
Appendix K – Summary of Interview with Lina Katan	83
Appendix L – Summary of Interview with Kristoffer Ravnbøl of Naboskab	84
Appendix M – Summary of Interview with Jonas Engberg of IKEA Denmark	87
Appendix N – Summary of Interview with Anne Bisgaard and John at Tingbjerg Forum.....	89
Appendix O – Summary of Interview with Anne Berg of MindLab.....	92
Appendix P – Examples of Co-Creation	95



List of Figures

- Figure 1. The Circular Economy Model 5
- Figure 2. Percent of 7 Residential Waste Focus Fractions Collected 6
- Figure 3. Defining the term "Innovation" 8
- Figure 4. The Four Bottom Lines of Public Value..... 9
- Figure 5. The Process of Co-Creation 9
- Figure 6. Recommendations when Engaging with Citizens Based on Co-Creative Roles..... 10
- Figure 7. From Incremental to Radical Innovation..... 11
- Figure 8. Approaches to Citizen Engagement..... 13
- Figure 9. Fitting the Approach to the Context..... 13
- Figure 10. Presence of Waste Companies on Facebook and YouTube 28
- Figure 11. Examples of Facebook posts by Fors 29
- Figure 12. Citizens of Glostrup Share tips on YouTube for Organic Waste Sorting 30
- Figure 13. Katzen-Mark's and Roskilde's Waste Sorting Stations and Ambassadors..... 31
- Figure 14. In Aarhus We Sort Our Waste 32
- Figure 15. The Aarhus Green Embassy 32
- Figure 16. John "The Sheriff" Nielsen serves as an Ambassador at Tingbjerg Forum..... 35
- Figure 17. Publication for "Good Advice on Waste Collection" by the Green Embassy 37
- Figure 18. Sorting Guidelines in the 5 Regions of Denmark by IKEA..... 39
- Figure 19. Competencies for Innovation in the Public Sector 40
- Figure 20. Pictograms Depicting the 7 Waste Focus Fractions 45
- Figure 21. The Three Approaches to Co-Creation in the Danish Waste Sector 47





CHAPTER 1

INTRODUCTION



Chapter 1: Introduction

In the year 2012, the world's urban population generated three and one half million tonnes of Municipal Solid Waste (MSW) per day, a number that is projected to increase to six million tonnes per day by the year 2025 (Bhada-Tata & Hoornweg, 2012). With such large amounts of waste being generated, proper waste management becomes very important in reducing the negative impacts waste has on global health, the environment, and the economy for communities around the world. As the rate of waste generation continues to increase, societies should aim to rely less on environmentally harmful and unsustainable waste treatment methods, such as landfilling, and begin treating waste as a resource (European Commission, 2017b). When treated as a resource, waste can become a continuous source of value for society through reduction, reuse, recycling, and even transformation into energy (European Union, 2010).

As a step towards a more sustainable future, the European Union (EU) established a transition plan towards a circular economy where waste is minimized and resources are kept in the economy for a longer time (European Commission, 2014). As a member of the EU, Denmark leads the efforts towards a circular economy by recycling 69% of its total waste produced, incinerating another 27% of it for energy generation, and sending only 4% of waste to landfills (Danish EPA, 2017). Although the numbers speak well for Denmark's ability to treat waste as a resource, the country still has one of the highest rates of waste generation per capita in the European Union (Eurostat Statistics Explained, 2016). In order to ensure the sustainability of their waste management systems, Denmark faces the challenge of continuing to increase their use of responsible waste treatment methods while also aiming to decrease the amount of waste it generates.

Without the public's participation in sorting and disposing of waste correctly, waste management companies would struggle to provide the services they offer to societies (Muller & Hoffman, 2001). Waste then becomes a shared problem where citizens must understand how their waste disposal methods impact society and waste companies must work to adapt their services to accommodate the daily needs of citizens. Dansk Affaldsforening, also known as the Danish Waste Association (DWA), is a national interest organization for municipalities and publicly owned waste companies. The DWA has recognized the need to understand citizens' attitudes towards waste management. By conducting a comprehensive study in 2013, the DWA determined that only 12% of Danish citizens remain indifferent towards sorting their waste, whereas the other 88% are positive towards sorting in varying degrees (Dansk Affaldsforening, 2013). Other Nordic countries such as Norway and Iceland face similar challenges as Denmark, where the public is willing to collaborate through proper waste sorting but fail to reduce the amount of waste that is generated (Eurostat Statistics Explained, 2016).

Like Norway and Iceland, the wide-spread use of waste management practices such as recycling and waste-to-energy systems, make it seem as though generating waste is not a problem for Denmark due to the value that is extracted from waste (Simon, 2014).

Progress for more sustainable waste management in Denmark is driven by two initiatives: continue increasing citizen participation in sorting efforts, and reducing the total amount of waste generated. The Danish Waste Association's first recommendation for achieving a circularized economy is to strengthen citizen participation through the sharing of best practices (Dansk Affaldsforening, 2017). A potential way to achieve a more collaborative waste management system is by incorporating citizens into the decision-making processes of the waste sector in order to create value, also known as co-creation. Co-creation has proven to be an effective practice for many public sectors around the world to design public policy *with* and *by* the people and not just *for* them (Bason, 2010; Bracci, Fugini, Sicilia, 2016).

The goal of this project was to identify co-creative practices that incorporate citizens in the design of waste systems that meet the preferences of both waste companies and citizens in Denmark. The project goal was achieved through the following objectives:

1. Evaluate the ways in which resident feedback is gathered by waste companies.
2. Identify ways to increase resident engagement with the waste sector.
3. Identify the benefits and challenges of implementing co-creation in waste companies across Denmark.





CHAPTER 2

BACKGROUND

Chapter 2: Background

The following sections aim to provide the reader with a general understanding of the concepts of waste management and co-creation. The first sections will describe waste management in Denmark while acknowledging the factors calling for its improvement. From there co-creation will be the focus, with sections describing co-creation as a means for innovation, co-creating in the public sector, and examples of co-creation.

2.1 Waste Management in Denmark

Municipal Solid Waste, also abbreviated MSW, is the technical term used to describe the everyday waste generated by residents and businesses, such as food, paper, cardboard, glass and packaging material; MSW is also known as garbage or trash (US EPA, 2017). Denmark produces some of the highest amounts of MSW per capita per year within the European Union (Kørnøv, Hill, Busck, Løkke, 2016). With Denmark producing great amounts of waste, focus must be placed on effective methods of waste handling and treatment. While Denmark's current waste diversion strategies are effective, goals put in place by the European Commission and the Danish Government push Denmark towards further improvement of their waste management (Danish Government, 2013; European Commission, 2017a). The Danish Government and the Danish Waste Association have acknowledged the potential for co-creation with citizens as a way to meet ambitious waste diversion goals (Dansk Affaldsforening, 2017).

2.1.1 Structure of the Public Services and the Danish Waste Sector

Denmark is divided into 98 municipalities that are responsible for providing public services such as healthcare, education and utilities, with one of those public utilities being waste management (Danish Municipal Association (KL), 2018b). Because public services are highly localized to each municipality, citizens can benefit directly from the resources and community development offered in their respective municipalities (Danish Municipal Association (KL), 2018b).

It is common in the public utilities sector for municipalities to partner with each other in the ownership of utility companies that provide district heating, electricity, water supply, wastewater treatment, incineration (waste to energy), and waste management (Dansk Affaldsforening, 2018b). The waste sector is composed of a combination of public and privately owned companies that provide different types of waste management services for the municipalities (Danish Municipal Association (KL), 2018b; Dansk Affaldsforening, 2018a). The Danish Waste Association (DWA) is an organization whose members consist of municipalities and municipally-owned waste companies. The DWA

serves as an intermediary between many stakeholders in the Danish waste sector including its members, the Danish government, and the citizens of Denmark (Dansk Affaldsforening, 2018a).

2.1.2 The Present and Future of the Danish Waste Sector

In December 2015, the European Commission introduced the Circular Economy Action Plan, an ambitious plan that outlined the goals and ways by which the Union's member countries could continue to develop their economies in a sustainable way (European Commission, 2017). As opposed to a linear 'take, make, dispose' economic model, the circular economy model detailed in *Figure 1* is a system in which resource usage is maximized, materials are kept in use for as long as possible, and waste is minimized (Ellen MacArthur Foundation, 2017). The Circular Economy model has positive impacts for society at large and requires the collaboration of all sectors. In particular, public waste sectors are faced with the challenge of designing systems that minimize waste and aid in "closing the loop" of a circularized economy (Bourguignon, 2016).



Figure 1. The Circular Economy Model
Source: Dansk Affaldsforening (2018d)

The Danish Government also published a report titled *Denmark Without Waste* which presented the country's own goals for better waste management, and stated that a minimum of 50% of household waste should be recycled by the year 2022 (Danish Government, 2013). The household waste highlighted in *Denmark Without Waste* refers to seven specific waste focus fractions that are commonly generated in residential areas including food waste, paper, cardboard, plastic, metal, wood, and glass. As stated previously, Denmark recycles 69% of its total waste; yet as shown in *Figure 2*, only 33% of the seven focus fractions of household waste were being recycled as of 2015 (Danish EPA, 2017). With recycling rates of the seven focus fractions needing to increase by 17%

between 2015 and 2022 for Denmark to reach their goal, it is necessary for residential waste sorting to continue to improve (Toft, Lindholt, & Sørensen, 2017).

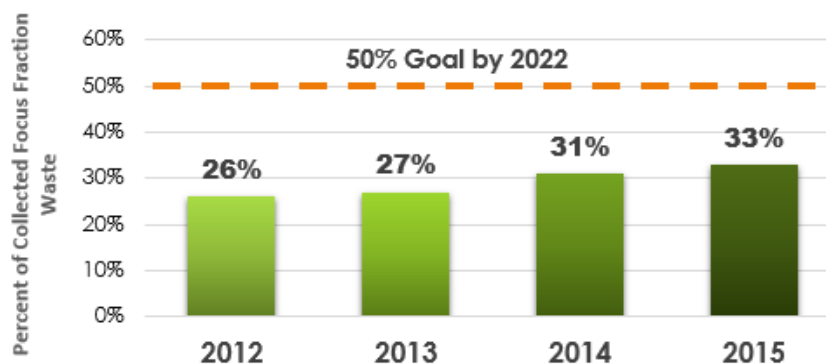


Figure 2. Percent of 7 Residential Waste Focus Fractions Collected
Source: Dansk Affaldsforening (2017)

Denmark Without Waste presents the goals for recycling of the seven focus fractions, however, current laws do not dictate to municipalities how to reach those goals. Municipalities have the freedom to choose which fractions are sorted and collected in their area, therefore, the number of waste fractions for citizens to sort varies across the country. As the waste system becomes more complex with increasing numbers of sorting fractions, waste management companies expect more responsibility, time, and knowledge on the part of the citizens to properly sort their waste, which can make citizen participation a difficult task (Lakhan, 2015). In order to increase residential waste sorting, waste management solutions should be as convenient and easy to use as possible for citizens (Dansk Affaldsforening, 2013).

The Danish Government already recognizes the value of citizen participation in the waste sector, however, it is necessary to increase cooperation between citizens and waste management companies to improve waste sorting (Danish Government, 2013; Danish Government, 2004). Current laws require municipalities to take citizen feedback into consideration before implementing a new waste strategy. The laws give citizens the opportunity to help decide the plans and goals regarding waste for the municipality, part of which is determining which fractions citizens are required to sort (Bekendtgørelser nr. 1309, 2012).

The Danish Waste Association has acknowledged the need for Denmark to move towards a more circular economy and the role that the waste sector plays in this future plan. In addition, the DWA has also acknowledged the role that citizen participation plays in the movement towards a circularized economy (Dansk Affaldsforening, 2017). In their Circular Economy Report published in 2017, the DWA recommends a series of 15 steps for Denmark's waste sector to follow to move towards a model based on circular economy. The first of fifteen steps proposed by the DWA is

strengthening citizen participation through the sharing of best practices, with one of those best practices being co-creation (Dansk Affaldsforening, 2017).

2.2 Co-Creation as a Means for Innovation

Governments around the world have increasingly used co-creation as a way to incorporate public participation in the reform and innovation of public services (Bracci, Fugini, Sicilia, 2016; Nambisan & Nambisan, 2013). In order to circularize the Danish economy and reduce the amounts of MSW generated, the waste sector can use co-creation to adapt their services to the needs of the citizens of Denmark.

2.2.1 Relevance of Co-Creation in the Public Sector

The concept of co-creation is not an entirely new idea; literature on implementing co-production and co-design as a method for innovation dates back to the early 1970's¹. What has changed, however, is the prevalence and widespread adoption of co-creation as a method to innovate public policy and public services around the world. In 2014, the European Commission initiated the Horizon2020² program, an unprecedented €80 billion research and innovation program active until 2020 that focuses on evaluating the role that research and technology play in addressing Europe's greatest societal challenges (European Commission, 2014). The Horizon2020 program helps fund projects such as Engage2020 and PE2020 (Public Engagement 2020), two independently run projects with the main objective of researching the current state of public engagement and developing guidelines on how to engage the public in the process of policy making across Europe (Engage2020, 2014; PE2020, 2014). Both projects are examples of the growing political and economic support behind implementing co-creation and engaging citizens in public affairs.

2.2.2 Improving the Public Sector through Innovation

In 2005, the Danish Government's Reform Programme identified "[getting] as much value as possible for users of the public sector" as one of the major challenges facing the nation, a challenge that at the time was thought would be "overcome through modern management and the implementation of new technologies" (The Danish Government, 2006). A year later in 2006, the Danish Government released a Globalization Strategy titled "Progress, Innovation, and Cohesion" that explicitly stated the need to lead public sector innovation to address the challenges faced by the

¹ See for instance Charles Handy's: *The Age of Unreason* (1989) on the rise of 'prosumer' or Vincent Ostrom's: *Theory of Public Policy* (1972) on polycentric governance.

² The Horizon2020 program falls under the Research, Science and Innovation Commission and is a result of the EU's *Europe 2020 Strategy* for "smart, sustainable and inclusive growth" (European Commission, 2010)

Danish welfare system (The Danish Government, 2006, p. V; Bason, 2010, p. 74). The term *innovation*, however, is used in different contexts and when used loosely can lead to more confusion. Public sector innovation (see *Figure 3*) can be defined as the process of taking ideas and implementing them in a way that creates value for society (Bason, 2010; Perry, 2010). Although there are many ways to innovate in the public sector, many governments around the world have noticed the potential to bring new ideas to the decision making process when citizens participate and are allowed to co-create public services (Bracci, Fugini, Sicilia, 2016; Bason, 2010).



Figure 3. Defining the term "Innovation"
Source: Adapted from Bason (2010)

2.2.3 Defining Co-Creation in the Public Sector

Co-creation is defined as the process by which enterprises and individuals work together to improve products and services with the goal of creating value for all parties involved (Bason, 2010). At the core, the idea is to increase citizen engagement in public decisions (Bason, 2010). Co-creation is a fundamental change in the interpretation of the role customers play in the delivery and design of products and services. In the public context, co-creation means that citizens become stakeholders in the decision making process of public entities where public services are not only delivered for citizens to receive, but citizens are also able to participate in the process of ideation, decision making, and the implementation of said services (Alford, 2014; KL, 2015).

In the private sector, many companies have included their customers in the design of their products and services as a way to improve their offerings and gain competitive advantages in the market (Nambisan & Nambisan, 2013). Benchmarking success, however, is different in public and private contexts. Success in the private sector is measured mostly by increased profit, revenue, and shareholder value, a very different interpretation from success in the public sector where governments are not working to drive incremental profits but rather to serve the people (Bason, 2010; KL, 2015).

Christian Bason, CEO for the Danish Design Center and former Director for Denmark's MindLab, proposes a "four bottom lines" model (see *Figure 4*) where outcomes that create value for both citizens and public entities are a combination of productivity, service experience, results, and democracy. In the "four bottom lines" model proposed by Bason, there are four metrics by which to assess the value of co-creative processes: *productivity* in using resources in an efficient way, the subjective judgement of citizens' *service experience* of public service delivery, the measurable

results of implementing co-creation, and the *democracy* of a process measured in transparency, participation and empowerment among others factors.

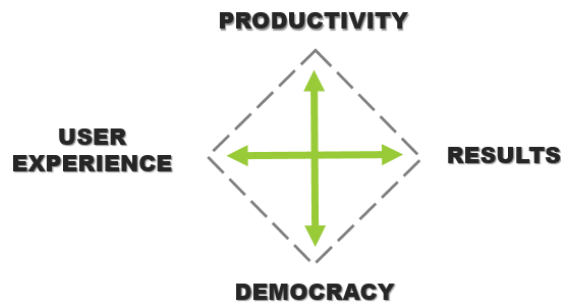


Figure 4. The Four Bottom Lines of Public Value
Source: Adapted from Bason (2010)

2.3 The Process of Co-Creating in the Public Sector

Arguably one of the greatest benefits of co-creation is that it provides the ability to drive innovation systematically, meaning that the feedback to and from citizens is routinely utilized in the development process (Bason, 2010; Nambisan & Nambisan, 2013). Bason (2010) suggests that co-creating with citizens is a practical interpretation of design thinking that happens in four steps as seen in *Figure 5*: *knowing* the present context, *analyzing* the underlying motives which cause the problem in order to understand it, *synthesizing* to bring together possible solutions and new ideas, and finally *creating* to test the knowledge acquired. Perhaps most important about Bason’s model is that each one of the four steps of the co-creative design process (*knowing*, *analyzing*, *synthesizing*, and *creating*) is an opportunity to engage with citizens in a different way and gather different information. Finally, Bason warns that the process is not meant to be taken solely as a linear approach; like in any design thinking environment, co-creating requires multiple iterations and revisiting certain aspects of the process, and an organization that does it successfully will go through the process routinely (Bason, 2010).

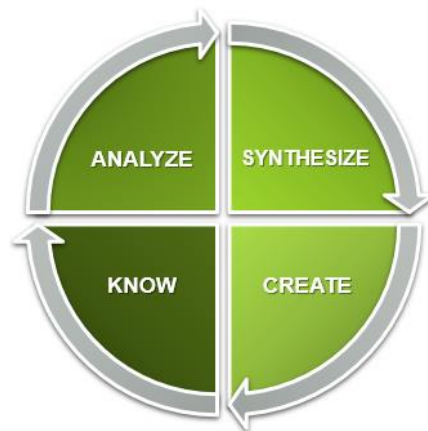


Figure 5. The Process of Co-Creation
Source: Adapted from Bason (2010)



2.3.1 The Roles of Citizens in the Co-Creation Process

In addition to understanding the process behind successful co-creation, there are implications in understanding what role citizens play in the co-creative process. Like Bason’s four step co-creation design process, Nambisan and Nambisan (2013) propose four different roles citizens can have in any given co-creative process: *Explorers*, *Ideators*, *Designers*, and *Diffusers*. Based on the analysis of multiple examples and case studies, Nambisan and Nambisan arrived at the conclusion that citizens interact and contribute differently in civic problem-solving, therefore the mechanisms used to approach them must be different as well.

Explorers are citizens who aid in identifying and discovering current and future problems with public services; they are most likely to discuss these problems with peers and are of best use to public entities when they do share those thoughts. *Ideators* are citizens who provide ideas on how to improve a public service based on the specific needs they face. Meanwhile, *Designers* are the citizens who have the design skills or specialized education to aid in crafting implementable solutions to improve public services. Lastly, *Diffusers* are responsible for closing the co-creative loop and facilitating the implementation of new ideas by spreading awareness.

In order to get the best participation by each of the four different types of citizens, Nambisan and Nambisan provide a set of recommendations (see *Figure 6*) that outline the best ways to reach each different type of citizen. The recommendations provided by Nambisan and Nambisan imply that platforms or methods for citizens to act as *Explorers*, *Ideators*, *Designers*, or *Diffusers* already exist, but choosing the best methods to engage with citizens is one of the most complex components of co-creating in the public sector (Bason, 2010; Nambisan & Nambisan, 2013).

EXPLORERS	<ul style="list-style-type: none"> • Provide enough data and process transparency • Sustain online communities to identify problems • Follow up and close the loop
IDEATORS	<ul style="list-style-type: none"> • Frame the problem in a way users can understand • The broader the problem, the wider the net • Use technologies to diverge and converge ideas
DESIGNERS	<ul style="list-style-type: none"> • Facilitate virtual design and prototyping • Have forums for community based co-designing • Promote the use of data for design
DIFFUSERS	<ul style="list-style-type: none"> • Promote theme focused online citizen communities • Enhance the “trialability” of public innovation

Figure 6. Recommendations when Engaging with Citizens Based on Co-Creative Roles.
Source: Adapted from Nambisan and Nambisan (2013)



2.3.2 Methods for Implementing Co-Creation - How to Decide

Research projects like Engage2020 and PE2020 are examples of how the European Union devotes resources to understanding the specific methods by which citizens can be engaged for public sector innovation. The EU realizes the importance of fully understanding a wide array of methods to engage with citizens since one of the biggest challenges organizations face when co-creating is determining the appropriate approach to a specific innovation context (Bason, 2010; Nambisan & Nambisan, 2013). Three considerations that help determine which method of co-creation is appropriate are: the level of innovation needed, the audience and stakeholders, and the information needed.

Step 1: Consider the Level of Innovation Needed

The first step to co-creating is understanding or *knowing* what problem the organization is trying to address (Bason, 2010). One way of identifying the degree of public engagement needed to co-create is understanding what level of innovation an organization is ready and willing to undertake (PE2020, 2014; World Bank, 2018b). Bason (2010) adapted the literature from Tidd et al. (2005) and Hartley (2005) to arrive at two levels for public sector innovation (see *Figure 7*): *system level* to define innovation for products or services delivered to citizens, and *component level* which refers to innovations to the way a public organization goes about its business. Additionally, Bason suggests that the innovations can also be compared by how new or revolutionary they might be, in a spectrum from *incremental* to *radical*. It is important for organizations to understand that system level and component level innovation require different approaches of citizen engagement, and radical innovation requires more engagement than incremental innovation.

	Incremental (‘Do what we do better’)	(‘New for us’)	Radical (‘New in the world’)
System level	New editions of existing services (for instance an updated version of an online tax service)	New generations of products and services (for instance digital patient journals in health care)	E-government Nuclear power
Component level	Improving product components Improving single work processes (for instance improved human resource tools)	New components or processes in existing systems (for instance the introduction of <i>lean management</i> in public administration)	For instance entirely new forms of collaboration between schools, social workers and police

Figure 7. From Incremental to Radical Innovation
Source: Bason (2010)



Step 2: Consider the Audience and Stakeholders

The second step to co-creating is *analyzing* the underlying motives that cause a problem or situation (Bason, 2010). Because co-creation is so dependent upon its context, the ability to implement solutions that are widely adopted by the public depends on how well public organizations are able to co-create with the right audience and gather the right ideas (Engage2020, 2014; World Bank 2018b). While the four co-creation roles proposed by Nambisan and Nambisan (2013) are useful in understanding how citizens can contribute to the co-creative process, the model does not describe who those citizens might be or how to find and recruit them.

The Engage2020 project outlines three different types of stakeholders in the co-creation process: the *organizer* or entity in-charge of organizing the co-creation, the *direct participant*³ or citizens who take part in the co-creative process, and finally the *beneficiaries* or the broad communities that benefit from the co-creation happening. In addition to considering the involvement of each stakeholder in the co-creative process, Engage2020 outlines some of the following criteria when selecting an audience with which to co-create: subject matter expertise, level of skills such as IT or facilitation, event organization or project management skills, the frequency and amount of participation required, and finally the education and academic knowledge of the participants.

Engage2020 also suggests understanding what demographic of the population will be the target audience for co-creation by considering other factors such as gender, age, and socioeconomic background, among others, since these factors might affect willingness and ease of engagement. An example of demographic considerations for public engagement can be found in the OPIN Guidelines, the results of a project sponsored by the EU's Horizon2020 that aimed to increase understanding of youth engagement in public affairs (Appendix A).

Step 3: Consider the Information Needed

The final step before creating innovative solutions in the public sector is *synthesizing* new ideas. In order to *synthesize* new ideas, organizations first need to understand what information they want to gain from citizen feedback, and then determine the appropriate engagement method (Bason, 2010). Some of the most prevalent approaches are detailed in *Figure 8* (Engage2020, 2014; World Bank, 2018b) and all provide different information from citizens that help in the decision-making process.

³ Note that the characteristics of direct participants can be closely related to the four roles proposed by Nambisan and Nambisan (2013).

DIALOGUE	Aims to improve “two-way” communication to exchange views.
CONSULTING	Aims to obtain citizen feedback for public decision makers.
INVOLVING	Aims to work directly with the public throughout the engagement process and ensure that public concerns and aspirations are consistently understood and considered in decision making processes.
COLLABORATING	Aims to partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.
EMPOWERING	Aims to allow involved participants to acquire certain skills or knowledge in the process of engagement
DIRECT DECISION	Aims to leave the final decision in the hands of citizens.
GRIEVANCES	Aims to obtain information from citizens on their pressing needs or opinions.
CITIZEN-LED MONITORING	Aims to increase transparency of the decision-making process.

Figure 8. Approaches to Citizen Engagement

Sources: Adapted from Engage2020 (2014) and World Bank (2018b)

Furthermore, the general approaches can be accomplished through a set of specific mechanisms to gather citizen input. The Engage2020 project analyzed 57 different mechanisms for public engagement and categorized them through a series of criteria to make the decision-making process easier for public servants wanting to engage in co-creation with their citizens. The full list of mechanisms from Engage2020 along with additional information is detailed in Appendix B. In addition to the mechanisms categorized in Engage2020, Nambisan and Nambisan (2013) categorized the suitability of relevant mechanisms to approach citizens using a different set of criteria. The criteria included the duration of engagement with citizens, the amount of input received, the complexity of prerequisites to employ the mechanism, and the complexity of the challenge being analyzed, and whether the challenge can be partitioned into smaller challenges (see Figure 9).

Approach/Mechanisms	Duration (Short-Term or Long-Term)	Individual or Collective	Prerequisites: Data and Tools	Problem Partitioning
Contests and competitions, web-based suggestion box, etc.	More suited to short-term engagement	More suited to individual inputs	More suitable when prerequisites are minimal	More suited when both problem and process can be partitioned
Workshops/brainstorming sessions: Innovation Jams, participatory design workshops, etc.	Suited for short-term and long-term	More suited to collective inputs	More suitable when prerequisites are minimal or moderate	Suited even when problem and/or process cannot be partitioned well
Data collection: Mobile apps, e-petitions, open source databases, etc.	More suited to short- to mid-term engagement	Suited for individual inputs	More suitable when prerequisites are minimal	More suited when both problem and process can be partitioned
Data access and virtual tools: virtual design and prototyping tools, databases (for mashups)	Suited for short-term and long-term	Suited for individual and collective inputs	Suitable even when prerequisites are high	Suited even when problem and/or process cannot be partitioned well
Dedicated communities: data analysis communities, online citizen communities, etc.	More suited to long-term engagement	Suited for individual and collective inputs	More suitable when prerequisites are minimal or moderate	Suited even when problem and/or process cannot be partitioned well

Figure 9. Fitting the Approach to the Context.

Source: Nambisan and Nambisan (2013)

2.4 Applications of Co-Creation

The goal of this section is to investigate methods of citizen engagement, citizen involvement, and co-creation that have been used across different disciplines. Analyzing examples of co-creation that have already occurred allows for key factors and lessons of each case to be applied to the waste sector. Examples from other public sectors, and partnerships with other companies for co-creation were chosen due to their similarities with the Danish waste sector.

2.4.1 Effective Public Engagement

Choosing effective methods to engage the public is a challenging step to co-creation. A residential care home in northern Italy focused on engaging residents by offering multiple methods of providing feedback to improve the experience of resident. The new president of the residential care facility allowed the residents and their families to act as *ideators* by offering multiple ways to voice their opinions. During a town hall meeting, residents and their family members were given opportunities to express any concerns they had with the current system, as well as offer potential solutions (Bracci, Fugini, Sicilia, 2016). Following the meeting, the president regularly held open office hours for vocal residents to express further concerns in person, and also placed a suggestion box in a public setting for less vocal members of the community to provide feedback in a comfortable way (Bracci, Fugini, Sicilia, 2016). By having multiple ways to engage the residents, the president received feedback from a large portion of the resident population. From the feedback given by the residents, the president *synthesized* suggested solutions into feasible methods of improvement, and then finished the co-creative process by implementing changes in the services of the residential care facility to create value for the residents (Bracci, Fugini, Sicilia, 2016). This example demonstrates how companies can engage different types of citizens by providing multiple options for feedback in order to effectively improve their services.

2.4.2 Citizen Involvement in Co-Creation

By involving citizens in their operations, organizations can learn how to improve their services. In the Swedish childcare industry, a childcare facility used a direct involvement approach for the *knowing* aspect of the co-creative process by giving parents the opportunity to act as substitutes to positions that may become temporarily vacant due to employees' illness or travel (Pestoff, 2009). The direct involvement in the childcare system allowed parents to act as *explorers* by being able to identify problems in the services and then report the problems to the childcare provider (Pestoff, 2006). The feedback provided by parents assisted the childcare providers in *knowing* issues with their service, and allowed the childcare providers to continue the co-creative process to improve their services.

This example demonstrates how service providers can directly involve their customers in their services to help determine areas of improvement.

Organizations can also involve citizens as ambassadors to serve as resources for the rest of their communities. When implementing a new welfare system in Gateshead, United Kingdom, the government involved citizens as ambassadors to distribute information about new initiatives and goals to individual communities (Bovaird, 2007). Members of the community acted as diffusers of information by becoming educated about topics such as breastfeeding, and then working as local ambassadors in their communities to distribute the information they learned. The educated ambassadors offered their community many ways to interact with the new initiatives the government was implementing, such as making themselves available through support groups, acting as peer counselors, and volunteering at telephone helplines (Bovaird, 2007). The government of Gateshead was successful in implementing the new welfare system partly because they involved citizens in the process as ambassadors that served as easily-accessible resources for the rest of the community.

2.4.3 Partnership Opportunities and Resources for Co-Creation

With a variety of specialized skills, organizations with interdisciplinary backgrounds can provide expertise to facilitate co-creation for public organizations. A partnership between the Bangalore government and the MOD Institute, an interdisciplinary urban action and research institute, used co-creation to improve the urban environment of Bangalore, India. The MOD Institute focuses on open-source platforms for citizens to provide feedback on any matters concerning urban planning and processing. In a particular example, the MOD Institute crowdsourced information from citizens regarding problem areas in their neighborhood, such as abandoned and run-down buildings, and also asked for better ways to utilize those spaces (MOD Institute & The Next Network, 2015). The information gathered was used to guide redevelopment plans for urban neighborhoods to fit the needs of the citizens using their own knowledge about the area, culture, and people. Through the use of both a physical space in the community and a web-based reporting system, the MOD Institute collected the input of over 1200 neighbors and residents of the area to *analyze* and *synthesize* what the people noted as important needs. The MOD Institute then collaborated with the Bangalore government in order to *create* a useful space in accordance with what the citizens envisioned for their community (MOD Institute & The Next Network, 2015). Through this partnership, the Bangalore government did not need to learn how to be experts on gathering citizen feedback, but rather used the MOD Institute's expertise to provide the information necessary to improve the urban environment of Bangalore.

With resources available for research and development, private companies have the ability provide specialized knowledge in specific subject matters which can be beneficial to the co-creative process (Bason, 2010; Bessant, 2005). IKEA, for instance, is a recognized brand with a strong market share in the sales of home goods in Denmark. As part of their research for product development, IKEA conducts comprehensive studies to determine what people around the world share in their everyday lives to promote well-being, and the findings are published in their yearly *Life At Home - Beating The Battles* report. IKEA employees gather information from thousands of people to *know* what people find enjoyable or challenging in their homes, and then *analyze* the information to understand why people feel that way (IKEA, 2017). Although other companies may not have such extensive resources dedicated to research and development, companies like IKEA can serve as a great source of specialized knowledge that can help facilitate the co-creative process.

Partnerships with universities can offer companies a resource for co-creation by providing young and inspired minds. The Danish waste company Vestforbrænding hosted a program with the Danish Design University, KEA, aimed to generate innovative thought around the waste sector (Copenhagen Academy of Business (KEA), 2012). Through the collaboration between Vestforbrænding and the university, the university offered a series of interactive courses focused on waste management that allowed waste professionals and students to act as *designers* and generate new ideas for a better waste sector (Copenhagen Academy of Business (KEA), 2012). Employees of Vestforbrænding held workshops through which specific problems within the waste sector were communicated to students of KEA, and once the students understood the problems, their design-focused minds could formulate new solutions to the proposed problems (Vestforbrænding, 2012). Although it was discontinued in 2012 for yielding results that were too technical and not feasible to implement, it still serves as a great example of co-designing and the creative thinking that can come from partnering with a university.

2.5 Summary

Each municipality in Denmark has the responsibility to provide services and resources necessary for the functioning of the community, one of which is waste management. The Danish government and the EU recently proposed a directive to move to a Circular Economy Model, and part of the directive presents a goal of increased recycling of the seven focus fractions of MSW. The DWA has come up with 15 steps to help the waste sector reach the recycling goal and make progress towards a circular economy; the first step is to increase citizen participation in the design of waste systems, also known as co-creation. Co-creation can provide the waste sector with robust solutions that are influenced by the citizens they serve, and this can lead to more participation and better waste sorting. The four

steps to co-creating are *knowing, analyzing, synthesizing, and creating*, and citizens can participate in the process as *Explorers, Ideators, Designers, and Diffusers*. Municipal waste companies can choose from many effective co-creative methods, with examples presented from the project Engage2020 and the report by Nambisan and Nambisan. The three steps to defining which method is best suited for the public organizations to co-create are to consider: the level of innovation needed, the audience, and finally the information needed from the audience and how to get it. Examples of co-creation being utilized in other public sector industries can be adapted for waste sector co-creation which can lead to increased public engagement, improved citizen involvement, and increased collaboration between organizations for co-creation.





CHAPTER 3

RESEARCH METHODS

Chapter 3: Research Methods

The goal of this project was to identify co-creative practices that incorporate citizens in the design of waste systems that meet the preferences of both waste companies and citizens in Denmark. The project goal was achieved through the following objectives:

1. Evaluate the ways in which resident feedback is gathered by waste companies.
2. Identify ways to increase resident engagement with the waste sector.
3. Identify the benefits and challenges of implementing co-creation in waste companies across Denmark.

3.1 Evaluate the Ways in Which Resident Feedback is Gathered by Waste Companies.

Through a conversation with our sponsor, we learned that co-creation is already taking place within the Danish waste sector, albeit in varying degrees. The following section describes the steps we took to understand how different companies in the waste sector engage with citizens. Further, such information allowed us to gauge the extent to which co-creation was being used between the waste companies and citizens.

3.1.1 Exemplar Co-Creation Project in the Waste Sector

Through our research we were able to find examples of co-creation, however these were not all in the waste sector. Fortunately, our sponsor had recently completed a co-creative project developing pictograms for the Danish waste sector that involved many actors of the waste sector on a national scale. We decided to interview our sponsor about this project to gain a better understanding of its context and how it was conducted. This interview provided us with a benchmark of how to co-create in the Danish waste sector through the sheer number of methods used to produce the final solution. Although this project was not conducted by a waste company, the nature of the project was such that the methods used could be implemented by waste companies for co-creative endeavors they might pursue in the future. A summary of our interview with Niels Toftegaard can be found in Appendix G.

3.1.2 Assessing Co-Creation at Waste Companies

In order to gather more information about co-creative practices that warranted resident feedback, we decided to interview representatives at member waste companies of the DWA that

had different examples of customer engagement and co-creation. Our sponsor recommended the companies sampled for our interviews. The selected companies served a variety of residential areas in Denmark and had a diversity of experiences in co-creating with citizens.

For the most part, we interviewed communications or marketing employees due to their direct involvement with customer engagement. As explained in our background research, Bason (2010) argues that all steps of co-creation offer the opportunity to engage with citizens in different ways and gather information to adjust the co-creative process. We interviewed communications or marketing employees at waste companies since they are typically in charge of the interactions with citizens and therefore facilitate the engagement that waste companies have with the citizens they service.

We conducted five interviews with representatives from waste companies that had experience with co-creation and customer engagement. Our team held interviews with employees of Arwos, Glostrup Forsyning, Nyborg Forsyning & Service A/S, Renosyd I/S, and Vestforbrænding. We conducted our interviews using a semi-standardized process and we always considered the following core ideas:

- How the company engages the citizens
- The extent to which the company utilizes customer feedback to improve company practices
- Examples that show co-creative practices and both the benefits and challenges the company encountered when co-creating with citizens

Appendices C through F contain the transcriptions of the interviews we conducted. Examples of co-creation provided through these interviews are highlighted as case studies in Appendix P - Examples of Co-Creation. While we recognize that we did not interview all waste companies in Denmark, those we did interview were diverse enough, as determined by our sponsor, in terms of size, utility operations, resident base, and methods of citizen engagement.

3.1.3 Social Media in the Waste Sector

During the course of our project, our team identified the value that social media platforms offer waste companies as a method to facilitate multidirectional communication channels. We found several examples of social media being used as a tool to co-create with citizens from our interviews and decided to further our investigation into the Danish waste sector's current utilization of different social media. Our team performed research on the existence and status of

social media pages of the different member companies of the Danish Waste Association. Only 46 of the 54 companies that make up the DWA were investigated. The excluded companies were not chosen as part of the social media research because they dealt primarily with the processing of waste and had no regular interaction with citizens.

Research of the 46 member companies determined the existence of Facebook, YouTube, and LinkedIn pages for each of the companies, as well as whether the companies utilized websites, SMS messaging services, or mobile applications. We chose Facebook, LinkedIn, and YouTube because of their popularity, ease of access, and extensive use by the waste companies we interviewed. When companies had Facebook or YouTube pages, we conducted an assessment on of the current state of these pages. Our team reviewed the content posted on these pages to determine the level of activity taking place through posts, comments, and general interactions with citizens. In addition, research into company pages allowed us to search for examples of public co-creation already occurring on these pages. The data collected served as a way to identify where companies could increase their own outreach through peer comparison.

3.2 Identify Ways to Increase Resident Engagement with the Waste Sector.

In addition to providing suggestions for waste company representatives to interview, our sponsor provided our team with interviews with representatives from external organizations that have worked alongside the Danish waste sector.

3.2.1 Communications and Public Relations Companies

Recognizing that communications personnel are at the forefront of resident engagement, we chose to interview representatives from The Green Embassy, Tankegang, and Katzen-Mark. These organizations highlighted experienced methods of engagement with citizens. Working as consultants to companies within the waste sector, The Green Embassy, Tankegang, and Katzen-Mark all provide assistance to waste companies with different steps of the co-creative process. We identified the value that could be gained by investigating waste-related projects through which these companies had helped to engage Danish citizens. From our background research we understood that resident engagement is necessary in order to build all steps of the co-creation process. We planned to learn more about the potential value that could be gained when waste companies partnered with outside organizations in order to engage with citizens.

Summaries of our interviews with representatives from The Green Embassy, Tankegang, and Katzen-Mark can be found in Appendix H, Appendix J, and Appendix I respectively.

3.2.2 Co-creation between the Public and Private Sectors

Through our background research, our team learned of the public nature of the Danish waste sector and the limitations that come along with it. We recognized the potential that exists in public-private partnerships between Danish waste companies and private enterprises, particularly with respect to the co-creation of in-home sorting mechanisms and the utilization of private consumer data. Our team chose to interview a representative from IKEA Denmark due to the large size of both their market share in Denmark and their company resources. We recognized their broad market share as an opportunity for IKEA to play a large role in the lives of Danish citizens, and their company resources as an opportunity for IKEA to share their research and development possibilities with the waste sector. Additionally, our team identified IKEA as being a large private company that had already begun to experiment with private-public partnerships. We chose to interview Jonas Engberg of IKEA Denmark, because of his knowledge on past partnerships between IKEA and the Danish waste sector and his position as a Sustainability Manager. A summary of our interview with Jonas Engberg can be found in Appendix M.

3.2.3 Anthropological Observation

To take into consideration how human behavior influences resident habits with waste, we interviewed Ph.D. candidate Lina Katan as well as Kristoffer Ravnbøl, an anthropologist at the community consultancy Naboskab. Both interviews offered anthropological insight into and observation of the waste sector and how citizens interact with the systems put in place by waste companies. Anthropological inquiry of the waste sector is helpful to shift the perspective towards citizens themselves and their interactions with the waste sector, rather than prioritizing waste companies first and citizens later. In his book, *Leading Public Sector Innovation*, Bason argues: “Even the most professional and service-minded organisations can have major blind spots for the simple reason that they are not who they serve.” We chose to interview anthropologists who had experience working with co-creative projects in the waste sector in order to determine how to overcome such blind spots in waste-related projects and understand the importance for waste companies to take into account their citizens’ behaviors. Summaries of our interviews with Lina Katan as well as Kristoffer Ravnbøl can be found in Appendix K and Appendix L respectively.

3.2.4 Internal Co-Creation in the Public Sector

From our background research we learned about the MindLab, an organization that offered experienced perspectives on the co-creation process specifically in the public sector. We chose to pursue an interview with a representative from MindLab in order to gather a more complete understanding of all considerations that should be addressed when co-creating in the public sector and gain more information on how public sector co-creation can be done effectively. We interviewed Anne Berg at the MindLab specifically due to her past experience with waste projects, as well as how to operate co-creatively in the public sector at large. A summary of our interview with Anne Berg can be found in Appendix O.

3.3 Identify the Benefits and Challenges of Implementing Co-Creation in Waste Companies Across Denmark

After gathering examples of co-creation, public engagement, and learning about different aspects of the co-creation process from our interviews, our team analyzed the information that we collected. Although we learned a great deal from the anecdotal information we gathered, synthesizing the information was essential for our team to be able to develop findings and recommendations for the Danish waste sector.

3.3.1 Analysis of Benefits

With the information from our interviewees, we determined key aspects of each successful example of co-creation that made them noteworthy. Throughout our interviews, the successfulness of the examples of co-creation that we found was described by the anecdotal claims of the individuals that we interviewed. Our team identified individual steps of the co-creation process that each example demonstrated and assessed their outcomes based on the four bottom lines of public value introduced earlier in *Figure 4*.

As our team gathered noteworthy aspects of co-creation examples, we identified common themes that existed among several of the examples. With each case of co-creation, we catalogued pertinent information which allowed us to recognize the process that each example followed and provided a deeper analysis of the cases that we found. The catalog of each example of co-creation can be found in Appendix P - Examples of Co-Creation. Furthermore, by extracting key aspects of each example, we categorized examples of co-creation by which step of the co-creative process they addressed effectively. By identifying what has already taken

place within the waste sector, we collected information that showed what practices have proven effective within the Danish waste sector already.

3.3.2 Analysis of Challenges

The processing of co-creation examples allowed our team to not only highlight effective strategies but also to identify areas where co-creative initiatives fell short or encountered difficulties. Once catalogued, we were able to see the entire process that each example followed. By recognizing the co-creative process, we were able to identify points in each process where co-creation either stopped or could be improved. As we recognized patterns, we began to form a list of considerations and expectations when co-creating in the Danish waste sector. By identifying the step at which co-creation stopped within our less successful examples, we analyzed aspects of the process that could have been improved in order to arrive at a more successful result as defined by the four bottom lines of public value.

3.3.3 Developing Recommendations

The co-creation processes we found from our research, interviews, and analyses were ineffective if the members of the DWA had no way of knowing how to implement the processes into their operations and company strategy. For this reason we developed a set of recommendations. This was done through a brainstorming session our team held with each other, in which we developed themes we knew we could support with examples from our research, interviews, and analyses. We developed the themes by assigning the examples and other supporting information to one metric of the four bottom lines of public value. We consolidated these themes into concise recommendations with the aforementioned examples as support. We chose to combine the accumulated information in this collaborative way because the data were collected independently by team members and reported as findings.

With the set of recommendations complete, we prepared a presentation for the waste companies to use to help incorporate our identified co-creative practices into the design of a waste system that meets the preferences of both waste companies and Danish citizens.



3.4 Methods Summary

Our team executed the described methodology to determine co-creative practices in which Danish waste companies and citizens can design a waste system that is mutually effective. We accomplished this through finding current methods of feedback from citizens to waste companies, identifying innovative ways other business sectors co-create, and analyzing how to incorporate co-creative practices into the strategy of Danish waste companies.





CHAPTER 4

FINDINGS & ANALYSIS

Chapter 4: Findings and Analysis

The following chapter presents the findings and corresponding analysis for the interviews, field visits, and general research conducted. This chapter evaluates co-creation in the waste sector by analyzing: outreach from waste companies to citizens, the involvement of citizens in waste related activities, and the collaboration of waste companies with organizations and professionals seemingly unrelated to waste for co-creation. Additionally, the final section of this chapter identifies and analyzes some of the common challenges waste companies encounter when co-creating. The information provided by our findings helped us develop recommendations for the waste sector to innovate through co-creation.

4.1 Public Outreach: Talking with People about Waste

The following section of our findings evaluates the different methods, platforms and channels that companies in the waste sector use to engage with citizens through outreach. The section analyzes outreach by: social media, personal interactions, and education.

Social media increases the potential to reach more customers and facilitate co-creative projects.

The use of social media to engage with citizens is not a surprising new development. Our research and interviews with communications and marketing specialists in the waste sector confirmed that social media and other digital platforms are a common method of engaging with citizens. A recent working paper published by the Organization for Economic Co-operation and Development (OECD) highlights the growing prevalence of social media as a platform to engage with non-traditional interest groups in public affairs and to empower citizens (Mickoleit, 2014). Unlike in many other countries, education level does not have a significant impact in social media uptake by citizens in Denmark, suggesting that social media can be an effective platform for public organizations to reach audiences regardless of their socio-economic background (Mickoleit, 2014). The returns and value of social media for day-to-day operations of public services are still somewhat unclear (Mickoleit, 2014) but their effect on the co-creative process is undeniable (Bason, 2010, pg.105-113).

To expand the research on value of social media for co-creation, we explored the uses of Facebook and YouTube as platforms for engagement in the waste sector. Facebook and YouTube are notably the most prevalent social media sites in Denmark (Werliin & Kockholm, 2016). *Figure 10* shows the



presence of 46⁴ DWA member companies on Facebook and YouTube, with more than two thirds of companies having joined Facebook and more than half having joined YouTube. The ways in which social media affects co-creation for waste companies is highly dependent upon the ways and the frequency with which the platforms are used.

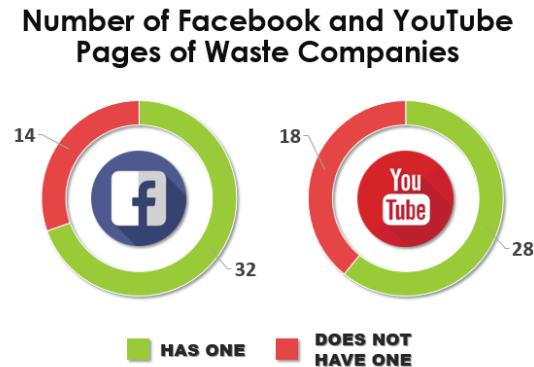
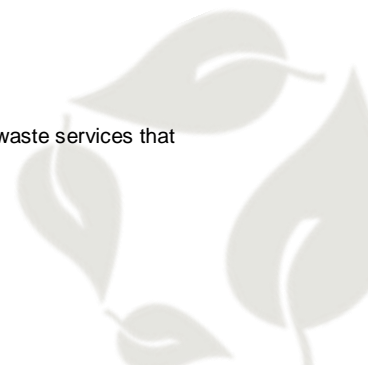


Figure 10. Presence of Waste Companies on Facebook and YouTube

Companies such as Glostrup Forsyning and Arwos take advantage of Facebook to keep citizens informed about the companies’ services and any changes that might affect the citizens’ experience with their residential waste. Sofie Lauritsen, who works as the customer outreach specialist at Glostrup Forsyning, explained that having a Facebook page to inform citizens is good for their company because they “get feedback from [the citizens] which is always good to have” and because generally citizens “respond positively to [the work] we are doing [at the company]” (S. Lauritsen, Personal Communication, Mar. 2018). In another positive response for Facebook, Stinne Stokkebo at Arwos shared that Facebook is efficient for outreach because it is a relatively inexpensive way to inform citizens and shared as well that Arwos takes advantage of the low cost advertising Facebook has to offer. Arwos monitors their Facebook page outside of regular work hours and as Stinne described, responding to citizens “makes it seem like [they] are open on weekends as well [...] which is important for the customer service experience [they] like to offer” (S. Stokkebo, Personal Communication, Apr. 2018).

YouTube is also used in similar ways as Facebook to provide information to citizens but in a different format, in video form. Glostrup Forsyning uses their YouTube page to show citizens informative videos about how to sort their waste at home, while Nomi4s will post videos about the processing of waste at their facility. Sofie Lauritsen from Glostrup pointed out that their YouTube page is not as active and generally not as popular as their Facebook page, and that posting their YouTube videos to the Facebook page generally results in more views and online engagement.

⁴ As mentioned in our methodology, our sample is based on 46 out of the 54 DWA member companies that offer waste services that directly involve the citizens.



Using social media for co-creation, however, takes more than just providing information to citizens about their local waste company; citizens' input is just as important for the co-creative process. Fors is a combined utilities company that uses their Facebook page to engage with citizens online, but also to invite them to participate in co-creative activities offline as well. *Figure 11* illustrates three examples of Facebook posts where Fors invites citizens to share tips with one another about water usage (*Figure 11A*), invites citizens to collaborate with their company in the form of ambassadorship (*Figure 11B*), or provide their opinion about a local dig site through a phone interview (*Figure 11C*).



Figure 11. Examples of Facebook posts by Fors
Source: Fors A/S Facebook Page (2018)

In trying to use Facebook as an outreach platform with co-creative goals, Arwos shared an online survey for citizens to submit their preferences about the schedule for the local waste sorting station. Stinne Stokkebo from Arwos explained that the results from the survey they posted on Facebook were, in her opinion, very helpful since they had a direct effect in modifying the opening schedule for the sorting station to meet customer demand.

The aforementioned examples are relevant to the early stages of co-creation of *knowing* and *analyzing* by relying on the comments and feedback that citizens provide online for the company to then take action. By asking citizens for tips or interviews, Fors is tapping into the explorer co-creative persona proposed by Nambisan and Nambisan (2013) in an online platform like Facebook.

Social media can also be used to involve citizens in the later stages of the *synthesizing* and *creating* steps of the co-creative process in the form of lead users (Bason, 2010). When Glostrup Forsyning was adding an organic waste fraction to their municipalities' waste collection, they utilized a Facebook group to bring together more than 200 lead users for the system. Sofie Lauritsen from Glostrup Forsyning claims that the group made communicating with lead users easier than having to

reach out to each one of them individually and “it even made [her] job easier since people were responding to each other’s questions [...] and it only required some monitoring” (S. Lauritsen, Personal Communication, Mar. 2018). Sofie Lauritsen expressed that company executives were happy with the online project and that the input from citizens resulted in quicker implementation of the new sorting system than the company originally expected. After the implementation of the organic waste fraction, Glostrup Forsyning followed up with the community of lead users they had gathered and invited them to share their experience and advice for other citizens in the form of YouTube videos that Glostrup Forsyning would later share on their YouTube website as seen on *Figure 12*.



Figure 12. Citizens of Glostrup Share tips on YouTube for Organic Waste Sorting
Source: Glostrup Forsyning YouTube Channel (2015)

Figure 10 illustrates the numbers of Facebook and YouTube pages that already exist, but the finding does not portray an appropriate representation of the uses Facebook and YouTube get by waste companies. Through desk research researching the social media platforms of DWA members, we learned that many of the waste companies’ social media pages have not been used in months or even years. Henriette Vest Jensen from Renosyd I/S, described that in the case of Renosyd I/S, the company had not invested resources in the past for a communications department to handle social media sites and that the municipality already has a Facebook page with more online traffic to share waste related content. Vest Jensen was hired just a few months before our interview to handle social media for Renosyd I/S and is working on planning new social media projects for the company. Renosyd I/S is just one case of a company in the waste sector that is working to improve their social media presence, but their example could help illustrate a potential area for improvement in social media outreach and future opportunities for co-creation in the waste sector.

Existing opportunities such as holidays, public events, and public spaces are important to start conversations with citizens about their waste.

Katzen-Mark is a marketing and communications consulting company specialized for waste sector initiatives. Lone Misfeldt, founder and strategy director for Katzen-Mark, remarked that they try to “meet people where they are at” (L. Misfeldt, Personal Communication, Mar. 2018) by offering diverse opportunities to engage in dialogue with residents. Lone Misfeldt supports dialogue with

citizens because it allows for casual conversation with citizens, a common method for exchanging views and opinions (Engage2020, 2014).

Waste companies expand their outreach by increasing interactions between waste service providers and citizens beyond their residential complex waste bins or the local sorting station. Representatives from both Vestforbrænding and Glostrup Forsyning mentioned during our interviews that the company's presence at local Cultural Nights has been a way to interact with customers by capitalizing on an outreach event that attracts diverse audiences. For instance, Glostrup Forsyning used Virtual Reality technologies to showcase the design of the new local waste sorting station and even attract tech-savvy young customers at the local Cultural Night. Vestforbrænding attracts people at Cultural Nights with visual displays that show how the different fractions of waste that residents sort at home are later processed at their facility and where the waste ends up.

In another example, Katzen-Mark and the Roskilde Municipality partnered to offer a portable waste sorting station to teach locals how to sort their waste. While the Roskilde municipal waste company designed and built the portable sorting station (see *Figure 13*), Katzen-Mark provides waste ambassadors that help teach locals how to sort their waste in Roskilde. Additionally, both the station and the ambassadors can be contracted for other public and large events.



Figure 13. Katzen-Mark's and Roskilde's Waste Sorting Stations and Ambassadors
Photo Credits: Katzen-Mark



In a similar approach to increase dialogue with locals, the Aarhus municipality constructed the Green Embassy, a small space in the city center open for all citizens to discuss and start their own “Green Initiatives” (see *Figure 15*). Whenever it is open, the Green Embassy is staffed by municipal employees who facilitate communications, planning, and even budget needs for citizens to start local projects like municipal gardens or booking public plazas for environmental advocacy events. Although the space is not exclusively used for waste-related initiatives, the Embassy has been used in the past for the municipality to inform citizens about changes to the municipal waste collection and engage in dialogue with those citizens who want to learn more. Marie Overgaard, a project manager at the Green Embassy, remarked that in the past the employees at the embassy put out posters (see *Figure 14*) to inform citizens about changes to the waste system and to invite them into the embassy. Once inside, employees could educate citizens and understand any concerns they had about the changes.



Figure 14. In Aarhus We Sort Our Waste
Credits: Aarhus Kommune



Figure 15. The Aarhus Green Embassy

Engaging in dialogue in a diversity of settings and with different audiences is important for the co-creative process. By having municipal representatives or waste company employees at public events and spaces being the ones engaging in dialogue, the feedback citizens provide is relayed to the company decision makers much quicker. It is then, that the process of *knowing* (Bason, 2010) what citizens think about the waste services the municipality offers is improved. By engaging with citizens in common spaces and public events, waste companies start a dialogue with *Explorers* who point out anything that might be wrong and *Ideators* who give ideas as to how to fix it (Nambisan and Nambisan, 2013).



Education programs make the technical aspects of waste management accessible to public of all ages.

Educating the public in waste management topics is not a new area for waste companies to experiment with, particularly when it comes to primary and secondary education students. For many years now, the Danish Ministry of Education has included in their common core different requirements in subjects such as social studies and sciences that involve learning about utilities and waste (Undervisnings Ministeriet, 2018).

A waste company that devotes a significant amount of resources to educational outreach is Denmark's largest waste company: Vestforbrænding. Allan Laumann, director for Vestforbrænding's Dissemination Center (Formidlingscentret), said that the center serves more than 300 schools scattered across the 19 municipalities that own the company, and hold educational programs for more than 22,000 students, by the latest estimates in 2017. Laumann attributes part of the success of the company's education center to the availability of eleven employees on staff dedicated to educational outreach and their approximately DKK 10 million annual budget⁵. Vestforbrænding's site in Copenhagen has four labs targeted for different audiences, from learning about waste sorting for younger children to teaching secondary school students processes for waste incineration and recycling material. Similarly, Reno Djurs, a waste company that services the Norddjurs and Syddjurs municipalities constructed a classroom as part of their landfill expansion project.

Vestforbrænding uses its educational facilities to reach audiences other than students in primary and secondary education. The Vestforbrænding Dissemination Center offers three educational programs for: teachers, property owners and facilities managers, and college students in an attempt to educate future business leaders. Additionally, the Dissemination Center is open last Thursday of every month for citizens who would like to visit the company's facilities (Vestforbrænding, 2018). Allan Laumann remarked that the priorities of the Dissemination Center are placed on the visiting children and the citizens that live in the 19 municipalities that own the company. Allan also remarked that their staff is available to help out other waste companies set up education programs, but that they are limited because their focus is placed on attending the constituents of the municipalities who own their company.

⁵ Approximately over USD \$1.6 million.



4.2 Citizen Involvement: Working with Citizens for Waste Projects

The following section evaluates the effects of citizen involvement in waste related activities and their effects on co-creation in the waste sector. Our analysis focuses on three ways of citizen involvement: empowering citizens, citizen-led initiatives, and direct consultation. Bason (2010) offers two ways of involving citizens for co-creation: as direct informants who help public organizations learn about the past and present, or as collaborators and co-producers in the delivery of public services. Over the next section we elaborate on examples of citizens involved as co-producers in the waste sector in the form of ambassadors, or citizen-led activities, and examples of citizens serving as direct informants of improvements to the waste sector.

Empowered citizens are efficient for implementing changes to the waste system and improving sorting habits.

Empowerment is the form of public engagement that aims to allow citizens to acquire skills and knowledge in the process of engagement (Engage2020, 2014). The World Bank Group suggests that citizen empowerment is important because it promotes social inclusion and allows citizens to be more active as members of their society (World Bank, 2018a). In the Danish waste sector, empowerment is noticeable by the role that ambassadors and lead users have in waste related activity.

The Tingbjerg Forum is a neighborhood in Copenhagen with approximately 6,000 residents representing more than 82 nationalities. In part because of the residents' diverse cultural backgrounds, lack of proper waste sorting had been a problem in some of the Forum's residential complexes. In an attempt to improve waste sorting habits among community members, marketing company Katzen-Mark led the collaboration with the Tingbjerg Forum and John Nielsen, a facilities manager at Tjingberg, to empower John Nielsen and have him become an ambassador for better waste sorting. As part of the campaign, John Nielsen became the "Sheriff for Better Waste Sorting" with his image being put up on a billboard to remind residents to sort their waste and supplementary publications distributed among the community to teach residents how to sort their waste as seen on *Figure 16*.



Large billboard at the residential complex in Tingbjerg Forum to remind residents to sort their waste.



Sample material distributed to residents to educate them on proper waste sorting.

Figure 16. John "The Sheriff" Nielsen serves as an Ambassador at Tingbjerg Forum
Graphics Credits: Katzen-Mark

Although as John Nielsen remarks that the “[billboard] was good because many people starting asking what [the project] was all about” (J. Nielsen, Personal Communication, Apr. 2018), the implementation process was more than just the advertising material. John Nielsen, along with Katzen-Mark’s Anne Bisgaard, “set up dialogues with each one of the residents in the complex” in addition to contacts “with local clubs and organizations such as the local church” (A. Bisgaard, Personal Communication, Apr. 2018). Both John Nielsen and Anne Bisgaard think the project was a success because it improved sorting of material in the plastic and metal bins which were previously contaminated with other waste material, but also because the project led the way to involve other facilities managers and brought out ideas from the community such as a neighborhood trash collection day or flea market concept.

“People liked more the idea of sorting their waste when they saw someone they knew doing it as well”

(J. Nielsen, Personal Communication, Apr. 2018).

Katzen-Mark has had similar experiences working with waste ambassadors in the past. In 2017, Katzen-Mark trained a group of citizens to become waste guides to facilitate education for proper waste sorting. Municipalities can hire the services of Katzen-Mark’s waste guides to educate other citizens at public events or visit apartment complexes (Katzen-Mark, 2017).

Another form of citizen involvement is citizens acting as lead users who help provide feedback on new implementations or changes to the waste system. Earlier in our findings, we review an example of Glostrup Forsyning using Facebook groups to bring together pilot testers of a new organic waste sorting bin system for the municipality. Sofie Lauritsen from Glostrup Forsyning explained how the pilot program provided insights for the company that organic waste had to be collected in three weeks as opposed four as they had originally planned. The involvement of lead users in the process

meant that only seven out of the roughly 7000 bins for organic waste collection were returned to the waste company upon implementation of the program.

In another example, marketing consultants at Tankegang partnered with waste company AVV in the municipalities of Brønderslev and Hjørring for the Nulskrald Project (Zero Waste Project). AVV and Tankegang challenged the citizens of Brønderslev and Hjørring to turn their neighborhoods into zero waste neighborhoods, by sorting as much waste as possible and producing the least unsorted waste. Tankegang would enhance the challenge by comparing the performance of neighborhoods against each other and by designating lead users in each neighborhood who would propose specific improvements that their neighborhoods needed to make their waste sorting better. Stener Glamann from Tankegang described an example when AVV moved the waste bins in a neighborhood after a citizen suggested a location that would get other neighbors to sort as well. The Nulskrald project in Brønderslev and Hjørring resulted in a reduction of unsorted waste by around 50% during the six weeks the project took place, and as Stener claims, it was also successful in improving the waste sorting habits of citizens for years to follow the project.

The role of citizens as empowered ambassadors or lead users is important for multiple aspects of the co-creative process. Empowered citizens can serve as explorers and ideators that help in knowing areas of improvement to the waste system, or also as diffusers when citizens act as ambassadors for the waste company that services them. Bason (2010) defines the process of involving ambassadors or lead users as *crowdsourcing*, where innovation is opened up for citizens to lead their own process of ideation and design.

Citizen-led initiatives are a way of collaborating with citizens to meet some of the sector's most ambitious goals and improve service delivery, but they require monitoring.

Naboskab is a social enterprise based in Copenhagen that works in circular economy projects at a citizen level and on projects for town and city development. In the past the team at Naboskab has designed and facilitated the concept of reuse “neighborhood closets” (direct translation for Naboskabe) which serve as places where community members can share and reuse household goods. Naboskab’s projects focus on the impact that exchange stations of second hand household items can have in minimizing the amount of material that otherwise end up as waste. Kristoffer Ravnbøl, co-founder and co-director for Naboskab, claims that the community neighborhood closets are meaningful for citizens because the closets allow citizens to have a direct impact in the management of resources they utilize. Ravnbøl recognizes that although the exchange units are meaningful for the residents, the stations require attention and care and that the projects where multiple citizens take care of the “neighborhood closet” are more successful than those where only one member of the community is involved. In the words of Kristoffer, “these citizen-led initiatives

tend to die-off and lose steam if they do not have the proper support” (K. Ravnbøl, Personal Communication, Apr. 2018).

In another example, the Green Embassy introduced earlier (as seen in *Figure 15*) facilitates a project by the name of “Good Advice for Waste Collection” (Gode Råd Ved Affaldsindsamling). Through the project, the municipal employees working at the Green Embassy provide safety vests, bags, and trash pickers for citizens to collect waste in their own neighborhoods as seen in *Figure 17*.



Figure 17. Publication for "Good Advice on Waste Collection" by the Green Embassy
Credits: Aarhus Kommune Green Embassy

The involvement of citizens in activities like re-using household goods or helping clean their neighborhood are characteristic of co-production, where citizens act as partners in the delivery of services that public organizations have to offer (Alford, 2014). Neighborhood exchange stations are part of reusing materials which is a subset of the circular economy goals for the Danish waste sector (Dansk Affaldsforening, 2015) while an example such as neighborhood cleaning is an example of fulfillment for a service that would typically fall under the jurisdiction of the municipality (KL, 2018b).



4.3 Collaboration: Diversifying the Waste Sector

The following section of our findings analyzes the impact that collaborating with actors outside of the waste sector can have on the co-creative process. One of the basic ideas of *knowing* for co-creation is gathering as much existing information or knowledge about the present state as possible. In public sector co-creation, it is crucial to include the information that other public organizations can provide as well as the input of external experts with diverse academic backgrounds or experts from the private sector in seemingly unrelated fields (Bessant, 2005; Bason, 2010). The following section analyzes the influence of actors indirectly related to the waste sector in the co-creative process and the impact of collaboration with said actors. Our analysis of collaboration is divided in two main focuses: collaboration with the private sector and collaboration with interdisciplinary experts.

Private sector enterprises have resources for research and design that expand the co-creative potential for the waste sector.

The Danish Waste Association advocates for a waste sector where “waste management and other parts of the supply remain publicly owned” (Dansk Affaldsforening, 2018e). Nonetheless, the waste sector is not exclusively composed of public companies. Municipalities and public waste companies rely on the supply of specialized services and materials that private companies offer such collection services or supply for municipal and residential waste bins. The DWA is cognizant of the impact private sector companies have on the delivery of waste management services and recently started to develop guidelines for public-private collaboration to meet the circular economy goals that the sector has set forth (Dansk Affaldsforening, 2018c).

Private actors have a stake in the design process of waste systems citizens use. PWS and Joca A/S, for instance, are some of the companies that design the waste bins citizens encounter around their cities, in their offices, and in their schools. IKEA produces and sells approximately one third of the residential kitchens sold in Denmark every year, meaning that they have a direct impact in the way citizens sort waste at home, particularly in their kitchens, and therefore has an indirect impact to the waste sector (J. Engberg, Personal Communication, Apr. 2018).

Because of the resources IKEA can invest in research and development, the company is able to collect specialized knowledge about citizen behavior specifically as it relates to consumption habits. For instance, IKEA releases a yearly report titled “Life at Home” in which they publish insights about the relationships everyday citizens have with their homes, both the material aspects and the relationships with other people and objects in the household⁶ (IKEA, 2017). The Space 10 lab is a

⁶ The 2017 Life at Home Report is the first yearly publication of the Life at Home Reports that includes research about the Danish Market.

research hub located in Copenhagen and funded by IKEA where a network of contributors research the concept of life in the future, from food to urban farming to concepts for renewable products (Le Puart, 2016).

“The discourse for environmental matters is held at a very high level but it all starts at home.”

(J. Engberg, Personal Communication, Apr. 2018).

Jonas Engberg⁷, Manager for Sustainability at IKEA Denmark, claims that partnerships between IKEA and the waste sector are possible and well regarded by the company. Engberg describes a recent project where IKEA partnered with the Aalborg Municipality and a local university to aid the Aalborg Municipality as they increased the number of waste fractions they were requesting their citizens to sort. Jonas stated that the project “challenged the idea that public sector and private sector companies cannot work together [...] we shifted from ‘enemies’ to collaborators” (J. Engberg, Personal Communication, Apr. 2018).

In 2013, IKEA compiled the Affaldshjælp (wastes help) guides which detailed the specific residential fractions of waste collected by the municipalities in the five regions of Denmark as seen in Figure 18. Unfortunately, the guides have not been updated since the year 2013 and the fractions for waste collected for each municipality have changed significantly ever since. Jonas Engberg describes that in the future, IKEA plans on reactivating the project and integrating the guides as part of the retail experience for customers to know exactly what type of waste receptacles they must purchase to sort their waste depending on where they live.

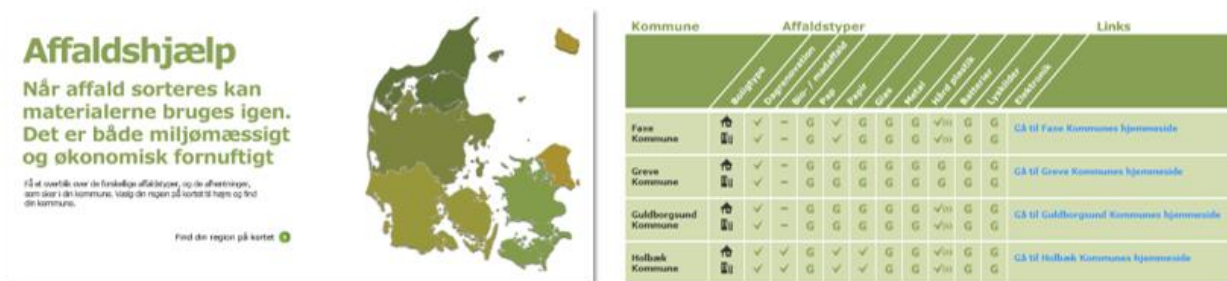


Figure 18. Sorting Guidelines in the 5 Regions of Denmark by IKEA
Source: IKEA (2013)

Jonas Engberg claims that he sees potential for increased citizen involvement through collaboration between IKEA and public waste companies. After all, Engberg claims that “[IKEA has] more visitors on [their] websites and in [their] stores than the municipal building or website” (J. Engberg, Personal

⁷ Jonas Engberg is not new to the scene in the Danish Waste Sector. In the past, Engberg has presented in many occasions to members of the waste sector about IKEA’s circular economy plan and is also recognized as a “Waste Ambassador”.

Communication, Apr. 2018) which makes them an important asset in learning and working with citizens.

Collaborations between IKEA and the waste companies are just one example of public-private partnerships that provide more knowledge about citizens' needs for the co-creative process in the waste sector. One can also find an example of public-private collaborations for co-creation in a pilot program when the marketing company Tankegang and the waste company Fors collaborated with private plastics suppliers Schoeller Plast and Aage Vestergaard Larsen to test kitchen waste sorting systems in 2000 homes in Zealand (Tankegang, 2016).

Private sector companies can offer specialized knowledge about citizens that public sector organizations might lack (Bason, 2010). Public waste companies might find that there is potential in the shared knowledge that can arise from partnerships with the private sector, what Bessant (2005) calls *discontinuous innovation* or the concept of innovating by drawing inspiration from new places.

Collaborating with experts from different professional backgrounds enhances the ability of waste companies to co-create with citizens.

Bason et al. (2009) argues that diversity in the public workforce is a driver for innovation and is expressed through four competencies (as detailed in *Figure 19*): *Public Administration, Design Thinking, Social Research, and Profession*. It is the interdependence and not the independence of each of the four competencies, Bason argues, that drives innovation because the collaboration of all four competencies provides diversity in perspectives and ideas (Bason, 2010). Throughout our research we discovered that many actors are involved in the waste sector that represent a diversity of the four basic competencies suggested in Bason et al. (2009).

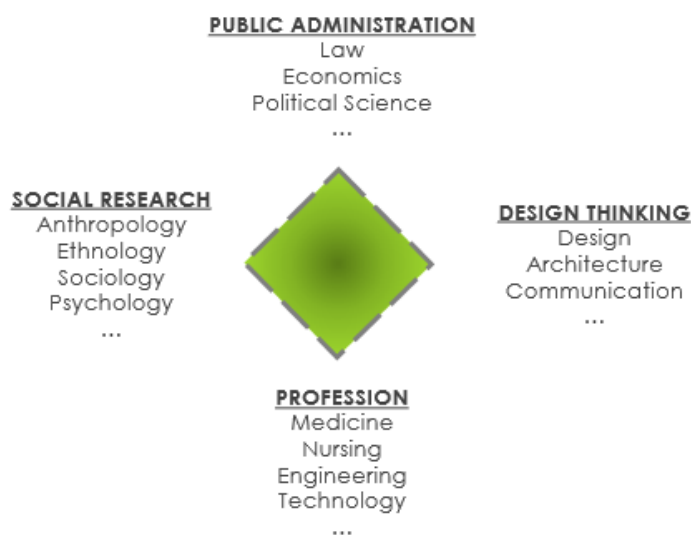


Figure 19. Competencies for Innovation in the Public Sector
Source: Adapted from Bason (2010) and Bason et al. (2009)



Stinne Stokkebo, director for the Waste Department at Arwos, told us “[they] have become a company that treats citizens as customers [...] customer service is at the core of who they are” and because of it “the way [they] hire has changed, [they] now have a journalist, a teacher, and others” on their team that represent the importance that the company places on customer service (S. Stokkebo, Personal Communication, Apr. 2018). Stinne Stokkebo explained that including a teacher, for example, made the outreach to schools much easier for Arwos.

In earlier examples, we described the role that the social enterprise Naboskab had with projects related to circular economy through household item exchange units or “neighborhood closets.” Although privately owned, Naboskab is an example of organizations that are commonly referred to as the public-third sector because their role is to help understand the needs of citizens and communities and help improve the public sector through innovation and service delivery (NAO, 2016; Bason, 2010). Naboskab in particular is composed entirely by a team of social researchers with backgrounds in anthropology. They also have team members with experience in city planning. Naboskab’s expertise in social research can be used to learn more about citizens and influence waste policy. Just recently, Naboskab was commissioned by Copenhagen’s municipalities to do research on the distances citizens would travel to get to a waste sorting station and the role of second hand shops and shared community reuse units (Naboskab, 2018). As Kristoffer Ravnbøl from Naboskab explained, “[their] research focuses on using qualitative methods for quantitative goals” that translate well to economic costs which are usually of high interest for decision-makers (K. Ravnbøl, Personal Communication, Apr. 2018). Ravnbøl explained their latest commissioned work for Copenhagen will have an impact on the placement and distribution of waste bins and reuse stations around the city as the municipalities move forward with a new waste strategy plan.

Tankegang and Katzen-Mark are two communications consulting companies that specialize in projects for waste and utilities companies. Many of the examples of co-creative practices we discovered in the waste sector were influenced by these consulting services, which play an important role in customer outreach. By relying on the services of communications consultants, waste sector companies are expanding their capacities in the competency of *design thinking* (Bason et al., 2009).

During our research process, we had the opportunity to meet Lina Katan. Lina is a sociologist with a background in ethnography. In her research, Lina focuses on studying human behavior through three theoretical paradigms: consumer behavior theory, affect theory, and practice theory. Lina is currently working to set up her doctoral thesis research with the Danish Waste Association studying the behavior of citizens particularly with regard to waste sorting habits. During her remarks, Lina explained that her research is partly driven to inform better waste policy since “much of the

information available is based on what people say or claim they do [...] the ideals and practice tend to differ”.

One collaborative approach to co-creation that has not yet been explored by the Danish waste sector is the concept of an innovation unit. An innovation unit is an organization dedicated to the development of public policy initiatives through the use of interdisciplinary and non-governmental teams (Davies, Nutley, & Smith, 2000). The Ministries of Business, Employment, Education, and Industry are owners of a collaborative innovation unit called the MindLab. MindLab focuses on innovation through co-creation by bringing public employees of all backgrounds to learn and incorporate co-creation into their professional roles. Anne Berg, a project leader for MindLab, said that “[their] unit tries to challenge places where outside-in perspectives could be useful for public employees to learn about the experiences of citizens.” (A. Berg, Personal Communication, Apr. 2018) MindLab offers workshops for public employees and does internal consulting for co-creative projects within the ministries that own the lab. Additionally, the MindLab has a team of their own ambassadors called “Lab Rats,” made up by public employees who have been trained by MindLab to diffuse the concepts of design thinking for co-creation within their respective ministries.

4.4 Challenges to Co-Creating in the Waste Sector

The following section of our findings evaluates the common challenges that waste companies face when co-creating. Our analysis is based on two main challenges for co-creation: resources and politics. While our previous sections detail the benefits and value of co-creating in the waste sector, the following section addresses the potential limitations companies face when attempting outreach, citizen involvement, and collaboration.

Co-creation requires investment of time and people yet the return on the investment is not always apparent.

Bason et al. (2009) presents three of the most common concerns with co-creation are: the fear of ‘citizen dictators’ and yielding all decision-making power to the citizens, the worry that co-creation requires too much time and resources, and the concern that co-creation might generate unrealistic expectations among citizens. In the waste sector, co-creating implies investing time and resources to prepare for citizen outreach and monitoring citizen-led initiatives, as well as strategic planning for any possible collaborations.



For instance, customer outreach through social media is a very resource-intensive task, with studies suggesting that platforms like Facebook or YouTube are among the most demanding for setup and maintenance investment (Mills & Plangger, 2015). During our interviews, the representatives from Glostrup Forsyning and Renosyd I/S mentioned that they were the only employees in their companies directly responsible for social media outreach, while the representative from Arwos described having multiple people on the team in charge of the company's social media sites. Despite the differences in the department size, a single employee dedicated to customer outreach can have a noticeable impact in the co-creative process. In an example we provided earlier, Sofie Lauritsen from Glostrup Forsyning was the only company representative in charge of a Facebook group with more than two hundred pilot testers for an additional organic waste sorting fraction. The implementation of the new system was successful, with only seven out of the approximate seven thousand waste bins getting returned to the waste company by the residents. The extent to which Sofie Lauritsen's role had a direct impact in the implementation of the bins is unclear, but she claims the size of the outreach department had little to no effect. The case with Glostrup Forsyning demonstrates that innovation through co-creation is possible even with limited resources. As Bason says: "trusting middle managers, institutional leaders and staff to do their work well, delegating responsibility and limiting formal control [...] are at the core of building a culture of innovation" (Bason, 2010, pg. 123). In the case of the waste sector, employees dealing with customer outreach or even waste collectors and facilities managers are among the first to discover problems in the system and are crucial to a waste company's innovation capacity.

Because co-creation is an iterative process, it is common for companies to experience failure, which can be a common frustration about the process. Henrik Dalgaard from Vestforbrænding remarked that in the past when their company had undertaken co-design projects such as design challenges among citizens, the ideas were abundant but not feasible. As Dalgaard points out, "for a few years we had a [citizen] innovation strategy where zero ideas came to fruition" (H. Dalgaard, Personal Communication, Apr. 2018). Employees at Vestforbrænding realized that "[citizens] are not thinking of how to redesign a waste bin" (H. Dalgaard, Personal Communication, Apr. 2018). Proponents of co-creation such as Anne Berg from MindLab and Kristoffer Ravnboel from Naboskab, agree that the co-creative process is about learning from failures and iteration, and failing before implementing large scale solutions that will affect a larger sector of the population.



Politics matters even when talking about waste.

Most waste companies in Denmark are publicly owned and operated by multiple municipalities with their own local leaders and governance, which means that the Danish waste sector is a highly political sector. Henrik Dalgaard from Vestforbrænding has been part of the waste sector for many years and stated that “many projects start because [our] politicians are trying to do something new, like adding a new waste fraction” (H. Dalgaard, Personal Communication, Apr. 2018). Dalgaard recognizes that fiscal responsibility is important and that their company is “limited by the risks [they] can take since [they] are not funded to be inventors” and that at the core, “it is not all about the money but rather political pull” (H. Dalgaard, Personal Communication, Apr. 2018). Earlier in our background research, we introduce the four bottom lines of public value (see **Fejl!**

Henvisningskilde ikke fundet.) including the public value in *democracy*. Democracy suggests that value in the co-creative process lies in the input provided by citizens but also the public servants who represent them (Bason, 2010). In a waste sector where each municipality has its own public agenda and their own set of public representatives, the differing perspectives have a direct impact in the co-creative process.

Ignoring the political forces within the waste sector during co-creation would be a great oversight. Municipal waste services are owned and operated by public municipal governments which can limit the ability of public servants to collaborate, particularly with private companies (Dansk Affaldsforening, 2018c). Even for Vestforbrænding, achieving full collaboration and standard practices among all of its 19 municipalities is challenging, as Dalgaard pointed out: “municipalities are looking to have their own identity, while we look [to promote] unity.” (H. Dalgaard, Personal Communication, Apr. 2018)

Political support, however, does not exclusively impact co-creation in the waste sector. Marie Overgaard, a municipal employee for the Aarhus Municipality and Project Leader for the Green Embassy, commented that the projects citizens lead through the embassy are partly due to the political support the embassy gets. The Green Embassy receives support at a policy level through the Active Citizenship Policy adopted by the leaders of the Aarhus Municipality in 2014, a set of directives that aim to increase citizen participation in public affairs. Even with the support of the local leaders, Overgaard claims that at least a small group of citizens in the municipality do not support the Embassy.

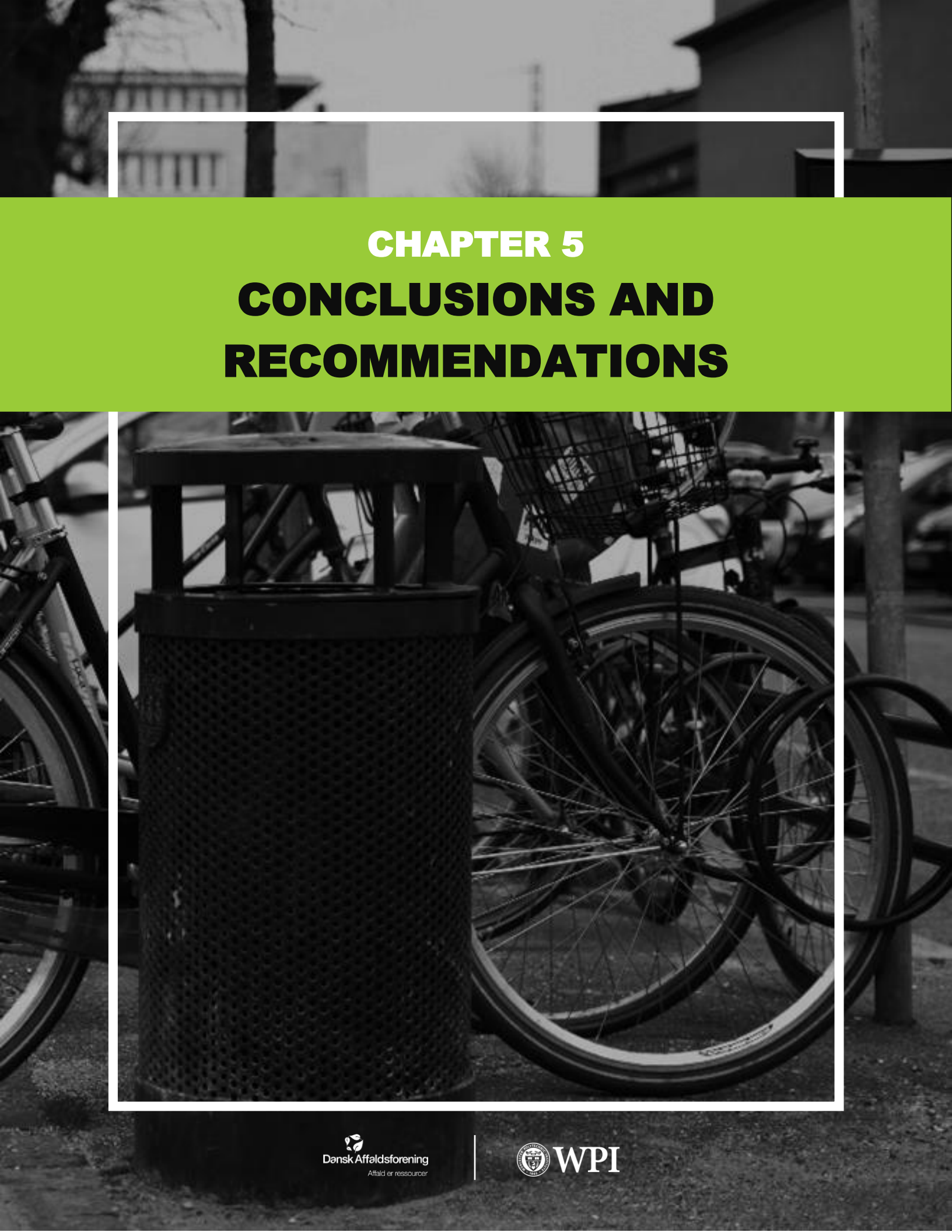
The recently implemented system of national pictograms designed by the Danish Waste Association in collaboration with other government agencies is an example of the positive effects that political support can have for collaboration and co-creation. After a development process that involved citizen

and expert consultation, the national pictogram system was released by the Danish Waste Association in January of 2017. In just a year after their release, the pictograms for waste sorting are now present at sorting stations and on waste bins across Denmark spanning 46 out of the 98 municipalities. Niels Toftegaard, Communications Specialist for the DWA commented that the process “took some convincing on the municipalities’ behalf” but that the support received by the DWA members is taking the pictograms to more places around Denmark and improving the communication that citizens receive. *Figure 20* shows some of the pictograms developed by the DWA.



Figure 20. Pictograms Depicting the 7 Waste Focus Fractions
Credits: Danish Waste Association and FUTU





CHAPTER 5

CONCLUSIONS AND

RECOMMENDATIONS

Chapter 5: Conclusions and Recommendations

Conclusions

Our project goal was to identify co-creative practices that incorporate citizens in the design of waste systems that meet the preferences of both waste companies and citizens in Denmark. Through a series of interviews, field visits, and general research we recognized that co-creation in the Danish waste sector happens in three situations: during company outreach to citizens, when citizens get involved in waste related activities, and finally when waste companies collaborate with professionals in fields that are indirectly related to the waste sector.

Our general assessment is that co-creation is still a concept in development in the realms of public government, and not just in the Danish sector. Because of complexity in the concept, there are multiple interpretations within the waste sector of what co-creation is and that there is no single way to define the best way to do it. In an attempt to synthesize the knowledge of co-creative practices in the waste sector, our research proposes that future co-creative projects in the Danish waste sector involve a combination of three approaches: outreach, citizen involvement, and collaboration (see **Fejl! Henvisningskilde ikke fundet.**).



Figure 21. The Three Approaches to Co-Creation in the Danish Waste Sector

Our research findings analyze the impact of citizen outreach in the co-creative process. We learned that social media offer a useful platform to keep citizens informed about their waste service providers but also a useful platform to facilitate co-creative projects. Additionally, our findings suggest that personal interactions with citizens and educational outreach are particularly important to build consciousness among citizens about proper waste treatment. We conclude that citizen involvement as co-producers of waste services in the form of ambassadors or citizen-led initiatives are co-creative ways of using citizens to improve the sector but require more monitoring and attention than

other co-creative methods. We conclude that collaboration is the most important aspect that drives future co-creation in the Danish waste sector. Through our research, we assessed the benefits that partnerships with private sector companies and collaboration professionals from different backgrounds have in the co-creative process and conclude that these partnerships are crucial for the future of co-creation in the waste sector.

Finally, our findings suggest that the two greatest challenges for co-creation in the Danish waste sector are the concern of time and human investment for co-creation and the effect that political influences have on the co-creative process. Although co-creation tends to lead to better solutions, the process requires additional resources such as employees dedicated to facilitating outreach or conducting citizen involvement activities. The political nature of the waste sector leaves decision-making open to scrutiny from many different actors, which can make co-creation challenging.

Recommendations

The following section provides recommendations for companies in the waste sector to consider during the process of co-creation. Our recommendations are a result of our combined background research into co-creation as well as findings we learned from conversations with professionals directly and indirectly related to the Danish waste sector. Our recommendations are addressed in categories based on the model proposed in *Figure 21*: customer outreach, citizen involvement, and collaboration.

We acknowledge that many of our field research findings are mostly based on the anecdotal experiences of the people we interviewed which can lead to some bias. However, the anecdotal data gathered provided information that we used to confirm or deny the validity of the theoretical models of co-creation. By noticing trends and similar insights as well as inconsistencies in the narrative presented by our research we recommend the following:

Recommendations on Customer Outreach

Based on the current use of social media platforms, we recommend that waste service providers strive to use pages like Facebook or YouTube as two-way communication channels and involvement opportunities.

As more waste and utilities companies move their customer outreach efforts to online social media like Facebook or YouTube, it is important to consider that these platforms are not only good for informing citizens about their local utilities or waste companies but also provide good opportunities to hear from the citizens. We recommend using Facebook features such as: polls to consult citizens, groups to bring potential ambassadors and pilot testers together, and promotion of discussions in

comment sections that request citizens to share feedback, ideas, or tips that might inspire other citizens. Citizens can also be encouraged to use YouTube or other video streaming websites as platforms to share their own best practices for sorting waste at home. Additionally, Facebook provides live streaming options which might allow waste company representatives to give casual facility tours to citizens who might not be able to visit the company's facilities. We recommend that waste companies join social media as a way of engaging with their customers, and also take into account the potential of using other platforms such as Snapchat or Instagram to reach younger audiences. Finally, we recommend that social media are used to invite citizens to become involved with the waste company beyond the social platform itself with invitations to become ambassadors, to provide feedback via a phone interviews, or invite citizens to be part of a co-creative research event like a focus group.

Continue to capitalize on existing public events, spaces, and holidays to reach customers and take advantage of these opportunities to gather more feedback.

One challenge that waste companies repeatedly encounter is getting enough feedback from citizens during the development of municipal waste strategies. While engagement with citizens through online surveys or municipal hearing boards is still useful, creating opportunities for dialogue with citizens can attract the opinions of diverse audiences if the locations and times are right. Citizens might not know the technicalities of designing a waste bin for organic waste, but they can certainly be instrumental *ideators* who point out what works for them or what does not. Create the spaces and find the opportunities to meet citizens. Provide options for the citizen to choose from different bins, or different designs for the local sorting station. Most importantly, be sure to follow up and commit to the dialogue: co-creation requires the commitment of all parties involved.

Utilize existing academic spaces and resources to reach broader audiences.

The resources and investment put into educational outreach programs and educational facilities can be re-utilized to reach other audiences beyond young learners. Spaces such as on-site labs or classrooms for students can be used as spaces to educate other citizens, and take advantage of the opportunity to hold co-creative outreach events such as workshops or focus group discussions. We also recommend that companies develop programs to educate groups of citizens who might benefit from understanding more about waste sorting such as building complex managers.

We recommend using diverse online and offline outreach strategies for youth involvement with the waste sector.

Fejl! Henvisningskilde ikke fundet. highlights some of the principles for youth involvement provided by the EU's OPIN in addition to recommendations for online and offline recruitment of young audiences. In our research, we discovered the importance that social media can have in co-creating

with citizens, but offline recruitment methods such as peer-to-peer and face-to-face add a personal connection to interactions with youth. Additionally, social influencers and celebrities play an important role in the perceptions of youth towards society. Proper waste disposal and environmental responsibility are important topics in the Danish society. Social influencers promoting messages of proper waste sorting can help foster a culture of responsibility among youth as well.

Recommendations on Citizen-Involvement

Empower citizens to become ambassadors or lead users of the companies' services.

In the same way that waste is not collected in the same way everywhere in Denmark, similarly, the experiences that citizens have with waste are different wherever they go. However, citizens are experts in their own lives and have their own approaches to dealing with their waste. Crowdsourcing the knowledge about waste through empowered citizens in the form of ambassadors for the waste company or lead users of a new service can give waste companies new ideas for what works and what does not in specific contexts. We recommend that companies devote resources to recruiting ambassadors that provide ideas and serve as diffusers in their communities as well.

Support citizen-led initiatives but consider that monitoring might be required.

We recommend that waste companies consider getting involved with waste or circular economy activities that citizens might already be leading in their local communities by providing support as necessary. We do not recommend that waste companies facilitate projects such as community exchange units unless there is a high demand by the citizens, since these projects tend to require monitoring and prolonged citizen leadership.

Involve citizens in the decision making process by exploring different public engagement methods.

In our background research, we discuss some of the research findings from the EU's Engage2020 project, which includes a list of 57 methods of public engagement, detailed in **Fejl!**

Henvisningskilde ikke fundet.. We recommend that waste companies continue to explore innovative research techniques of public engagement. We have identified six options along with explanations for potential implementation and a reasoning for their selection:

- **Challenge Prizes** are useful for addressing specific, well-defined challenges that the waste company faces at a municipal level. Challenge prizes encourage citizens to participate with creative contributions incentivized by some sort of prize. Challenge prizes are not new to the waste sector but are a useful tool to crowdsource knowledge and get new and well defined ideas from citizens.



- **Charrettes** are useful for urban planning and designing urban spaces taking into account the perspectives of different citizens. Charrettes could be useful for input on municipal waste bin placements or shared waste systems.
- **E-Conferences** allow for participation of citizens without devoting resources to event planning. E-conferences could attract citizens who are very interested in waste and environmental advocacy.
- **Expert Workshops:** Many waste companies share similar challenges when addressing residential waste sorting issues. A combination of experts from different fields within and outside the waste sector can lead to productive discussions on how to address shared problems.
- **Science Week** is inspired by Denmark's own Forskningens Døgn (Science Week). Waste companies could consider participating at the Annual National Science Week.
- **Serious Games** are forms of gaming that entertain and inform citizens at the same time. Although the name implies seriousness, serious games can be comic yet casual and present relatable ways by which citizens could learn how to sort their waste. The games can be set up in either physical or digital spaces.

Other methods of engagement or uses of the same method for different purposes are possible.

Recommendations on Collaborations

Consider the benefits that partnerships with private sector companies can bring to the co-creative process.

In our findings, we elaborate on the specialized research and knowledge that private sector companies such as IKEA and other suppliers of residential sorting bins might have on the aspect of citizens as consumers. We recommend that waste companies explore possible partnerships with private companies to conduct co-creative projects based on shared knowledge of citizens as consumers. Larger-scale partnerships like developing sorting guides for a municipality or the whole country could combine the needs of the waste companies, with the retail structure that private companies need.

Expand the waste sector's innovative competence by collaborating with experts from diverse backgrounds.

The model of four competencies for public innovation suggests that public sector organizations can increase innovation by collaborating between social researchers, professionals, design thinkers, and public administrators. We recommend that waste companies consider hiring or collaborating with more social science researchers and design thinkers, as well as inviting waste professionals and public administrators to be part of the co-creative practices. If hiring and including as part of the

company is not an option, we recommend that companies work with consultants or third-sector social enterprises by commissioning them with research projects that expand the companies' knowledge of their customer base.

Consider the impact that an innovation unit could have for the waste sector.

Models of innovation units like MindLab take a direct approach at promoting innovation and design thinking among public administrators and public organizations. In the future, the Danish waste sector could collaborate with other utilities sectors and the respective national ministries to set-up an innovation unit similar to MindLab.

Reflections: Lessons Learned in Technology and Society

It is our civic duty to remain aware of the impact our role as citizens plays on the delivery of basic public services. Nonetheless, it is also the responsibility of our societies' leaders and public servants to ensure that the process of public service delivery is designed without forgetting the impact they have on the lives of the citizens they affect. Through our project, we learned that co-creating with citizens is one approach to innovate waste management by considering the input that the everyday citizen can have in the design of public services. For many years now, the engineers, politicians, and professionals of the Danish waste sector have worked to develop waste systems that have Denmark at the global forefront of waste management. Nonetheless, as waste systems get more complex and citizens are asked to sort their waste into more fractions, Danish waste experts must consider the limitations to what they expect citizens to do. While the Danish public is generally in favor of developing towards a more environmentally sustainable society, still the everyday citizen thinks about their waste for just a limited time during their everyday life. The experts who design waste systems around Denmark must never forget that their systems' success depends on the input of those who are affected by them. Our research, sheds light on the potential and the value that arises when citizens and other stakeholders are brought into the decision-making process of the Danish waste sector. ***There is always more that citizens could do for the waste sector, but there is just as much that the waste sector can do for the citizens.***



REFERENCES



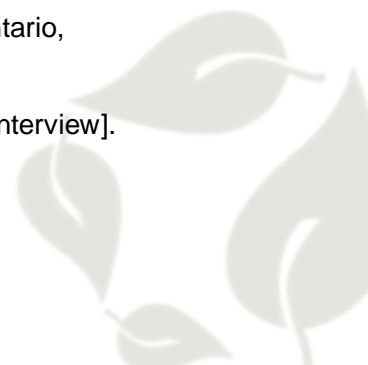
References

- Alford, J. (2014). *Engaging public sector clients: From service-delivery to co-production* [PDF Document]. Retrieved from Copenhagen Business School Website: https://www.cbs.dk/files/cbs.dk/coprodn_slides_copenhagen_25_april_2014_circ_2.pdf
- Bason, C. (2010). *Leading public sector innovation: Co-creating for a better society*. Bristol, UK; Portland, OR, USA: Policy Press at the University of Bristol. doi:10.2307/j.ctt9qgnsd
- Bason, C., Knudsen, S., & Toft, S. (2009). *Put the Citizen Into Play: How to Involve Citizens and Businesses in Public Sector Innovation*, Copenhagen: Gyldendal Public.
- Bekendtgørelse nr. 1309 af 18.12.2012 Affaldsbekendtgørelsen [Danish regulation number 1309, passed December 18, 2012, titled Waste Declaration]. Retrieved from Danish Government database: <https://www.retsinformation.dk/eli/ta/2012/1309>
- Berg, A. (2018, April 18). Ambassador Program at Tingbjerg [Personal interview].
- Bessant, J. (2005). Enabling Continuous and Discontinuous Innovation: Learning From the Private Sector, *Public Money and Management*, 25(1), 35–42.
- Bisgaard, A. (2018, April 12). Ambassador Program at Tingbjerg [Personal interview].
- Bovaird, T. (2007). Beyond Engagement and Participation: User and Community Coproduction of Public Services. *Public Administration Review*, 67(5), 846-860.
- Bracci, E., Fugini, M., & Sicilia, M. (2016). Co-production of Public Services: Meaning and Motivations. In Bracci E., Fugini M., & Sicilia M. (Eds) *Co-production in the Public Sector* (pp. 1-11). Cham: Springer.
- Copenhagen Academy of Business (KEA). (2012). Design, Bæredygtighed og Affaldsforebyggelse. Retrieved from university publication March 12, 2018: https://kea.dk/fileadmin/user_upload/Bibliotek/videncenter_3.0/pdf/Theme_Catalogue_-_Design_Sustainability_and_Waste_Management.pdf
- Dalgaard, H. (2018, April 12). Co-Creation and Waste at Vestforbrænding [Personal interview].
- Danish Government (2004, June 21). *Waste Strategy 2005-2008*. Retrieved from Danish Government report: <https://www2.mst.dk/udgiv/publications/2004/87-7614-249-3/pdf/87-7614-250-7.pdf>
- Danish Government (2013, August 14). *Denmark without waste: Recycle more-incinerate less*. Retrieved from Danish Government report: http://mfvm.dk/fileadmin/user_upload/MFVM/Miljoe/Ressourcestrategi_UK_web.pdf
- Danish Government, (2006, October). *Denmark's National Reform Programme: First Progress Report*. Retrieved from Danish Government report: <https://uk.fm.dk/publications/2006/denmarks-national-reform-programme>

- Danish Municipal Association (KL). (2015, March 12). What is Co-Creation?. Retrieved from government website: <http://www.kl.dk/Menu---fallback/Hvad-er-samskabelse-id176104/>
- Danish Municipal Association (KL). (2018a). Local Government Reform. Retrieved from government website February 04, 2018, <http://www.kl.dk/English/Local-Government-Reform/>
- Danish Municipal Association (KL). (2018b). Municipal Responsibilities. Retrieved from government website March 26, 2018, <http://www.kl.dk/English/Municipal-Responsibilities/>
- Dansk Affaldsforening. (2013, August) *The Danes' waste management, attitudes and values* [Report Summary in English]. Retrieved from DWA website: https://www.danskaffaldsforening.dk/sites/danskaffaldsforening.dk/files/media/documents/Publikationer/andre_rapporter/results_from_report_on_danes_waste_management.pdf
- Dansk Affaldsforening. (2017, May). Full Trash on the Circular Economy. Retrieved from DWA website: https://www.danskaffaldsforening.dk/sites/danskaffaldsforening.dk/files/media/documents/Publikationer/fuld_skrald_dansk-affaldsforening_web.pdf
- Dansk Affaldsforening. (2018a). About Danish Waste Association. Retrieved from DWA website: <https://www.danskaffaldsforening.dk/om-os/about-the-danish-waste-association>
- Dansk Affaldsforening. (2018b). Members of the Danish Waste Association. Retrieved from DWA website: <https://www.danskaffaldsforening.dk/om-os/medlemmer>
- Dansk Affaldsforening. (2018c). Public-Private Cooperation. Retrieved from DWA website: <https://www.danskaffaldsforening.dk/politik/offentligt-privat-samarbejde>
- Dansk Affaldsforening. (2018d). The Green Thread: Simply and Better Garbage Sorting. Retrieved from DWA publication: https://www.danskaffaldsforening.dk/sites/danskaffaldsforening.dk/files/media/dansk_affaldsforening_dengroennetraad_web_2018.pdf
- Dansk Affaldsforening. (2018e). UN World Goal. Retrieved from DWA website: <https://www.danskaffaldsforening.dk/politik/fns-verdensmaal>
- Dare2. (2013, August) *The Danes' waste management, attitudes and values: Quantitative analysis carried out for Danish Waste Association*. Retrieved from digital report: https://www.danskaffaldsforening.dk/sites/danskaffaldsforening.dk/files/media/documents/Publikationer/andre_rapporter/danskernes_affaldshaandtering_holdninger_og_vaerdier_-_web.pdf
- Davies, H., Nutley, S., & Smith, P. (Eds.). (2000). What Works? Evidence-based policy and practice in public services. Bristol: *The Policy Press*.
- Ellen MacArthur Foundation. (2017). *Circular Economy Overview*. Retrieved from Foundation website February 24, 2018, <https://www.ellenmacarthurfoundation.org/circular-economy/overview/concept>



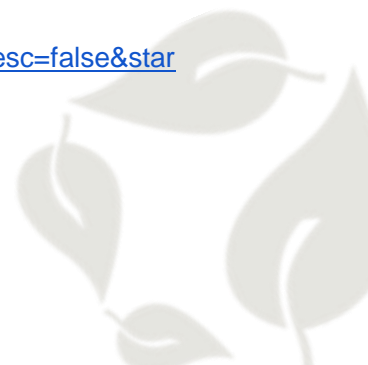
- Engage2020. (2014). *Engage2020 - Engaging society in 2020*. Retrieved from Engage2020 website: <http://engage2020.eu/home/>
- Engberg, J. (2018, April 9). IKEA Partnerships with the Danish Waste Sector [Personal interview].
- European Commission. (2010). *Europe 2020 Strategy*. Retrieved from EU website: https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-economic-governance-monitoring-prevention-correction/european-semester/framework/europe-2020-strategy_en
- European Commission. (2014). *Horizon 2020*. Retrieved from EU website: <https://ec.europa.eu/programmes/horizon2020/en>
- European Commission. (2017a, January 26). *Implementation of the circular economy action plan*. Retrieved from EU website: http://ec.europa.eu/environment/circular-economy/implementation_report.pdf
- European Commission. (2017b, January 26). *The role of waste-to-energy in the circular economy*. Retrieved from EU website: <http://ec.europa.eu/environment/waste/waste-to-energy.pdf>
- Eurostat. (2016, August 11). *Generation of municipal waste per capita*. Retrieved from online database February 23, 2018, http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=cei_pc031&plugin=1
- Fors A/S. (2018) In *Facebook* [Company page]. Retrieved April 23, 2018, from Company Facebook Page: <https://www.facebook.com/fors2016/>
- Glostrup Forsyning. (December 21, 2015). Home [YouTube Channel]. Retrieved from Company YouTube Channel: <https://www.youtube.com/channel/UCQgjEDKwOv06NARflxmnV4g>
- Handy, C. B. (2003). *The Age of Unreason*. Boston, MA: Harvard Business School Press.
- IKEA. (2013). Affaldshjælp. Retrieved from company website: https://www.ikea.com/ms/da_DK/rooms_ideas/how_to/affald.html
- IKEA. (2017). *Life at Home: Beating the Battles*. Retrieved from IKEA publication: http://lifeathome.ikea.com/home/images/LIFE_AT_HOME_2017.pdf
- Katzen-Mark. (2017). *Lån en Affaldsguide*. Retrieved from Katzen-Mark website: <https://www.katzenmark.dk/lan-en-affaldsguide>
- Kørnøv, L., Hill, A. L., Busck, O., & Løkke, S. (2016, October 19). Liberalization in the Danish waste sector: An institutional perspective. *Waste Management & Research*, 34(12), 1201-1209. doi:10.1177/0734242X16671799
- Lakhan, C. (2015). A Comparison of Single and Multi-Stream Recycling Systems in Ontario, Canada. *Resources*, 4(2), 384–397. doi:10.3390/resources4020384
- Lauritsen, S. (2018, March 19). Social Media Review at Glostrup Forsyning [Personal interview].



- Lindegaard Juul, K., & Bedsted, B. (2017, November). OPIN Guidelines for Youth Engagement. Retrieved from online report: https://opin.me/documents/2/OPIN_guidelines_web.pdf
- Mickoleit, A. (2014), "Social Media Use by Governments: A Policy Primer to Discuss Trends, Identify Policy Opportunities and Guide Decision Makers", *OECD Working Papers on Public Governance*, No. 26, OECD Publishing, Paris. <http://dx.doi.org/10.1787/5jxrcmghmk0s-en>
- Mills, A., & Plangger, K. (2015). Social media strategy for online service brands. *Service Industries Journal*, 35, 1-16. 10.1080/02642069.2015.1043277
- Misfeldt, L. (2018, March 24). Co-Creation for Waste at Katzen-Mark [Personal interview].
- MOD Institute, & The Next Network. (2015). *NextBengaluru*. Retrieved from university website: <http://gatishil.nextbangalore.com/#start>
- Muller, M., & Hoffman, L. (2011). *Community Partnerships in Integrated Sustainable Waste Management*. Retrieved from online report: http://www.waste.nl/sites/waste.nl/files/product/files/tools_compart.pdf
- Naboskab. (2018, January). *Københavnernes hverdagspraksis og flow* [Report]. Retrieved from Naboskab website: http://naboskab.dk/wp-content/uploads/2018/03/Rapport_Københavnernes-Hverdagspraksis-og-Flow_Naboskab_Januar2018-2.pdf
- Nambisan, S., & Nambisan, P. (2013). Engaging Citizens in Co-Creation in Public Services: Lessons Learned and Best Practices. *IBM Center for The Business of Government*. Retrieved from online report: <http://www.businessofgovernment.org/report/engaging-citizens-co-creation-public-services>
- NAO. (2016). What are third sector organisations and their benefits for commissioners? Retrieved from government website: <https://www.nao.org.uk/successful-commissioning/introduction/what-are-civil-society-organisations-and-their-benefits-for-commissioners/>
- Nielsen, J. (2018, April 12). Ambassador Program at Tingbjerg [Personal interview].
- OECD, P. (2011). Together for better public services: partnering with citizens and civil society. Retrieved from online book: https://www.oecd-ilibrary.org/governance/together-for-better-public-services-partnering-with-citizens-and-civil-society_9789264118843-en
- Ostrom, V. (1972, December). Theory of Public Policy. *Policy Studies Journal*, 1(2), 64-66. <https://doi.org/10.1111/j.1541-0072.1972.tb00066.x>
- PE2020. (2014). PE2020 - Public Engagement Innovations for Horizon2020. Retrieved from PE2020 website: <https://pe2020.eu/about/>
- Perry, K. A. (2010). Innovation in the 'Public Sector': putting it into Perspective. Retrieved from university publication: [https://www.ucviden.dk/portal/en/publications/innovation-in-the-public-sector\(b8e7d375-682d-4967-aaa5-66c5cb12c241\).html](https://www.ucviden.dk/portal/en/publications/innovation-in-the-public-sector(b8e7d375-682d-4967-aaa5-66c5cb12c241).html)



- Pestoff, V. (2006, December 14). Citizens and co-production of welfare services. *Public Management Review*, 8(4), 503-519, doi: 10.1080/14719030601022882
- Pestoff, V. (2009, May 18) Towards a Paradigm of Democratic Participation: Citizen Participation and Co-production of Personal Social Services in Sweden. *Annals of Public and Cooperative Economics*, 80(2), 163-344, doi:10.1111/j.1467-8292.2009.00384.x
- Pluart, J. L. (2016). *Ikea Highlights 2016 - Secret Innovation Lab Revealed*. Retrieved from IKEA website: https://www.ikea.com/ms/en_US/this-is-ikea/ikea-highlights/IKEA-secret-innovation-lab/index.html
- Simon, J. M. (2014, January 27). *(The story of) Denmark's transition from incineration to Zero Waste*. Retrieved from publication: <https://zerowasteurope.eu/2014/01/the-story-of-denmarks-transition-from-incineration-to-zero-waste/>
- Stokebbo, S. (2018, April 6). Social Media Review with Arwos [Personal interview].
- Tankegang. (2016, August 18). FORS tester nye spande til køkkenet. Retrieved from Tankegang website: <https://www.tankegang.dk/fors-tester-nye-spande-til-kokkenet>
- Toft, R., Lindholt, E., & Sørensen, A. (Eds.). (2017, August). Waste Statistics 2015, *The Danish Environmental Protection Agency*, 4-9, 18-20. Retrieved from government report: <https://www2.mst.dk/Udgiv/publications/2017/08/978-87-93614-20-8.pdf>
- Toftegaard, N. (2018, Apr. 10) Pictograms for Better Waste Sorting [Personal Interview]
- Undervisnings Ministeriet. (2018). *EMU Danmarks Læringsportal*. Retrieved from government website: <https://www.emu.dk/omraade/gsk-laerer/ffm/naturteknologi/3-4-klasse/modellering-obligatorisk>
- US EPA. (2017). Municipal Solid Waste. Retrieved from government website from: https://cfpub.epa.gov/roe/indicator_pdf.cfm?i=53
- Vestforbrænding. (2018). *Hvem er formidlingscentret?* Retrieved from Vestforbrænding website: https://www.vestfor.dk/Viden-og-laering/Hvem_er_formidlingscentret
- Werliin, R., & Kokholm, M. (2016). *Device Study 2016: Social Media Across the Nordics*. Retrieved from report: https://www.audienceproject.com/wp-content/uploads/study_social_media_across_the_nordics.pdf
- World Bank. (2018a). *Strategic Framework for Mainstreaming Citizen Engagement in World Bank Group Operations*. Retrieved from report: <http://documents.worldbank.org/curated/en/266371468124780089/pdf/929570WP0Box380atagicFrameworkforCE.pdf>
- World Bank. (2018b). *Urban Population*. Retrieved from database: https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?end=2016&name_desc=false&start=2006



APPENDICES



Appendices

Appendix A – OPIN Guidelines for Youth Participation

The OPIN is an initiative supported under the EU’s Horizon2020 project, between March 2015 and March 2018. Although the project has concluded, the results and findings are still available online to serve as a resource for others who are trying to engage with youth audiences. The OPIN is an all-in-one online toolbox for youth eParticipation projects that focuses on three stages: Tools, Tips, and Support. The OPIN provides easy to use software for citizens to initiate their own co-creation practices and a set of guidelines on how co-creating can be done.

OPIN proposes **seven basic principles for Youth Engagement**: Early involvement, transparency, genuine influence, match of expectations, diversity and quality of information, practical organization of the participation process, and opportunities for the youth to deliberate.

Communication Channels and the Citizens they Reach

Adapted from: OPIN Guidelines

		Target Groups			
		Young People	Decision Makers	Media	General Public
Means of Communication	Facebook	X	X	X	X
	Youtube	X	X	X	X
	Instagram	X			X
	Websites		X	X	
	Press Releases		X	X	
	Newspaper		X	X	X
	Workshops	X	X		
	Flyers	X		X	
	Merchandise	X			
	Project Launch	X	X	X	X

OPIN proposes **five methods to recruit young people**: face-to-face recruitment, peer-to-peer approach, send invitation letters, recruit by telephone, use social media and other websites.

Source:

Lindegaard Juul, K., & Bedsted, B. (2017, November). *OPIN Guidelines for Youth Engagement*.

Retrieved from the OPIN Website https://opin.me/documents/2/OPIN_guidelines_web.pdf



Appendix B – 57 Methods for Citizen Engagement by Engage2020

- **Engage 2020 eAnthology:** The eAnthology is a collection of all findings by the Engage 2020 team that includes methods of engaging citizens, practical examples, and best practices. Additional information can be found on the eAnthology page of the Engage2020 website cited below
- **Action Catalogue:** The Action Catalogue is a supplement to the eAnthology presented by Engage2020. The catalogue provides a detailed list of 57 different methods to engage with citizens and the different factors that organizations using co-creation must take into account when selecting a specific method to solve a problem. Additional information, such as definitions of terms and explanations of methods, can be found on the Action Catalogue website cited below.

Co-creation methods/mechanisms by the Engage2020 project

1. Action Research	21. Delphi method	41. Participatory Sensing, Volunteer Sensing, Citizen Observatory
2. Challenge Prizes	22. Democs card game	42. Participatory Strategic Planning
3. Charrette	23. Distributed Dialogue	43. Perspective Workshop
4. Citizen compass	24. E-conference	44. Q methodology - stakeholder selection
5. Citizen Science	25. Focus Groups	45. Reflexive Interactive Design
6. Citizen juries	26. Future Panel	46. Resource Flow Map (RFM)
7. Citizens' summit	27. Future Search	47. Scenario Workshop
8. Citizens' Assembly	28. Future workshop	48. Science Shop
9. Citizens Hearing	29. Group Delphi	49. "From Question of a CSO to a Research Question"
10. Citizen Visions on Science, Technology and Innovation (CIVISTI)	30. Hackathon	50. Integration of civil society driven research in university curricula
11. Civic dialogue	31. Interdisciplinary Work Groups	51. Needs Survey among CSOs
12. Community-Based (Participatory) Research (CB(P)R)	32. Integrated Assessment Focus Groups, Participatory Integrated Assessment (PIA) with computer models	52. Science Café
13. Consensus Conference	33. Interviews	53. Science Theatre
14. Crowd Wise	34. Knowledge Atelier	54. Serious Gaming
15. Science week	35. Mass Experiment	55. User committee
16. Deep Democracy - The Lewis Method	36. Multi Criteria Decision Analysis (MCDA)	56. World Café
17. Deliberative Mapping	37. Neo-Socratic Dialogue (NSD)	57. World Wide Views (WWV)
18. Deliberative (Mini-publics) Workshops	38. Open Space Technology	
19. Deliberative online forum	39. Participatory Budgeting	
20. Deliberative Poll (Deliberative Polling®)	40. Participatory Design	

Sources:

The Engage2020 Consortium (2015, October). *Engage2020: Science, Society and Engagement- An e-anthology*. Retrieved from the Engage2020 Website

http://engage2020.eu/media/Engage2020_withVideo.pdf

Louise Jørgensen, M., & Larsen, G. (2015) *Engage2020 Action Catalogue*. Retrieved from the Action Catalogue Website <http://actioncatalogue.eu>

Appendix C – Summary of Interview with Sofie Lauritsen of Glostrup Forsyning

In preparation for the interview, our sponsor provided us with preliminary background information on the company and a list of related projects to help formulate our questions. The following is a summary of the information gathered from our semi-standardized interview with Sofie Lauritsen of Glostrup Forsyning, a multi-utility company that effectively utilizes social media to engage with customers and has completed several projects using co-creation.

General Facebook

Sofie gave a presentation highlighting different scenarios she has encountered while using Facebook as a tool to engage with customers. One use of posts is to keep the public up to date with routine tasks to show the public they are hard at work. She used an example of a wastewater collection site being cleaned, where she posted a picture of a person using a machine to clear the sludge. This post received positive comments primarily from the worker who cleaned it which provided some funny banter and good publicity. Another use of posts is to describe a big project that may have stimulated some controversy, in order to provide a platform for comments or concerns. She used an example where she posted pictures and information about a project that was using residual heat from a Fur Coat Factory to heat homes. The post highlighted the benefits, which in this case was the 24,000 GJ of heat added to the system from the factory would heat 1000 homes. The post received positive comments and indicated the project was well received by the public due to the increase in heat and diminished costs. Sofie also used the Fur Coat Factory example to demonstrate how posts can become political, and the strategy used to maintain a good image. A local politician began questioning on Facebook the allocation of the heat captured, because the project was described as heating 1000 homes but the heat was actually going to five large business. The company's reply posts had to be tailored to each response and approved by Sofie's boss, as the company cannot take a political stance or say something that could be used in political agendas. She noted the polite responses kept the company in good standing with the public and answered the politician's questions. The company also uses private messages to engage with customers. This form of communication is often used when customers have specific concerns (uncollected waste, rats, etc). If the issue can't be resolved through Facebook, the customer will be directed to Glostrup Forsyning's app to input a formal request. Private messages are also used when customers have suggestions or ideas, but the company can't act on those changes without approval from the municipality, so the customers are then directed to contact their local government official.

Waste Sorting Project

Sofie described a project in which co-creation was successfully used to increase the number of waste fractions customers were required to sort, while describing the process she used to begin the co-creation process and also the results. She began by recruiting the participants, and to do so the company paid for a sponsored ad on Facebook, from which a 200 home association (apartments/condos) agreed to participate, and also the company paid for 2-3 ads in the local paper, from which 100 individual homes agreed to participate. Recruiting was capped at 300 homes, and the short time frame in which they reached that number indicated the advertising was successful. A secondary survey was completed at the initial meeting to learn by what method individuals *initially learned* of the project (not signed up for it), and the results showed it was roughly 50% Facebook ads and 50% local ads, with 116 of the 300 homes responding. Once there were enough participants, Sofie initiated the project, and also set up different ways for people to communicate amongst each other and with the company. A Facebook group was created for the 300 homes participating with announcements and scheduling information, and also ways for participants to communicate any trouble they are having with the new system. This form of communication proved most effective for the 100 individual homes. Flyers with announcements and scheduling information were distributed to each of the 200 homes in the association, which proved more effective than just the Facebook group because there was a single person spearheading the distribution, and the physicality of the flyer was a good reminder. This method was only practical due to the small area that these homes occupied but was not practical for the 100 individual homes that were spread out. The project resulted in a high participation rate, while also showing that the system would function better if the company increased the frequency of collection from every 4 weeks to every 3 weeks. The success of the project led to the full scale implementation of the new sorting system in Glostrup, where approximately 7000 new systems were distributed and only 7 systems were returned, which indicates a high acceptance rate in the community. The Facebook page is still unofficially active with the test project participants, and it serves as a platform for the members to discuss waste sorting questions and give each other advice (with confirmation from Sofie). Two years after the study, Sofie has begun checking in on customers to make sure the new system is still working as it should.

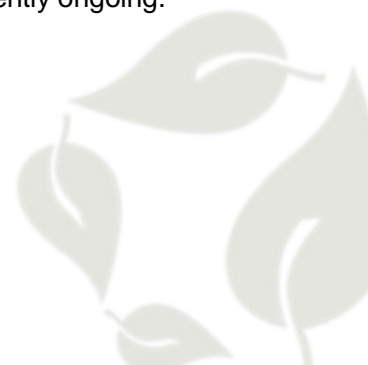
Waste Water Project

Sofie described a project in which co-creation was successfully used to prevent wastewater back-ups from the system into people's homes. She described how the company was approached with this issue by customers living on a particular street that had recurring issues with their wastewater backing up into their basements. One customer took the lead for the neighborhood and emailed the company directly, which led to Sofie meeting with the customer at their home to better understand the issue. After the site visit, she determined the street to be suitable for testing because it was at

the top of the hill, and therefore only that street's waste water would be a factor. The solution to the technical problem was a valve that diverts the rainwater from the system to people's gardens during heavy rainfall. Catherine Leth, a customer who had experienced similar issues and also works for another utility company, came up with the design and tested it in her own neighborhood (not Glostrup). The technical solution coming from a customer shows the value that can be gained from consumer input. Sofie then took the product and implemented a pilot program for the street, and set up means of communication for the duration of the project. A Facebook group with the participants on that street was made to allow them to communicate with each other and also find information provided by the company. The page was filled with a lot of basic information based on questions Sofie assumed would be asked, and the page also stressed that this was strictly a test because their street did not receive priority for environmental projects based on the Climate Adaption Initiatives. The page also had a platform for people to ask questions and discuss issues they may be having with the system. Other forms of communication that were used in this project was SMS, which was useful because a reminder to all participants could be sent in a single text, and also flyers, which were practical because it was only one street and it was easy to go door to door with information. The project is still ongoing but is so far well received.

Redesigning of Sorting Station

Sofie described a project in which ideas for redesigning the town's sorting station were inspired by similar projects in other municipalities where co-creation was used. The new design will create more space in the sorting station, implement a new layout of bins, and have an updated electronics and hazardous waste areas. The designer has worked on similar projects, and was successful in the optimization of other sorting stations which took user feedback into consideration. The renovations are causing the temporary shutdown of the station, meaning customers are required to bring their waste to other facilities. Sofie's role is to ensure effective communication before and during the redesign in order to minimize the disruption the project has on the community. She ensured that suggestions of where to redirect trash were posted on the company's Facebook page and LinkedIn, signs were put up around the sorting station, and she sent in an article to the local paper. The goal of this was to reduce any confusion when customers are first trying to figure out what to do with their waste. A unique method they used to engage with people about the project was to create a 360 degree view video of the new recycling station was made that was viewable with Virtual Reality Headsets. They had the video on display at a Cultural Night and also the Annual Festival, and the new technology attracted a new, younger audience to the project. The redesign is currently ongoing.



Platforms for Engaging Customers

After all the separate cases were discussed, Sofie generally talked about how she uses each platform of engagement. This gave us an idea of the distinctions between each platform. She discussed how she uses Facebook to post current information and projects on the main page to stay relevant and create publicity, to post videos and testimonials related to utility use so customers can learn from them, to create groups for specific projects so people can collaborate with each other and the company (Sofie), and to deal with comments and concerns customers have when they post them on the companies wall. The content and language of posts on Facebook are tailored towards the everyday citizen. Sofie uses LinkedIn similarly to Facebook to post current information and projects on main page to stay relevant and create publicity, but instead the content and language is tailored to professionals (i.e. more technical wording, more graphs, etc). Sofie uses Youtube to post videos and testimonials to help customers with their utilities, and the Youtube channel typically has the same videos as the Facebook page except with fewer views (Facebook is more popular). The company website has all information about the company and services offered by the company, and also provides a platform for complaints/reports. The company also has an app for their waste water and waste utilities. With the Wastewater App, users can track their water usage down to the hour, which can influence their behavior in attempts to save money and also indicate an issue, such as a leaky pipe or running toilet. With the Waste Collection App users can gather any information regarding the collection of their waste (pick up schedule, sorting information, recycling center hours, etc), and also find a platform to report uncollected waste. Sofie often takes advantage of Cultural Nights or Annual festivals because of the opportunities to engage with a large population in a setting that is not just about waste. At these events, the company will set up a stand with displays about the company and their services, have interactive demos/ activities to engage younger audiences, and also talk to as many people as possible. By starting conversations the company is taking the first step of engaging with people who do not necessarily want to talk about waste.

Communications Group

Sofie described a group she formed of some of her colleagues to collaborate on ways to engage with their customers. It was created from her realization that being isolated in a company as the only person in charge of marketing really limits her capabilities. The group is comprised of 12 members across 10 utility companies, many of which only have 1 communications employee. The companies vary in size and service, which provides a large scope of potential ideas. The group meets 3-4 times per year to discuss new ideas in communications and learn from the successes of the others.

Appendix D – Summary of Interview with Stinne Stokkebo of Arwos

In preparation for the interview, our sponsor provided us with preliminary background information on the company and a list of related projects to help formulate our questions. The following is a summary of the information gathered from our semi-standardized interview with Stinne Stokkebo of Arwos, a multi-utility company that effectively utilizes social media to engage with customers and has completed several projects using co-creation.

General Discussion about Arwos

Stinne began by telling us general information about Arwos and the citizens they service in Aabenraa Kommune. Over the past 15 years, Arwos has focused on changing their mindset to be more service oriented when dealing with citizens. Part of this shift is the hiring of employees with personal skills and non-technical backgrounds, such as a school teacher who now facilitates tours of the waste facility and a journalist who manages their Facebook page. The company regularly uses Facebook, YouTube, and SMS to reach citizens, and the most common content they post are updates on recent activities, Facebook surveys, and technical videos. Along with these forms of interaction, Stinne also conducts workshops when changes are happening to the waste management system. She mentioned how Facebook allows citizens to contact them any time of day, not just regular business hours, and this makes it seem as if they were open 24/7. Facebook is also primarily used to engage adults through wall posts and surveys about their services.

Understanding their Citizens

Stinne recognized the importance of understanding the citizens, so Arwos hired an outside research company to conduct a Gallup Kompas analysis of the citizens of Aabenraa, which involved intensive ethnographic studies. The study mapped the citizens' behaviors and attitudes into 7 different personas that fell on two scales: from socially concerned to self-concerned, and from traditional to modern. The results indicated the citizens of Aabenraa are primarily self-concerned and traditional. Stinne also explained how their residents tend to be much less environmentally concerned and more old fashioned than residents of cities like Copenhagen. She claims this is an advantage for the company because citizens will do the environmentally responsible options for waste sorting as long as Arwos makes the system easy for them to use.



New Communal Recycling Bins

Stinne described a project where Arwos implemented new communal recycling bins in the municipality. Consumers were complaining about how long it took to insert bottles and cans into the receptacles, so Arwos tried testing a new bin that made it easier. It was important for Arwos to receive feedback regarding to new bin, so Stinne put stickers and signs on and around the bin acknowledging that the bin may not be perfect, and that Arwos wanted the citizens' feedback on how well it worked. The contact information to provide feedback was the email of Stinne, the head of the waste management division, and she claimed this provided insightful feedback and made people feel special talking to someone of importance in the company. The overall response from the community was positive, and this led to a full implementation in the municipality.

New Municipal Waste Plan

With the waste management strategy for the next 6 years being voted on next year, Stinne has been working to involve citizen input in the strategy. She described her last attempt at simply using a survey to involve citizens in the waste plan, and noted its failure was due to its very philosophical nature which caused the feedback from citizens to be broad and confusing. In the hopes of getting more concrete feedback, she conducted a workshop with people of various backgrounds in the community. To recruit participants, she sent direct invitations to people in the community, which she claims helped create a personal interaction that made people more inclined to participate. During the workshop, Stinne provided the participants with the necessary background information to make informed decisions regarding waste management. The workshop addressed concerns such as what is properly recyclable, the environmental impacts and costs of waste management, and also included a life cycle analysis of new ideas to determine what matters the most to the participants. Part of what Stinne learned was people cared that waste management solutions are "easy and proper". The results of the workshop were extremely positive, and Arwos included almost all of the citizen input into the proposed new waste plan.



Appendix E – Summary of Interview with Henrik Dalgaard and Allen Laumann of Vestforbrænding

In preparation for the interview, our team investigated a specific co-creation example that Vestforbrænding co-sponsored in 2012. Our team reviewed online publications of the co-creative program and familiarized ourselves with the report that was published on the main findings and conclusions of the project. Our team also spoke with our sponsor, the Danish Waste Association to gain a better understanding of the structure of Vestforbrænding and both the services the company offers and the customer base that the company services. All of our team's preliminary research helped us to formulate questions for the interview. The following is a summary of the information gathered from our semi-standardized interview with Henrik Dalgaard and Allan Laumann of Vestforbrænding, the largest waste company in Denmark.

The Contentious Nature of the Danish Waste Sector

Following Henrik's presentation of his personal background with Vestforbrænding, he spoke about the Danish waste sector in general and specifically highlighted the contentious nature of it. Henrik reaffirmed for our team that when recycled and processed, waste is treated as a commodity and with Vestforbrænding acting as one of the few waste companies within Denmark that deals with the processing and sale of recyclable materials, they deal with a financial side of waste that most other Danish waste companies do not. Henrik did mention that despite there being a great deal of money in waste, Danish waste companies are structured in a way that they are non-profit organizations. The non-profit nature of Danish waste companies creates a system where any profit margins made by waste companies must be spent within the sector itself. Funds gained from waste cannot be used to build a new school for example, but rather must either used to lower fees for residents or somehow reinvest back into the waste system. Henrik explained that with waste comes a great deal of political entanglement. With Danish waste companies being owned by municipalities or municipalities handling waste services to their residents themselves, Henrik explained how the waste sector in Denmark is very much a political entity, and how this creates a large amount of controversy within the waste sector.

Examples of Co-Creation

Henrik spoke briefly of several co-creation projects that Vestforbrænding had conducted in the past. Although not a great amount of detail was specified, Henrik mentioned how Vestforbrænding had attempted to work with young people in the past to solve an issue of having flies infest organic waste when it was sorted. Henrik explained that ideas were formed by young residents in attempts to solve the proposed issue, however no practical solutions were found.

Henrik also spoke about a campaign that Vestforbrænding had launched on their website; offering a prize as an incentive to the “most effective and original ideas.” The campaign encouraged residents to share images of how residents personally sorted waste within their homes. Henrik explained that the purpose of this project was to gather new ideas of inventive ways to sort residential waste *within* residents’ households. Henrik admitted that while this initiative was fun, it was very down-to-earth and the results of it were not very helpful. Employees at Vestforbrænding quickly saw that although the campaign warranted participation, none of the submitted photos highlighted anything creative or realistic to be implemented to a wide variety of Vestforbrænding’s residents. Henrik reaffirmed the fact that people are all individuals and solutions that they came up with themselves are very often specifically tailored to their own individual needs and not useful for others to learn from.

Limitations of Co-Creation

Following his explanation of several co-creation projects Vestforbrænding has participated in throughout the years, Henrik led into the various limitations that he felt existed with co-creation. Firstly, concerning trial-runs and their use when implementing new sorting fractions for example, Henrik mentioned how they are simply a tool to buy time and despite their success, the initiative they are piloting will still go live to the general public eventually due to the political inclinations behind these initiatives. Henrik also spoke on how ideas for improvements to the waste sector are generally not “innovative.” He argued that with the diversity of waste companies within Denmark, with any “new idea,” another municipality has almost always already tried it. Or in other words, “we aren’t learning anything new.”

A concept that Henrik touched on when speaking through some of the co-creation examples Vestforbrænding has been involved with in the past is that of the impracticality of new ideas. Henrik particularly highlighted how ideas that Vestforbrænding received from residents during their co-creative projects lacked a very significant knowledge on the practicalities of the waste sector. Although Vestforbrænding gathered many different ideas and suggestions, Henrik was very clear that over the 15 years that he had been working for Vestforbrænding, not a single useful idea was collected from a resident. Henrik spoke about how even with creative and inventive ideas, residents never thought about the practical side of things concerning finances of their ideas, the implementation of them, or having to sell them to the political arena that Henrik previously highlighted. Henrik summed up his claims by explaining that residents are simply not designers. Although they may know what works best for them personally, there is a lot of oversight that residents do not pay attention to when formulating and providing new ideas to companies.

Vestforbrænding Looking into the Future



When asked about what areas Vestforbrænding needed ideas in the future, Henrik was able to offer up some suggestions. He mentioned that communications was a large area for investigation at the moment. In particular, Henrik identified recycling stations as a specific area that could benefit from having more effective communication. He brought up that Vestforbrænding was concerned with where the “right places to put signs were” given that from their research, Vestforbrænding had found that most residents didn’t pay any mind to pictograms or signs, but rather simply looked into the bins to see what was already in each fraction at the sorting station. Henrik brought up the idea of nudges as it related to the location of bins at sorting stations, mentioning that the most ideas options for sorting should be easier and closer to the entrance than less desirable locations.

In addition, Henrik mentioned that in an ideal world, finding a more optimized household bin design is something that Vestforbrænding is interested in. Being able to make bins cheap, durable, and aesthetically pleasing is something that Vestforbrænding has been trying to do for a while, and something that they will continue to investigate into the future.

Closing Remarks on Co-Creation

To conclude his portion of the interview, Henrik made a few final remarks about the concept of co-creation and his personal view on the topic. He mentioned how at a corporate level, it is at times quite difficult for Vestforbrænding to blindly engage with their residents’ ideas and input. Henrik noted that it is hard for a company such as Vestforbrænding to take risks when it comes to their strategies and the things that they implement. Henrik summed his thoughts up nicely when he mentioned that Vestforbrænding serves the purpose of dealing with Denmark’s waste: they are not paid to be inventors.

When asked if he felt that Vestforbrænding and Danish waste companies in general were asking too much of their customers with a waste system and sorting system that were too complex, Henrik argued that was not the issue. He explained that despite the many intricacies of the Danish waste sector, the process in general was not something that was too complex for average Danish residents to engage with. He noted that education on this system was not the answer of how to produce more engagement and better sorting, but rather that unfortunately, with the way the system is set up, the few can quickly ruin the system for the many with poor sorting habits.

Immediately following our team’s interview with Henrik, we spoke with Allan Laumann, the head of Vestforbrænding’s Communications Department. The following is a transcription of the main topics of conversation during our team’s interview with Allan.

Vestforbrænding’s Educational Opportunities



Allan spoke about Vestforbrænding's many initiatives they use to engage and educate children within the municipalities that Vestforbrænding services. Allan informed us that there were over 300 schools among the 19 municipalities that own Vestforbrænding. With multiple age groups of children that their programs cater to, Allan highlighted the continual increase in student population that Vestforbrænding engaged with in the past few years. Educating around seven classes of 25 students each day, Allan projected that in 2018, Vestforbrænding would be able to reach around 25,000 students, with that figure only growing to 30,000 students in 2019. Further along in the interview, Allan offered our team the opportunity to tour the facilities that Vestforbrænding had on site to offer to their resident population.

Acknowledging the incredible resources that they had available to them, Allan spoke of Vestforbrænding's 10 million DKK annual budget dedicated to educational programs. Much larger than the budget most other Danish waste companies have available, Allan spoke of the opportunities this budget allowed his company.

Youth Engagement Co-Creation Example

When discussing youth engagement, Allan highlighted a project that Vestforbrænding was currently working on. He explained to us how Vestforbrænding had partnered with a famous Danish YouTuber in order to develop a short series of videos relating to waste. Using the established crowd appeal that this YouTuber already possessed, Vestforbrænding planned to target the videos towards a younger audience. Allan spoke about how the videos were to be distributed to individuals only while they were physically at one of Vestforbrænding's recycling stations through the use of an app or a code that people could scan. Allan explained that the purpose of the videos would be to briefly educate individuals about specific parts of the waste system that needed improvement and to solicit response videos made by school children that would be watching the videos in which children would offer up their ideas for improving whatever was described to them.

Allan highlighted that a large part of the YouTuber competition was to take advantage of the fact that children are very impressionable. Telling children "this is the right way to do something" is typically enough to warrant proper behavior out of them, especially so when it comes to their interactions with their waste. Furthermore, Allan spoke of the opportunity that educating children had in order to encourage them to act as ambassadors to their parents when it came to household waste and sorting habits.



Appendix F – Summary of Interview with Henriette Jensen of Renosyd

In preparation for the interview, Henriette provided our team with a brief understanding of Renosyd's current customer outreach strategies and newly formed social media. Our team reviewed Renosyd's social media pages prior to the interview in order to formulate preliminary background information on the company and create a list of more specific questions. The following is a summary of the information gathered from our semi-standardized interview with Henriette Jensen of Renosyd, a waste company that has a newly formed communications branch and is in the process of investigating the use of social media to engage with customers.

Renosyd's Dual Usage of Facebook

Henriette began the interview clarifying how management at her company, Renosyd, had just begun to invest resources into a communications branch, with Henriette being the first and only employee dedicated to customer outreach and relations. Along with the prior lack of employees within Renosyd dedicated to customer engagement, Henriette informed us that before she had been hired to the company in December of 2017, Renosyd rarely used social media to interact with their customers. As a result of her hire, Henriette informed us that in addition to Renosyd's existing corporate Facebook page, she was in the process of developing a secondary "brand" Facebook page through which she hoped would be able to foster a more interactive environment with customers. Henriette highlighted a social media page currently in use in the Aarhus municipality that she explained was effective at serving as an educational tool for residents of the municipality about their waste and their role in sorting it. Henriette informed us how she had drawn inspiration from Aarhus's Facebook page and explained how it had successfully broken down the barrier of being perceived as a "corporate page." She argued the Facebook page had been successful due to the amount of customer engagement it had produced; effectively generating comments and discussion among residents. Henriette made clear throughout the interview the importance of removing the "corporate title" associated with communications that companies deliver. Henriette argued things such as creating a secondary Facebook page more dedicated to comfortable customer communications rather than corporate announcements and communications of the sort were more effective in warranting replies and leading to discussion with residents - as was the case in Aarhus.

Renosyd's App and the Importance of Uniform Communications

Henriette informed us of a mobile app that members of Renosyd had developed along with contributors from five other municipalities that her company currently uses for the dissemination of announcements to their customer base. Henriette explained how this app was something that she

was giving more attention to during her role in communications along with her company's social media pages. She explained that out of the 80,000 residents that Renosyd services, only around 8,000 currently used the app that Renosyd offers. Discussion of the app and Henriette's desire for more customers to use it brought up an interesting point concerning uniform communications. Henriette spoke about how the area Renosyd services covers a very diverse population - from apartments to individual homes to summer houses - and how with the diversity in housing also came a diversity in customers. Due to the great amount of diversity, Henriette stressed the importance of having a uniform platform on which all of Renosyd's customer base could be reached so that accurate information could be consistently disseminated to residents and all populations could be engaged with through one venue. Henriette spoke of her desires to have either the Facebook page she was developing or the app that her company had helped to develop serve as a uniform method through which all of Renosyd's customers could be reached. A notable quote from the interview concerning uniform communications was: "Without a communications department, there is no continuity among what information is delivered."

Additionally, Henriette informed us of the future plans for Renosyd's app. She informed us that currently the app is only being used for unidirectional communications: from Renosyd to residents. Henriette told us that there were plans to further develop the app to enhance its functionality in the future to be a place where feedback, questions, or ideas could be submitted by residents to be delivered to Renosyd. Future functionality of a feedback system would allow the app to serve as a fully functional co-creation tool.

Advice from a New Communications Department

With Henriette being a relatively new addition to Renosyd's employee base and with her piloting the company's first communications strategy, we took part of the interview to speak with Henriette about considerations companies should keep in mind when first implementing customer outreach programs. Similarly to other interviews, Henriette highlighted the complexities that arise with any form of communications due to the waste sector's private-public nature. Henriette mentioned how her job of dealing with communications was complicated because Renosyd, along with all other waste companies, operate within a political arena. Due to the political entanglements that her company faces, Henriette spoke about how she had to run posts and comments by her directors prior to publishing them to make sure the message that she was communicating aligned with any potential underlying political agendas.



Appendix G – Summary of Interview with Niels Toftegaard of Dansk Affaldsforening

Through our time at our sponsor, the Danish Waste Association (DWA), we have learned a lot about the different projects and initiatives currently underway, as well as those which have previously been pursued by the Secretariat. The following is a summary of the information gathered from our interview of our liaison at the DWA, Niels Toftegaard, whose work in communications in the waste sector has proven invaluable to us and our project.

Common Waste Pictograms

Niels provided a formal introduction to the need for the project as well as the project itself and its current status.

Since the many waste companies of Denmark are their own municipality-run companies and often have other concerns like other utilities and municipal agendas, the idea of a national sorting system has not yet been developed even after the local government restructuring in 2007. Further, it is recognized that the many municipalities of Denmark do not all produce the same waste, and that different municipalities have different capabilities when it comes to dealing with waste - both of which resulted in various insignia, icons, and pictograms for the same kind of refuse. For example, the pictogram for metals was represented graphically in nearly 20 different ways. Such data for many of the different waste fractions was compiled as part of the project.

In order to gain a better understanding of the different actors involved and their respective needs for a pictogram scheme, the project was conducted in coordination with the Danish Association of Municipalities (KL), the Danish Environmental Protection Agency, as well as the design agency FUTU. To determine the level of opportunity, need, and analysis of cost for such a pictogram system, several waste companies, IKEA Denmark, a number of supermarkets, municipalities, and the Danish Consumer Council were consulted. Additionally, six workshops were held for the municipalities and municipal waste companies to go over integration of such a system, and comprehensive data were collected on all the different insignia used by the waste sector to show variance. A survey of the general public was also filled out by 2,500 people through promotion on Facebook and other platforms, and prototypes were made to be sent to a forum of the DWA members for debate and discussion.

The finalized pictograms were released in several stages. The first included 17 waste icons specific to household waste collection, and began in January 2017. The second stage consisted of 50 waste icons to be used at recycling stations in cities. These increased number of waste fractions allowed for greater acceptance and diversion of waste for that material brought to such centers. Future possibilities of the program include the diagrams being used on consumer product packaging bought

by customers. This concept was discussed with supermarkets in particular to get such labeling on the store branded products. Company resistance focused on lack of available space on the products themselves, production and implementation costs, and the certainty of the impact without such implementation on all consumer goods.



Appendix H – Summary of Interview with Marie Nielsen of The Green Embassy

In preparation for the interview, our sponsor provided us with preliminary background information on the organization and a list of related projects to help formulate our questions. The following is a summary of the information gathered from our semi-standardized interview with Marie Overgaard Nielsen of the Green Embassy, a municipal organization that effectively facilitates citizen led projects by acting as an intermediary between the citizens and the municipality.

Co-Create Aarhus

Marie gave a presentation on the municipal directive Co-Create Aarhus which was a plan to increase active citizenship in Aarhus where strategic focus to bring the community together by providing the tools and funding for projects that benefit the community and its members. The directive has two main goals: increase the livability of communities, and spread knowledge among the residents regarding the environment and how they can improve it. The directive sparked interest in three main categories of projects that benefit the community. Taste Aarhus projects focus on making community spaces “edible” and increasing natural harvesting. Clean Streets projects work to clean up communities by providing knowledge, funding, and tools for community members. City Outcomes projects aim to measure the successes of active citizenship through interviews and studying metrics before and after projects. As of 2017, the number of citizen directed projects has increased from approximately 20 projects per year to 40 projects per year, and the number of public events held in the square is up from 66 days in 2016 to 167 days in 2017. Other results that are being recognized are fewer sick days taken by residents, increases in physical activity, decreased loneliness, and a greater sense of community.

The Green Embassy and Community Engagement

Marie described what makes the Green Embassy accessible for people to come forward with new ideas and concerns they may be having and also what grabs people’s attention. She noted the building being one-of-a-kind and located in an area with heavy foot traffic in the city square gains a lot of attention. Also in nice weather, the doors are always open making it inviting for people to come in and talk. An employee will typically walk around and talk to citizens about upcoming projects or ideas they may have which helps generate interest in the building. They also hang up posters around the square and on the doors of the building with upcoming event information. This all creates a very personal atmosphere, making it easy for conversations between the municipality and the citizens to happen and generate progress for active citizenship



Some difficult groups to reach are people who may have a good idea, but don't feel comfortable making the first contact. The ways the Green Embassy gains attention above attract resourceful people in the community, but that is not where all the good ideas come from. The way they try to overcome this obstacle is through contact on the streets and starting those conversations with people in the hopes of reaching people who are typically not willing to make the first contact.

Aarhus and Active Citizenship

We discussed what makes Aarhus different from other municipalities in regards to citizen participation, and how their structure promotes their great sense of community. Aarhus is unique with having the Green Embassy, as it allows for convenient and open contact with the citizens while also providing the knowledge and the contacts to easily navigate the municipal politics. Marie described how most road blocks tend to happen on the municipal side which makes their expertise extremely valuable. The directive Co-Creating Aarhus shows the municipality is open to change in the community, and citizens want their communities to flourish, so the Green Embassy serves to bring them together. Marie notes the process is most effective when both sides are pushing in the same direction, but sometimes there are political setbacks. Sometimes politicians argue the projects are simply “pranks” (like the longest strawberry bush in Denmark) and the projects take money away from more useful projects. The embassy argues the money needs to go towards community projects anyway in the forms of a certain number of plants, bushes, and trees, need to be planted each year to maintain the appearance. The embassy simply asks that these funds go towards certain citizen directed projects to increase active citizenship.

Project Criteria and Types of Projects

Marie then described the criteria for a citizen led initiative to be taken on by the Green Embassy. Those criteria are the following:

- Needs to be in a public space
- Needs an association
 - The association will ensure there is commitment all the way through and the project isn't a waste of funds
- Citizens complete the project
 - The embassy can offer guidance, knowledge, and funding, but they do not offer labor. This has to be done on the part of the citizens.
 - Completing the physical project is part of the community building experience to bring together the people who care the most about a certain project

She then described different types of projects they take on and what the benefits are. Community gardens a typical type of project, and they benefit the community by bringing together people of all

generations in a purpose that also produces crops available to everyone in the community. Clean street projects are when people clean up their own neighborhoods. They improve the overall community and also generate a lot of new ideas for how to use the cleaned up spaces which increases involvement. It also increases the amount of pride people have for their street. Part of these projects is a continuation where citizens can come to the Green Embassy and get all of the supplies such as trash bags, pickers, and safety vests. The Green Embassy also facilitates creative workshops that increases collaboration between citizens to come up with ideas for new projects.

Redesigning of Sorting System

Marie described a project in which the Green Embassy helped the municipality in the redesigning of their sorting system. She did not directly work on the project, but she gave us the name of the person who did (Sofie) which our sponsor could provide contact information. The following describes the process she used to keep the public informed on the new changes. The municipality was implementing a new waste sorting fraction with new bins, and one of the challenges was overcoming the negative stigma of a failed prior attempt at a sorting system that gave people a very negative view on this project. Marie was unsure if the actual design used citizen involvement.

Before the implementation, it was important to provide information in multiple ways. They hung up posters on the Embassy's walls describing the changing system, and this attracted a lot of attention and caused people to step into the building with comments or questions. The Green Embassy was also opened for a few full days (as opposed to the varied schedule with limited hours throughout the week) to address anybody's concerns as to what would be changing for them personally. Videos were also posted on Facebook describing the new system and the things people have to do to sort their waste correctly. All of the information before the actual implementation was critical to transition away from the negative image that waste sorting already had in the municipality. Once the project was implemented, citizens still had access to the Green Embassy and email or phone calls for any further questions, and customers who had not sorted well received letters or notes with warnings on them. The project resulted in major improvements in reducing the amount of waste to landfills the municipality produced. 6 months later and there is still a high acceptance rate across the municipality.



Appendix I – Summary of Interview with Lone Misfeldt of Katzen-Mark

In preparation for the interview, our sponsor provided us with preliminary background information on the company and a list of related projects to help formulate our questions. The following is a summary of the information gathered from our semi-standardized interview with Lone Misfeldt of Katzen-Mark, a public relations firm that addresses communication tasks for municipalities and public and semi-public companies, with waste and recycling, water, wastewater, environment and planning being longstanding specialties.

General Discussion

Some topics of general discussion were significant and will be useful at finding further sources of information and can be used in our findings. Lone believes the biggest challenge faced by companies is the timing of contracts and projects. She explained how most contracts in the public sector are 4-year contracts that tend to coincide with municipal elections, and waste companies work out a contract for those 4-years but people change quicker than every 4 years. The contracts make the implementation of a new system extremely difficult in the middle of a term. Lone restated that she believes the most effective way of engaging people is by making everyone ambassadors by providing knowledge to all, because people with influence in the community will help the message stick.

Tools to Engage with Customers

We began our discussion with Lone by talking about a few tools her company uses when trying to get feedback and engage customers. The three that were briefly discussed were Focus Groups, Dialogue, and Public Spaces. She described Focus Groups as being effective at getting to what is important for the customer and finding out what works on a local level. It is a smaller sample, so the results may not correlate to the entire population. The next tool she described was Dialogue which is used by opening up a means for communications during the project and also after the project has technically ended to continue assisting people do what the project intended. Katzen-Mark does this by appointing and educating an ambassador, typically the facilities manager for a building that can answer people's questions and can then allow the company to know if there are recurring comments or concerns when it comes to the new system. The facilities manager is typically a good choice because people are more comfortable asking questions to someone they recognize. Lone claims that through her experience, Dialogue is the most effective tool to engage with citizens while also getting feedback. The third tool she describes is using Public Spaces and events to invite people to provide their ideas on a topic and it is effective at targeting large groups. These spaces can be

facilitated by a company in the form of a Summit, or it can be a stand at a community festival where there is a large audience and many different perspectives being welcomed to provide feedback.

Waste Bins for Public Events Project

Lone described a project in which they opened up a public space to solve an issue and to engage with the community by providing education about waste. This project began from the overflowing of waste bins in a local park in Roskilde. The community approached the municipality and asked for more bins and more fractions to sort, and Katzen-Mark saw it as an opportunity to be able to use the issue as a platform of engagement. The solution was to build a fun-looking, portable, waste sorting station from a trailer. The trailer had 4 sorting fractions and could be stationed anywhere in the park, or be used for other events such as festivals in the community. To engage and educate the users of the park, an employee well educated in waste sorting was stationed at the trailer to answer people's questions about what trash goes in which bin. These employees are a part of Katzen-Marks' waste division, and can be hired as ambassadors by any municipality. The project provided a platform to also have educational sessions explaining the implications of proper waste management when the project was beginning. As a result of the project, there were fewer overflowing trash bins, more fractions to sort into, and more citizens educated on waste. The users' of the park sorting improved, and it was apparent as the employee's guidance was needed less and less.

Redesigning of Sorting System in Copenhagen Ghettos

Lone described a project in which ideas for redesigning the towns sorting system was facing challenges in certain low-income and culturally diverse areas of Copenhagen. The project was a great example of using an ambassador to engage with citizens and open up a dialogue. Lone gave us the contact of the person directly in charge of the project, and we conducted a further interview with more specifics. The summary of the project can be found in Appendix N: Interview at Tingbjerg Forum.



Appendix J – Summary of Interview with Stener Glamann of Tankegang

In preparation for the interview, our sponsor provided us with preliminary background information on the company and a list of related projects to help formulate our questions. The following is a summary of the information gathered from our semi-standardized interview with Stener Glamann of Tankegang, a public relations firm that addresses communication tasks for municipalities and public and semi-public companies, a number of which are involved in the waste industry.

Zero Waste Concept

To begin the interview, Stener described the origin of his Zero Waste concept, which is the notion that a community could produce absolutely no waste that is sent to landfills. He envisioned the benefits of moving towards a circular economy, diminishing pollution, and increasing community involvement. Before Stener, the concept of Zero Waste, or Nuskrald (Zero Waste), was never thought of in Denmark. Stener proposed a Zero Waste experiment to the waste company AVV as an idealistic way to reach its citizens

Zero Waste Project: Hjørring & Brønderslev

Stener described the first attempt at a Zero Waste community with AVV in Hjørring & Brønderslev with help of a university in need of a project. Stener approached the two municipalities to participate, and stressed they were looking for improvements and any conscientious effort would lead to improvements. After the municipality agreed, Tankegang began advertising the project to citizens using Facebook, local newspaper articles, and municipal websites. This resulted in 128 families agreeing to participate. During the project participants were simply given the goal of reducing the amount of waste they produce, and the means by which they chose to reduce their waste was up to them. Tankegang told participants to let them know how *the waste company* could help *them* sort better and reduce their waste, and neither Tankegang nor AVV provided suggestions, but rather made accommodations. Stener gave an example of when a customer approached the company and told them he could get the other six houses at his end of the street to sort better if there were communal bins on the way out of the street. So in the spirit of the experiment and involving the community, the company put the bins at the end of the street to gain the full participation of 6 more homes. After the 2 month experiment, the 128 families reduced their waste production by over 50%, with results still showing 4 years later in a consistent increase in sorting even after the project ended. Like Stener intended, AVV gained a new relationship to their customers, put the concept of Zero Waste into use in Denmark, and showed the capabilities of designing waste systems based on what people say they need rather than what the company thinks they need.

Zero Waste Project: Tversted

Stener described another attempt at a Zero Waste community for an entire year in a small seaside community of Tversted that has a lot of summer homes. This time citizens in the municipality approached AVV and Tankegang with the idea. They both agreed to take on the project and Stener began recruiting participants by using all forms of media they had to start advertising including social media, newspapers, municipal websites, etc. Tankegang also held an initial engagement meeting to see if more than just a few of the citizens would get behind the idea, and 100 citizens showed up which Stener indicated was a good start. To recruit more of the community, Tankegang held a Zero Waste Exhibition at the municipal waste facilities that focused on the ideas of waste prevention, reuse, and recycling. The exhibition included a short film talking about the concept of zero waste, and also fun activities such as families would cook a meal for themselves and save the waste, and the piles of waste at the end showed them just how much they threw away in just a single meal. They also had a fashion show with kids wearing secondhand clothes to demonstrate how old clothes can be repurposed. On top of that, small details such as every chair being old and reused, and every coffee cup being different, further engrained the message that products can have multiple life cycles if you make the choice to reuse or recycle properly. In the end, 300 families attended and all 300 families signed up to participate.

During the experiment, Tankegang made a Facebook page containing all the information required including instructions and meeting schedules. Progress of waste reduction was also posted on the Facebook page every two weeks. The project increased the amount of education on waste being taught in schools. The project also sparked a huge media and public following, so Stener had to keep it relevant by posting articles online and on Facebook that would attract attention (like progress posts) throughout the year. According to Stener, one of the biggest challenges of the project was the employees at sorting stations being unprepared for such specific questions regarding sorting. The employees didn't even know when the project was starting so it was difficult for them to answer citizens' questions. So a short time into the project AVV taught the employees about advanced waste sorting.

After 1 year, the project was considered a huge success, however the town never fully reduced their waste to zero, as Stener stated it was an impossible goal. But that idealistic approach in dealing with waste for an entire year branded Tversted as a Zero Waste community. The progress and effort of the year-round citizens also increased the summer resident's effort to sort better as well, since they respected what they had accomplished and wanted to continue the push towards zero waste. AVV also gave all the summer homes a new waste sorting system with more fractions to sort. Stener said the effect of increased sorting is still present years later, and like the other Zero-waste project, the municipality gained a new relationship with its citizens.

Appendix K – Summary of Interview with Lina Katan

The following is a summary of the information gathered from our semi-standardized interview with Lina Katan, a Ph.D. candidate at the University of Copenhagen who is potentially conducting ethnographic research with Dansk Affaldsforening in regards to waste sorting.

Discussion of Her Project

Lina intends to conduct an ethnographic study to uncover the motivations and challenges of Danish citizens when they are sorting their waste. She notes the gap in research of the topic, as there are plenty of technical reports on the subject, however, none of them relate back to theory to truly understand why people act certain ways. She explained that ethnography is a method of conducting research that involves the researcher immersing themselves in the lives of the people they are studying in order to understand the underlying reasons behind behaviors. She plans to look at what is happening when people are dealing with waste by conducting observation studies and not just relying on surveys, because she explained that people tend to be inconsistent between their words and their actions. The observation studies will be multiple days long, and she will recruit participants by conducting general interviews either face-to-face or over the phone first, and then suggesting a full observation at the end to hopefully have them agree. By using her knowledge of three theoretical paradigms (Consumer Behavior Theory, Practice Theory, and Affect Theory) she hopes to use the observation studies to look beyond the scope of just waste to determine the deeper thoughts and emotions at work. Lina described that everyday actions have many different connotations, and a lot of things people think of as objects or relations are actually ways of going through life. She used actions such as people “Doing Family” and “Doing Home”, noting how both have a very specific mental and emotional process behind the actions. She described an example of summer homes, and how “people tend to take a vacation from their values as well”, which shows how their behavior changes depending on if they are “Doing Home” or “Doing Vacation”. In the same way, dealing with waste will have many different connotations for people, which will vary from person to person and culture to culture meaning she needs to tailor her methods for this project differently than any other project involving behavior.



Appendix L – Summary of Interview with Kristoffer Ravnbøl of Naboskab

In preparation for the interview, our sponsor provided us with preliminary background information on the company and a list of related projects to help formulate our questions. The following is a summary of the information gathered from our semi-standardized interview with Kristoffer Ravnbøl of Naboskab, a social enterprise that effectively uses co-creation on a very local scale.

General Discussion about Naboskab

Kristoffer began by giving a general overview of the company and how it began. The direct translation of Naboskab is “neighborhood closet” which was the premise of their business, where they provided very local communities with sharing platforms to share everyday items. The purpose was to reduce the amount of underutilized items being bought to just sit in someone’s garage all year and show the value in reuse. The closets held specialized tools & equipment, unique kitchen supplies, old clothing, books, and just about anything else people thought could have value for someone else in the community. The company is now 4 years old and their projects have branched out from just sharing platforms to now including waste management. Naboskab’s staff is comprised of social scientists and anthropologists, which gives the company a good foundation to study people’s behaviors and what affects those behaviors. A common complaint of customers of similar companies is the anthropological results tend to be vague and unmeasurable, so Naboskab’s goal for each project is to use “qualitative data for quantitative results”. By finding ways to quantify results, Naboskab can better present their findings to customers who want to see direct improvements caused by the project.

Evaluating Fredericksburg Closets Project

As described in the paragraph above, Naboskab is well known for their community closets as sharing platforms in very local communities. The company set up 10 closets in Fredericksburg, and were later asked to evaluate the effectiveness of the closets at increasing reuse and diminishing waste. The project originally consisted of overlapping efforts, with the two most related to our project being the investigation of citizen-driven efforts and the further development of environmental ambassadors. Naboskab found that most citizen-driven efforts related to community sharing platforms tended to be less successful when only one person was in charge of the project because other people were not invested in the project to help keep everyone motivated. The single person projects tended to “lose steam” as the person in charge lost motivation, and often faced additional issues when the closets had more items going in than going out to be reused. Projects that had multiple people in charge tended to be more successful, and they also tended to serve as a focal

point in the community. The company focused on training people to be in charge of closets and to serve as ambassadors who would keep people engaged while providing the community with the necessary information to keep the sharing platform successful.

In order to evaluate the 10 closets in Fredericksburg, Naboskab conducted interviews with the users of the closets, measured how many items went through the closet to be reused, and what the social and environmental impacts were of each. To measure quantifiable data, the company collected and categorized the inventory of the closet at different times, and then used a company called Consito to calculate the amount of CO2 emissions that were prevented by the reuse of the inventory. The company found each reuse station took in 1 ton of material per year, and the exact emissions prevention was not specified.

Study and Recommendations on Waste in Copenhagen

In November of 2017, the Copenhagen Kommune hired Naboskab to analyze their waste sorting systems and how citizens interact with it in order to come up with recommendations for which concerns about waste should be prioritized in the next governmental waste plan. Over the course of 9-10 weeks, Naboskab collected 602 questionnaires, conducted 40 short interviews and conducted 15 long-term interviews to understand the citizens and what makes it easy for them to sort their waste. The investigations took place in the urban area, in the citizens' homes, and at recycling stations. One of the areas of focus was bin placement in the city, and Kristoffer described how they are currently set up so the fractions that accumulate the most in people's homes are supposed to be the closest to their homes. As an example, food waste bins should be closer than glass waste bins because food waste needs to be taken out more frequently. To better understand what makes it easy for people to sort based on bin placement, Naboskab asked citizens how far they would be willing to walk to a communal bin, and how far the closest bin actually is. They then compared the numbers and verified the distance on Google maps, and found people's perceptions offer differed from the actual distance they had to walk. From all of the data Naboskab collected, they gave the municipality a set of recommendations to make waste sorting easier for their citizens. The first recommendation was that the sorting systems in people's homes should mirror the systems where they have communal bins to prevent confusion and make it clear what fraction belongs in each bin. The second recommendation was that all the different fractions should be sorted at one communal location, and not spread out by how frequently they are emptied. The third recommendation was the bins should be placed in convenient locations, such as near transit, schools, or markets, because they found people will travel up to three times as far to sort their waste if it is in their intended direction of travel. The complete results of this evaluation are still being reviewed by the municipality, and will hopefully be used in the formulation of the next waste policy.

General Discussion on Co-Creation

During the interview, Kristoffer included many claims and pieces of information he has found to be consistent in his experiences using co-creation. Since there is not a logical progression from one idea to the next, the information is simply provided in the following list:

- “Technical systems run into trouble when they try to do a ‘one-size fits all’ approach”
- When conducting workshops, the citizens need enough information on the topic to gain inspiration from, and an issue to prevent is having 1 person dominate the conversation so the entire group’s ideas are heard.
- Using co-creation to come up with a robust solution is more costly than designing without co-creation, especially to do it well.
- A typical focus group requires approximately 10 man hours between preparation, conducting, and analyzing the results.
- A typical 1 hour interview requires approximately 3-4 man hours between preparation, conducting, and analyzing the results
- Questionnaires should be relatively quick (between 5-10 min) so people are more likely to complete them
- Co-creation can be used to collaborate with both citizens and employees which can provide added value to the process



Appendix M – Summary of Interview with Jonas Engberg of IKEA Denmark

IKEA is the largest retailer of home goods in Denmark. Therefore, by interviewing a representative of the company we hoped to gain private sector insight about what the company has done and is doing in terms of user engagement in the home - an intimate place and the area in which our project is mostly concerned. Our interview with Jonas Engberg, Sustainability Manager for IKEA Denmark, is summarized below.

Perspective

Since IKEA is a large, multinational retailer and consumes 1% of both the world's trees and cotton, the company must be cognizant of how it is evolving with the rest of the world. To this end, sustainability is at the core of IKEA's business strategy and core vision, "to create a better everyday life for the many people." Sustainability is a real thing for many people - it poses the highest perceived threat in the world - and while the company's focus is life in the home, life in the home also concerns how to get rid of stuff. Since IKEA sells one third of all kitchens in Denmark, a question to ask is "what kind of role can retailers play in the waste system?" To this end, IKEA's new CEO has highlighted the transition from a linear to a circular economic model as a major focus, while also considering the core values of the company.

Product & System Design

Aware that Denmark is an innovative country in which each other's ideas are supported, and that everyone wants the best, IKEA has embraced this openness. Jonas also highlighted a project where IKEA worked with the Aalborg municipality to change the home collection practices of residents. While keeping the company's interests a priority, IKEA manages to sell to the best of their ability, which includes benefits to the environment - this was also true in the Aalborg project. Further, Jonas mentions that "the industry can change when companies get together and come out of the meeting with more ambitious goals than similar meetings held by politicians."

IKEA is very much interested in selling the right stuff, and for what they produce to be impactful as well as practical. "We want to sell solutions, not challenges or challenging problems." Jonas also noted that many decisions go into why consumers choose to buy the products that they do. A wide variety of options are provided to the customer because what they want and what they actually buy can be different. This is true in different cities and regions of Denmark, but also true when it comes to sustainable thinking. People often make their decisions primarily based on function, price and design, and if there is a sustainable component to it, then that is an added benefit, but it is not a core

decision-making quality. IKEA is looking to change the role of sustainability in decision making of customers, especially since sustainable design often competes with keeping products at low prices.

Future Possibilities

As any company is aware, they must adapt to the changing times, and IKEA is no different. To enable new ideas, IKEA funds, but does not run, the Space 10 concept design innovation lab in Copenhagen. Here, the company hopes to create the IKEA of the 21st century, with such inspiring ideas such as the circularity of food for both customers and employees at the IKEA stores. Jonas also discussed how the IKEA of the future might include an in-house workshop where customers can bring in their IKEA furniture for repair. The idea here being that IKEA knows their products the best, and could supply the correct replacement parts or processes for refurbishment. This inclusive idea was inspired by the growing trend and use of Facebook Marketplace, where people communicate regularly to find the best, close local deals on resold items. Similarly, on the Danish eBay 10% of products are resold IKEA products. IKEA is aware of this area's contribution to their efforts toward a circular economy, on which they could capitalize by re-selling their products as an added revenue stream.

While IKEA is the basis of supply through mass production and function of their products, and not as much customization, they still would like to be “a part of the journey of personal attachment.” This was exemplified in their recent, non-retail-based acquisitions, TaskRabbit, a company in the United States. TaskRabbit is an enabler of community-based, hands-on service. This is based on the idea that people prefer a local handyman than a more costly, corporate service provider. In a similar way, customers may find creative solutions using IKEA products through the IKEAhacks.com website, which is not affiliated with the company. This unique approach to their products inspires even the IKEA designers to create more functional products in the future.



Appendix N – Summary of Interview with Anne Bisgaard and John at Tingbjerg Forum

During our previous interview with Katzen-Mark, our team learned of an ambassador program that Katzen-Mark initiated at Tingbjerg Forum with one of the local facility managers. Through further correspondence with our contact at Katzen-Mark, we set up an interview with the facility manager from Tingbjerg Forum and project manager from Katzen-Mark that initiated the ambassador program. Our initial interview with Katzen-Mark provided our team with adequate background knowledge on the program for our interview. The following is a summary of the information gathered from our semi-standardized interview with Anne Bisgaard of Katzen-Mark and John of Tingbjerg Forum, partners in a facilities ambassador program.

Background of Tingbjerg Forum and John’s Role

Anne and John took time to explain some background of the Tingbjerg Forum housing development and its resident population to frame the motivation for their ambassador program. They informed us that the complex was comprised of around 6,000 residents across about 2,000 apartments, all broken up into different housing blocks. Anne mentioned that across the entire development, there were 82 different nationalities represented and this was partially due to Tingbjerg Forum being cheaper than the surrounding areas.

John explained his role as a facility manager to us. He mentioned that he was one of 25 facility managers across all of Tingbjerg Forum and personally oversaw 150 apartments belonging to four different buildings. John also specified that he was a well-known individual within the community and highlighted how helpful this was with the implementation of the ambassador program.

Implementation of the Ambassador Program

Anne and John explained the initial purpose of the program to increase sorting habits of the residents through increased engagement and education on the system in place at Tingbjerg Forum. Anne went on to describe how she and John had gone from door to door of the apartments the program was being implemented in to knock and initiate face-to-face conversations with the residents of the apartments. Anne highlighted the usefulness of a personal communication method in creating dialogue with local residents as opposed to simply handing out flyers that would not have been as successful as reaching the residents. In addition to the personal conversations that John and Anne held, bins in the area’s public spaces were updated with proper waste fraction stickers and publications were delivered to residents with in-depth information about the specific sorting of their waste.

Ambassador Program in Action

When the program was finally rolled out, employees at Tingbjerg Forum decided to close the waste chutes that were typically used in order to encourage residents to physically interact with the sorting stations within the community. The closing of garbage chutes also later allowed John more of an opportunity to spend time interacting with residents around the sorting stations and answer any questions they had. Anne explained how large posters were printed off with encouraging phrases alongside an image of John and then hung in the areas where the ambassador program was being implemented. Anne spoke of how these large posters helped to remind residents of the ongoing program and engage them in thought about their waste sorting habits beyond the few seconds a day they typically thought about their waste.

Anne explained how during the program, additional dialogue was pursued with residents of the community. Anne and John took the initiative to meet residents where they were by attending pre-existing resident groups such as mother groups, preschool groups, church groups, and even retiree groups. When attending these groups, Anne explained how she and John had taken the time to engage in even more dialogue with residents through answering questions and asking for feedback. Additionally, Anne highlighted the opportunity that some of these dialogues offered for the generation of new ideas. She explained to us how out of these meetings, residents had proposed ideas for new events that the community could hold. Some examples of suggested events included large barbeques where residents could pick up trash in their community and learn about sorting, and concepts of creating public flea markets to reduce the amount of waste being disposed of. Additionally, Anne mentioned the emergence of residents sharing their own personal solutions that they had found to work in their own lives. After collecting some personal practices from residents, Anne recognized the opportunity to share some best practices of residents with others in the community. Specifically, Anne described how she had highlighted a home sorting system that one community resident had shared with her in a flyer that Anne then distributed to others within the community.

Ambassador Program Results

Anne and John concluded their discussion of the ambassador project by informing us of the results of the program. They both explained that following the implementation of the ambassador program, sorting of waste within Tingbjerg Forum has increased notably. With specific reference to plastics and metals, John admitted the significant improvement that the community had had. Anne also credited the program with increasing the involvement of citizens with the waste system in the community, increasing the number of questions residents asked, and increasing the interactions individuals had with knowledgeable members of the waste system that could help to answer the questions that residents had. With the success of the preliminary ambassador program with John,

members of the Tingbjerg Forum have begun to look into further implementation of ambassadors in other areas of Tingbjerg Forum. Anne explained that at the time of our interview, there were already a few other ambassador programs active or in the works.



Appendix O – Summary of Interview with Anne Berg of MindLab

During our background research, our team performed considerable research on the MindLab and much of the framework that projects at their organization follow. In preparation for this interview, our team reviewed some of the projects that the MindLab has completed. All of our team's preliminary research helped us to formulate questions for the interview. The following is a summary of the information gathered from our semi-standardized interview with Anne Berg of MindLab, an organization that focuses on citizen involvement within public sector initiatives.

Background of the MindLab

Anne explained a bit about MindLab, the organization's structure, and their plans moving into the future. She explained how MindLab was owned by and operated under four different ministries: the Danish Ministry of Industry, Business and Financial Affairs, The Ministry of Employment and The Ministry of Education. Anne also explained that the objective of the MindLab is to figure out how to bring average citizens into the public servant arena and engage them - very similar to our team's background research. Working with a similar "four bottom lines" model to the model identified by our team in our background research, Anne explained to us how the MindLab gauged projects that they involve themselves in. Anne mentioned that a shift in how MindLab operates had recently taken place. She specified that the MindLab was trying to take more of a guiding role in the projects they conducted rather than their previous role as leaders and researchers. Anne highlighted the importance of helping their partners to *perform* the projects they were involved in and allowing members of the MindLab simply help to guide their partners along the correct path along the way. Anne explained that this new approach the MindLab had adopted helps the public entities that MindLab typically partners with to adopt a more citizen-centric mindset into the projects that they conduct and become better versed in professional empathy.

With regards to co-creation in general, Anne mentioned the importance of having proper social infrastructure in all the correct places with all involved actors in order to arrive at successful results.

Party Waste Project in the Gothersgade Area

Anne described a project that she had worked on in the Gothersgade area where "party waste," namely pizza boxes were focused on when trying to increase proper disposal techniques. The City of Copenhagen gave Anne and her team the task of developing a way in which proper disposal rates of the waste generated by nightlife in Copenhagen could be improved. Through the project, Anne highlighted the importance of what she referred to as "mimicking," or trying to emulate what is already in place when trying to make improvements. In this specific instance, Anne's team designed

a new take on a park bench to be tested in the Gothersgade area. Emulating iconic Copenhagen benches that most Danes are familiar with, the new benches were designed to entice nightlife to utilize the additional seating that the benches provided, and therefore be closer to the waste bins that were attached to the benches. The attached waste bins were designed to be much larger than typical Copenhagen waste bins, to increase the convenience associated with proper waste disposal. Anne informed us that this initiative had proved very effective and with the implementation of the new benches and a monetary deposit being placed on pizza boxes, improperly disposed nightlife waste was drastically reduced.

Waste Chutes in Fyn

Anne briefly mentioned an additional project that she had been a part of that dealt with a high rise in Fyn. In her project, Anne explained how in an apartment complex, there had been an implementation of an underground waste depot. While individuals who had initially thought of and implemented the concept of an underground collection receptacle had imagined the project to have positive impacts, when evaluating its implementation, Anne found the opposite. Anne explained how attempting to “hide the waste” underground was the wrong approach. She went on to inform us of how the “out of sight, out of mind” attitude had caused waste sorting in the apartment complex to be something that individuals placed less of a focus on doing properly.

General Comments on Co-Creation

Anne offered some helpful insights into the co-creation process as a whole and a few of her personal pieces of advice when implementing co-creation into a company strategy. Anne acknowledged the need to “sell” co-creation within a company. She stressed the need to show that the process is feasible, and to convince the right people that it is important. She highlighted the fact that the waste sector and public entities in general are typically very risk averse and this prevents many individuals within these spheres to have hesitation when considering co-creation. As a result of the present hesitation to co-creation, Anne suggested the use of “the right terms” and the importance of being able to convince individuals through the use of terms such as “bravery.” She explained how the hesitation was often times misplaced due to the nature of co-creation projects saving companies money in the long run due to their nature of “failing quickly” if they do fail. Anne explained how in the short term, this loss may look like a negative, but when broadening the scope of a company to the long term, it can easily be seen how a potential failure can prevent future issues of a much larger scale.

The final piece of advice that Anne mentioned with regards to co-creation within the public sector was the need for the continuation of the shift towards the use of it. Anne mentioned the importance of not separating the development of co-creative strategies from the technical, engineering focused

aspects of the companies that it is being introduced into. She mentioned that this shift is already happening, but again, highlighted how companies needed to keep it going. The importance of such integration into technical fields was highlighted because Anne argued the need to disseminate co-creation, and a citizen-centered mindset into companies and organizations as a whole. Anne acknowledged the importance of having all members of an organization pushing forward the idea of co-creative mindsets in order for the platform to fully take root.



Appendix P – Examples of Co-Creation

Part I: Nyborg Forsyning Field Trip	
Keywords	Citizen awareness, citizen outreach, learning, education,
Source	Field Trip: Communications Representative was Camilla Uttenthal, and the water supply plant manager gave us the short tour of the facility and an engineer provided some quick summaries in English of the full Danish tour for residents.
Description	
Actors	Company communications person, division heads, citizens (students, retirees, families)
Issues	Informing the citizens about their water supply, and the history of water supply in the area developed over the centuries.
Method	On this day it was World Water Day, and Nyborg Forsyning - 1 of 15 water suppliers in the area - uses the “holiday” as an opportunity for outreach to their citizens This was coordinated by their communications representative, who manages communication for water supply, sewage, heat, and waste collection operations. She uses their website, newspaper advertisements, and the municipality phone line for emergencies. Throughout the day the company has 3 tours of 28 people that meet at their water supply plant. The tour of the facility includes the entire process of water extraction, filtering, testing, and dispensing. The tour then transitions into a nature walk curated by a historian from the Town’s castle-turned-museum, which this company services. Local history of the area as well as relevance of the different difficulties water supply has faced in the area were presented. Opportunities for questioning about the supply of water by the residents were frequent and encouraged The walk concluded with hot beverages and sweet treats. About 2-2.5 hours’ commitment by the citizens.
Result	This example shows that community education and engagement in utility processing can occur by capitalizing on the “holiday” method of topic focus. Further, broad subject matter and other incentives bring more people in and keep interest alive for the event. Given the size of the town, once a year is adequate, but could probably happen more frequently and during non-work hours, e.g. Saturday. Abroad demographic was reached.

Part II: Glostrup Forsyning: Waste Sorting Project	
Keywords	New sorting system, full-process

Source	Interview with Sofie Lauritsen at Glostrup Forsyning
Description	
Actors	Glostrup Citizens , Communications employee, waste employees
Issues	Increasing the number of waste fractions that households are required to sort, keeping the public informed, creating a smooth transition, full implementation
Method	<p>Recruitment of Participants: Sofie as the lone communications employee ran ads for the pilot program in the local paper and also on Facebook through sponsored ads.</p> <p>During the pilot: A Facebook group was created for the participating homes to ask questions, get information from articles and videos, see announcements, and find scheduling information of meetings or changes. Flyers with announcements and scheduling information were distributed to the housing association by a single person who lived there. That person acted as an ambassador in that neighborhood (the other homes were too spread apart to use this approach).</p> <p>After the pilot: The Facebook group is still “unofficially active” by the members of the pilot program where they still collaborate with each other about their personal waste sorting systems and ask questions amongst the group. 2 years after the study, Sofie is now checking in on customers of the full scale implementation to make the system is still working effectively.</p>
Result	<p>Recruitment of Participants: From the recruiting methods, 300 homes agreed to participate. The Facebook ad recruited a 200 home housing association, and the local ads recruited the other 100 homes. In a secondary survey about how the participants personally learned about the pilot program (the housing director signed the association up), it was determined that 50% of people learned from the Facebook ad and 50% from the local paper, with 116/300 homes responding.</p> <p>During the pilot: The Facebook group was most effective for informing and involving the individual 100 homes because it was a central source of information and communication. The Flyers were most effective for the 200 home association because it was a physical reminder, could be distributed in the small area, and had a ambassador spearheading the efforts.</p> <p>After the pilot: There was a high rate of participation in the pilot, which led to a full scale implementation of the new sorting system. This has been successful, with over 7000 systems distributed to customers and only 7 systems being returned. From the study Glostrup Forsyning learned that increasing the frequency of collection from every 4 weeks to every 3 weeks significantly improved results.</p>

Part III: Glostrup Forsyning: Waste Water Project	
Keywords	Waste water, full pilot process, consumer design
Source	Interview with Sofie Lauritsen at Glostrup Forsyning
Description	
Actors	Glostrup neighborhood , Communications employee, wastewater employees,
Issues	During heavy rainfall in a particular neighborhood, wastewater was backing up into peoples' homes, communication during a pilot
Method	<p>Recruitment of Participants: A member of the neighborhood approached the company with the issue, and based on her location the street was suitable for pilot testing of a solution</p> <p>Product/Solution: A customer of another municipal wastewater company designed a valve that closed the wastewater system pipe when there was heavy rainfall.</p> <p>During the pilot: A Facebook group was created for the participating homes to ask questions, get information, see announcements, and find scheduling information of meetings or changes (it also stressed that it was strictly a test based on funding and other initiatives). Flyers with announcements and scheduling information were distributed door-to-door by the company. SMS reminders were sent with reminders about collection dates and meetings</p> <p>After the pilot: Still ongoing</p>
Result	<p>Recruitment of Participants: The neighborhood was eager to participate because of the damage to their homes that occurred when it flooded</p> <p>During the pilot: The Facebook group was an effective platform for people to ask questions and discuss issues they may be having with the system. The flyers were practical because it was only one street and it was easy to go door to door with information. The SMS reminders were effective because a reminder to all participants could be sent in a single text. Providing preemptive information for a smooth transition to the new system and informing the participants early-on prevented (but did not necessarily eliminate) confusion during the pilot program</p> <p>After the pilot: The pilot is still ongoing, however the participants can keep the system after it is finished</p>

Part IV: Glostrup Forsyning: Redesign of Sorting Station Project	
Keywords	New sorting station, communicating changes
Source	Interview with Sofie Lauritsen at Glostrup Forsyning
Description	
Actors	Glostrup Citizens , Communications employee, waste employees
Issues	<p>Redesigning the sorting station, keeping the public informed, creating a smooth transition</p> <p>The Project: The new sorting station would have more space, a new bin layout, and updated electronics and hazardous waste areas. This caused a temporary shutdown during construction</p>
Method	Prior to and during redesign: Sofie posted suggestions of where to redirect trash on Facebook, and LinkedIn, put up signs at and around the sorting station, and put an article in the local paper. At a cultural night, the company had a booth where they presented information about the new station and also had discussions with members of the community. They also presented a 360 degree view video of the new recycling station that was viewable with Virtual Reality Headsets
Result	Prior to and during redesign: Posting the suggestions of where to redirect the trash was a necessary action to let people know where to bring their trash, and the methods prevented confusion during the initial stages of the redesign. The cultural night was a way to engage with a large portion of the community and start conversations with people who might not normally be interested in waste. The 360 video engaged with a new, younger audience by showing them what the new facility will look like using a unique method.

Part V: Green Embassy: Waste Sorting Project	
Keywords	New sorting system, communication during project, public space
Source	Interview with Marie Overgaard Nielsen
Description	



Actors	The Green Embassy, Aarhus waste company, citizens of Aarhus
Issues	Increasing the number of waste fractions that households are required to sort, changing the negative stigma of a failed past attempt at a new sorting system
Method	<p>Prior to implementation: Posters advertising the new system were hung up on the embassy building in the middle of the city square. The embassy was used as a public setting for citizens to express their concerns and ask questions about the new system. Videos were posted on Facebook describing the new system and how to sort waste properly.</p> <p>During implementation: The green embassy allowed continued access to the embassy to ask questions and the Facebook page for videos and other information. Citizens could also call/email with questions or concerns. Letters/notes were given to customers who did not sort correctly with a warning and information on how to correctly sort.</p>
Result	With help from the efforts to communicate with the citizens, the new system is easy to use and has led to major improvements in Aarhus's reduction of landfilled waste. Informing the public and also allowing them opportunities to express questions or concerns in a public setting proved useful in gaining their participation. It made it simpler for the citizens and gave them a voice.

Part VI: Katzenmark: Sorting System for Parks	
Keywords	Public space, educating the public, sorting system
Source	Interview with Lone Misfeldt
Description	
Actors	Users of the public park, Roskilde waste company, Katzenmark (PR)
Issues	Trash bins consistently overflowed in a local park, only one fraction
Method	<p>Realization of Problem: The waste company was approached by its citizens with the issues of overflowing waste and not enough fractions</p> <p>The Project: The municipal waste company built a fun-looking, portable, waste sorting station from a trailer, and stationed an employee educated in waste sorting at the trailer</p> <p>Communication: Held an unveiling event of new trailer</p>



Result	The physical trailer had plenty of space and 4 different fractions which reduced the number of overflowing trash bins and provided more ways to sort. The specific design also shows how a technical solution can be turned into a platform that can address an issue while allowing for public engagement. The fun design of the trailer provided an easy way to engage kids in the park and to make them more educated on sorting waste. The employee being stationed at the trailer helped educate people of all ages, and as time went on the employee was needed less and less, which indicates improvement in the users of the park's waste sorting system. The unveiling of the project brought together a large audience to be informed about the project in a public place.
---------------	--

Part VII: IKEA Denmark: Aalborg Municipality Waste Bins	
Keywords	Cooperation, private sector engagement,
Source	Interview with Jonas Engberg, Sustainability Manager for IKEA Denmark
Description	
Actors	IKEA Denmark, Aalborg Municipality, University of Aalborg
Issues	To implement home waste fractioning to align with municipality's waste plan 2017
Method	Initiated by a speech Jonas gave that reached representative of Aarhus Municipality, a part of the IKEA store was used by the municipality as an area for them to interact with citizens about this new system. Prior to this the citizens were mailed information about the change going to occur, with reference to exemplar bins on how to sort at home. With their trip to IKEA and seeing exactly what they need to be a good citizen at the forefront of their shopping journey, they could abide by the new policy better. The options at IKEA were not presented as the single, limited option - there were many and there was no sense of the customer even having to buy the product - just that it was a solution." It was a friendly, we would like to help you approach." Pictograms of proper sorting were provided and there were also stickers given out for curbside bins.
Result	All actors were happy, especially the municipality. This was measured in terms of the lack of complaints generated by comparison to other and prior experiences with changing systems with which customers are familiar. A good community engagement feeling resulted for all parties and in a way reduced the cost of making the product.



Part VIII: Tankegang: Zero Waste 1	
Keywords	Full-process co-creation, Pilot program, Zero-waste
Source	Interview with Stener Glamann
Description	
Actors	Tankegang as PR, AVV waste company, citizens of Hjorring & Bronderslev, university students for research
Issues	Reducing a communities waste to landfills to zero
Method	<p>Recruiting Participants: Stener approached the waste company AVV with the idea. After they agreed to allow a pilot program, they advertised for participants using Facebook and local media ads. They stressed improvements and not absolutely no waste.</p> <p>During the pilot: The company simply gave the participants the goal of reducing their waste production, and the participants could request whatever tools they needed to be successful. Waste production was measured for each neighborhood of participants before the pilot, and then every 2 weeks until the end. The amount each neighborhood produced was posted on Facebook after every weighing.</p> <p>After the pilot: The pilot ended after 2 months where a big announcement was made with the results</p>
Result	<p>Recruiting participants: Advertisements recruited 128 families</p> <p>During the pilot: With the company's focus on reducing the waste in landfills, the open ended-ness created the opportunity for people to be ambassadors for their neighborhoods. Citizens went to the company with requests and ideas so they can sort better. One example of both is a citizen requesting communal bins at the end of his street so he could get the other five houses to participate. The weighing of the waste produced in different neighborhoods gave citizens a reference point to see how they were doing. Posting those numbers on Facebook created a competition between neighborhoods, and gave citizens extra incentive via Prospect Theory to change their own behavior</p> <p>After the pilot: The participants reduced their waste to landfills by over 50% in the 2 months of the pilot. Four years later the results were still showing in a consistent increase in sorting across both municipalities. The company AVV gained a new relationship with their citizens that was more open and personal.</p>

	The idea of Zero-Waste communities gained publicity and inspired Tankegang & AVV's next Zero-Waste Community.
--	---

Part IX: Tankegang: Zero Waste 2

Keywords	Full-process co-creation, Pilot program, Zero-waste
-----------------	---

Source	Interview with Stener Glamann
---------------	-------------------------------

Description

Actors	Tankegang as PR, AVV waste company, citizens of Tversted, university students for research
---------------	--

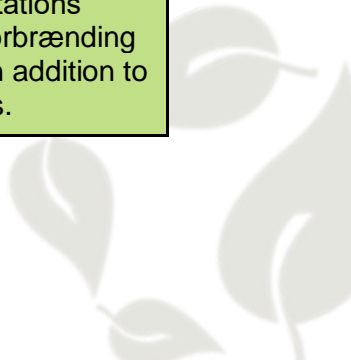
Issues	Reducing a community's waste to landfill to zero for an entire year, small town with a lot of summer homes
---------------	--

Method	<p>Recruiting Participants: Stener approached the waste company AVV with the idea based off of their first Zero Waste Project, and once again AVV agreed to try the experiment. After they agreed to allow a pilot program, they advertised for participants using social media, local media ads, and on the municipality's website, while also making a Facebook group. Stener and AVV held an initial engagement meeting to see if the citizens of Tversted would be willing to take on this project, and 100 citizens attended giving positive feedback. To engage with the whole community, the waste facility held an exhibition with the theme Zero Waste. There were a lot of fun activities, such as families would cook a meal for themselves and save the waste, and the piles of waste showed them just how much they threw away in just a single meal. Another example was a fashion show with kids wearing secondhand clothes to show how old clothes can be repurposed. They played a short film talking about the concept of Zero Waste, and also provided information on how to reduce waste. Small details of the exhibition that made an impact were every chair was old or reused and every coffee cup was different (not used)</p> <p>During the pilot: The Facebook page contained all the information required including instructions and meeting schedules. Waste production was measured for each neighborhood of participants before the pilot, and then every 2 weeks until the end. The amount each neighborhood produced was posted on Facebook after every weighing. Schools began teaching waste education in classrooms across all age levels. To keep the project relevant, Stener continually posted articles online and on Facebook, especially at progress points. Sorting station employees receive comprehensive training to deal with the increased demand (not done right away)</p>
---------------	--



	After the pilot: The pilot ended after 12 months where a big announcement was made with the results
Result	<p>Recruiting participants: The advertisements recruited 100 citizens to attend the initial engagement meeting which allowed the project to continue. The Zero Waste Exhibition recruited 300 homes to attend the event (nearly the entire year-round population), and it gained full participation from those families. The fun activities engaged citizens on a very personal level, and details of the event portrayed just how many life cycles a product can have.</p> <p>During the pilot: The ambitiousness of the project created a large public and media following, with 12,000 people joining the Facebook group in the first 6 months, and the story breaking national headlines. The town was covered in reporters and journalists interested in the story.</p> <p>After the pilot: The participants did not manage to reduce their waste to landfills to “Zero” in the 12 month span of the pilot, but the project was still considered a success by Stener. 4 years later the positive results are still showing in a consistent increase in sorting of the entire municipalities. The company AVV gained a new relationship with their citizens that was more open and personal.</p>

Part X: Vestforbrænding: YouTuber Competition	
Keywords	YouTube, Gamification, Youth Engagement
Source	Interview with Allan Laumann
Description	
Actors	Gex: a Danish YouTuber, School children within Vestforbrænding’s municipalities, Vestforbrænding’s Communications team
Issues	Engaging with youth populations to generate ideas about the waste system
Method	Vestforbrænding’s Communications team partnered with Gex, a famous Danish YouTuber in order to create videos for use at Vestforbrænding’s recycling stations. In the videos that Gex made, he provides information about specific aspects of the waste system, and then encourages those watching to participate in a competition that the videos were made for. Although the program has not yet been fully implemented, Gex’s waste videos will be made available to individuals only while they are physically at one of Vestforbrænding’s recycling stations through the scanning of a physical code. Targeted at students, Vestforbrænding plans for the videos they made in collaboration with Gex to be used in addition to educational programs that Vestforbrænding already offers to students.



	<p>Vestforbrænding plans to use Gex's notoriety and youth appeal to encourage youth to engage with their video competition.</p> <p>Following the videos in which Gex provides students with knowledge about the waste system, students are given the task of making their own videos and sending them in to Vestforbrænding's Communications team. Students will be given the task of coming up with ideas on how to address or solve issues within the waste sector that Gex's videos helped to educate them about. As incentive, Vestforbrænding plans to offer the chance to meet Gex in person to the top five video submissions that they receive during the course of their competition.</p>
Result	Program has not occurred yet.

Part XI: Vestforbrænding: Collaboration with KEA Design Students	
Keywords	University Collaboration, Design Students
Source	Interview with Henrik Dalgaard
Description	
Actors	Design Students from KEA, Vestforbrænding company representatives, Educators at KEA
Issues	Utilizing the design focused minds of KEA students to form ideas on how to address common problems faced by the waste sector
Method	<p>Vestforbrænding partnered with KEA, a Danish Design School, and created the curriculum for a course that the university offered to its student body. During the course, representatives from Vestforbrænding and other waste professionals provided technical explanations to students within the classes in order to educate them on less accessible specifics of the waste sector. After providing students with a sufficient background on the waste sector, the curriculum of KEA's course proposed seven "themes" that all represented common challenges faced by the waste sector. Students within these classes formed into teams and each team generated a developed idea to solve one of the seven areas that was proposed to them. At the conclusion of the course, teams of students delivered their ideas in the form of project proposals to a panel of representatives from KEA and Vestforbrænding.</p>
Result	Over 130 students from KEA participated in the course over the time that it was active. Although discontinued in 2012, during the time that it was active, the course resulted in the development of 27 different project proposals. This program allowed for waste professionals and design thinkers to combine their expertise and knowledge to form innovative ideas on how to address common issues faced in the waste sector.

Part XII: Tingbjerg via Katzenmark: Facilities Ambassador	
Keywords	Personal engagement, user ideation, community support
Source	Personal interview and site visit to Tingbjerg Community with Anne Bisgaard of Katzenmark and Facilities Manager John
Description	
Actors	Community residents, community facility manager, Katzenmark communications advisor
Issues	Informing migrant community on best sorting and collection practices
Method	As new members of the community move into the Tingbjerg apartment complex, they are coached on how to sort their waste by the various community Facilities managers, who manage, among other things, the collection of waste and proper sorting in the community. One of those managers, John, has been extremely engaged with the influx of residents over the past few decades, and he enjoys working with and helping the residents. To this end, Katzenmark has used him as a channel through which to further encourage and remind resident to sort their waste. This was done physically through an advertisement campaign of a large billboard and several pamphlets and flyers delivered to residents. Additionally, John and the other the facilities managers met with the various clubs, church groups, and other community-based organizations to provide opportunities of resident input to the ambassadors who can affect change.
Result	The advertisement and ambassador campaign has resulted in a strong dialogue for improvements between the facilities managers and the residents. Ideas currently in development include kindergarten education at the local schools by the ambassadors; a waste info day for the community; a community yard sale to divert waste; and a barbeque to pick up trash in the community.

Part XIII: Glostrup Forsyning: Professional Facebook Chat	
Keywords	Peer co-creation, exploration, ideation
Source	Interview with Sofie Lauritsen at Glostrup Forsyning office
Description	
Actors	Communications representatives and employees of municipal utility companies, which are responsible for many of the same utilities.

Issues	The non-standard structure of the utility industry in Denmark makes collaboration and openness between the various governments, utilities, and private companies difficult at times, especially for smaller companies with one- or two-person communications or marketing teams.
Method	Recognizing a need for improved communication and collaboration, a 12-person group of communications personnel representing 10 companies across Denmark have formed a private Facebook chat. The group meets in-person quarterly to discuss good and bad practices each of them has experienced in their work, the company, and/or the sector.
Result	With the group in operation since January 2018, there have been many conversations in the Facebook chat as well as an in-person meeting.

Part XIV: Naboskab: Copenhagen Kommune Legislation	
Keywords	Community Involvement, Citizen Behavior, Urban Waste Bin Placements
Source	Interview with Kristoffer Ravnbøl
Description	
Actors	Residents of Copenhagen, Copenhagen Municipality, Employees of Naboskab
Issues	Public officials of the Copenhagen Municipality recruited employees at Naboskab to evaluate ways to increase citizen participation in recycling rates. Naboskab directly investigated the placement of public sorting bins within the streets of Copenhagen.
Method	Consultants at Naboskab identified the improvement placement of public sorting bins as a potential opportunity to increase recycling rates of municipal waste. Naboskab consultants investigated the behaviors of Copenhagen citizens when sorting their waste at communal recycling bins. Through the use of 602 questionnaires, 40 short interviews, and 15 long-term interviews, Naboskab gathered insight on citizens' willingness to travel to recycling bins. A mix of questionnaire data on how far citizens were willing to walk to bins and having citizens physically walk to bins to gather practical data was helpful for Naboskab in uncovering a lack of effective estimation as to citizens' behaviors. Polling of citizens took place within the streets of Copenhagen, in the citizens' homes, at recycling stations.
Result	From their investigation, consultants of Naboskab gathered preferences of Copenhagen citizens on the distance they were willing to travel to sort their waste at communal recycling bins. Consultants gathered findings that highlighted specific behaviors of Copenhagen citizens such as their preference to have all sorting fractions in one singular location. The findings from Naboskab's research

	were summarized into a report and provided to the Copenhagen municipality as a set of recommendations.
--	--

Part XV: Vestforbrænding: Classroom Spaces	
Keywords	Education, students, ideation, engagement
Source	Interview with Allan Laumann
Description	
Actors	Vestforbrænding Communications team, waste educators, primary and secondary school students
Issues	In Denmark, there is a requirement for students to be educated in the utility sector. Also, Vestforbrænding recognizes the value in generating ideas in citizens of all ages so that the sector can be improved in operation and ideation for the long-term.
Method	The five education centers engage hands-on with the users, and provided a better understanding of waste, energy, and utilities in the home. In operation the centers are run by a staff of 11 educators that guide the children, students, residents, and professionals - all of which are welcome. Preference is given to the 300 schools of the 19 municipalities Vestforbrænding serves, and with other learners the facility expects 30,000 persons to be engaged this year alone. Vestforbrænding's size affords them the ability to pursue such endeavors - it costs them 10,000,000 DKK per year to operate the education centers, and 11,000,000 DKK to build a center and develop its curriculum.
Result	Each year the number of people that go through the education centers increases - this year they expect 30,000 people. By providing a space with the relevant information the citizens in Vestforbrænding's jurisdiction need, the company is fulfilling and making easier the education of students for school. Also, the company gains a more informed customer base for better operations, e.g. at-home waste sorting. While the information being shared in this method is mainly one-way, the indirect result is a more collaborative relationship between the waste company and the citizens they serve.

Part XVI: Danish Waste Association: Common Waste Pictograms	
Keywords	Sorting, Communication, Homogeneity, nationwide implementation
Source	Interview with Niels Toftegaard, Communications Consultant at the DWA

Description	
Actors	KL (Danish Association of Municipalities), Danish Waste Association (DWA), Danish Environmental Protection Agency, and design agency FUTU
Issues	There is not a universal sorting system by which all of the residents of Denmark can comply. At the very least, there is not even a common set of graphics to define certain types of waste and waste categories.
Method	In collaboration with the Association of municipalities and the Danish EPA, the DWA has been working to create and implement a set of graphics for waste sorting across Denmark. Many waste companies, supermarkets, municipalities, and Council of Consumers, and IKEA were interviewed to determine how large the opportunity was to make such a change that affects so many areas of life in Denmark. Several workshops were held in which people from municipalities and municipal waste companies could weigh-in on the issue as well. Extensive mapping of all the different icons in current use by municipalities was conducted, with some having as many as 20 different icons for the same fraction. Further, a public survey was conducted to gather response from everyday Danes.
Result	The survey resulted in 2500 responses to the proposed icon system. The prototypes were sent to one of the forums the DWA has with its members to be put to debate. A first stage was set up such that 17 waste icons were to be used for household collection starting in January 2017, and the second stage was to expand the icon number to 50 for recycling stations. Further specialty might be needed from municipality to municipality, since waste produced in an urban area is very much different than that which is produced in the countryside.

