IIIEE Theses 2024:XX

Unraveling the Fabric of Waste in King County

An evaluation of the post-consumer textile waste management system and repair/reuse landscape in King County WA, USA

Alexa Malick

Supervisor

Naoko Tojo

Thesis for the fulfilment of the
Master of Science in Environmental Management and Policy
Lund, Sweden, May 2024

Published in 2015 by IIIEE, Lund University, P.O. Box 196, S-221 00 LUND, Sweden,
Tel: +46 – 46 222 02 00, Fax: +46 – 46 222 02 10, e-mail: iiiee@iiiee.lu.se.

ISSN 1401-9191

Acknowledgements

There are many people I would like to thank who helped me get through the thesis writing process, both in regard to getting words on paper and offering immense emotional support.

I would like to thank my parents. Thank you Mom and Dad for having weekly meetings with me, reading my drafts, and helping me manage my stress. I appreciate your extremely positive (although biased) feedback. It is always helpful to have cheerleaders in your corner. Thank you for always being there for me.

I would like to say a big thank you to Naoko Tojo for being such a supportive and insightful supervisor. Thank you for taking the time to carefully read my drafts and give me thoughtful feedback. I also want to say thank you for encouraging me to stay positive when I was feeling a bit lost in the process. Your support truly made me feel confident in my abilities.

I would like to say thank you to Louis. Thank you for listening to me ramble trying to make sense of my thoughts (those ramble sessions were actually very helpful), and for offering me so much emotional support.

I would like to thank Liu for being my study buddy. I don't know how I would have finished writing if we hadn't gotten through it together.

Lastly, I would like to thank B29. It has been a privilege to go through this experience with everyone and I am so grateful for all the mental breaks I had because of my batchmates.

Abstract

The environmental and social impacts from the textile value chain have resulted in increased interest and involvement from various stakeholders, one of which being local government. As a means to address the negative impacts of the textile industry, circular economy theory has been adopted by many stakeholders, often using the term 'circular fashion.' A critical component of circular fashion is appropriate management of a textile's end-of-life (post-consumer waste management), a component often handled by government waste systems. This research explores the topic of local government involvement in post-consumer textile waste management systems, through a case study approach, to contribute to the knowledge of textile circularity. King County, WA, US is used as a case study to explore the topic from a practical perspective. This research intends to contribute specifically to the US context. Post-consumer textile waste management is investigated through two approaches: (1) King County's textile waste intervention, Threadcycle, which intends to educate residents about proper textile waste disposal practices, and (2) King County's repair/reuse landscape. An ex-post policy theory-driven evaluation is conducted for Threadcycle to assess the effectiveness and relevance of the intervention, while a comparative analysis is conducted between King County's repair/reuse organizations and current literature to identify critical components for such organizations to be successful. As a result of this research, it is proposed that *Threadcycle integrate the existing repair/reuse landscape into the intervention to better address textile circularity and increase alignment with King County's waste goals*. The findings indicate ways in which local governments in the US can address textile waste and additionally, the research identifies *goal alignment, paid employee(s),* and *residential interest* as critical components for repair/reuse organization's success, as well as *an integrated network amongst repair organizations* as a strengthening factor for success.

Keywords: Post-consumer textile waste management, garment repair, local government intervention

Executive Summary

Background and Problem Definition

The negative environmental and social impacts of the textile value chain are immense (Ellen MacArthur Foundation, 2017). Clothing represents more than 60% of global textiles used (Ellen MacArthur Foundation, 2017), and therefore, clothing is a critical component in the discussion regarding the impact of textiles. Most of the negative impacts from the textile value chain occur during the production and consumption stage (UNEP, 2023). However, in regard to the growing interest in promoting a circular economy, effectively managing a textile's end-of-life is vital (Dagilienė et al., 2021) and "has strong potential to reduce the impacts from textiles production" (UNEP, 2023, p. 33). One of the most effective ways to promote circularity and, consequently, reduce the negative impacts of the textile value chain, is to reduce consumption through extending a garment's useful lifetime (UNEP, 2023). To support garment life extension, garment repair can be utilized. Therefore, repair plays an important role in the end-of-life efforts to reduce the negative impacts of textiles and promote circularity.

Currently, the US is a leading contributor to the environmental and social issues pertaining to the textile value chain due to disproportionately low garment use rates in relation to other countries (Ellen MacArthur Foundation, 2017) and high landfill rates (US EPA, 2023). Literature points to the importance of government involvement in addressing a textiles' end-of-life and post-consumer textile waste management options (Bukhari et al., 2018; Hawley, 2014; Juanga-Labayen et al., 2022, 2022; K. A. Schumacher & Forster, 2022; K. Schumacher & Forster, 2022), however, little US case specific research has been conducted to evaluate how local governments are addressing textile waste. This lack of research presents an opportunity to investigate a local level post-consumer textile waste initiative in the US from a case study perspective to understand and evaluate such a system.

King County, WA, was chosen as an ideal case to explore and understand the local government's role in the post-consumer textile waste management system for three primary reasons: (1) King County is located in the US, (2) King County established a textile waste management intervention called Threadcycle in 2011 to address textile waste, and (3) King County has progressive zero-waste initiatives which support various repair organizations. Therefore, King County makes an ideal case to evaluate an established textile waste management government intervention and an existing repair/reuse landscape.

Aim and Research Questions

The aim of this research is to contribute to the enhancement of textile circularity by exploring the post-consumer textile waste phenomenon in the US from a practical perspective, specifically that of King County, WA. The case focuses on two angles: the current textile waste management system and the current repair landscape. While conducting a case study of King County is not by definition generalizable to the entirety of the US, it can serve as a basis for understanding the overall post-consumer textile waste phenomena in the US through practical knowledge rather than theoretical (Flyvbjer, 2006).

In order to achieve the aim, the researcher seeks to answer the following research questions:

> RQ 1(a) *'How is Threadcycle intended to operate?' (b) 'is Threadcycle effective in achieving its stated aims?' (c) 'is Threadcycle relevant in regard to how it addresses the issue of post-consumer textile waste?'*
>
> RQ 2(a) *'how does the existing garment repair/ general repair/reuse landscape in King County operate?' and (b) 'what are the current drivers and barriers they face?'*

RQ 3 (a) *'How can Threadcycle incorporate repair initiatives to align with their waste goals' and (b) 'how can King County help improve local repair/reuse organizations?'*

Research Design

This research presents a case study of King County's current textile waste management intervention, Threadcycle, and current repair initiatives within King County. A case study approach was chosen as it allowed for an in-depth exploration of Threadcycle and the current repair/reuse landscape in King County, allowing the researcher to understand *how, what,* and *why* the specified events are operating the way they are (Crowe et al., 2011). The research was conducted in two phases, both of which utilize qualitative data gathered through interviews, relevant documents, and literature. The interviews were analyzed using an abductive coding approach for content analysis.

Phase I addresses RQ 1(a), (b), and (c), and supports RQ 3(a), through an ex-post theory-driven evaluation of Threadcycle. Conducting a theory-driven evaluation entailed the development of an intervention theory for Threadcycle, as well as utilizing the Five Core Principles for evaluation presented by Coryn et al. (2011). Two evaluation criteria were selected. They included effectiveness – *to what degree do the achieved outcomes correspond to the intended goals of the intervention and can the outcomes be attributed to the intervention?* – and relevance – *do the processes and goals of the intervention cover key environmental problems?*

Phase II addresses RQ 2(a) and (b) and supports RQ 3(a) and (b) through a comparative analysis of barriers and drivers of repair/reuse organizations' operations that were found in literature and barriers and drivers that were found within the King County landscape. To conduct a comparative analysis, guidance was taken from Rose (1991). Firstly, a matrix was developed which includes relevant literature and King County repair organizations on the y-axis and barriers and drivers (which were deemed 'critical components') on the x-axis. The matrix allowed for further analyzation of data and provided a method for 'quantifying' the impact of each component.

Results

Evaluation of Threadcycle

The evaluation of Threadcycle identified three primary breakdowns which hindered the assessment of the effectiveness of the intervention. The breakdowns are as follows: (1) a lack of coordination and communication between King County SWD/SPU and Threadcycle partners, (2) questionable post-consumer textile waste management assumptions underlying the intervention, and (3) a lack of alignment between Threadcycle and King County SWD/SPU waste management goals. In terms of the effectiveness of Threadcycle, it was found that the per-capita rate of textile disposal in King County/Seattle landfills decreased by 10% from 2011 to 2019/2020, however, the researcher could not attribute this decrease directly to Threadcycle. This is due to the three breakdowns presented above which indicate implementation failure. Therefore, the effectiveness of Threadcycle was deemed inconclusive by the researcher. In terms of relevance, it was found that while the intervention addresses an important waste issue (textile waste), the messaging does not adequately address waste prevention and instead prioritizes recycling and relies on strategies that have potential to reallocate waste. However, it was also found that Threadcycle's messaging regarding donation of damaged textiles is necessary and should continue to be promoted. Therefore, Threadcycle was found to be partially relevant but requires some alterations.

Repair/reuse landscape

The research conducted indicates that the existing repair/reuse landscape in King County is substantial and is growing. Through an assessment of barriers and drivers (critical components)

for operating repair/reuse initiatives, it was found that barriers and drivers faced in King County line up well with current literature on the topic. The *availability of space* was identified as a more prominent barrier in King County than found in literature which is likely due to the high housing costs in the Seattle area. Additionally, *goal alignment, paid employees* and *residential interest* were identified as critical components for successful operations and were not previously identified in literate. Further, *an integrated network between repair/reuse organizations* was identified as a strengthening component that was not previously identified in literature. The use of messaging in terms of calling on residents to reduce consumption was investigated to understand if current repair/reuse organization messaging matches with that of King County SWD/SPU and it was found to align well.

Conclusions and Recommendations

Proposal to utilize repair in Threadcycle

Due to the findings from both Phase I and Phase II, it is proposed that King County SWD/SPU harness the existing repair/reuse landscape in King County and incorporate it into the overarching Threadcycle message as well as the information that is provided when residents access the Threadcycle webpages. By incorporating the existing repair landscape into Threadcycle, the intervention will better align with King County's waste prevention priorities. In addition to partnering with repair and reuse organizations, it is recommended that residents be provided with digestible and actionable information about why they should repair to extend the life of their clothing and where they can find resources to assist with repair.

Additional suggestions for Threadcycle

In addition to providing information about repair, it is also critical that King County SWD/SPU continue to provide textile donation options. However, it is important that King County reevaluate Threadcycle's partner organizations, increase communication, and incorporate a method for accountability and transparency with partners. Threadcycle should continue to advocate for donation of damaged textiles rather than landfilling, however, King County must ensure all partners align with this sentiment (currently they do not). It is also recommended that information about the current issues pertaining to the textile industry (including production, consumption, and end-of-life/waste management options), be provided to residents. Further, it is recommended that the name 'Threadcycle' be changed to something that does not insinuate an effective textile recycling industry, but instead reflects the current reality of the textile waste management system.

Suggestions for King County to enhance local repair and reuse initiatives

It is suggested that King County utilize the results of this research to enhance their efforts to support the development of repair and reuse initiatives in the county. While many of the organizations have utilized grants offered through King County and the State of Washington, it was identified that affordability of space is still a barrier for expansion of efforts. Additionally, an interconnected network of such organizations was found to be a strengthening component, and therefore it is recommended that such a network continues to be fostered by the county. It is recommended that King County communicate with repair and reuse organizations to identify ways in which they can specifically assist with the finances and logistics of expansion projects as it would assist with King County's waste prevention agenda.

Contributions

The findings of this research reinforce the current challenges of post-consumer textile waste management in the US. Further, they speak to the role the local government can play in the textile waste system. In the case of Threadcycle, it was found that the intervention needs to increase waste prevention messaging, reevaluate the partnerships it has in place, introduce regulatory actions to ensure waste is being managed ethically, and ensure messaging aligns between the county and partner organizations. Additionally, it was found that Threadcycle can utilize the existing repair/reuse system in King County to contribute to waste prevention efforts.

Through an evaluation of repair/reuse organizations in King County, various critical components and strengthening components for successful operations were identified that were not found in previous literature. The critical components included goal alignment (plan for growth), residential interest, and paid employee(s). The strengthening component identified was an interconnected network of organizations. With such an understanding, King County and similar counties can better understand how they can contribute to the success of the existing repair/reuse organizations.

Table of Contents

List of Figures

List of Tables

Abbreviations

CE	Circular Economy
CF	Circular Fashion
EPA	Environmental Protection Agency
EPR	Extended Producer Responsibility
EU	European Union
MSW	Municipal Solid Waste
SPU	Seattle Public Utilities
SWD	Solid Waste Division
UNEP	United Nations Environmental Programme
US	Unites States of America

1 Introduction

The discourse on the environmental and social impact of the textile value chain has grown over the last few decades, and with clothing representing more than 60% of global textile use, clothing has become a central discussion point within the rhetoric (Ellen McArthur Foundation, 2017). When considering the global environmental and social impacts of textiles, there are numerous areas of concern, most of which stem from upstream production processes. Such impacts include the extreme amounts of water used for production (roughly 93 billion cubic meters annually), greenhouse gas emissions from production totaling 1.2 billion tons of CO_2eq., dependency on non-renewable energy for production, significant amounts of plastic in the ocean, hazardous chemicals contained in water discharge from production processes (primarily effecting countries in the Global South), dangerous working conditions, and low wages (Ellen MacArthur Foundation, 2017).

Although the environmental and social issues presented above have been identified and quantified, clothing production has continued to increase, and in parallel, clothing consumption has increased, perpetuating the issues further (Bukhari et al., 2018). Due to the increased availability of fast fashion[1], as well as a growing global middle class (Gwilt, 2014), global clothing production doubled between 2002 and 2017, a span of only 15 years (Ellen MacArthur Foundation, 2017). Further, in the same time span (2002-2017), clothing utilization decreased worldwide by 36% and it is estimated that half of the fast fashion that is produced, is disposed of in less than one year (Ellen MacArthur Foundation, 2017). Intensified clothing disposal rates have been attributed to both a decrease in clothing quality as well as industry driven planned obsolescence due to an increase in micro trends and availability of inexpensive clothing (McNeill et al., 2020). Naturally, higher consumption and disposal rates have resulted in both an increase in all the above mentioned environmental and social impacts, as well as a global increase of post-consumer textile waste, defined in this paper as "discarded garments or household textiles (sheets, towels, and pillowcases) that are worn-out, damaged, and outgrown or of no value to consumers" (Juanga-Labayen et al., 2022, p. 176). This definition of post-consumer textile waste expands beyond items that are considered unusable to also include items that are simply unwanted by the consumer, and therefore are disposed of.

End-of-life of textiles

Within the textile value chain, as is similar with all value chains, each segment results in different levels of environmental impacts in various impact sectors. In accordance with life cycle assessment research conducted by the United Nations Environmental Programme (UNEP), in terms of climate, the textile production stage has the largest impact, followed by the consumption stage, the yarn and fabric production stage, fiber production stage, and finally, end-of-life which contributes nearly 0% of the climate impacts within the values chain (UNEP, 2023). End-of-life constitutes collection and sorting of textiles as well as landfilling and waste to energy (UNEP, 2023). In terms of freshwater use and water scarcity, all stages of the value chain have nearly equal footprints apart from end-of-life, again making up roughly 0% of the overall footprint (UNEP, 2023). In terms of land use, fiber production dominates with lesser percentages in all other categories besides end-of-life, where again it is nearly 0% (UNEP, 2023).

Although end-of-life constitutes nearly 0% of all these impact categories, it does not mean there are no negative impacts, rather, the proportion of the impact coming from the disposal stage is so minute compared to the other stages that it rests at roughly 0%. While this data makes the

[1] Fast fashion is characterized by quick production turnaround rates, increased clothing collections offered per year, increased clothing variety, mass production and low prices (Bukhari et al., 2018; Ellen MacArthur Foundation, 2017).

end-of-life stage of textiles seem insignificant, the impact textile waste has, both on the environment and on human health (due to emissions and hazardous chemicals) is substantial, and therefore should not be neglected in the textile value chain discussion (Bukhari et al., 2018). Further, implementing infrastructure to manage a textile's end-of-life is a vital component within the growing interest in transitioning to a circular economy (CE) (Dagilienė et al., 2021). The UNEP defines circularity "as an approach where materials are kept at their highest possible value as they move and are retained as long as possible within the value chain" (UNEP, 2023, p. 33). Further, the UNEP states that increased circularity within the textile value chain "has strong potential to reduce the impacts from textiles production" (UNEP, 2023, p. 33), the most impactful sector of the value chain. Therefore, to contribute to circularity of textiles and reduce impacts from across the value chain, the end-of-life stage must be considered.

While the CE has been met with varying opinions, for the sake of this research, the concept will be accepted as an important underlying current within the discussion of post-consumer textile waste, and therefore acts as the guiding theory for this research. This is due to the prevalence of the concept within the current rhetoric regarding textiles. In fact, the term circular fashion (CF) has been developed from the concept of CE. Dissanayake & Weerasinghe (2021) state that CF requires moving beyond a focus on the "traditional waste management and recycling [system]. It is a system where resource consumption is reduced, production of efficiencies are increased, sustainable inputs are sought and materials are repaired, recycled, and reused, rather than [thrown] away" (p. 29). This explanation of CF further highlights the importance of addressing a textile's end-of-life, in addition to other stages of the value chain.

In line with the environmental and social need to address end-of-life of textiles, as well as growing attention towards a circular transition, increased interest in managing textile waste is emerging across various governmental and non-governmental organizations worldwide. This effort can be realized, for example, through organizations such as the United Nation Environmental Program and the Ellen MacArthur Foundation who have published research pertaining to a circular transition of the textile industry, as well as political action such as the EU's *Strategy for Sustainable and Circular Textiles*, France's implementation of Extended Producer Responsibility (EPR) for textiles, The American Circular Textiles initiative (ACT), and California's push to implement an EPR system for textiles.

Political interest in textiles in EU and US

In the EU, progress is being made toward implementing *the Strategy for Sustainable and Circular Textiles* initiative which aims to require that products are designed for durability, reusability, repairability, recyclability, and energy-efficiency (European Commission, 2021). The initiative falls within the European Green Deal and the Circular Economy Action Plan (European Commission, n.d.).

France is the first country to have fully implemented an extended producer responsibility (EPR) scheme for textiles (Bukhari et al., 2018), and Sweden, along with other Nordic countries are currently following suit (Regeringskansliet, 2020). Through their EPR scheme, France has set a 50% collection target for the annual sale of clothing, linens, and footwear, with a material recovery goal of 95% (Bukhari et al., 2018). Through such EPR schemes, producers are financially and organizationally responsible for the collection and management of their waste, this in turn aims to motivate producers to create products that are durable, and repairable, as well as providing incentive for innovative recycling systems (Bukhari et al., 2018). Implementing an EPR scheme demonstrates the importance of considering a textile's complete life span as it forces the producer to be mindful of the end-of-life phase of the product.

In the US, there are few state level initiatives, that have not yet passed, aiming to address various components of the environmental and social issues facing the apparel industry. Firstly, California is working towards implementing *The Act for Responsible Textile Disposal and Reuse* which entails implementation of an EPR system in the state. Secondly, New York State is pursuing implementation of the *Fashion Sustainability and Social Accountability Act* which primarily focuses on supply chain management and controlled chemical use within the textile value chain (The Fashion Act, n.d.). The *Fashion Sustainability and Social Act* primarily focuses on upstream efforts rather than end-of-life, however the push for such legislation further highlights the political interest in reducing the negative impacts of the textile industry. From a national perspective, *American Circular Textiles* (ACT), is a coalition of "leading organizations driving circularity in the US" who are working to implement circular fashion policy throughout the nation (ACT, 2024). The initiatives presented above are the only US initiatives identified by the researcher that are of a similar magnitude to the policy initiatives identified in the EU (as of Spring 2024).

Textile consumption and repair

Life cycle assessments have shown that one of the most effective ways to reduce the negative impacts from the textile value chain is to reduce consumption through extending a garment's useful lifetime (UNEP, 2023). Extension of a garment's life, and subsequently a theoretical reduction of garment consumption, aligns with end-of-life efforts as this practice results in a decrease of textile waste (Moalem & Mosgaard, 2021). To aid garment life extension, garment repair can be utilized. Further, repair plays a critical role in the transition towards a circular textile system as it prioritizes waste prevention (McQueen, McNeill, Huang, et al., 2022).

Repair can be performed through various avenues, including, self-repair - the user repairs one's own items, unpaid repair - a non-user performs the repair and is not financially compensated, or paid repair - a non-user performs the repair and is financially compensated (McQueen, Jain, et al., 2022). Further, repair opportunities can be realized through the producing company/one of their licensed repairers, independent repairers, for-profit/not-for profit organizations, community groups and private people (Bradley & Persson, 2022).

A reduction in textile consumption aided by repair additionally addresses issues pertaining to textile exportation. Textile exportation is a common practice in the US and the EU for managing textile waste, however, in many cases it has become a burden on countries in the Global South, a topic that will be expanded upon in section 3.1.3 (Bukhari et al., 2018; K. A. Schumacher & Forster, 2022; Sonnenberg et al., 2022).

1.1 Problem definition

The following section presents why it is critical that the US be involved in the discussion regarding the environmental and social impacts of textile waste. Additionally, the importance of local government action on the issue is addressed. Lastly, the case of King County, WA, USA is presented in regard to the local government's current textile waste management initiative, Threadcycle, and the current repair landscape in King County.

1.1.1 US's contribution to the impact of textiles

Although the US is in its initial stages of addressing the environmental and social impact of the textile industry, as exemplified through current policy initiatives presented in section 1, the country is a leading contributor to the environmental and social issues pertaining to the textile value chain. In the US, according to statistics from 2017, clothes are worn one quarter as long as the global average (Ellen MacArthur Foundation, 2017). According to the United States Environmental Protection Agency (EPA), landfills in the US received 11.8 million tons of textile waste in 2018, the majority of which came from clothing (US EPA, 2023). It is estimated that

textile waste makes up 7.7% of all municipal solid waste (MSW) landfilled in the US by weight (US EPA, 2023). While the impacts of the textile value chain span the globe, it is clear that the US plays a leading role in perpetuating the impacts of the textile industry both through extremely high levels of consumption and disposal and many a missed opportunity to divert textiles from the landfill.

While the impact of textiles is a pressing issue, and the US is a leading contributor to said issue, any state scale initiatives, such as *The Act for Responsible Textile Disposal and Reuse* in California and the *Fashion Sustainability and Social Accountability Act* in New York, will likely take much time to establish. Although slow implementation of statewide policy is expected, various literature still points to the importance of government involvement and the variety of opportunity the government has to both be involved in and encourage further research into the topic (Bukhari et al., 2018; Dagilienė et al., 2021; Juanga-Labayen et al., 2022; K. A. Schumacher & Forster, 2022). There are various forms of government initiatives explored within literature that are relevant across different sectors of the textile value chain, including the local government's involvement in managing post-consumer textile waste.

Much research has been conducted to investigate the issues relating to textile waste from both a global and a US perspective, articulating the challenges of textile collection, sorting, repair, recycling, and exportation, as well as the ways in which different actors can be incorporated to reduce textile waste and improve the waste management system (Bukhari et al., 2018; Hawley, 2014; Juanga-Labayen et al., 2022, 2022; K. A. Schumacher & Forster, 2022; K. Schumacher & Forster, 2022). However, only one case study on the topic of post-consumer textile waste management conducted within the US was identified by the researcher. The case study, by Newell (2015), focuses on textile recycling in New York State, and primarily discusses the state's private textile management actors. The study did not focus on the opportunities of repair in regard to managing post-consumer textile waste, nor did it have a strong focus on the role of local government. Therefore, there is a lack of case specific research on public sector initiatives to address and reduce post-consumer textile waste in the US. This lack of research presents an opportunity to investigate a local level post-consumer textile waste initiative in the US from a case study perspective to understand and evaluate such a system.

1.1.2 Threadcycle Intervention

In Washington State, US, King County's Solid Waste Division (SWD) and Seattle Public Utilities (SPU) have together taken action to address the high levels of textile waste going to the landfill through an intervention called Threadcycle. In 2014, King County LinkUp, an initiative to expand recycle markets in King County, chose to investigate post-consumer textiles because they were identified as a substantial waste stream that could be diverted (King County, 2014). Thereafter, in 2015, King County SWD developed Threadcycle, a local government intervention to raise awareness, educate residents, and partner with textile collection organizations throughout the county to divert post-consumer textiles from the landfill (King County, 2014).

According to a meeting with Alex Erzen, a project manager at King County SWD and Hannah Scholes, a policy analyst at King County SWD, the primary goal of the intervention was to address the patchwork messaging that had previously been conveyed within the county and inform citizens that most all textiles can be donated, even those that are damaged. Initially, informational campaigns were dispersed throughout the county, but have since ended. Since 2017 the program has lain dormant, however, information is still available online. Currently, as rhetoric around textile waste is increasing, residents are becoming more aware of issues relating to what happens to textile waste after it has been donated. Therefore, King County SWD has been receiving increased questioning regarding what is happening to their textile waste when

donated. As Threadcycle partners with independent organizations to manage textile waste, King County does not have this information and therefore cannot answer citizens' questions.

Despite the current dormant state, the Threadcycle intervention can serve as a valuable case study, providing an example of how governmental involvement with post-consumer textile waste management operates from a local perspective in the US. As the intervention was introduced nearly ten years ago, an ex-post policy evaluation of the program can inform if the initiative is accomplishing its goals. King County poses as an ideal candidate for an evaluation as they pride themselves on being advanced in terms of waste management. This can be seen through their various county wide and statewide initiatives that promote waste prevention. Further, the City of Seattle deems itself an international leader in solid waste management (Seattle Public Utilities, n.d.). With such high waste management standards, a case study of a local government initiated post-consumer textile waste management in King County is valuable.

1.1.3 Repair initiatives

Relative to King County's progressive waste goals, various repair and reuse initiatives have developed throughout the county, some of which include garment repair. These initiatives further support the value of pursuing a case study of King County as there is opportunity to understand and evaluate how these initiatives are operating and how they can be used to enhance King County's current method to address post-consumer textile waste. Much research has been published to identify drivers and barriers citizens face when deciding to repair a garment, but lesser was found that identifies factors that aid to or hinder the success of local repair initiatives. Further, often this research solely focuses on repair initiatives and does not connect these initiatives to local waste management strategies.

1.2 Aim and Research Questions

The aim of this research is to enhance the understanding of the circularity of textiles by exploring the post-consumer textile waste phenomenon in the US from a practical perspective through a case study, specifically that of King County, WA. While conducting a case study of King County is not by definition generalizable to the entirety of the US, it can serve as a basis for understanding the overall post-consumer textile waste phenomena in the US through practical knowledge rather than theoretical (Flyvbjer, 2006).

The research focuses on both Threadcycle, a governmental initiative to address textile waste, and the various repair/reuse initiatives throughout the county. It does this by (1) conducing an ex-post policy evaluation of King County SWD/SPU's current textile waste management initiative, Threadcycle, (2) understanding what repair initiatives operate in King County and how they are running, and (3) making a connection between Threadcycle and current repair operations to understand how they can align to strengthen King County's post-consumer textile waste management system.

In order to achieve the aim, the researcher seeks to answer the following research questions:

> RQ 1(a) *'How is Threadcycle intended to operate?' (b) 'is Threadcycle effective in achieving its stated aims?' (c) 'is Threadcycle relevant in regard to how it addresses the issue of post-consumer textile waste?'*
>
> RQ 2(a) *'how does the existing garment repair/ general repair/reuse landscape in King County operate?' and (b) what are the current drivers and barriers they face?*
>
> RQ 3 (a) *'How can Threadcycle incorporate repair initiatives to align with their waste goals' and (b) 'how can King County help improve local repair/reuse organizations?'*

1.3 Scope and Delimitations

The focus of this empirical research is on King County, WA. The goal of this case study is to cover all of King County, however, due to the differences in population density, as is expanded upon in section 2.2.2, the City of Seattle was represented more than others. The choice of utilizing King County as a case is expanded upon in section 2.2.2. The geographical scope of this research encompasses King County and additionally utilizes literature that has been conducted outside of Washington. For the purpose of pursuing a case study, interviews were used as the primary data source to enable an understanding directly from the perspective of participants.

1.4 Ethical Considerations

The presented research design has been reviewed against the criteria for research requiring an ethics board review at Lund University and has been found to not require a statement from the ethics committee.

The researcher is loosely working in partnership with King County SWD. King County SWD is providing the researcher with some contacts and relevant official reports. However, the researcher is not being compensated to any degree. Additionally, the researcher is fully guiding the research process. King County SWD has no direct influence on the people the researcher chooses to speak with or the questions the researcher asks.

All participants in the presented research have voluntarily signed a consent form that clearly articulates the intention of the research and potential benefits and risks of participating in the study. The consent form allows the researcher to use the information gained from the interview in the research. Further, participants were asked if they would like to remain anonymous in the study. If so, appropriate action to maintain their anonymity was taken. Participants were encouraged to ask questions and had the option to leave any questions unanswered or opt out of the study at any point. Participants are not being compensated by the researcher or King County SWD in any form.

All interview and survey data were stored on the researcher's personal OneDrive account which was password protected. Direct interview data was not shared by the researcher. Data was analyzed through the Word application and was not shared.

1.5 Audience

The presented research aims to contribute to the academic discussion regarding post-consumer textile waste management in the US. In addition, the researcher intends to reach government officials and provide a greater understanding of the steps they can take to positively impact the textile value chain. The researcher additionally intends to provide case specific research for King County SWD and SPU to aid in the eventual revelation of the Threadcycle intervention.

1.6 Disposition

This paper is structured as follows. Chapter 2 presents the research design and methods used for collecting and analyzing data. Chapter 3 presents a literature review of existing research that is relevant to textile waste management and repair initiatives. Chapter 4 provides an overview of King County's current waste management landscape with a specific focus on the Threadcycle intervention. Chapter 5 presents the findings and analysis for Phase I, an evaluation of Threadcycle. Chapter 6 presents the findings and analysis for Phase II, an evaluation of the current repair landscape in King County. Chapter 7 provides a discussion that intends to integrate findings from both Phase I and Phase II to answer RQ3. Chapter 8 provides final conclusions and suggestions for future research.

2 Research Design and Methods

The following chapter presents both the design and methods utilized for the presented research. The research is divided into two phases, Phase I, evaluating Threadcycle, and Phase II, investigating the current repair/reuse landscape in King County.

2.1 Overview of the methodological approach

This research presents a case study of King County's current textile waste management initiative Threadcycle and current repair/reuse initiatives within King County. The research was conducted in two phases and will be differentiated throughout this paper. Phase I was used to answer RQ 1(a) *'how is Threadcycle intended to operate?'* (b) *'is Threadcycle effective in achieving its stated aims?' and* (c) *'is it relevant in regard to how it addresses the issue of post-consumer textile waste?'* To address these research questions, an ex-post theory-driven evaluation of King County's post-consumer textile waste initiative, Threadcycle, was conducted. Qualitative research, obtained through five interviews with carefully selected stakeholders, relevant documents, and a literature review, were used to conduct the evaluation. Content analysis was the method used to analyze data.

Phae II of this research was used to answer RQ 2(a) *how does the existing garment repair/ general repair/reuse landscape in King County operate?' and (b) 'what are the current drivers and barriers they face?'* A comparative analysis between interview data and current literature was used to explore the current landscape. Qualitative data was obtained through semi-structured interviews with eleven relevant stakeholders involved in various types of repair/reuse initiatives in King County, relevant documents, and a literature review. The interviews were analyzed using the content analysis method. The findings from Phase I and Phase II were used to answer RQ 3(a) *'how can Threadcycle incorporate repair initiatives to align with their waste goals?' And (b) 'how can King County help improve local repair/reuse organizations?'* RQ 3(a) and (b) are elaborated on in the discussion chapter of this paper.

2.2 Research Design

The following section presents the methods used to guide the research process of both Phase I, an ex-post policy evaluation of Threadcycle, and Phase II, a comparative analysis of King County's garment repair initiatives and current literature. This section begins with an overview of how literature was used within the research process. Following, the decision to conduct a case study is expanded upon. Thereafter, the research design for evaluating the Threadcycle intervention is discussed and finally, the methods for conducting a comparative analysis are explained.

2.2.1 Literature Review

Conducting a literature review is a critical component within a research project as it prompts the researcher to identify, read, and analyze literature that has previously been conducted within their field of interest (Blaxter et al., 2010). With such an understanding, the researcher can provide rational for their chosen work as well as establish concepts and theories that can be utilized (Blaxter et al., 2010). Blaxter et al. (2010) encourages the use of literature reviews to facilitate comparisons between existing literature and the author's research. Utilizing the literature review as a vehicle for comparison and supporting evidence/justification for results is an important element to the presented research. This is prominent in both Phase I and II of the research but is utilized in different ways.

The literature review is presented in Chapter 3 and is broken down into four parts. Section 3.1 provides an overview of post-consumer textile waste management with a focus on the US context and is intended to provide support for Phase I, the evaluation of Threadcycle. Literature

is used to provide context that would not be achieved through interviews including specifics about textile exportation and the textile recycling process. Section 3.2 provides an overview of research pertaining to garment repair initiatives and supports the investigation of the repair/reuse landscape in King County. In line with Blaxter et al. (2010) the literature review is used as part of the comparative analysis for Phase II. Section 3.3 of the literature review explores government involvement in both post-consumer textile waste management and repair initiatives. This section is addressed from both the US and EU context. The mix of US and EU perspectives offer various vantage points of information, forming a more robust picture, but additionally, including the EU perspective aids to the lack of literature available from the US perspective.

2.2.2 Case Study

This research follows a case study approach. Case studies are a well-established qualitative research approach used throughout a variety of disciplines and can provide an exploration of an event or phenomena, allowing the researcher to understand *how, what,* and *why* the specified event or phenomena is operating the way that it is (Crowe et al., 2011). Crowe et al. (2011) defines the case study as "a research approach that is used to generate an in-depth, multi-faceted understanding of a complex issue in its real-life context" (p. 1). Further, the case study can help in understanding where gaps exist in said case and why these gaps might be prevalent (Crowe et al., 2011). For the presented research, a mix of exploratory and explanatory approaches were utilized to conduct an intrinsic case study. An intrinsic study was chosen as it focuses on a single unique case to develop an understanding of the event or phenomena (Crowe et al., 2011). While the researcher believes this study presents a unique perspective, it is also believed the findings from the study can be applied to contexts outside of King County.

King County, WA, USA, was chosen as an ideal case to explore and understand the local government's role in the post-consumer textile waste management system. The reasons for selecting King County were threefold. Firstly, King County is in the US, one of the leading contributors to the textile waste issue. However only one case study on post-consumer textile waste management based in the US was identified, therefore leaving a gap in understanding the post-consumer textile waste management system in the US context from a practical perspective. Secondly, King County SWD and SPU collaboratively worked on an initiative to address textile waste, Threadcycle. This initiative provides grounds for a policy evaluation to understand if Threadcycle is working in the intended manner and in what ways. Developing such a policy evaluation will additionally provide information to a greater context, beyond King County, as such learnings can translate to other US regions. Thirdly, King County and the State of Washington have progressive zero-waste initiatives which support various repair/reuse initiatives. The county has set a zero-waste goal for 2050 and has already begun the transition through roadmap planning and funding programs (Bolsinger et al., 2022). Such repair/reuse initiatives can be further explored through a case study to understand how they are operating and where gaps might be present.

2.2.3 Evaluation of the *Threadcycle* Initiative

Phase I of this research aims to address RQ 1(a) *'How is Threadcycle intended to operate?' (b) 'Is Threadcycle effective in achieving its stated aims?' (c) 'Is Threadcycle relevant in regard to how it addresses the issue of post-consumer textile waste?'* For this phase, both exploratory and explanatory research types are used. Through mixing exploratory and explanatory research both "*what*" and "*how*" questions can be answered (Tellis, 1997). For the sake of evaluating Threadcycle, *what* questions are used to gain a general understand of the intervention while *how* questions aim to understand the inner workings of the intervention. Together, these approaches can help evaluate if Threadcycle is operating in an effective and relevant manner in terms of the goals of the intervention.

Ex-post policy analysis

To evaluate Threadcycle, an ex-post policy evaluation will be performed. Evaluation of public policy has become a common practice within the US context and plays an important role in the policy-making process (Fischer, 1995), and therefore the use of policy evaluation for Threadcycle is deemed relevant. Before conducting a policy analysis, the researcher must identify which dimensions should be evaluated. For the sake of evaluating Threadcycle, the environmental dimension was chosen. This was because the initiative was primarily established to attain environmentally oriented goals. While the environmental dimension was primarily evaluated, the social dimension naturally became relevant as environmental justice and social justice often intertwine. Two general criteria for the evaluation of environmental policy instruments presented by Mickwitz (2003) were deemed most relevant for the purpose of the presented research. The chosen criteria were (1) effectiveness – *to what degree do the achieved outcomes correspond to the intended goals of the intervention and can the outcomes be attributed to the intervention?* And (2) relevance – *do the goals of the instruments cover key environmental problems?* Effectiveness was chosen as it requires the researcher to assess both the final outcomes of the intervention as well as the attributability of the outcomes to the intervention (Vedung, 2017). Utilizing intervention theory assists with the assessment of attributability as it allows the researcher to assess the connections between the processes and the outcomes of the intervention. Relevance was chosen as the second evaluation criteria because it was deemed necessary to not only understand if the intervention is achieving the intended outcomes, but also if these intended outcomes adequately address the issues at hand.

Theory Driven Evaluation

For the intent of this research, Threadcycle is deemed an environmental policy through the lens of Lundqvist's (1996) purpose definition, meaning, "courses of action which are intended to affect society – in terms of values and beliefs, action and organization – in such a way as to improve, or to prevent the deterioration of, the quality of the natural environment" (As cited by Mickwitz, 2003, p.418). This definition of environmental policy was considered appropriate for Threadcycle as the initiative was developed in response to a need to address the environmental impacts post-consumer textile waste had on King County, and subsequently, throughout the nation and the world.

Conducting a theory-driven evaluation entails both, a conceptual evaluation component by forcing the researcher to understand the theoretical mechanisms underlaying the policy, and an empirical component, creating opportunity for the researcher to understand the true outcomes of the policy (Coryn et al., 2011; Rogers et al., 2000). The duality of the evaluation is primarily due to the use of intervention theory (also referred to as program theory). In research, intervention theory has been defined as a "model, theory or philosophy about how the program works, and indicates the causal relationships supposedly operating in the [intervention]" (Fitz-Gibbon & Morris, 1996). The use of intervention theory requires the evaluator to identify the mechanisms within the intervention, providing opportunity for a more complete understanding and well-rounded evaluation. The intention is not to describe how the intervention is working, but instead how it is intended to work (Mickwitz, 2003).

Coryn et al. (2011) emphasizes the relevance and widely accepted nature of using intervention theory amongst researchers for policy evaluation. Benefits of using intervention theory include avoiding a black box evaluation, meaning the inner workings of the system are unknown. Instead, intervention theory develops an explanation as to *why* a policy does or does not work (Coryn et al, 2011; Rogers et al., 2000). Rogers et al. (2000) also explains that intervention theory can clearly show where faulty thinking may exist in terms of how a program should work. These findings in turn make the policy evaluation more valuable when considering policy improvements or policy transfer (Coryn et al., 2011).

To address the complexity of causality, Rogers et al. (2000) points out that intervention theory provides grounds for a sounder casual attributional assessment. This is due to the evaluation of intermediate steps/outputs rather than simply the final outcomes. (Rogers et al., 2000).

Chen (2005) breaks the use of theory-driven evaluation into two approaches, the process monitoring approach and the outcome monitoring approach. Within the process monitoring approach, a process evaluation is conducted. A process evaluation uses the intervention theory as a framework to specifically assess the implementation process (Chen, 2005). The outcome monitoring approach encompasses both an intervening mechanism evaluation – assessing whether or not the causal assumptions of the intervention are operating as expected, and a mediating mechanism evaluation – assessing how the factors outside of the intervention are influencing the outcomes (Chen, 2005). Chen (2005) additionally presents the integrative process/outcome evaluation approach which intends to merge all three approaches into one comprehensive evaluation.

Due to both time and resource constraints of the presented research, an integrative process/outcome evaluation will be performed, however, specific components of the intervention will be excluded, meaning that only certain parts of theory-driven process, intervening mechanisms, and moderating mechanisms will be assessed. The components that will be excluded are those influenced by residential awareness and use of the intervention. The choice to exclude these components was two-fold. Firstly, a lack of time and access to obtain a fair population sample presented a challenge. Secondly, as the researcher developed a more in-depth understanding of Threadcycle, it became apparent that the structure and underlying assumptions of the intervention were most essential to evaluate and could be assessed without resident participation.

2.2.4 Phase II: Evaluation of current repair initiatives

Phase II aims to address RQ 2(a) *'how does the existing garment repair/ general repair/reuse landscape in King County operate?' and (b) what are the current drivers and barriers they face?'* And assist in answering RQ 3(a) *'how can Threadcycle incorporate repair initiatives to align with their waste goals?' and (b) 'how can King County help improve local repair/reuse organizations?'* This phase is exploratory in nature, providing a general understanding of what is happening with repair organizations in King County by providing insight into challenges and successful components of the organizations.

Comparative analysis

To answer *RQ2(a) and (b),* the literature review presented in Chapter 3 is used as a basis for comparison between repair initiatives identified in King County and existing literature on repair initiatives. Specifically, the focus of the comparison is on the drivers and barriers of local repair organizations operations. Commonly, a comparative analysis is used to provide descriptions and explanations of commonalities and differences between "large-scale social units, usually regions, nations, societies and cultures" (Drobnič, 2023, p. 1238). For the sake of this research, the concept will be used to compare repair organizations within the region of King County with the general literature that is available on repair organizations. Through this approach, the structure and guidance of a comparative analysis is utilized to explain the ways in which King County compares to existing literature, explain the reasons for the similarities and differences, and identify factors that have not been found in existing literature. This approach intends to provide a more nuanced understanding of the drivers and barriers of repair organizations as it offers a unique perspective to existing research.

2.2.5 Researcher reflexivity

A guideline to be followed throughout the research process is the researcher's efforts to practice reflexivity. Past experiences of the researcher present biases that may shape interpretations of the data (Creswell & Creswell, 2018). To maintain reflexivity, the researcher followed Creswell & Creswell's (2018) guidance of creating memos detailing thoughts and feelings had during the data collection and analysis stages. The researcher then used these memos while analyzing data to be aware of and reflect on personal biases throughout the process.

2.3 Methods used to collect data

The following section presents the methods used to collect data for both Phase I and Phase II of the research. Data was collected through available literature, interviews, and documents found through desktop research and is expanded upon below.

Literature review

To collect relevant literature the researcher used databases and a general internet search through the Google search engine. Databases used were Google Scholar and the Lund University Online Library. These databases were chosen as they are accessible and contain a wide breath of academic journals. The Google search engine was used to gather relevant information that would not be found in academic journals. Such literature included reports from government and private organizations and information found on webpages.

Different key words were used to find information relevant to Phase I and Phase II. Key words/phrases for Phase I included post-consumer textile waste, post-consumer textile waste management, textile recycling, textile exportation, policy, and local government. Phase II included garment repair, repair, repair café, repair policy, local government, barriers, and drivers. The key words/phrases were combined in various groupings to expand the literature search.

Once literature was identified and deemed relevant through an initial read through of the abstract, it was stored in Zotero, a reference management software. An initial skim of the articles was performed to determine their relevance. If deemed relevant, a thorough read through of the text was done and notes were taken and organized on the application Miro, a digital organization platform.

Selection of interviewees and interview process

Semi-structured interviews were conducted with purposefully selected stakeholders as a primary data source for the presented research. Interviews are arguably one of the most important components of case study research as they provide direct information from stakeholders (Tellis, 1997). The semi-structured interview structure was chosen as it allows the interviewee to share information with limited interference from the researcher. Clifford et al. (2016) emphasize that semi-structured interviews are conversational and informal, allowing the interviewee to feel comfortable. They encourage open responses delivered from the point of view of the interviewee (Clifford et al., 2016).

Interviewees were identified both through contacts provided by Ezren and Scholes and through actors found online via desktop research. Contacts provided through Ezren and Scholes included three of the seven Threadcycle partners. Beyond the contacts provided, the researcher identified various categories of additional interviewees. Such categories included academics in the textile industry and those involved with repair initiatives within the King County region. While the initial search for repair actors was within the confines of garment repair, this was soon expanded to repair/reuse in general as few actors were identified in the King County region who were specific to garment repair.

Those who were deemed relevant were contacted via email. All were provided with the same information about the research. The email sent to participants can be found in *Appendix A*. Once the interviewee informed their interest in participating, the researcher scheduled the interview and sent a consent form for the participant to sign, providing written consent to use the information from the interview in the research. Participants were also given the opportunity to stay anonymous.

Due to response rates from actors, some groups were represented more heavily in the study than others. A table of interviewees can be found in *Appendix B*. In terms of evaluating Threadcycle, of the seven partner organizations, only one was open to participate. Other partners either did not respond to the email or responded and stated that they did not have time to participate. In addition, two academics of textiles/apparel were interviewed as well as two King County employees.

For Phase II, response rates for interviews were much higher. In total eleven people were interviewed. Interviews were primarily held via video call with two exceptions of in-person interviews where the researcher was able to physically visit the organization's operations. These interviews were with Rausch of Refugee Artisan Initiative and Dolovova of Furniture Repair Bank. All interviews were recorded on a personal password protected recording device.

Prior to conducting the interviews, an interview guide was developed. The guide differed between Phase I and Phase II and varied slightly between each participant depending on their specific organization and/or role within the organization. The interview guide for Phase I can be found in *Appendix C* and Phase II can be found *Appendix D*.

As is protocol with a semi-structured interview, the interviewees were encouraged to share as much as they were able to with little influence from the researcher. The interviews began with a brief introduction from the researcher complimented by an overview of the study and followed with answering any questions the interviewee had. Following, the researcher asked the questions on the interview guide. Occasionally the interviewee was probed by the researcher to elaborate on specific topics, but the researcher tried to keep comments to a minimum.

Document collection

In addition to interviews, documents were used as a data source to gain a richer understanding of the case. Tellis (1997) shares the importance of avoiding over-reliance on document data, but instead using it to support data collected from other sources. For the presented case, documents were used both to support the data collected, and to gain a better understanding of context.

To collect relevant webpage documentation, a Google search was conducted. Webpages were found using key words including King County, Washinton State, waste, and zero-waste. All webpages collected were government issued. Various reports utilized were provided by Ezren.

Documents utilized include the LinkUp report produced by King County before implementing Threadcycle, King County SWD and SPU waste reports, as well as specific King County and Washinton State webpages. Such webpages were deemed important to include as they provide supporting evidence of waste initiatives within King County and Washington State that are relevant when evaluating both Threadcycle and local repair initiatives.

2.4 Methods used for analyzing data

The following section presents the methods that were used to analyze data. Analysis of Phase I was performed through theory-driven analysis while Phase II was performed through a comparative analysis between King County and existing literature.

2.4.1 Analyzing a case study

To analyze a case study effectively, Crowe et al. (2011) emphasizes the importance of reviewing and organizing the data gathered multiple times to develop an in-depth understanding of the data. Interview data, existing literature, and government documents were the primary forms of data utilized. Coding of data was performed through an abductive approach. Two separate analyzation processes were performed for Phase I and Phase II. The analysis of Phase I was guided by the theory-driven evaluation framework while Phase II was guided by a comparative analysis between the primary data collected and literature.

Content analysis

Content analysis was used to analyze interview data for both Phase I and Phase II. Krippendorff (2018) defines content analysis as "a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use" (Ch. 2.1). Krippendorff (2018) expands on this definition, explaining that the conent which arises from such a method is influenced by the researcher's chosen context. In this sense, the analysis must fall into a relevant context in which the research question(s) can be appropriately answered (Krippendorff, 2018). For the presented research, the analysis is primarily rooted in an environmental context, however, as social justice concerns are often coupled with environmental issues, a social justice context is also prevalent.

For the presented research, interviews are the primary data source for content analysis and coding was the method used for *data making* – developing usable data from unprocessed data (Krippendorff, 2018). An abductive approach was taken, meaning that the process combined deductive coding, themes gained from literature, and inductive coding, themes revealed directly from the data (Skjott Linneberg & Korsgaard, 2019). This method was deemed most appropriate by the researcher as the literature review provided grounds for a starting point within the data collection process, a deductive approach, but additionally understanding the benefits an inductive approach provides, enabling the researcher to stay true to the data collected (Skjott Linneberg & Korsgaard, 2019). This approach was put into practice by first establishing codes that were rooted in literature. Once the coding process began, the researcher used the pre-set codes to the extent deemed relevant, however when a new code was needed to properly reflect the data, it was added. Coding was performed in multiple cycles, as is recommended within research (Krippendorff, 2018; Skjott Linneberg & Korsgaard, 2019). After coding the data, a theory-driven evaluation was completed for Phase I and a comparative analysis was completed for Phase II.

Theory-driven evaluation for analysis

As presented in section 2.2.3, theory-driven evaluation was conducted to investigate and analyze Threadcycle, King County SWD and SPU's initiative which addresses post-consumer textile waste. With respect to performing a theory-driven evaluation, Coryn et al. (2011) presents five overarching principles each with numerous subprinciples. While Coryn et al. (2011) points out that many of the principles themselves are not unique to theory-driven evaluation, their application becomes distinctive when used with intervention theory. The presented research follows these principles to a level deemed appropriate by the researcher, as Coryn et al. (2011) states that the applicability of each principle varies depending on the specific intervention. The principles will briefly be expanded upon below.

Core principle 1 – Theory-driven evaluations/evaluators should formulate a plausible intervention theory (Coryn et al., 2011).

To formulate a plausible intervention theory for Threadcycle in line with Coryn et al. (2011), the researcher utilized two resources, (1) the report, *Post-Consumer Textiles: King County LinkUp Research Summary Report,* which was funded and published by King County SWD and Seattle Public Utilities in 2014 as a basis for the development of the Threadcycle intervention, as well as (2) personal communication with King County SWD employees, Erzen, the program manager of Threadcycle, and Scholes, a policy analyst. These communications included various email exchanges, online video calls, and one in person meeting. Erzen, although the current program manager, was not involved in the initial development of Threadcycle. Through personal communication, the researcher was able to gain an understanding of the intentions of the intervention. Additionally, the researcher was also able to ask specific questions that were not clearly answered in the LinkUp report. Core Principle 1 is further elaborated on in section 4.2.1 and throughout Chapter 5.

Core Principle 2 – Theory-driven evaluations should formulate and prioritize evaluation questions around an [intervention theory] (Coryn et al., 2011).

Core Principle 2 asks that the researcher formulate evaluation questions around the intervention theory and prioritize questions accordingly. For the sake of the presented research, questions asked are dependent on the stakeholder group being investigated. For example, interviews with academics focused on the theories underlying the Threadcycle program while interviews with Threadcycle's partner organizations focused on their working relationship with King County. Further, the interview questions were in line with the evaluation criteria: effectiveness and relevance.

Core Principle 3 – [Intervention theory] should be used to guide planning, design, and execution of the evaluation under consideration of relevant contingencies (Coryn et al., 2011).

Principle 3 asks the researcher to be mindful when planning research regarding what is realistic to complete due to general plausibility of collecting information, time for research, budget, and use of the evaluation. Further, it asks the researcher to consider the extent of the evaluation. As stated in section 2.2.3, due to time and resources, the presented evaluation focuses on components that can be evaluated with the data that can be collected, primarily excluding input from residents of King County. The evaluation area of focus is clearly depicted in *Figure 4-1.*

Core Principle 4 – Theory-driven evaluations should measure constructs postulated in the [intervention theory] (Coryn et al., 2011).

Principle 4 asks the researcher to evaluate process, outcome, and contextual activities that are assumed to occur in the intervention. For the presented evaluation, the primary constructs evaluated are process and contextual activities, again, highlighted in *Figure 4-1.*

Core Principle 5 – Theory-driven evaluations should identify breakdowns, side effects, determine program effectiveness, and explain cause and effect associations between theoretical constructs (Coryn et al., 2011).

Core Principle 5 will be applied to describe and explain cause-and-effect associations, otherwise understood as the way one aspect of the intervention influences outputs of the intervention. To assist with this portion of the evaluation, the side effect model presented by Mickwitz (2003) is used, however for the sake of this research, side-effects will be referred to as outputs. Through the output evaluation model, outputs of the intervention are first sorted into anticipated and unanticipated outputs (Mickwitz, 2003). Anticipated outputs both in the target area and outside the target area are divided into beneficial and detrimental outputs while unanticipated outputs

are sorted into environmental outputs and other outputs (Mickwitz, 2003). The output evaluation is presented as *Figure 5-2* and is explained in section 5.2. The Output model is thereafter used to identify breakdowns in the intervention. Such breakdowns can be understood as elements of the intervention that hinder its success (Coryn et al., 2011). Principle 5 will be presented in Chapter 5.

Comparative analysis

As a means of performing comparative analysis to analyze King County's repair/reuse landscape, guidance from Rose's *Comparing forms of comparative analysis* (1991) was adapted. Rose's work targets comparison of politics, however, the researcher chose to adapt various methodological tactics to compare drivers and barriers (critical components) for repair/reuse initiatives between organizations within King County and with existing research. A key factor Rose highlights within comparison research is the necessity of using "concepts that are applicable in more than one county" (Rose, 1991, p. 447). For the presented research, "country" is translated to "repair organization." Rose continues to explain that concepts are "common points of reference for grouping phenomena that are different geographically" (Rose, 1991, p. 447). The use of concepts for the presented research can be adapted to group different phenomena between different repair organizations and current literature. In line with Rose's (1991) work, initial selection of these concepts was done prior to the collection of qualitative data. However, it was deemed necessary to edit these concepts upon performing a content analysis and identifying new concepts that were not found in literature. A matrix was used to structure and illustrate the comparative analysis. The matrix can be found in *Appendix E*. Repair organizations are placed in the rows and the concepts are placed within the columns.

3 Literature Review

The purpose of this literature review is to provide a basis for the presented thesis research by way of understanding what research has been conducted and where there is need for further investigation. Additionally, this literature review is used to assist with both the theory-driven evaluation of Threadcycle presented in Chapter 5 and the comparative analysis presented in Chapter 6. This section is broken down into three overarching categories: (1) current post-consumer textile waste management practices in the US, (2) garment repair's role in end-of-life management, and (3) the local government's role in post-consumer textile waste and repair. While the researcher intended to primarily utilize research from a US perspective, in some cases a lack of availability of such research resulted in a need to expand the scope. This primarily resulted in utilizing research that is based in Europe.

3.1 Post-consumer textile waste management practices in the US

As previously stated, post-consumer textile waste can be defined as "discarded garments or household textiles (sheets, towels, and pillowcases) that are worn-out, damaged, and outgrown or no value to consumers after their service life" (Juanga-Labayen et al., 2022, p. 176). It is important to highlight that post-consumer textile waste does not simply consist of textiles that no longer function as intended but also includes those that are deemed unwanted by the consumer. It is estimated that 60% of textile waste could be reused as is at its time of disposal, illustrating the significant amount of post-consumer textile waste that is fit for reuse (Juanga-Labayen et al., 2022). This understanding of post-consumer textile waste provides a clear depiction of what is considered 'waste.'

3.1.1 US municipal waste management context

Much academic research on post-consumer textile waste management exists, providing a sound understanding of the topic and the ability to position new research within it. The focus of this section will primarily be on post-consumer textile waste management within the US context as this literature review intends to provide support for the evaluation of Threadcycle. With a focus on the textile waste system in the US, it is first relevant to understand how the overarching waste system works, beyond the specificities of textile waste.

The US Environmental Protection Agency (EPA) which has regulatory authority over the entirety of the country, primarily regulates landfills and waste-to-energy plants. They do not however, have the authority to manage municipal solid waste (MSW), also referred to as post-consumer waste (K. A. Schumacher & Forster, 2022). The responsibility of managing post-consumer waste is therefore dependent on either the state, county, or municipality. The result of this structure influences the capabilities and goals set by waste management systems within the US as they are tied to local level authority. It is therefore a challenge to implement nationwide and often statewide measures to align waste management practices. This lack of alignment is clearly illustrated through post-consumer textile waste management practices in US as there are high variances of practices from state to state and municipality to municipality (K. Schumacher & Forster, 2022).

The US EPA has also presented a waste management hierarchy for non-hazardous materials. The hierarchy places waste management solutions in order from most desirable to least desirable, placing source reduction and reuse together as the most desirable option while treatment and disposal is the lowest tier (US EPA, 2024). Currently, the waste management hierarchy is under review to ensure it aligns with the most recent available data, however, it has not yet been updated (US EPA, 2024).

The current EPA waste hierarchy uses the term reduction; however, prevention can be used synonymously. The EPA defines waste reduction as "reducing waste at the source" (US EPA, 2024). The prioritization of prevention and the role waste management organizations play within such prioritization efforts has developed into an interesting discussion. (Van Ewijk & Stegemann, 2016; Zacho & Mosgaard, 2016). Van Ewijk & Stegemann (2016) highlight the argument waste managers have made in opposition to the hierarchy, stating that prevention is not the focus of waste management and further, that waste managers hold very little to no authority over waste prevention. In addition, waste collection profits tend to depend on the volume of waste collected, posing an economic challenge in waste prevention efforts (Van Ewijk & Stegemann, 2016). Waste prevention also poses challenges as it is not easy to measure. Van Ewijk & Stegemann (2016) identify measurement through waste tonnage reduction, however, they state that attributing waste reduction to prevention actions is extremely difficult.

Although these issues are prevalent, discussion about how prevention can be better incorporated into society is increasing and scholars have highlighted the importance of including local waste management actors within these discussions (Zacho & Mosgaard, 2016). Therefore, this research rests upon the notion that source reduction, also interpreted as prevention, is priority for those who manage textile waste. The US EPA however, groups reduction and reuse together. This is not the case in various other waste hierarchies such as that of the EU's waste hierarchy which places reuse a step below reduction (European Commission, n.d.).

3.1.2 Collection, sorting and grading textiles

In the US, 85% of post-consumer textiles are sent to the landfill rather than reuse and recycling systems (K. A. Schumacher & Forster, 2022). Although landfill rates are high, post-consumer reuse and recycling markets do exist. Therefore, there is a missed opportunity for used textiles to be funneled into these markets. Many authors contribute this discrepancy to the challenges of textile collection in the textile waste management system (Jäämaa & Kaipia, 2022; Juanga-Labayen et al., 2022; Kamble & Behera, 2021; K. Schumacher & Forster, 2022). Textile collection is handled through two overarching methods: drop-off and pickup (King County, 2014). The most common forms of drop-off collection are through charity shops, drop-boxes, retailer drop-offs, and specialty collection events, while pickup collection can be provided through, public or private curbside collection or online resellers (Jäämaa & Kaipia, 2022; King County, 2014).

While these systems exist, rates of utilization are still very low in relation to the total amount of discarded garments, hence 85% of textiles waste going to the landfill. The lack of utilization of textile waste collection methods has been attributed to various factors including: consumers' lack of education and motivation to utilize these textile collection methods (Jäämaa & Kaipia, 2022; King County, 2014), proximity to drop-off points (King County, 2014), and an overall infrequency of textile disposal (Jäämaa & Kaipia, 2022). Many researchers therefore point to the need for increased availability of consumer friendly textile collection methods to increase utilization, however these methods are often met with a variety of challenges which are discussed below (Jäämaa & Kaipia, 2022; Juanga-Labayen et al., 2022; Kamble & Behera, 2021; K. A. Schumacher & Forster, 2022).

Dagilienė (2021) discusses challenges that consumers face when choosing to properly dispose of their textile waste. Proper disposal can be hindered by a lack of information about properly disposing of textiles, a lack of personal desire to separately dispose of textiles and/or, a lack of information about the processing of textile waste (Dagilienė et al., 2021). These issues point to a lack of awareness about the importance of properly disposing of textile waste, as well as issues that arise due to a lack of information about where textile waste is going and what is happening to it.

From a technical perspective, a primary challenge faced during textile collection is the need for textiles to be completely dry and uncontaminated, therefore textiles must be kept separate from all other waste streams (K. A. Schumacher & Forster, 2022). Further, textile drop boxes without proper regulation can face issues with a lack of transparency about what happens to textiles upon collection, unsightliness, and public safety (due to a potential for fires) (Newell, 2015). Some municipalities in the US offer curbside collection of textiles, however, research has shown that these initiatives often gain little utilization, likely due to the fact that textile disposal is not performed as frequently as other waste streams such as organics or recyclables (King County, 2014). Further, these systems result increased costs and logistics(K. Schumacher & Forster, 2022).

Once textile waste is collected, it is either sorted under the collecting organization's operations or sold to be sorted at a for-profit organization. Typically, 20% of what is collected from charity organizations is sold through domestic resale (K. A. Schumacher & Forster, 2022). In a case study of the textile waste system in New York State, for-profit sorters were identified as the strongest part of the system (Newell, 2015). For-profit sorters primarily purchase textiles that are deemed unfit for resale in domestic markets, and thereafter grade the textiles (Newell, 2015). The grading process is used to categorizes items by fiber content and/or product type, as well as ability for recycling or exportation (K. A. Schumacher & Forster, 2022). The grading process is heavily dependent on manual labor as relevant technology in the US is not yet advanced enough to identify fiber content in specific mixed materials (K. Schumacher & Forster, 2022).

3.1.3 Textile exportation

Textile exportation acts as a backbone of the post-consumer waste textile system in the US. It is estimated that the African continent is the final destination for nearly 70% of garments donated globally but primarily from the US and Europe (Banik, 2020). A US specific report found that in 2014, 48% of donated textile waste within the US was sent to the Global South (Hawley, 2014). Newell (2015) highlights the importance of textile exportation within New York State's textile waste management system, finding that international exportation provides the largest return of investment for for-profit sorters. Newell (2015) additionally points out that if exportation was no longer an option for New York State, in 2015 the state would be responsible for an additional 51,000 tons of textile waste and $43 million in revenue from exportation to make up.

While textile exportation acts as a necessary tool for managing textile waste, it is a controversial practice. Some researchers agree that relevant factors are considered before exportation, such as climate and textile quality (Hawley, 2006; Watson & Palm, 2016), however, according to K.A. Schumacher & Forster (2022) industry experts advocate that many textiles are not sorted or graded properly before being exported, leading to unneeded and unwanted clothes in Global South countries. Scholars have highlighted that not all participants within the collection and exportation system are "serious actors" (Thidell et al., 2019). The topic of exportation connects back to issues relating to consumers being unaware of where their textiles are ending up after donation as they may be concerned about contributing to this system.

The OR Foundation, a registered charity in both the US and Ghana, has investigated the consequences of textile exportation specifically in the country context of Ghana. From their investigative research, they have found that within Kantamanto, one of the largest clothing markets in Ghana, 40% of what is imported ends up in the landfill almost immediately after arriving in Ghana (OR Foundation, n.d.). According to Bukhari et al. (2018), the market for 'reuse' in the Global South is decreasing stating that from 2015 to 2018, it decreased 10-15%, illustrating the extremity in terms of volume of garments set overseas as a method for reuse.

This issue is prevalent in many African countries extending beyond Ghana and is perpetuated by the extreme levels of consumption in countries such as the US resulting in rates of textile exportation that are far too high for the receiving country to effectively utilize (Sonnenberg et al., 2022). Further, due to fast fashion, there has been a general decrease in garment quality and many African markets are advocating for receiving better quality garments (Bukhari et al., 2018). Additionally, various countries in Africa do not have advanced textile recycling capabilities, and therefore, secondhand textile exportation should not be deemed as a recycling solution, as it is sometimes portrayed by collection organizations and sorters (OR Foundation, n.d.; Sonnenberg et al., 2022). Various countries have taken action to implement tariff increases or bans on used textile imports but have backed down efforts due to trade disputes (Sonnenberg et al., 2022).

An additional concern of some African countries is the impact importation of garments has on domestic production of clothing (Bukhari et al., 2018). This can be illustrated through the case of Kenya where the garment industry once employed 500,000 people and now employes 20,000 (Bukhari et al., 2018). However, some researchers disagree with this notion. Watson & Palm (2016) conducted research on the topic of exportation, specifically in relation to the Nordic countries, and found that the decrease in domestic production in some countries in Africa is in part a result of increased importation of new inexpensive clothing from Asia (Watson & Palm, 2016). Watson & Palm (2016) do however highlight the importance of implementing codes of conduct for collection organizations and their subsequent buyers and exporters to ensure fair trade agreements, working conditions and wages.

3.1.4 Textile recycling

Upon collecting, sorting, and grading, textiles deemed unfit for reuse, they are generally funneled into the textile recycling system, posing an additional challenge within the system. There are two overarching methods for textile recycling: mechanical and chemical recycling (K. Schumacher & Forster, 2022). Mechanical recycling typically entails shredding of the garment into small pieces to be downcycled and used in sectors outside apparel such as construction and agriculture (Juanga-Labayen et al., 2022). They can also be bleached and re-spun into new yarns, however the mechanical process results in shorter, weaker fibers, and therefore can only constitute 20-30% of fabric to maintain fabric integrity (K. Schumacher & Forster, 2022). Chemical recycling is the process of using chemicals to disassemble textiles to their fiber or monomer, the yarn and fabric is thereafter able to be rebuilt with the same integrity as the original (K. Schumacher & Forster, 2022). While chemical recycling allows for textile-to-textile recycling, great technological advancements are required for effective use (K. Schumacher & Forster, 2022).

K. Schumacher & Forster (2022) provide a list of specific technical challenges within both mechanical and chemical recycling which highlight the need for major innovation to maintain fiber quality, process blended materials, process finishings and specific dyes, and increase knowledge regarding the environmental impacts of chemical recycling. Further, both K. Schumacher & Forster (2022) and Kamble & Behra (2022) identify a lack of funding for the advancements of recycling technology to be a significant barrier in the textile waste management sector. It should be noted that Kamble & Behra (2022) indicate a lack of funding as an issue not solely for textile recycling, but for the textile waste management system as a whole.

3.2 Repair

The Marriam-Webster Dictionary defines repair as "[restoring] by replacing a part or putting together what is torn or broken" (*Definition of REPAIR*, n.d.). Repair can be performed through various avenues. McQueen, McNeill, Kozlowski et al. (2022) group the practice of repair into three overarching categories: self-repair – the owner repairs their own item, unpaid repair – a non-owner performs the repair at no expense, and paid repair – a non-owner performs the

repair at an expense. Repair opportunities are also being realized through repair offers provided by the producing company of the garment.

As part of the overarching movement towards a circular economy and subsequently a circular fashion industry, garment repair is a topic of great relevance. In a CE, as opposed to a traditional economy, repair takes a central role as the goal of repair is to extend a product's life for as long as possible (Bradley & Persson, 2022; McQueen, McNeill, Kozlowski, et al., 2022). It has been identified that one of the most effective ways to reduce the negative impacts from the textile value chain is to reduce garment production and consumption through garment life extension, which can be realized through repair (UNEP, 2020). In theory, increased utilization of garment repair acts as a waste prevention strategy because less textile waste will be generated and be funneled into the landfill (Moalem & Mosgaard, 2021). Therefore, the expansion of garment repair should be of interest to those who deal with post-consumer textile waste as it can aid to a reduction of textile waste flows. Additionally, as repair should, in theory, aid to the prevention of waste, the practice falls in line with the US EPA's waste management hierarchy which prioritizes waste reduction. While repair has potential to reduce waste and is highly relevant to the CE, it is important to note that repairing an item does not always substitute buying a new product (Moalem & Mosgaard, 2021). Therefore, it is not a perfect solution, but nonetheless, is a step in the right direction.

3.2.1 Barriers for consumers to participate in repair

Various factors influence an individual's motivation and ability to repair a garment, and much research has been done to understand these factors. Overarchingly, the culture of garment repair has been dissolving over the past two to three decades due to a variety of influences (Gwilt, 2014). Due to the growth of the fast-fashion industry, clothing is available instantly and inexpensively, making repair often less convenient than buying new garments (Gwilt, 2014; McQueen, McNeill, Kozlowski, et al., 2022). Further, various studies have found that garment quality influences repair efforts, finding that higher perceived quality of a garment results in a higher chance of repair and vis-versa (McNeill et al., 2020; McQueen, McNeill, Kozlowski, et al., 2022; Potdar et al., 2023) Therefore, with the increase of fast-fashion, many garments in circulation today are not perceived as worth repairing (McQueen, McNeill, Kozlowski, et al., 2022). At the same time, paid repair can be expensive, time consuming, and is less available than in past decades (Gwilt, 2014). The level of damage to a garment has also been found to influence the likelihood of it being repaired, finding that smaller damages are more likely to be repaired than larger ones (McQueen, Jain, et al., 2022).

In terms of self-repair, possessing adequate repair skills and tools for repair are key influencing factors to determine if garment repair will be performed (Gwilt, 2014; McQueen, Jain, et al., 2022; McQueen, McNeill, Huang, et al., 2022). Recently, studies have found a decrease in people possessing these skills which authors attribute, in part, to the shift away from teaching sewing skills in school as well as the historic association between sewing and women's work, a domestic chore, or a sign of poverty (Diddi & Yan, 2019). Diddi & Yan (2019) therefore encourage a transition in the discourse of repair to move from a domestic work point of view to an environmentalist point of view. Aligning with this notion, studies have shown that women are more likely to take part in self-repair, only enhancing the need to change these perceptions of garment repair (McQueen, Jain, et al., 2022; Potdar et al., 2023).

Various studies have found that an additional profile inclined to participate in repair are those who are environmentally conscious (McQueen, McNeill, Kozlowski, et al., 2022; Moalem & Mosgaard, 2021; Potdar et al., 2023). Potdar et al. (2023) specifically investigated fashion sensitivity consumers and found that those who are both fashion sensitive and environmentally conscious are likely to engage in garment life extension practices, therefore, advocating that you

can both be interested in fashion and practice environmentally conscious repair habits. Further, Potdar et al. (2023) find that the promotion of education and general pro-environmental practices can positively influence and encourage garment repair practices.

3.2.2 Repair movements

While traditional repair services in both the US and Europe have been declining, recent years have seen a resurgence in repair initiatives (Keiller & Charter, 2016). These initiatives have been especially prevalent in the EU, in part, due to the growing 'Fixer Movement' which encompasses an assortment of community based initiatives, including online fixing sites, social enterprises, and repair cafés (Keiller & Charter, 2016). Such movements have also become prevalent in the US, but to a lesser degree (Keiller & Charter, 2016).

Within the Fixer Movement, repair cafés have seen rapid growth (Keiller & Charter, 2016). The term repair café was first coined in 2009 by Martine Postma in Amsterdam, who eventually developed the International Repair Café Foundation which provides information for those looking to establish their own repair cafés (Moalem & Mosgaard, 2021). The foundation has three stated goals: to reestablish local repair in a modern way, to maintain and distribute repair knowledge, and to promote social interaction for people with different backgrounds through casual events (Moalem & Mosgaard, 2021). The repair café movement has seen tremendous growth, demonstrated by the fact that in April 2021 there were reportedly over 2,000 repair cafes in 37 countries (Moalem & Mosgaard, 2021). A 2016 survey of registered repair cafes found that most were fully citizen led initiatives with 12% gaining support through the government or public institutions (Keiller & Charter, 2016).

Although often referred to as "repair cafés," various names for similar initiatives exist, including fix-it fairs and repair workshops. For the intentions of this research, the term repair café is used loosely to encompass all initiatives that fall under the same general goals and guidelines. The intention of a repair café is to enable citizens to repair their goods free of charge using shared tools and knowledgeable volunteers (Moalem & Mosgaard, 2021). The cafés can be temporary or fixed in regard to frequency and location, and can play a community role, providing a space for people to gather and spend time together (Moalem & Mosgaard, 2021).

Barriers of repair movements

Although repair initiatives have seen great success, they face various barriers and, according to Moalem & Mosgaard (2021), little research has been conducted to understand how repair cafés can sustain themselves in the long run. Within a survey conducted by Keiller & Charter (2016) that was distributed to registered repair cafés, respondents were given a list of potential barriers and were asked to mark the barriers on a scale ranging from "not a barrier," to "somewhat of a barrier," to "moderate barrier," and finally "major barrier." Only 8% of respondents identified anything as "a major barrier" to their operation, however the choice of "somewhat of a barrier" was prominent. The most frequent barriers (ranging from "somewhat of a barrier" to "major barrier") were activities that had to do with marketing to citizens. The second most frequent group of barriers were activities related to finances, and the third most was ensuring continuity. (Keiller & Charter, 2016).

In line with continuity, Moalem & Mosgaard (2021) point to the barriers repair cafés may face as they are dependent on volunteer time. Through a study of Swedish repair initiatives, Bradely & Persson (2022) find that the initiatives that run solely off volunteers face greater challenges as their roles may include an ever-increasing time commitment and overall effort as the repair operation expands. As volunteer positions are unpaid and often side-jobs, it can be challenging for volunteers to accommodate increasing workloads as initiatives expand. These barriers will be expanded upon in section 6.1.

3.3 Involvement of local government in textile waste management and repair

Often, in the US, the government does not play a central role in the collection or processing of textile waste (unless curbside collection is offered through the municipality). However, local government is still called upon to participate in actions to improve post-consumer textile waste management. Additionally, local government is often called upon to support repair initiatives.

3.3.1 Managing textile waste

From a US perspective, various authors have touched on the importance of local government involvement in managing post-consumer textile waste. Juanga-labayen et al. (2022) highlight the need for a holistic approach involving all major stakeholders, including industry, government, private agencies, and consumers. Kamble & Behera (2021) state that governments and policy makers should encourage and fund research for the improvement of textile waste management and support business start-ups based on textile waste recycling. Schumacher & Forster (K. A. 2022, K. 2022) identify various areas policy and regulation can be used for textile waste management. In terms of the local level, Schumacher & Forster (K. 2022, K.A. 2022) recommend facilitating partnerships, highlighting that public-private partnerships can be effective. They also recommend providing public databases with information relating to textile waste-management, participating in green procurement, implementing disposal bans on textile waste, mandatory recycling, and imposing fees.

Beyond the US context, Thidell et al. (2019), investigate select Swedish municipalities' textile waste management initiatives, providing clear examples of the roles local governments can have in textile management. They present the idea of viewing the government's role in textile waste management from the standpoint of governance rather than government, meaning the government acts as a regulator – developing formal policies, provider – providing financial support, staff, etc., enabler – utilizing network to enhance collaboration, and consumer – green procurement (Thidell et al., 2019). Further, governance deviates from formal decision making to modes that include collaboration, activating networks, and the use of one's own resources (Thidell et al., 2019). Through such a holistic view, local governments can expand their impact opportunities through, for example, incorporating organizations such as those involved in repair/reuse.

Regulation of textile waste collection

Maldini et al. (2021) provide additional case specific examples of textile waste management in various EU countries, highlighting regulations that have been put in place to aid appropriate control and transparency of collected textile waste. For example, in the Netherlands, a regulation enacted in 2009 requires charities to collect textile regardless of quality and additionally ensure that all collectors are registered as waste organizations (Maldini et al., 2021). Similarly, in Berlin, collectors outside of the primary waste management organization must prove that the textile waste they are collecting is being disposed of properly (Maldini et al., 2021). Considering the controversial and questionable practices relating to what is happening to the textiles after the collection point, such regulations may help to provide transparency and reduce excessive or unethical textile exportation.

3.3.2 Promoting repair

In addition to textile waste management, local government can play an important role in repair initiatives. Through a study of a garment repair initiative in Colorado, US, Diddi & Yan (2019) found that 90% of their participants (although not a generalizable study) supported the idea of mending events within the community. They continue to say that local governments may benefit

from assisting with these types of events as they may divert textile waste from the landfill, emphasizing the role textile repair can play in waste prevention (Diddi & Yan, 2019).

Expanding into the wider arena of repair, Richter & Dalhammar (2019) investigate electronic repair initiatives in Sweden and find that different municipal departments play pivotal roles within community repair events through initiating, promoting, or supporting the activities. Such ideas tie back to the concept of governance as was discussed by Thidell et al. (2019). While the study does not focus on garment repair, the researcher finds that it still has relevance to the role municipalities play in repair.

Richter & Dalhammar (2019) find that electronic repair organizations can originate from a top-down approach - initiated or funded by the local government/public institutions, a bottom-up approach - initiated by citizens, or a hybrid of these two. They find that most of these non-profit electronic repair initiatives either have a top-down or hybrid approach, highlighting the importance of involvement of the local government/public institutions (Richter & Dalhammar, 2019). As presented in section 3.2.2, however, Keiller & Charter (2016) found that only 12% of repair cafés in their study had support from their local government or public institutions. These differences could be due to the type of repair organization, location, and/or specific needs for running the organization. Nonetheless, both studies point to at least some level of positive influence on repair/reuse organizations support from the local government can provide. Maldini et al. (2021) expands on the importance of local government collaboration with existing garment repair/reuse organizations to improve existing waste systems, rather than redesigning systems from scratch. This indicates that collaboration does not only benefit local repair/reuse organizations, but can also benefits local government's waste efforts.

3.3.3 Addressing consumption

In terms of utilizing repair as a method for waste prevention, the process is not always A leading to B, meaning, repair does not always result in reduced consumption and subsequently, reduced waste. Moalem & Mosgaard (2021) found that not all repairs are performed to substitute the purchasing of a new product. Further, although removed from garment repair, Richter & Dalhammar (2019) found that one-third of phone repair participants within their study utilized repair initiative for improving newly purchased phones. Therefore, it is believed that discussion about consumption should play a role in the repair discourse (Dagilienė et al., 2021)

Case studies examining post-consumer textile waste management within EU countries have highlighted the importance of messaging that encourages reduced consumption. This messaging acts as tool for local governments when implementing actions to improve their waste reduction efforts. For example, the City of Amsterdam is working on a communication campaign to promote a reduction of clothing consumption amongst citizens (Maldini et al., 2021). Often, repair plays a significant role within this discussion of consumption reduction. Bradley & Persson (2022) investigate two repair initiatives in Sweden, the Fix the Stuff campaign, and Fixotex repair spaces. Both initiatives emphasize the importance of promoting consumption reduction and as a result minimizing waste.

Maldini et al. (2021) suggests setting up targets that aid consumption reduction, emphasizing that such targets should focus on citizen purchasing habits and company practices that lead to overconsumption. Such methods could be through regulation of advertisements. However, Maldini et al. (2021) highlights that there is a lack of research to understand what contributes to successful implementation of consumption reduction initiatives from a local government standpoint. Additionally, tracking such efforts can be difficult, further hindering such efforts (Maldini et al., 2021).

3.4 Summary

In summary, much research has been conducted to understand the overarching landscape of the US textile waste management system. The system, including collection, sorting, grading, exportation, and recycling, requires further investment for improvement to effectively manage the amount of textile waste and the quality of clothing that is most prevalent in the waste streams (K. Schumacher & Forster, 2022). Additionally, repair initiatives are becoming more prominent globally and are a necessary component to the CE as they can be utilized to promote waste reduction (Bradley & Persson, 2022). To both advance the post-consumer textile waste management system and improve repair efforts, involvement of the local government is necessary (Juanga-labayen et al., 2022). Such assistance can be realized through the local government's efforts to practice governance where they act as an enabler, provider, regulator, and consumer (Thidell et al., 2019). In regard to government messaging, promoting reduced consumption of textiles can be used to further encourage waste reduction and is used in various EU cities. (Dagilienė et al., 2021). While this knowledge exists, from the US perspective, little research has been conducted from a case study perspective to understand how local governments are addressing the pressing issue of textile wase. By pursuing a case study of a US initiative from the county level, a more practical understanding of current possibilities to address textile waste can be realized.

4 The Landscape of King County's waste

The following section describes the waste landscape in King County as it pertains to both textile waste management and garment repair. Resources used for understanding the landscape were government webpages, independent organization webpages, and government produced reports. Although Seattle, a large metropolitan city, is part of King County, Seattle operates its own solid waste management system, Seattle Public Utilities (SPU). King County Solid Waste Division (SWD) oversees the rest of King County (excluding the city of Milton, therefore Milton is not included in this study). While they are two separate waste management entities, the Threadcycle intervention is a collaborative effort between King County SWD and SPU. Therefore, this overview of King County's landscape will include relevant information from both parties.

4.1 Solid waste management landscape

Both King County SWD and SPU are required to produce solid waste management plans, detailing the strategies set forth for managing solid waste for the following 5 to 6 years, and in recognition of the following 20 years (King County, n.d.; Seattle Public Utilities, n.d.). These reports provide extensive insight into waste management goals, policies, and actions for the entirety of the public waste management sector. Additionally, King County has produced a Strategic Climate Action Plan[2] (SCAP) where they detail specifics of their climate goals. The SCAP includes King County's Re+ program, an initiative to help develop and promote zero-waste practices. Comparatively, SPU has incorporated detailed climate and zero-waste goals within their solid waste management plan. While the reports provide extensive amounts of information, attention is primarily paid to information deemed relevant by the researcher for the presented research.

4.1.1 Moving towards zero waste and a circular economy

King County has set a goal of reaching zero waste of resources with economic value for reuse or recycling by 2030 (King County, 2021). King County SWD therefore, states the same goal within their Strategic Waste Management Plan (King County SWD, 2019). As part of this goal, King County SWD has developed the Re+ Strategic Plan to promote a circular economy through encouragement of reduction, reuse, and prevention of landfilled waste. The plan calls on collaboration between the King County SWD, residents, communities, businesses and cities, and provides grants, technical support, and guidance to support reuse, repair, remanufacturing, and end markets for recycled materials (King County SWD, 2019). Currently, the primary focus is on organics, paper and plastic waste streams as these are the leading materials that can be diverted from the landfill (King County SWD, 2019).

Similarly, SPU champions zero waste of resources as a cornerstone of their business strategy (*Zero Waste*, n.d.). This can be further exemplified through SPU's use of the zero-waste concept within their *Solid Waste Management Plan Update: Moving Upstream Towards Zero Waste*. SPU additionally mentions the importance of promoting zero waste to ultimately lead to a circular economy (Seattle Public Utilities, 2021). Further, the report states that SPU is focusing on upstream efforts to reduce waste (Seattle Public Utilities, 2021). Such efforts include upstream textile initiatives, however, such initiatives are not specified.

4.1.2 Addressing prevention and consumption

Both King County SWD and SPU's waste management plans clearly identify waste prevention as a primary and long-standing objective. King County SWD defines waste prevention as "the practice of creating less waste, which saves the resources needed to recycle or dispose of [the

[2] SCAP was produced as a collaborative effort between various departments in King County

averted waste]" (brackets indicated changes by the researcher) and has identified their organization as a leader in developing prevention strategies for its cities (King County SWD, 2019, p. 14). King County SWD's definition aligns with SPU's which states, "[w]aste prevention keeps waste from entering the waste stream in the first place, yielding the greatest environmental gains of any waste management strategy" (Seattle Public Utilities, 2022, p. 4.3). SPU provides various initiatives and recommendations to develop waste prevention including increased research efforts, residential awareness campaigns, and increased support for community organizations.

In congruence with promoting waste prevention, sustainable consumption and consumption reduction are mentioned in both reports. While consumption reduction is a tool for waste prevention, it can place responsibility both on the producer (ex. minimizing product packaging), and on the consumer (ex. encouraging consumers to buy less). As was mentioned in section 3.3.3, various governmental initiatives in the EU explicitly state the importance of including messaging that educates and promotes consumption reduction from their citizens (Maldini et al., 2021). The reports do not explicitly state the extent to which King County SWD or SPU place responsibility on the consumer vs. that which is placed on the producer. Following is an explanation of what they do state.

Within the Strategic Climate Action Plan (SCAP), King County presents consumption-based emissions[3] data, showing that consumption-based emissions are more than double geographic emissions[4] (King County, 2021). King County states that, "[w]hile King County does not have direct control over all emissions within [a product or service's life cycle], it can influence the reduction of these emissions by … education and resources for the community to understand and reduce the impacts of their own consumption" (brackets indicate changes by the researcher) (King County, 2021, p. 135), demonstrating their focus on consumer consumption habits. Similarly, SPU mentions the promotion of informed purchasing and consumption by individuals as a strategy for waste prevention, and plans to investigate this topic further (Seattle Public Utilities, 2022). Additionally, investigating and increasing reuse and repair markets is listed as a recommendation to reduce per-capita consumption (Seattle Public Utilities, 2022).

Discrepancies between King County SWD and SPU

While both parties define prevention as a step prior to recycling, aligning with the EPA's waste management hierarchy, a point of interest is the difference in the way they are presented between King County SWD and SPU's waste management plans. SPU explicitly states that the focus of promoting waste prevention is to help residents understand that prevention includes reducing recycling and compostable waste in addition to residual waste (Seattle Public Utilities, 2022). This is further illustrated through SPU's use of separate prevention and recycling/composting chapters within their report, clearly identifying them as separate solutions. Conversely, while King County SWD does establish prevention and recycling as separate practices, within the report they are consistently grouped together as "waste prevention and recycling." This use of combined terminology may not have the same emphasis on prevention as it does in SPU's report and instead communicates to the reader that prevention and recycling are of equal importance. King County SWD does however point out that while prevention is a top priority, recycling rates have plateaued, and therefore are interested in increased action in the recycling sector (King County SWD, 2019). This could justify King County SWD's

[3] Consumption-based emissions are emissions that come from production, transportation, use and disposal of goods, food, and services consumed in King County (King County, 2021).

[4] Geographic emissions are emissions that occur within King County from those associated with vehicles and buildings in the county as well as electricity use regardless of where the electricity is generated (King County, 2021).

reasoning for grouping prevention and recycling together throughout the report. Although this discrepancy was identified, during an interview with Ashima Sukhdev, a Climate Mitigation & Circular Economy Policy Advisor at SPU, Sukhdev clearly stated that she believed King County SWD and SPU were aligned in terms of their prevention and recycling goals. Nonetheless, grouping waste prevention and recycling together can cause unnecessary confusion.

An additional point of interest in the reports is the use of the waste management hierarchy. SPU presents a waste management hierarchy that places prevention above reuse followed by recycling/composting (Seattle Public Utilities, 2022). This is unlike the EPA's hierarchy which places prevention and reuse on the same level. The King County SWD waste management plan does not provide a waste management hierarchy diagram, and therefore does not specify a difference between prevention and reuse. Various attempts were made to identify a waste management hierarchy graphic published by King County SWD but were not successful. Washington State's Department of Ecology's waste management hierarchy was identified and aligns with SPU's (Department of Ecology, n.d.) Therefore, conclusions can be drawn that King County SWD follows the same hierarchy. This is, however, not explicitly stated by King County SWD and has the potential to cause discrepancy as prevention speaks towards consumption reduction while reuse may speak towards both consumption reduction and redistribution markets. In terms of textile waste, redistribution markets can be complicated and controversial, as was explained in section 3.1.3, and therefore, may cause confusion within the messaging. This discrepancy would be solved if King County SWD explicitly provided a waste management hierarchy in their report that differentiated reuse from prevention.

4.2 Post-consumer textile waste management landscape

Regarding post-consumer textile waste management in King County, various actors are involved. Actors include: for-profit and not-for-profit organizations for collection, sorting, reuse, recycling, or exportation. Three cities within the county provide curbside textile waste collection (King County, 2014). Additionally, there are various repair options within the county, enabling product life extension opportunities.

Although these options exist, significant quantities of unwanted textiles are being funneled to the landfill. In 2015, King County SWD and SPU launched Threadcycle, an information campaign to educate residents that they can donate all unwanted textiles, including those that are damaged, to various existing textile collection points (Seattle Public Utilities, 2022). The initiative included an informational campaign that was funded until 2017 and now lies dormant. However, information for residents still exists on both King County and Seattle government websites. The following section explains the development, content, and underlying assumptions of Threadcycle, and presents the intervention theory developed by the researcher.

4.2.1 Threadcycle intervention theory

Referring to the Five Core Principles presented by Coryn et al. (2011) that were discussed in section 2.4.1, developing a reasonable intervention theory is the first step when conducting a theory-driven evaluation. The intervention theory identifies all relevant actors, inputs, anticipated outputs, and anticipated outcomes of the policy. Additionally, the development of the intervention theory addresses RQ 1(a) *'how is Threadcycle intended to operate?'*

Methods for obtaining information that pertains to the intervention were presented in section 2.4.1. To guide the collection of information for the formulation of the intervention theory, the researcher combined a framework from Coryn et al. (2011) and a framework from Mickwitz (2003). Through combining the frameworks, information was obtained in a structural manner and as a result, the intervention theory was developed. Both frameworks are generally the same

with a few terminology and term expansion differences, therefore, it was found suitable to combine them. The combined framework asks the researcher to identify all relevant components including, actors, inputs/activities, outputs, and outcomes (initial, intermediate, and long term), that are needed for the final construction of the intervention theory.

Actors include decision making entities, agencies implementing the instrument, and the target groups (Mickwitz, 2003). Inputs are resources used by the administrator to produce outputs (Mickwitz, 2003). Similarly, activities are the actions used to produce the desired outputs and outcomes (Coryn et al., 2011). These two components were combined as the information for both sections were compatible. Outputs are the immediate results of the intervention (Coryn et al., 2011) or, similarly, matters that the target group are immediately faced with (Mickwitz, 2003). Outcomes are the long-term expected changes due to the intervention (Coryn et al., 2011). Initial outcomes are changes in knowledge, intermediate outcomes are behavioral changes, and long-term outcomes are the result of the intermediate outcomes (Coryn et al., 2011). The intervention theory is presented as *Figure 4-1.*

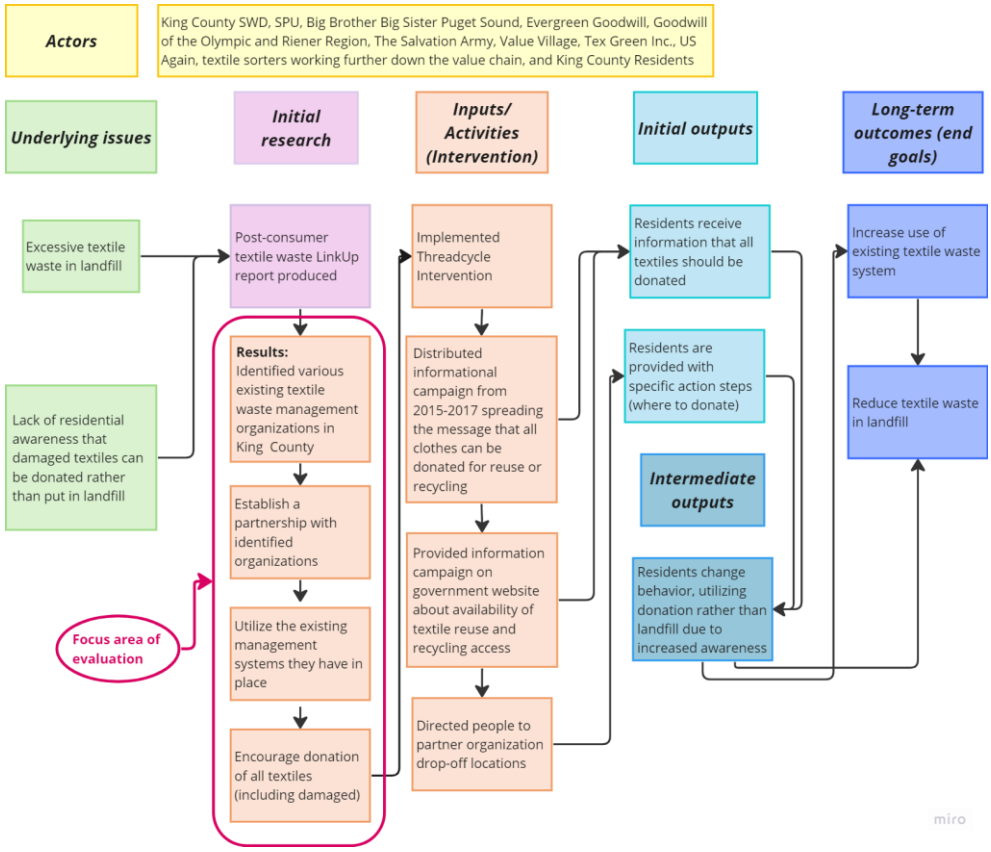

Figure 4-1. 'Threadcycle intervention theory'

Addressing 'sustainability'

In addition to Threadcycle's central message which addresses textile recycling and reuse, a brief section titled 'Sustainable clothing tips' is provided. Most of the information included in this section is regarding both environmental and social textile certifications. Subsequently, vague information titled 'tips to shop wisely' are included. The information included within these tips are, "mend clothing and repair shoes you already own, buy less, buy high-quality items that will not wear quickly, buy classic styles that will outlast trends, shop secondhand, and buy items from brands with environmental certifications." Although these 'sustainability tips' are included

on the Threadcycle website, they were not deemed relevant enough to include within the intervention theory as it is clear this section is not a prominent component of the intervention.

4.2.2 King County repair and reuse landscape

Within the King County region, there are various initiatives that provide residents with the opportunity for repair and reuse of an array of items. To answer RQ 2(a), '*how does the existing garment repair/ general repair/ reuse landscape in King County operate?'* the researcher was interested in identifying and speaking with as many of these organizations as possible. Organizations identified are presented in *Table 4-1*. The organizations listed vary in terms of service and structure. The researcher acknowledges that there may be organizations that were not included in the presented table. Of the ten repair organizations/ initiatives identified, seven were interviewed by the researcher. Additionally, seven of the initiatives had at least some level of garment repair initiative incorporated into their offerings. A brief overview of each initiative identified is provided in *Table 4-1*.

Table 4-1. 'Repair and reuse organizations in King County'

Organization	Type	Location/ boundaries	Public Offerings	Funding
Sustainable Capitol Hill	Registered non-profit	Capitol Hill neighborhood in Seattle	**Tool library** **Monthly Activities** (ex. Mending/ repair circle, Bicycle maintenance workshops, Repair cafés) **Fruit cleaning program**	No required member fee, Donations, Government grants
Seattle Reconomy	Registered non-profit	City of Seattle & City of Shoreline	**Tool Libraries** NE Seattle Tool Library Shoreline Tool Library **Reuse building materials** **Classes + Events** (ex. Workshop orientation, bicycle maintenance, mending)	Suggested members donation, Government grants
Repair Economy Washington	Registered non-profit	Washington State	**Information provider/ communicator** Partners with repair and sharing initiatives across WA State to organize information in one place	Government grants
King County SWD sponsored repair events	N/A	King County (various locations)	**Repair events** Free and open to the public at libraries and community centers. Held once a month at different locations each month.	N/A
Phinney Ridge Neighborhood Association	Non-profit	Phinney Ridge	Community organization. Offers various **events** including a "Needles and Arts Group"	Government grants, Donations
South King Tool Library	Non-profit	Federal Way	**Tool library** **Repair Events** Various events including clothing swaps, etc.	Government grants, Donations
The Facility Makerspace	Non-profit	Lynnwood	**Tool Library**	Required membership fees
Refugee Artisan Initiative	Registered non-profit	Lake City region of Seattle	**Textile Mending Fairs** **Twice a month in April, May, June 2024. Free to join and make minor garment repairs.**	Government grants, Donations
Furniture Repair Bank	Registered non-profit	Seattle region	**Public Repair Classes** **Focus on furniture repair.**	Government grants, Donations
FXRY	For-profit start-up	Seattle region	**Paid garment repair/ alterations services**	Start-up Fundraising

Government involvement in repair

As was mentioned in section 4.1, as King County works to transition to zero waste of resources and a circular economy, aiding resident's ability to repair their goods is necessary. Through King County's Re+ program, grants are awarded to reuse and repair organizations, stimulating the repair sector in King County. For the 2024-2025 cycle, 2.2 million USD are being rewarded (King County, 2024). Additionally, King County has a program titled EcoConsumer which provides residents with information about repair events, repair businesses, as well as tool and gear libraries. Further, Zero Waste Washington, spanning the entirety of Washington State, provides both grants and business advice and support for zero-waste initiatives. All the above-mentioned initiatives point to the involvement of the local government in King County.

5 Threadcycle findings and analysis

The following chapter presents the findings and analysis of Phase I, an ex-post policy evaluation of Threadcycle. The objective of this chapter is to answer RQ 1(a) *'how is Threadcycle intended to operate?* RQ 1(b) *'is Threadcycle effective in achieving its stated aims? and* RQ 1(c) *is Threadcycle relevant in regard to how it addresses the issue of post-consumer textile waste?* The chapter begins by presenting the findings from five interviews. Interviews were conducted with one Threadcycle partner, who will be referred to as Partner X, and four participants who are not directly involved with the initiative. This included Patty Liu, a Program Manager at King County SWD and Ashima Sukhdev, a Climate Mitigation and Circular Economy Policy Advisor for SPU. Additionally, two academics in the textile sector were interviewed, Jana Hawley, a researcher of textile waste management in the US, and Armine Ghalachyan, an assistant professor at Washington State University's Department of Apparel, Merchandising, Design & Textiles. While residential awareness, attitude towards, and use of Threadcycle is an important element of the intervention, the researcher chose to exclude this component from the evaluation due to a lack of time and ability to effectively survey the 2.2 million residents of King County. Further, as the researcher began the initial investigation, focusing the evaluation on the underlying structure and processes of Threadcycle was deemed appropriate for an evaluation.

The findings from the five interviews and webpage analyses will be presented, and following, an analysis of the findings will be performed using theory-driven evaluation. The evaluation will follow guidance by Core Principle 5 of theory-driven evaluation proposed by Coryn et al. (2011). An analysis of cause-and-effect associations and breakdowns will be used to address two evaluation criteria: effectiveness and relevance of Threadcycle.

5.1 Threadcycle interview findings

The following section intends to discuss the findings that pertain to the inner-working and processes of Threadcycle. The highlighted section of *Figure 4-1* was the primary focus of this evaluation. Through the development of the intervention theory, it was made evident that Threadcycle is dependent on partnerships between King County SWD, SPU, and seven organizations that have long standing textile collection schemes. These partnerships are an integral component of the intervention as the processing of textiles is fully dependent on the operations these organizations have in place. Without the existing processes these organizations employ, Threadcycle would not be able to function. Neither King County SWD nor SPU have their own textile processing facility to reuse, redistribute or recycle textiles.

This highlights two key components of the intervention which became the focus of the presented research, (1) the reliance on partnerships with textile collection organizations and (2) the dependency on the existing textile waste management system these partner organizations participate in. These components were used as a basis to evaluate the effectiveness of Threadcycle. To assess these components, the researcher intended to speak with representatives of the partner organizations to understand the relationship they have with King County SWD and SPU, how their operations fit with the goals of Threadcycle, and how the current textile recycling landscape is operating.

Due to the lack of interviews with partners as well as the complexity of the textile waste management system, interviews with additional stakeholders, analysis of partner organization's webpages, and relevant literature became necessary data collection tools as they provided further insight into the inner workings of the system.

As briefed in section 2.4.1, an abduction approach to coding was used for content analysis of interviews. The coding structure for Phase I is as follows. Preliminary deductive codes included

(1) intervention partnership, (2) existing waste system and (3) relevance of the intervention. As part of the abductive approach, inductive codes were developed during the coding process to ensure the results stayed true to the data. The inductive codes were sub-codes of the pre-determined deductive codes. The final coding structure was as follows in *Figure 5-1*.

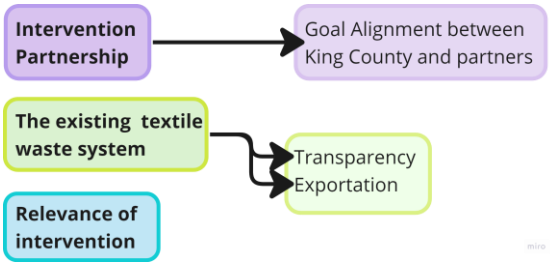

Figure 5-1. 'Phase I coding structure'

5.1.1 Threadcycle partnerships - findings

As previously stated, Threadcycle intended to utilize the processes of seven partner organizations for the management of textile waste. These partnerships raised two primary points of interest for the researcher. Firstly, to what extent are partners aware of the partnership they have with King County SWD and SPU, and secondly, do the Threadcycle and waste management goals of King County SWD and SPU align with the intentions of the partner organizations? As only one partner organization was responsive for an interview, data from the webpages of the six other organizations was necessary to add to the evaluation of the partnership. The interviewee from the Threadcycle partner organization is referred to as Partner X.

Partnership Awareness

Firstly, it should be addressed that the lack of interviews with partner organizations limits the generalizability of the data concerning partnership awareness considerably. Even so, the information gained regarding partnership awareness from an interview conducted with Partner X will be presented. Although relevant, information gained from Partner X poses further limitations because at the time of the interview, Partner X was relatively new to their role. Therefore, it is possible that they had not yet obtained all relevant information to their role, which could have implications on their knowledge of Threadcycle.

At the start of the interview, Partner X was asked to explain their awareness and understanding of Threadcycle. Partner X explained that, to their understanding, Threadcycle is a King County website that points residents to organizations, such as their own, that collect unwanted textiles. It was thereafter made apparent that there is currently not a working relationship between Organization X and King County SWD and SPU, therefore pointing to an extreme lack of communication between King County and Threadcycle partners.

Threadcycle does not necessarily have to be in constant communication with their partner organizations. If King County points its residents in the direction of the partner organization, the partners can independently operate because they rely on their own operational infrastructure. This lack of communication, however, does imply that King County SWD and SPU are not able to track where the diverted textile waste is going. This concern was brought up in early communication with Ezren who acknowledged that some residents call King County SWD to inquire about what is happening to textiles after donating to Threadcycle partner organizations and King County SWD is not able to provide this information. To address this issue, communication with partners needs to be re-established. Further, as highlighted by

Maldini et al. (2021), some countries/cities within the EU enforce regulations that require all textile collectors to register as waste management organizations and report on what happens with their collected textiles. In a similar sense, codes of conduct could be developed as was discussed by Watson & Palm (2016). Such regulations could be considered to support Threadcycle and would aid in addressing the lack of communication within operations.

While interview information was only gained from one partner organization, and therefore cannot be generalized to the remaining six partners, the lack of responses from five of the seven organizations indicates a general lack of communication in the intervention. Perhaps the lack of responses could be a result of the nature of this research, as it is voluntary and student led, however, the lack of communication King County SWD has had with four of the seven partner organizations, as informed by Ezren, aids to the notion of an overarching lack of communication.

Intention alignment

In addition to inquiring about Threadcycle's partner organizations awareness of the intervention, the researcher was interested in investigating the alignment of intentions between Threadcycle and the partner organizations. Through the development of the intervention theory, it was understood that one of the primary objectives of Threadcycle is to spread the message that all textiles can be donated (excluding those that are contaminated or mildewed). This knowledge, in theory, would lead to an increase in textile diversion from the landfill. During the interview with Partner X, this goal was explained, and Partner X was asked if it aligns with their organization's messaging. The interviewee was not able to directly answer the question (this could be attributed to the fact that they recently started their position), but instead, Partner X explained that their organization is unaware of what type of textiles are donated (damaged or undamaged) because they only collect textiles, they do not sort them. This response was of interest to the researcher as it pointed to the chain of actors involved in the process of operations. For the organization Partner X represents, after textiles are collected, they are sold, for profit, to a different organization, lengthening the chain of actors involved in the process. This creates further challenges regarding communication and will be expanded upon further in section 5.1.2.

As Partner X was not able to provide information in reference to their messaging of what textiles they collect, the researcher investigated the organization's website and found that it states, "[we partner] with individuals like you and companies like yours to collect *new and gently used clothing* throughout the region." Such a statement clearly contradicts a key component of the messaging Threadcycle intended to convey. This messaging indicates a blatant lack of alignment between the Threadcycle initiative and the partner organization. The websites of the remaining six partner organizations were subsequently reviewed. Of the seven, only one partner explicitly references Threadcycle and states that damaged items can be donated. Three partner organizations do not specify the quality of clothing that must be donated, leaving ambiguity for users. The remaining three (including Partner X), all specify that textiles must be "gently used" or "resalable." These findings illustrate a clear lack of alignment of intention between Threadcycle's messaging and their partners' messaging.

5.1.2 The existing textile waste management system - findings

The intervention theory presented in section 4.2.1 highlights an additional critical component of Threadcycle, its reliance on the existing textile waste management system in King County and subsequently the greater US. Therefore, an investigation of the existing system was used as an additional criterion to evaluate the effectiveness and relevance of Threadcycle as the state of the system has tremendous implications on the success of the initiative. The researcher asked

interviewees about their perceptions of the current system. Overarching opinions varied, but all pointed to a theme of a lack of transparency within the system.

Chain of actors

As mentioned in section 5.1.1, the interview with Partner X highlighted the chain of actors involved in the current system operations. The organization Partner X represents is solely responsible for collecting textiles. After collection, they sell them to an additional organization who sorts and redistributes them. This chain results in a lack of ability to monitor the textiles and further, prevents King County SWD and SPU from informing citizens about what happens to the textiles. Due to the lack of ability to interview partner organizations, organization's websites were investigated to gain further insight into the chain of actors involved. Unfortunately, across all remaining partners, little information regarding the chain of actors is provided. No partner websites provide information about the organizations they sell their discarded textiles to. In the interview conducted with Hawley, the prevalence of private operators within the system was mentioned. Hawley explained that private operators often participate by buying what is not sold in reuse shops. This exemplifies the challenge of effectively tracking textile waste as it is frequently passed to additional actors who King County SWD and SPU are unaware of.

Recycling

Regarding textile recycling, the topic was only brought up by two interviewees when asked about the current textile waste management system. What was discussed aligns well with current literature on the topic. Hawley spoke to the prevalence of garment downcycling while Ghalachyan touched on the difficulties of textile-to-textile recycling. Ghalachyan emphasized that while such technologies are being developed, they are not yet to scale. She additionally stated that she does not believe they will be to scale any time soon. Both Ghalachyan and Hawley pointed to the importance of upstream initiatives to aid in effective textile recycling. Hawley spoke of the importance of reducing the use of mixed fiber within garments as well as reducing the use of spandex as it complicates the recycling process. In a similar sense, Ghalachyan touched on the importance of circular design to address garment recyclability. Currently, such upstream initiatives are not being addressed through the Threadcycle intervention.

Due to the name 'Threadcycle,' it is implied that recycling is a component of the intervention as the name is a play on the words, "threads" and "recycle." Additionally, the Threadcycle webpage is titled "Threadcycle – Textile Recycling," implying textiles are being recycled. As supported by both the presented literature and interviews with Hawley and Ghalachyan, current textile recycling technologies need further development to address the magnitude of textile waste being generated. Additionally, both King County SWD and SPU follow the waste hierarchy which promotes prevention before recycling, a sentiment the Threadcycle name does not naturally align with. Therefore, the Threadcycle initiative might benefit from a change in name that both aligns with waste priorities (waste prevention before recycling) and additionally, it would benefit from a name that does not imply textiles are being recycled, but rather reused or downcycled.

Exportation

When investigating the current waste system, textile exportation was deemed an area of great relevance primarily due to the data gathered from the literature review. Therefore, interviewees were asked about their understanding of textile exportation within the existing system. The goal of inquiring about the topic of exportation was to understand the role it plays within the King County and greater US system. As previously mentioned, Partner X explained that their organization is not responsible for what happens after textiles are collected and sold. Therefore,

they have no insight into whether the textiles they collect are exported, again, posing challenges for King County SWD and SPU as they cannot track this information.

When asked about textile exportation, Hawley did not touch on the potential negative or positive implications of the practice, but instead shared that exportation has changed to comply with the bans various countries have imposed and that selling is based on long standing relationships between sellers and brokers. Hawley stated that "the relationship is a two-way street." She explained that problems arise when new sellers come into the market without long-standing relationships with brokers. Even with such an understanding, the issue remains that King County SWD and SPU do not have the ability to monitor which sellers are involved in King County's system.

Ghalachyan and Liu aligned in their response to textile exportation, speaking to the role overconsumption of textiles plays in textile exportation, again pointing back to the importance of waste prevention, a component Threadcycle does not address to the same level as recycling. Ghalachyan and Liu both expressed that they question the ability of importing countries to manage the volume of textile waste they are receiving. They both raised the issue of utilizing exportation as a method for waste relocation rather than effective reuse or recycling of the waste. This additionally points back to both King County SWD's and SPU's waste management plans which prioritize waste prevention prior to recycling, however, the current Threadcycle initiative lacks the prevention message.

The overarching challenge of the Threadcycle initiative regarding textile exportation, again, leads back to the issue that King County does not have the ability to track the waste. Therefore, they have no indication of what sellers are managing the waste and how much is being exported, what quality of clothing is being exported, or where it is going. Literature has already highlighted the controversies of the practice, as presented in section 3.1.3. It is understood that much of the textiles that are donated are exported, however King County cannot address this issue without having information about textiles after collection. Further, as touched on by Ghalachyan and Liu, the volume of textiles consumed and thereafter being exported to countries without infrastructure to manage the volume can be unreasonable. Threadcycle is not addressing the massive volumes of textile waste, but instead spreading the message that the infrastructure to manage current consumption practices is adequate.

5.1.3 Relevance of intervention - findings

Interviewees were asked to share their opinions on how information about textile waste management should be improved and what the priorities should be when disseminating information. Hawley's response was interesting in that she directly addressed the issues of consumers' awareness of the ability to donate damaged clothing and encouraged an increase in this messaging. This sentiment directly spoke to one of the primary goals of Threadcycle. Ghalachyan expressed the same concern as Hawley, stating that she has observed people believing that textile collection points are for gently used clothes and that it would be impolite to donate textiles that are damaged. As previously discussed, this is the message that is spread by only three of the seven Threadcycle partner textile collection organizations. Liu also touched on this issue, speaking specifically about King County residents. Liu shared that many residents are still not well informed that ripped or stained clothing can be donated.

In terms of King County's waste sector priorities, Liu and Ezren shared that currently, paper, plastic and food waste are the prioritized waste sectors. As a former employee of the Re+ program that was mentioned in chapter 4.1.1, Liu shared that while the program currently does not focus on textiles, it is "a living program" and could prioritize textiles in the future. An SPU employee, Sukhdev shared that SPU is aware of the importance of the textile sector and stated

that SPU is interested in taking an upstream approach to the issue of textiles. These findings indicate that textile waste management initiatives are relevant and that while they are not a top priority in King County, they are still of interest to King County's waste professionals.

5.2 Threadcycle output evaluation

As a means of evaluating Threadcycle with the chosen criteria, effectiveness and relevance, various outputs were evaluated. To assess the effectiveness of the assumptions underlying the structure and processes of Threadcycle, the researcher asked, *does Threadcycle achieve the intended goals of the intervention, and can the results be attributed to Threadcycle?* And to assess the relevance of the intervention the researcher asks, *do the goals of the intervention properly address key environmental problems?* As stated in section 5.1, the researcher investigated two overarching assumptions, Threadcycle's dependency on partnerships and Threadcycle's dependency on the existing textile waste management system in King County. Following Core Principle 5 from Coryn et al. (2011), the researcher utilized the findings to identify cause-and-effect associations and breakdowns to determine the effectiveness and relevance in achieving its stated goals. The identified cause-and-effect associations and breakdowns are presented below.

Cause-and-effect/output associations

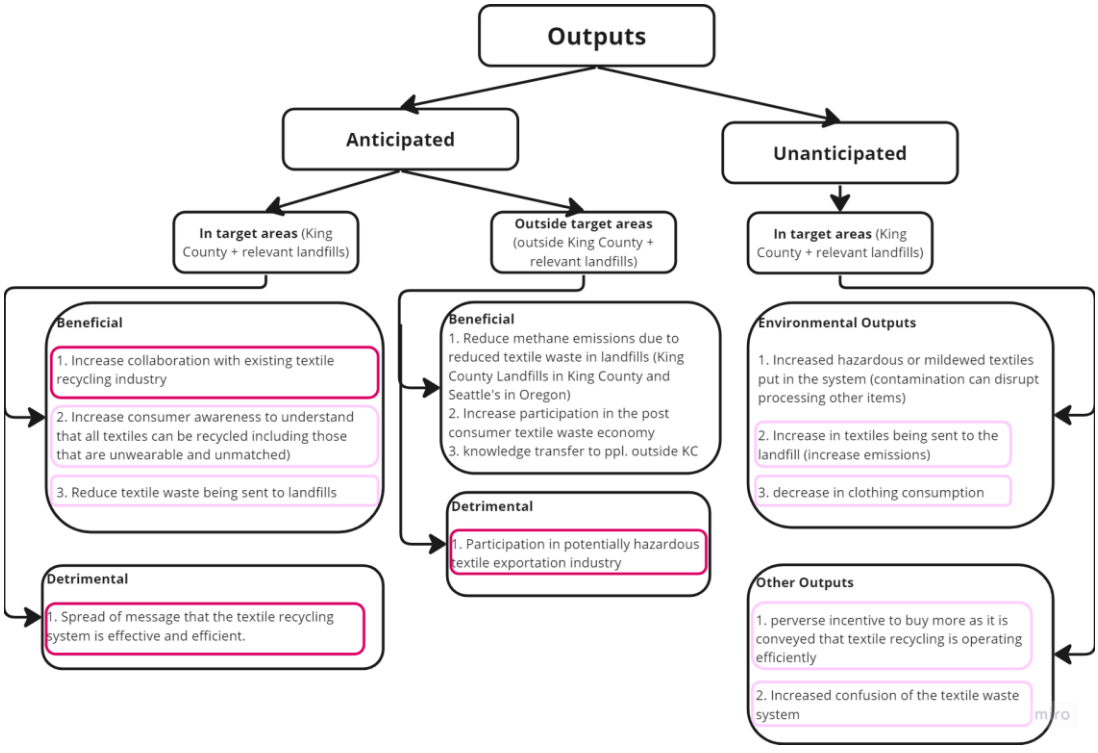

Figure 5-2. 'Output model'

Source: Adapted from Mickwitz (2003)

Prior to identifying breakdowns in the Threadcycle intervention, cause-and-effect associations were evaluated. The side-effect evaluation model from Mickwitz (2003) was used to identify both the anticipated and unanticipated effects of the Threadcycle intervention. For the sake of this research, the term "effect" will be replaced with "output." Utilization of the model was deemed useful as the researcher identified it to be an effective visual tool to establish all relevant outputs of the intervention. Therefore, it is used to complement the intervention theory. Within

the model, there are various outputs that were not assessed in this research, however, of the outputs that were not evaluated, some are still touched on due to the findings from interviews and document collection. These will be indicated by a light circle and will be briefly expanded upon. Outputs that were directly evaluated are indicated by a dark circle and will also be expanded upon. Those that are not circled, will not be expanded upon.

5.2.1.1.1 Anticipated effects in target areas

5.2.1.1.1.1 Beneficial outputs

Three beneficial anticipated outputs within the target area of King County were identified, however, only one was explicitly evaluated within this study. This was *an increase in collaboration with the existing textile recycling industry* and was identified as a result of the inputs/activities (as shown in the intervention theory in section 4.2.1). As explained in chapter 5.1.3.1.1, while a technical relationship remains between King County and the seven partner organizations, the relationship is not active. Therefore, the researcher believes that this benefit has not been adequately realized. Increased and consistent communication, required monitoring, tracking, and reporting to King County SWD and SPU would aid to realizing this anticipated output.

The second beneficial anticipated output identified was *an increase in consumer's understanding that damaged textiles can be donated rather than sent to the landfill*. This was identified as an initial output and was not directly tested as it was out of the practical scope of the presented research, however, as previously explained, partner organization's lack of alignment with this message has potential to hamper the success of this output.

The third anticipated beneficial output identified was a *reduction of textile waste being sent to the landfills*. This was identified through the intervention theory as the long-term outcome of the intervention. While this was not a direct component of the presented research, reports released by King County SWD and SPU provide insight into how the volume of textiles in landfills have changed. *Table 5-1* presents the data from both King County SWD reports and SPU reports. The report from 2011 contains information from King County that includes the City of Seattle. The tonnage of textile waste from the reports was then divided by the population at the time to find the waste per-capita. For 2019/2020, King County SWD and SPU released separate waste reports, therefore, the information from the two reports were combined. The population is from the year 2020.

The table indicates that from 2011, before Threadcycle was implemented, to 2019/2020, per-capita textile waste decreased by roughly 10%. This is not a negligible change and does indicate a per-capita decrease in textile waste going to the landfill. This finding is significant as it indicates a shift, however, it remains unclear if this shift is due to Threadcycle or other factors.

Table 5-1. 'King County textile waste'

Year	Residential textile waste in landfill (lbs.)	population	waste per-capita (lbs.) (textile waste/pop.)
2011[5]	78,928,000	1,972,000	40
2019[6]/2020[7]	81,800,000	2,274,000	36

[5] Data from *Post-Consumer Textiles: King County LinkUp Research Summary Report* including all of King County (King County, 2014).

[6] Data from *King County Waste Characterization and Customer Survey Report: King County Waste Monitoring Program* excluding Seattle (Cascadia Consulting Group, 2020).

[7] Data from Seattle's *2020 Residential Garbage and Recycling Stream Composition Study* (Cascadia Consulting Group, 2022).

5.2.1.1.1.2 Detrimental outputs

Only one anticipated detrimental output within the King County region was identified - *Threadcycle is spreading the message that the textile recycling system/overarching textile waste management system in King County is effective and efficient*. The Threadcycle initiative emphasizes and encourages 'recycling textiles' rather than sending them to the landfill. This messaging implies that infrastructure to recycle textiles exists. As discussed in section 3.1.4 and section 5.1.2, such infrastructure that can handle the level of textile waste in the system and the types of materials used (blended fibers) does not yet exist. Further, spreading such a message prioritizes recycling over prevention, a notion that does not align with King County SWD or SPU.

5.2.1.1.2 Anticipated outputs outside of target area

5.2.1.1.2.1 Detrimental outputs

Contribution to a controversial and potentially hazardous textile exportation industry was identified as the only anticipated detrimental effect outside of the King County area. As previously discussed in section 3.1.1, section 5.2.1, and section 5.1.3.1.2, participating in textile exportation can lead to negative effects in importing countries. This effect was categorized as anticipated as the Post-Consumer Textile waste report (2014) produced by King County prior to launching Threadcycle acknowledges the prominent role export markets have in the existing system. Further, the report acknowledges the potential economic and socially hazardous impacts of the practices (King County, 2014).

5.2.1.1.3 Unanticipated outputs inside the target area

5.2.1.1.3.1 Environmental outputs

Three unanticipated environmental effects within the target area were identified, however only two will be expanded upon. These include *an increase in textiles being sent to the landfill* and *a decrease in clothing consumption*. As presented in *Table 5-1*, although *an increase in textile waste being sent to the landfill* from 2011 to 2019/2020 did occur, the per-capita rate decreased by 10%. Although at first glance it seems that this unanticipated environmental effect was realized, it was not if assessed in terms of per-capita. However, as previously mentioned, this decrease cannot be attributed to Threadcycle through the presented research.

A *decrease in clothing consumption* was not directly evaluated in presented research, however, it is relevant to discuss because such an output aligns with King County SWD and SPU's priority of waste prevention. However, the researcher found that a decrease in clothing consumption is not a current priority of the Threadcycle intervention, as the intervention focuses on recycling and reuse markets, rather than reduction from the source. The researcher believes that this should be an anticipated output, however, as Threadcycle currently stands, it is not.

5.2.1.1.3.2 Other outputs

Non-environmental related unanticipated effects identified were, *a perverse incentive to buy more textiles as residents may believe the textile waste management system is effective* and, *increased confusion of the textile waste system operations*. As previously discussed, the Threadcycle campaign inherently spreads the message that textile waste can be adequately managed. As discovered in the literature review and further backed up by interviews, the current waste management system depends primarily on textile downcycling and exportation, both less optimal solutions than prevention. Further, organizations such as the one that Partner X represented rely on such donations to sell textile waste for a profit, therefore, they have an incentive to encourage increased donations,

encouraging increased consumption to meet donation needs, creating a perverse incentive to generate more textile waste.

Secondly, *increased confusion of the textile waste system* was identified as an unanticipated effect of Threadcycle as the intention was to provide information and resources to residents. As stated in section 5.1.1, Ezren shared that residents have called to inquire about what happens to the textile waste that is donated to Threadcycle's partner organizations, and King County is not able to provide this information. While the initiative was meant to provide information about recycling options, the information provided to residents is not supported by detailed information, and therefore has the potential to generate further confusion about the system.

Breakdowns

Breakdowns can be understood as elements of the intervention that hinder its success (Coryn et al., 2011). Three overarching breakdowns were identified from the findings and the analysis of cause-and-effect/output-associations. They included (1) a lack of communication and coordination with partners, (2) questionable assumptions, and (3) lack of alignment with county waste goals.

5.2.1.1.4 Lack of communication and coordination

A lack of communication and coordination between partner organizations and King County was identified as the first breakdown in the Threadcycle intervention. As discussed, only two of the seven Threadcycle partners were responsive to interview requests sent by the researcher for this study and further, King County has only been in contact with three of the seven partners within a recent time frame. While the partners can perform operations on their own, they have no requirement or motivation to provide King County with any information regarding how much waste they are collecting or how the waste is managed after collection. Therefore, King County cannot provide information to residents about textile waste. King County is spreading the message that the textile waste that is managed by their partners is being recycled or redistributed effectively, when in reality, they cannot back up these claims.

Additionally, after investigating all seven partner organization's webpages, it was discovered that only one organization communicated that damaged textiles can be recycled (not including those that are hazardous or mildewed). Three organizations did not specify if donated textiles can be damaged, and three explicitly stated that only new or gently used garments should be donated. Considering that informing residents that damaged textiles can be donated is a key component of the Threadcycle initiative, the lack of alignment within partner organizations points to an implementation failure of the intervention.

5.2.1.1.5 Questionable underlying assumptions

The utilization of the existing textile waste management system is considered a questionable underlying assumption and poses the second intervention breakdown. Both the research findings and the literature review indicate the challenges associated with the current waste system. Firstly, the chain of actors involved in the system's operations result in monitoring challenges, preventing King County from knowing how the waste is managed. Secondly, textile recycling is a complicated process that requires further innovation. Through their webpages, various of Threadcycle's partner organizations hint at the idea that they are recycling unwearable textiles. This practice, however, is often downcycling as textile-to-textile recycling is not yet developed to a large scale. Lastly, textile exportation is a controversial practice and, as discussed in both the literature review and interviews, although in some contexts can be positive, in other contexts it can be extremely negative. Therefore, due to the lack of transparency, lack of recycling technology, and practice of textile exportation, the existing textile waste system that

Threadcycle is dependent on is considered a breakdown and further, indicates implementation failure of the intervention.

5.2.1.1.6 Lack of alignment with county waste goals

Lastly, the lack of alignment between the Threadcycle intervention and King County waste goals was identified as a breakdown. As presented in Chapter 4, both King County SWD's and SPU's waste management plans highlighted the importance of prioritizing waste prevention before recycling. However, Threadcycle primarily emphasizes recycling. The Threadcycle webpage does provide residents with 'Sustainable clothing tips,' however, these tips are limited and vague, making 'textile recycling' seem like an equally adequate option. This lack of alignment is considered a breakdown because there is a clear gap between King County's waste goals and the Threadcycle message.

Effectiveness

To evaluate the effectiveness of Threadcycle, the researcher is asking, *does Threadcycle achieve the intended goals of the intervention, and can the results be attributed to Threadcycle?* As was presented in *Table 5-1,* between 2011 and 2019/2020, King County/Seattle have seen a 10% per-capita decrease in textile waste in the landfill. While this contributes to the long-term outcome of Threadcycle, the researcher is not able to attribute the decrease to the intervention because of the three breakdowns presented above. Due to the lack of communication with partners, there is no waste management transparency. This is a substantial concern as the existing system is controversial and can be a contributor to environmental and social issues. Further, while King County prides itself on championing progressive waste policies and prevention strategies, the Threadcycle initiative does not align with such thinking. Rather than providing information to residents about effective textile waste prevention, the intervention's messaging and name instead suggests that textile recycling is effective and advanced. Further, no specific information about the recycling process is provided to the user and sustainable textile habits are not adequately promoted. These breakdowns point to implementation failure of Threadcycle, and it is suggested that they be reevaluated. Due to the implementation failure, the researcher cannot attribute the per-capita decrease in textile waste to Threadcycle.

Relevance

To evaluate the relevance of Threadcycle, the researcher is asking *do the goals of the intervention properly address key environmental problems?* The researcher concludes that taking government action to address post-consumer textile waste in the US is a needed action. Further, while landfilled textile waste is one of the least environmentally impactful segments of a garments value chain, finding ways to address the end-of-life of textiles is needed to promote a circular economy. However, the way in which this issue is addressed is critical for it to be relevant to the issue at hand. Through interviews, it was agreed that there is still a need for increased messaging stating that damaged textiles can be donated. This component of Threadcycle is environmentally relevant and should continue to be perpetuated. A central component that is lacking however, is King County SWD/SPU's ability to track the textile waste through the system they are promoting to ensure waste is being dealt with in an ethical manner. Without such abilities, it is unclear if the textile waste being diverted from King County's landfill is being relocated to a different landfill. Additionally, textile waste prevention should be a central point of discussion within the intervention to better align with King County's waste agenda. Due to these circumstances, the intervention is deemed partially relevant but requires alterations in the system to be fully relevant.

6 Repair and reuse landscape finding and analysis

This chapter presents and analyses the findings of Phase II to answer RQ 2(a), *'how does the existing garment repair/ general repair/reuse landscape in King County operate?'* And RQ 2(b), '*what are the current drivers and barriers they face?'* The literature review presented in Chapter 3 was used to guide a comparative analysis of drivers and barriers faced by the repair organizations in King County and current literature.

Ten overarching repair/reuse initiatives were identified which are presented in *Table 4-1*. Of the ten organizations, interviews were held with representatives from seven of the organizations. Six of the organization interviewed were identified to have some form of garment repair element[8], however, only four were found to provide consistent garment repair activities.

Nine interviews were conducted with actors relevant to the discussion of repair within King County. A table with all the interviewees is provided in *Appendix B*. Like Phase I, an abductive coding approach was taken. The deductive codes developed from the literature review were, (1) *marketing*, (2) *volunteers*, (3) *space*, (4) *finances*, and (5) *messaging*. Through the coding process, it was realized that the codes 1-4 needed to be broken into two categories "barriers" and "drivers." It became clear that all the factors identified as barriers could also act as drivers. For example, while a dependency on volunteers can be a barrier for the sake of continuity, volunteers also act as drivers as they allow for low or no membership fees, resulting in increased accessibility to residents. Therefore, the researcher grouped barriers and drivers as 'critical components' for success of repair/reuse organizations within the King County context, and subsequently, 'barriers' and 'drivers.' Additional inductive codes were found to be relevant that were not identified in the literature and were added. They included: *goal alignment, community interest, paid employees,* and *integrated network*. The established coding structure for Phase II is illustrated in *Figure 6-1*.

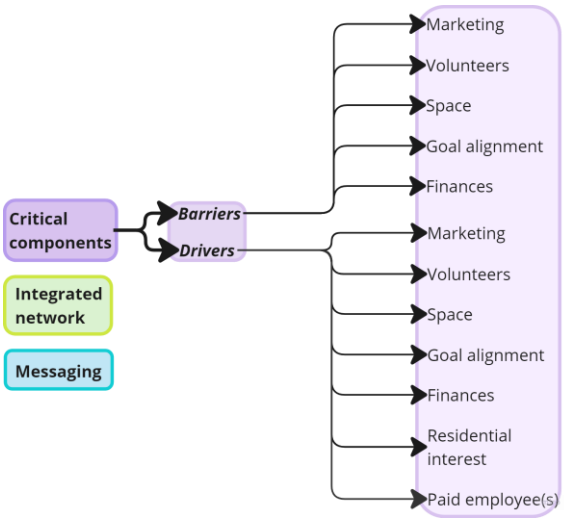

Figure 6-1. 'Phase II coding structure'

To conduct a comparative analysis, as was detailed by Rose (1991), a matrix was developed. The matrix places existing literature and the various repair/reuse organizations interviewed across the y-axis, and "concepts" (in this case the concepts were the codes) placed along the x-axis. The existing literature acted as a starting point for comparison. Through the development of a matrix, the researcher was able to present the data gathered from interviews and illustrate how

[8] PNA was additionally found to have a mending initiative, however, was not interviewed.

current literature matches up with this data. Additionally, the matrix was used to identify connections between the concepts as many of them are interconnected. These connections allowed the researcher to develop a more well-rounded understanding of the findings. These connections are illustrated using color codes. The matrix is presented in *Appendix E*.

Upon developing the matrix, the concepts were further broken down into sub-concepts. After organizing the information accordingly, the researcher counted how many interviewees spoke about each sub-concept. This was done to further organize the data and allow the researcher to 'quantify' the results, enabling a clearer understanding of the relevance of each concept. *Figure 6-2* presents the sub-concepts as well as the interviewees who spoke about them. A heat map approach was used to display the data meaning the more a sub-concept was spoken about, the darker the color and vis-versa. When each sub-concept was mentioned in terms of a barrier, it was color coded orange, and when it was mentioned in terms of a driver, it was color coded green.

Critical Components						
Marketing	**Volunteers**	**Space**	**Goal alignment (growth)**	**Finances**	**Residential interest**	**Paid employee(s)**
Marketing efforts are dependent on volunteer time and capacity (Ackerley)	Lack of accountability (Epstein)	Pop-up model creates challenges with accessibility (Bruner)	Access to money but no plan for what to do with it without goal alignment (Ackereley)	Hinder ability to buy space rather than rent (Epstein)	Growth in community engagement (not for repair but just for engagement (Mason)	Looking to fill needed gaps (business admin.) through paid employees (Epstein)
Repair Economy Washington put everything in one place (Mason)	Limited time and capacity (Mason, Ackerley)	Desire to buy rather than rent but greater Seattle area is expensive (Epstein)	Lack of goal alignment hinders growth opportunities (Ackereley, Mason)	Hinders ability to have paid employees (Epstein)	Continued growth of participants and interest (Mason, Epstein)	Run in part by paid employees (Epstein, Bruner, Rausch, Dolovova, Dawson)
Various communication platforms are successful for marketing (Ackerley, Dolovova)	Limited skillsets (Ackerley, Dolovova, Bruner)	Challenge to move material from one location to another (Bruner)	Ability to accept more used items due to goal alignment (Epstein)	Funding in an overarching barrier that can hinder operations (Bruner)	Demand for public tailoring services (Rausch, Calley)	
	Hinders continuity (Ackerley, Epstein, Bruner)	Limited space reduces ability to expand services and resources (Ackerley, Dolovova, Bruner)	Clear goal setting can provide paid jobs which can help the org. grow (Rausch, Epstein)	When an organization only focuses on repair, it can be harder to receive funding (Dolovova)		
	Volunteers have capacity to be taught skills (Dolovova)	Larger space results in greater opportunity to grow (Epstein)	Allows for ability to reach more people (Dolovova, Bruner, Epstein)	Paying for repair services/selling upcycled products is expensive (Rausch, Dawson)		
	Volunteers allow member donations to stay low (Epstein)	Utilization of community space for events is beneficial (Ackerley, Watson)	Overarching goal to collaborate with other reuse/repair organizations (Epstein, Bruner, Dolovova)	Running a mending circle does not require many financial resources (Mason)		
	Access to many volunteers (Epstein, Dolovova)	Government grants help with renting space (Epstein, Dolovova)		Member fees are optional allowing more people to access (Mason, Epstein)		
	Initiatives can grow with dedicated volunteers (Ackereley, Mason, Epstein)			Grants are available in the King County area (Epstein, Ackereley, Dolovova, Rausch, Bruner, Liu)		

Figure 6-2. 'Critical components of reuse and repair organizations with sub-concepts'

6.1 Analysis of critical components

As presented in section 3.2.2, the primary overarching barriers identified in the literature were *marketing*, *dependency on volunteers*, *space*, and *finances*. It should be noted that much of the literature identified pertains specifically to repair cafés, while the organizations interviewed included repair cafés, tool libraries, repair/reuse informational tools, and for-profit repair initiatives. This was due to the lack of available literature on organizations beyond the repair café. As previously mentioned, the researcher grouped drivers and barriers into overarching 'critical components.'. After performing content analysis for each of the interviews, *goal alignment*, *community interest*, and *paid employees* were identified as additional critical components that were not found in the literature. An analysis of each critical component is presented below.

6.1.1 Marketing

Through a survey conducted by Keiller & Charter (2016) which included 317 registered repair cafés from 10 countries, the most prominent barriers for operations identified were those in relation to marketing. Of the seven interviewed organizations in King County, marketing was not identified as a primary barrier. It was found that all the organizations already have high success of participants and are aware of effective communication channels that can be used to spread information about events to both obtain participants and volunteers. Such channels included 'Meetup' and specific Facebook groups. Repair Economy Washington was also found to play a key role in promotion of events as the organization provides an accessible database that includes nearly all repair/reuse initiatives throughout Washington State and enables residents to search for events or organizations near them in an efficient manner. The overall success of marketing throughout King County also speaks to the high level of residential interest, an additional critical component identified by the researcher.

It was mentioned by one interviewee that marketing efforts are constrained to volunteer time and capacity. Therefore, the number of communication channels utilized for messaging is often limited. While the interviewee felt that this was acceptable as the organization was aware of which channels were most effective, only utilizing the successful communication channels could result in reaching residents who already have interest in repair/reuse, and not reaching those that are not already aware of the existing opportunities. Therefore, it would be beneficial to expand marketing to channels beyond those that are known to be effective. This barrier is connected to the dependency on volunteers as the level of outreach pursued is dependent on volunteer time and capacity.

6.1.2 Volunteers

The role volunteers have within repair/reuse organizations is a commonly discussed critical component in current literature. Literature addresses the integral role volunteers have in terms of organizing and facilitating operations (Moalem & Mosgaard, 2021), but additionally, literature addresses the challenges that arise from a dependency on volunteers (Bradley & Persson, 2022; Keiller & Charter, 2016; Moalem & Mosgaard, 2021). Moalem & Mosgaard (2021) address the potential lack of appreciation volunteers may receive which can lead to burnout. They additionally point to the issues that may occur if certain skillsets are required but not found within the available volunteers (Moalem & Mosgaard, 2021). Bradely & Persson (2022) mention that volunteer workload may be ever-increasing. The survey from Keiller & Charter (2016) found that ensuring continuity, which can often be a result of dependency on volunteers, was

marked as either 'somewhat of a barrier,' 'moderate barrier,' or 'major barrier' by 50% of repair café respondents.

Responses from King County organizations were found to line up well with existing literature. *Figure 6-2* shows that a dependency on volunteers was one of the most discussed topics and was almost evenly split between barriers and drivers. Interviewees spoke about the challenges relating to a lack of accountability, limited time and capacity, limited skillsets and ensuring continuity. However, many also spoke about the needed role they play and the opportunities they create within the organizations. Epstein went so far as to state, "volunteers are our biggest strength."

Connecting back to marketing, specifically for volunteers, the organizations seemed to have no issue recruiting high volumes of volunteers. Various interviewees also spoke about the ability to train volunteers when needed, and the importance of ensuring volunteers feel valued for longer retention. Two interviewees shared that they actively remind their volunteers of the important work they are doing. Additionally, one interviewee shared that they encourage volunteers to assist in areas they are interested in to keep them engaged. Such ideas can be exemplified through Mason's work at Sustainable Capitol Hill. Mason, a volunteer, started a mending group which has been so successful that it has expanded from once a month to twice a month. This example shows the importance of Mason's dedication which is in part a result of a genuine interest in mending.

While volunteers were found to play an integral role in many of the organization's operations, it was also found that having one or a few paid employees aided the organization's success. Although volunteers can be trained to obtain specific skillsets, it was mentioned by one interviewee that as operations were expanding, they were finding a need to hire a part-time business manager to ensure continuity and time-commitment. This indicates that there is value in employing a small number of paid employee.

6.1.3 Space

Within their survey, Keiller & Charter (2016) found that 'finding a suitable venue' was marked as 'somewhat of a barrier,' 'moderate barrier,' or major barrier' by only 25% of respondents. Within King County, space was found to be much more of a prominent barrier. Various interviewees spoke about the importance of a larger space for growth and expansion. This notion especially pertained to tool libraries as increasing inventory requires more space. Space acting as a prominent barrier within King County makes sense when considering the economic landscape. The Seattle area in specific has experienced a significant increase in housing costs. From May 2023 to May 2024, housing costs have increased 12% (Groover, 2024). Additionally, Seattle has a higher cost of living than the national average (*Cost of Living in Seattle*, n.d.). One interviewee spoke of the desire to purchase space rather than rent as it would result in more stable income opportunities which could help with expansion. However, this task is currently difficult as the cost of buying space is high. This finding speaks to repair/reuse organizations operating in areas with similar economic landscapes. Various interviewees pointed to the important role libraries and community center spaces can have in terms of space for events. However, the use of this space pertains primarily to initiatives that do not provide reuse equipment (such as sewing machines) to participants as it limits storage space opportunities.

6.1.4 Goal alignment within the organization

A critical component not identified in the literature but found through interviews was goal alignment within the repair/reuse organizations. The researcher used the term *goal alignment* to encompass visioning and plans for growth. Of the seven organizations, one was found to have

a clear lack of goal alignment amongst the volunteers. Due to this lack of alignment, the organization did not have a clear growth plan. The interviewee who spoke about this indicated that the reliance on volunteers and lack of paid employees has resulted in confusion/unalignment regarding what the overarching goals of the organization are. This barrier connects back to the barrier of continuity and dependence on volunteers.

The six other organizations interviewed were found to have strong goal alignment attributes. Two overarching trends were identified that aid in the organization's goals alignment. Firstly, various interviewees spoke about the goal of having paid employees for specific roles. For some organizations, this is an integral component of their organization's operations while for others, as was touched upon earlier, it became necessary as specific skillsets were needed. Further, the organizations that seemed to have stronger goal alignment were the ones that had one or multiple paid employees.

The second overarching trend to aid goal alignment identified was an initiative to implement a "reuse commons." This idea was brought up by various interviewees from different organizations, including the interviewee held with Sukhdev, an SPU employee. By establishing a reuse common, many of the organizations, specifically in the Seattle area, would all be in the same building and therefore would be able to share resources. This would allow the organizations to help each other develop and grow. These efforts are enhanced by the organization's internal goal alignment.

6.1.5 Finances

According to the survey distributed by Keiller & Charter (2016), only 25% of participants marked obtaining sufficient finances as 'somewhat of a barrier,' 'moderate barrier,' or 'major barrier.' Finances were found to have a larger impact as a barrier within the organizations in King County. The organizations that faced higher financial concerns were found to be those with higher levels of goal alignment and simultaneously those who were planning to pay select employees and therefore needed to identify adequate revenue streams. Additionally, the desire to physically expand or buy space is hindered by financial need. Further, two of the organizations interviewed have business models that depend on consumers buying their goods. In this case, a challenge with finances occurs due to the need for consumers to be willing to pay enough for the price of labor for repair. This is a general concern when charging for repair that was also identified in the literature (Gwilt, 2014).

While finances were considered a barrier for the reasons stated above, various financial advantages (drivers) were also identified. Firstly, both King County and Washington State provide various grant opportunities for zero waste/waste reduction initiatives. It was found that nearly all the organizations interviewed were taking advantage of these grants. Many of which have utilized these grants to rent space, helping to overcome space as a barrier. The availability of these grants demonstrates a critical role the local government is playing in the development of these organizations. Due in part to these grants, various organizations interviewed do not require member fees but instead have donation suggestions for their members. One interviewee shared that these member fees can support day to day operations. Finally, specifically pertaining to garment repair events, one interviewee shared that running regular mending circle requires little funding. Therefore, finances for such a program are not a high barrier in the first place.

6.1.6 Residential Interest

Residential interest was the second critical component that was not identified in literature but was identified through interviews. Amongst all the organizations interviewed, no barriers concerning residential interest were found, rather, all organizations seemed to have harnessed

strong residential interest. As previously stated, Mason from Sustainable Capitol Hill was able to expand a mending circle to take place twice a month due to increasing interest and engagement. Additionally, Mason shared that some people join for the community engagement in addition to mending. In terms of paid garment repair/tailoring services, various interviewees spoke about the lack of availability in the King County region and the success they have had in offering these services. All these sentiments speak to the relevance of and interest in such initiatives, specifically pertaining to garment repair.

Residential interest can also be exemplified through other sub-concepts. For example, marketing was not identified as a primary barrier in the King County context as continued residential participation in the organizations has not been an issue. Additionally, one interviewee spoke to the high number of volunteers they currently have, further demonstrating significant residential interest.

6.1.7 Paid employee(s)

The inclusion of paid employee(s) was identified as a critical component in repair/reuse organizations. Nearly all the organizations interviewed were dependent to varying degrees on paid employees. Only one organization that was interviewed had no paid employees and they were simultaneously found to have a lack of goal alignment. Organizations that had paid employees had clear visions regarding how they planned to grow. Additionally, in some instances, paid employees were needed to fill specific roles and provide continuity within the roles. Most all organizations, however, were still highly dependent on volunteers.

6.2 King County's interconnected network

The second overarching code and a strengthening component of King County's repair/reuse landscape that was not previously identified in literature was the relevance of an interconnected network between many of the organizations. An interconnected network was deemed a strengthening component rather than a critical component because although highly helpful, it was not found to be crucial.

Repair Economy Washington is connected to essentially all the existing repair/reuse organizations throughout Washington. Due to this connectivity, Repair Economy Washington has developed a database for residents to easily identify their local repair/reuse organizations. Repair Economy Washington also holds conferences with various stakeholders stimulating knowledge transfer. In a similar sense, King County's Eco-consumer webpage provides a database of information of repair and reuse events across King County. Additionally, various interviewees spoke to the goal of establishing a reuse common where multiple organizations can operate in the same space. Developing a reuse common would bring existing organizations closer together physically and allow for them to grow together by sharing resources such as staff, storage space, and materials. Through fostering an interconnected network within the repair/reuse organizations in King County, greater opportunity to expand and reach more residents is possible.

6.3 Analysis of messaging

The thirds overarching code that did not fall within the umbrella of 'critical components' or 'strengthening components' was the role messaging played within the repair/reuse organizations. As was shared in Chapter 3, various repair initiatives in the EU have incorporated consumption reduction into their messaging, emphasizing that resident's must participate in minimizing waste (Bradley & Persson, 2022; Maldini et al., 2021). Due to this, the researcher was interested in understanding what role residential consumption reduction messaging has within the repair/reuse organizations in King County.

It was found that there is a consensus amongst King County repair/reuse organizations that although consumption reduction plays a central role in most all the organization's ethos, there is a tendency to stay away from including it as a direct message. Both interviewees from Sustainable Capitol Hill shared that messaging is heavily focused on community engagement rather than consumption reduction. Various interviewees shared that consumption reduction is a subcomponent of their organization's goals, however, there is not a desire to directly share such messaging as doing so could be exclusionary or cause resentment. Further, interviewees also shared that no matter what the reasons behind participating in such organizations are (environment, economic, social, etc.), if they participate, they are slowly normalizing the practice of repair and reuse. Sukhdev, an SPU employee, shared that SPU is very careful in not putting all the responsibility on the consumer but instead applying most pressure upstream. This method aligns with how most of the organizations are operating, providing opportunity but not applying excessive pressure.

7 Discussion

The following chapter utilizes findings from Phase I and Phase II to answer RQ 3 (a) *'how can Threadcycle incorporate repair initiatives to align with their waste goals' and (b) 'how can King County help improve local repair/reuse organizations?'* This chapter begins by presenting a proposal for Threadcycle to incorporate the existing repair system into the intervention. Following, additional recommendations for enhancing Threadcycle are discussed, suggestions for King County to improve the repair sector are presented, and King County's use of governance is examined. Finally, a reflection of the results and research methodology is presented.

7.1 Proposal for Threadcycle to utilize current repair system

Due to the findings from both Phase I and Phase II, it is proposed that King County SWD and SPU harness the existing repair/reuse landscape in King County and incorporate it into the overarching Threadcycle message as well as the information that is provided when residents access the Threadcycle webpages. A proposed updated intervention theory is provided in *Appendix F*. The reasons for this proposal are discussed below.

7.1.1 Addressing waste prevention

As was identified in section 5.1, one of the primary breakdowns of Threadcycle is the lack of alignment between the underlying messages of Threadcycle and King County SWD/SPU's waste priorities. Both entities prioritize waste prevention before reuse and recycling, however, the Threadcycle message prioritizes reuse and recycling through donation. To integrate a waste prevention message, Threadcycle can capitalize on the pre-existing repair system in King County and provide information about garment repair events before providing information about textile donation. Additionally, information about the detrimental effects of textile waste should be provided to combat the existing message that conveys effective textile reuse and recycling systems.

It was expressed by Sukhdev, an SPU employee, that SPU does not aim to place all responsibility of waste prevention on residents, however, also acknowledges that they should be involved in prevention. By providing residents with repair information before donation information, responsibility to reduce waste is not placed directly on the resident, but instead the resident is provided with relevant information about textile waste and the importance of extending the lifespan of textiles. Additionally, although garment repair does not always result in reduced garment consumption, increasing access and visibility to repair is an important part of the transition to a CE (Dagilienė et al., 2021), a goal of King County. Finally, the promotion of garment repair in King County through Threadcycle can assist in normalizing repair which can eventually lead to more progressive messaging such as those in some EU cities that explicitly advocate for consumption reduction.

In line with normalizing repair, research indicated that many perceive garment repair as women's work and that sewing/mending skills are not taught in schools (Diddi & Yan, 2019). Therefore, the promotion of garment repair can assist in standardizing the task and re-introducing the skills into society. Further, Diddi & Yan (2019), suggest changing the perception of repair to move away from women's work and instead be perceived as environmental work. Incorporating such messaging into Threadcycle can assist with such an effort.

7.1.2 The existing repair/reuse system

As was found through answering RQ 2(a) and RQ 2(b), King County already has a strong repair and reuse landscape. Although heavily focused in the greater Seattle area, repair and reuse organizations are operating successfully throughout the county. Further, it was made clear that

garment repair initiatives tend to be popular amongst their audiences. Through interviews, it was found that many of the organizations have well defined goals for expansion of services and are already collaborating with other repair and reuse organizations to foster efficient growth.

In addition to collaboration amongst repair and reuse organizations, there is also already involvement of the local government through grants, sponsorship of some repair cafés, business guidance, and the Eco-consumer webpage which connects residents to many of the existing repair initiatives. The pre-existing involvement of the local government provides further justification for incorporation of the existing repair landscape into the Threadcycle interventiom. Further, it was identified that many of the organizations have the same underlying messaging regarding waste prevention and consumption reduction as King County SWD and SPU. As was expressed, the general message is not to create resistance towards repair and reuse, but instead normalize it. This pre-existing alignment within the messaging reduces potential discrepancies between the organizations and would result in better messaging alignment between King County SWD/SPU and Threadcycle.

7.1.3 Practicalities of implementing

Threadcycle primarily utilizes informative policy instruments. Therefore, a critical step in incorporating repair is to update the current information that focuses on reuse and recycling through donation and include information pertaining to garment repair. Currently, the sustainability tips included (as presented in section 4.2.1) are vague and do not point the user to any further information to help them follow through with the tips (excluding the provision of a list of environmental and social certifications). Therefore, this requires updating these tips, adding information about garment repair opportunities in King County, information about why repair is important, and the challenges the textile reuse and recycling (through donation) system currently face. It is recommended that this would include information about the lack of transparency in the current production and end-of-life system, the need for industry accountability through policy, the challenges pertaining to textile recycling, information about textile-to-textile recycling vs. downcycling, and issues of textile exportation. By providing this information, residents will have the opportunity to obtain relevant knowledge about the current system and make more informed choices in regard to garment consumption.

While the researcher believes that residents should be provided with up-to-date information about the end-of-life of textiles and should be encouraged to repair as a way to extend the life span of their garments, it is also critical that King County SWD/SPU continue to provide textile donation options as residents will inevitably have textiles they want to let go of. As was discussed in section 5.1.2, not all actors within the textile recycling and reuse industry are contributing equally to the negative outcomes. Concerns primarily arise when textile collection organizations lack transparency regarding their operations. This was found to be the case with many of the Threadcycle partner organizations both due to a lack of communication between King County SWD/SPU and partners, and due to a lack of information provided on the partner's websites. It is therefore recommended that King County SWD/SPU reevaluate the organizations they promote to residents and incorporate a method for accountability and transparency with partners. This may also include upstream accountability efforts through advocating for policy that requires reporting on textile waste.

Additionally, as was discussed in Chapter 5, it is important that Threadcycle continues to advocate for donation of damaged textiles rather than landfilling. Multiple interviewees identified this misunderstanding as an issue that is still pertinent. This message should however be enhanced by aligning it with all the partner organizations or clearly indicating which ones do not take damaged textiles. Further, this should be addressed after King County SWD/SPU

reestablish their relationships with partners and are provided with a greater level of transparency regarding the partners' operations.

In addition to providing information about the current recycling and reuse system through donation and strengthening communication with partners, it is also recommended that information about the current issues pertaining to the textile industry/textile consumption are shared as well as the benefits of extending a garments life span through repair. As was previously mentioned, clothes in the US are worn a quarter as long as the global average (Ellen MacArthur Foundation, 2017). Therefore, the US has a responsibility to address its substantial environmental and social impacts of extremely short garment lifespans. King County SWD and SPU can contribute to spreading up to date information about effective solutions to reduce the impact of textiles through garment life extension.

Apart from providing educational information, it is also necessary that Threadcycle includes actionable information about where to repair. The existing interconnected network of King County repair organizations makes this task straightforward. Further, through the Eco-consumer webpage, King County is already aware of most of the existing repair organizations in the county, making this task more straightforward.

7.1.4 Additional suggestions for Threadcycle

While the integration of the existing garment repair network creates an avenue for Threadcycle to incorporate a waste prevention prioritization message, there is much more regarding the impact of textiles that needs to be addressed. As expressed in Chapter 1, although the end-of-life of textiles is a necessary component of the value chain to improve, it is not the most impactful component in terms of GHG emissions, water use, water contamination, and land use (UNEP, 2020). Therefore, upstream efforts must also be made to reduce the negative impacts of the textile value chain. As mentioned in section 4.1.1, SPU has stated that they are prioritizing upstream efforts through legislation. Therefore, the researcher suggests that this information be shared through the Threadcycle messaging so residents can become aware of all efforts being made by local government to minimize the negative impacts of textiles.

Through discussions with Ezren (Threadcycle program manager), potentially changing the name of Threadcycle was mentioned. After evaluating the intervention, the researcher strongly agrees with this sentiment. As was expressed in Chapter 5, the name insinuates that textile recycling technology is advanced. As was found in the literature and agreed upon through various interviews, this is not accurate to the current situation. Often, items are mechanically downcycled (Juanga-Labayen et al., 2022; K. A. Schumacher & Forster, 2022). Further, chemical recycling, which allows textiles to be recycled rather than downcycled, still requires major technical advancements (Kamble & Behera, 2021; K. A. Schumacher & Forster, 2022). Therefore, the name Threadcycle can be misleading as it contradicts the current textile recycling landscape and perpetuates the notion that recycling technology can handle the types of garments people are disposing of at the rates they are disposing of them.

7.2 Suggestions for King County to enhance local repair and reuse initiatives

In addition to identifying the ways in which Threadcycle can utilize local repair initiatives to enhance the intervention, this research also presents areas in which the local government can continue to support the existing local repair initiatives, answering RQ 3(b), '*how can King County help improve local repair/reuse organizations?*'. As was presented in Chapter 6, the existing network is strong and is currently utilizing support from the local government through grants, sponsorships, and communication channels.

While many of the organizations have utilized grants offered through King County and the State of Washington, it has been identified that affordability of space is still a barrier for expansion of efforts. Further, various organizations spoke to the development of a reuse commons. As was identified in Chapter 6, an interconnected network of such organizations was found to be a factor for success, and therefore it is recommended that such a network continues to be fostered by the local government. A reuse common requires appropriate space and support. Therefore, it is recommended that King County communicate with repair and reuse organizations to identify ways in which they can specifically assist with the financials and logistics of this expansion project as it would also assist with King County's waste prevention agenda.

7.3 King County's use of governance

In terms of assessing how King County can enhance both Threadcycle and local repair/reuse initiatives, the concept of governance within the discussion of textile waste should be kept in mind. As was mentioned in section 3.3, governments can enable governance by acting as a regulator, provider, enable, and consumer (Thidell et al., 2019). It was found that King County SWD and SPU are acting as a provider through grant opportunities, and as an enabler through participating in the discussion and collaboration between repair and reuse organizations. As was expressed in section 7.1, the researcher believes that King County can expand their enabling efforts through increased communication and partnership with the established repair network for the sake of enhancing Threadcycle as well as increasing their opportunities to act a as a financial provider through avenues in addition to grants.

In terms of acting as a regulator, it is encouraged that increased transparency of textile waste management organizations be implemented (as was mentioned in section 7.1.1). This can be established through stronger regulations or codes of conduct imposed on textile collection organizations and subsequent management facilities. Further, it is encouraged that upstream textile policies, such as EPR, be advocated for in Washington State. King County can act as a consumer by ensuring best choices are made when purchasing textiles for internal use and disposing of said textiles. Overall, however, the researcher deems that King County is already pursuing governance effectively. It is suggested that this concept continues to be pursued in relation to textile waste management and repair/reuse organization support.

7.4 Reflection of research approach and results

Following, a reflection of the research approach and results will be discussed. First, the researcher will reflect on the chosen research design to indicate ways in which the approach was successful and ways in which it could be enhanced. Following, the researcher will reflect on the legitimacy of the research. And lastly, the researcher will speak to the generalizability of the study.

7.4.1 Research approach

In terms of Phase I, the researcher believes that through developing an intervention theory of Threadcycle and evaluating the intervention by way of theory-driven evaluation, Threadcycle was disassembled to a level that allowed the researcher to identify relevant breakdowns with the chosen scope, however, limitations were incurred. The researcher faced challenges in terms of finding relevant interviewees for the evaluation of Threadcycle. This resulted in a dependency on current literature and the use of partner organization's webpages. If the researcher was able to speak with representatives from more partner organizations, the results may have differed.

In terms of Phase II, the researcher acknowledges that the choice to conduct a comparative analysis with current literature resulted in the literature primarily revolving around repair cafés while the landscape in King County included initiatives beyond traditional repair cafés. This was

due to the lack of availability of literature. Upon reflection, the researcher believes that utilizing systems theory may have been beneficial to understand the complexities and nuances of the current landscape. For example, Hawley (2006) used systems theory when evaluating textile recycling systems in the US, stating that systems theory can be used to "explain the connectedness, interdependencies, feedback processes, and integration of the textile recycling system"(Hawley, 2006, p. 1). In a similar sense, systems theory could be used to explain the repair/reuse system. Such an approach might provide deeper insight into the integration element of the existing organizations in King County and would not have been based on the limited research that has already been conducted.

7.4.2 Legitimacy of results

Due to the lack of time and budget of this research, a comprehensive evaluation of Threadcycle was not performed. To do so would require residential input to gauge awareness of the textile waste system. Evaluating this component would likely provide a more well-rounded and legitimate understanding of the intervention. Further, the researcher believes it could be beneficial to investigate the motivations and barriers King County residents face in relation to garment repair. This insight could further enhance the development of garment repair opportunities within existing repair/reuse organizations and subsequently aid to increased garment repair opportunities for Threadcycle. Overall, including residents within the evaluation would likely increase the legitimacy of the results as a critical stakeholder (King County residents) would be accounted for.

7.4.3 Generalizability of results

As is the nature of a case study, this research is not explicitly generalizable. The results found pertain specifically to the King County context. The researcher chose this case to act as an intrinsic study, meaning it was chosen for its unique context. This was justified due to King County's progressive waste prevention priorities. While it was chosen to act as an intrinsic study, upon analyzing the findings, the researcher believes the results and suggestions can act as a guiding reference for other US regions who are implementing post-consumer textile waste management strategies and those that are evaluating how to improve their local repair/reuse operations.

8 Conclusions

The environmental and social impacts of the textile industry are profound and need to be addressed by actors throughout the value chain. The end-of-life management of textiles is an important component of the value chain, and requires action from various actors, one of which being local government (Juanga-Labayen et al., 2022; Kamble & Behera, 2021; K. A. Schumacher & Forster, 2022). In the US, textile disposal rates via landfill are high (Bukhari et al., 2018). Therefore, the US has a responsibility to increase its efforts to effectively manage and prevent textile waste. This research uses King County, WA as a case study to evaluate how the local government is currently addressing textile waste and to identify how they can improve such efforts, specifically through increasing messaging about repair. The intention of this research is not only to provide suggestions for King County, but also provide a reference for local governments who have a similar textile waste and repair/reuse landscape.

8.1 Summary of findings

The following section will present an overview of the findings and concluding remarks to answer RQ 1(a), '*how is Threadcycle intended to operate?'* (b) '*is Threadcycle effective in achieving its stated aims?' and* (c) '*is it relevant in regard to how it addresses the issue of post-consumer textile waste?'* RQ 2(a) '*how does the existing garment repair/ general repair/reuse landscape in King County operate?' And* (b), '*what are the current drivers and barriers they face?'* And RQ 3 (a) *'how can Threadcycle incorporate repair initiatives to align with their waste goals' and (b) 'how can King County help improve local repair/reuse organizations?'* Following, the contributions this research brings to literature will be defined and recommendations for future research will be presented.

8.1.1 Threadcycle conclusions

As was discussed in Chapter 4, the intervention theory presented as *Figure 4-1* provided an answer to RQ 1(a). The intervention theory illustrates the straightforward nature of Threadcycle which depends on the existing textile waste management infrastructure/actors and primarily utilizes informational policy instruments. Upon the evaluation of Threadcycle, Chapter 5 presented three key breakdowns of the intervention, (1) a lack of coordination and communication between King County SWD/SPU and Threadcycle partners, (2) questionable post-consumer textile waste management assumptions, and (3) a lack of alignment between Threadcycle and King County SWD/SPU waste management goals. Following, RQ 1(b) and RQ 1(c) Will be expanded upon.

Effectiveness and relevance

In terms of the effectiveness of Threadcycle, it was found that although the per-capita rate of textile disposal in King County/Seattle landfills decreased by 10% from 2011 to 2019/2020, the researcher cannot attribute this decrease directly to Threadcycle. This is due to the three breakdowns presented above which indicate implementation failure. Therefore, the effectiveness of Threadcycle is deemed inconclusive by the researcher. In terms of relevance, it was found that while the intervention addresses an important waste issue, the messaging does not adequately address waste prevention and instead relies on strategies that have potential to simply reallocate waste. However, it was found that messaging regarding donation of damaged textiles should be promoted, a message Threadcycle does include. Therefore, Threadcycle was found to be partially relevant but requires alterations.

8.1.2 King County repair/reuse landscape conclusions

Through conducting interviews with King County's repair and reuse initiatives, RQ 2(a) and RQ 2(b) could be answered. It was found that the existing repair/reuse landscape in King County is substantial and is growing. There are a variety of repair and reuse organizations in the county

including tool libraries, repair cafés, a furniture repair service, free garment mending services, and paid garment mending services. In terms of location, many of the organizations identified operate in the greater Seattle area, which is reasonable because Seattle houses most of King County's residents (King County, 2020). There are, however, also successful repair/reuse initiatives beyond the Seattle area.

(Critical) components for repair/reuse

Through an assessment of critical components (both barriers and drivers) for operating repair and reuse initiatives, it was found that King County's context lines up well with current literature on the topic. The availability of space was identified as a more prominent barrier in King County than found in literature which is likely due to the high housing costs in the Seattle area. Additionally, goal alignment, residential interest, and paid employees were identified as critical components for successful operations and were not previously identified in literate. Further, an integrated network between repair/reuse organizations was identified as a strengthening component that was not previously identified in literature. The use of messaging in terms of calling on residents to reduce consumption was investigated to understand if current repair/reuse organization messaging matches with that of King County SWD/SPU and it was found to align well.

Interest in garment repair

Garment repair was found to be of high interest within the existing repair/reuse organizations. Of the ten repair and reuse organizations identified, seven were found to offer some type of sewing or mending event. Of these, four provide them consistently. Although only four offer such initiatives regularly, it was expressed by interviewees from both the organizations that offer them regularly and those that do not, that garment repair/mending tends to be a popular event, showing that there is interest in garment repair in King County.

8.1.3 Proposal to utilize repair in Threadcycle

Upon evaluating Threadcycle and the current repair and reuse landscape in King County, RQ 3(a) was discussed. Due to the existing repair landscape and Threadcycle's need to address waste prevention, it is proposed that repair be incorporated into the intervention. King County SWD/SPU already have connections to the existing repair/reuse system and therefore, direct implementation into Threadcycle was found to be a reasonable pursuit.

Role of local government

It was discovered that the local government is already aiding the development of repair and reuse initiative in King County. As was identified through interviews, the grants offered from the government, both King County and Washington State Department of Ecology, have provided great support to many of the existing organizations. Additionally, business development programs for circular economy initiatives are offered through Next Cycle Washington. King County also sponsors repair cafés in the King County region that are hosted by libraries and community centers. Providing such support is logical as King County SWD and SPU pride themselves on being progressive in the waste sector by working towards a zero-waste economy and prioritizing waste prevention.

8.2 Contributions

The presented research reinforces the current challenges of post-consumer textile waste management in the US. Further, it speaks to the role the local government can play in the textile waste system. In the case of Threadcycle, it was found that the intervention needs to increase waste prevention messaging, reevaluate the partnerships it has in place, introduce regulatory actions to ensure waste is being managed ethically, and ensure messaging aligns between the

county and partner organizations. Additionally, it was found that Threadcycle can utilize the existing repair/reuse system in King County to contribute to waste prevention efforts.

Through an evaluation of repair/reuse organizations in King County, various critical components and strengthening components for successful operations were identified that were not found in previous literature. The critical components included goal alignment (plan for growth), residential interest, and paid employee(s). The strengthening component identified was an interconnected network of organizations. With such an understanding, King County, and similar regions, can better understand how they can contribute to the success of the existing repair/reuse organizations.

8.3 Recommendations for future research and concluding remarks

The findings from this research can be further enhanced through continued research. It is suggested that research be conducted to understand King County residents' viewpoints on textile disposal options, and their attitudes towards repair. Additionally, the researcher believes it would be of value to investigate resident's current understanding of the textile waste management system. These findings could assist in reshaping current messaging to ensure residents have an accurate understanding of what happens to textile waste. An additional area of study that would provide valuable insight would be an investigation into private clothing companies' clothing take-back programs. By understanding and evaluating these operations, local governments could partner with companies that offer such services and provide more options to their residents.

The field of post-consumer textile waste is one that is gaining increased attention and needs to be evaluated by various stakeholders. This research intends to contribute to the current understanding of the local government's role in managing textile waste and shed light on how repair can be utilized as a means to increase the circularity of the system. It is the researcher's hope that the findings presented be contemplated by local government to stimulate action to increase the effectiveness and relevance of post-consumer textile waste management not just in King County but also in other local governments.

Bibliography

ACT. (2024). *ACT American Circular Textiles*. ACT. https://www.americancircultextiles.com/about-us

Banik, D. (2020, May 5). Unpacking secondhand clothes in Africa. *Twyg*. https://twyg.co.za/unpacking-secondhand-clothes-in-africa/

Blaxter, L., Hughes, C., & Tight, M. (2010). *How to Research* (4th ed.). McGraw-Hill/Open University Press. https://eds-p-ebscohost-com.ludwig.lub.lu.se/eds/ebookviewer/ebook/bmxlYmtfXzM1MzYyMl9fQU41?sid=9c92f6e5-6e30-4f58-94ab-3779f0359027@redis&vid=0&format=EB&rid=1

Bolsinger, B., Yildiz, D., Kim, N. S., & Danzek, L. (2022). *Transitioning to the Circular Economy by 2050: Equitable, Low-Carbon, and Non-Extractive*. King County, University of Washington. https://kingcounty.gov/~/media/depts/dnrp/solid-waste/linkup/documents/transitioning-circular-economy-2050.ashx?la=en

Bradley, K., & Persson, O. (2022). Community repair in the circular economy – fixing more than stuff. *Local Environment*, *27*(10–11), 1321–1337. https://doi.org/10.1080/13549839.2022.2041580

Bukhari, M. A., Carrasco-Gallego, R., & Ponce-Cueto, E. (2018). Developing a national programme for textiles and clothing recovery. *Waste Management & Research*, *36*(4), 321–331. https://doi.org/10.1177/0734242X18759190

Cascadia Consulting Group. (2020). *2019 King County Waste Characterization and Customer Survey Report: King County Waste Monitoring Progam*. King County SWD Department of Natural Resources and Parks Solid Waste Division. https://cdn.kingcounty.gov/-/media/king-county/depts/dnrp/waste-services/garbage-recycling-compost/solid-waste-planning-monitoring/solid-waste-monitoring/waste-characterization-study-2019.pdf?rev=f974951c3fe14808ab190f34f0e52579&hash=70F0117687BBE4004ADC9995AF479B17

Cascadia Consulting Group. (2022). *2020 Residential Garbage and Recycling Stream Composition Study*. Seattle Public Utilities. https://www.seattle.gov/documents/Departments/SPU/Documents/Reports/SolidWaste/2020ResidentialWasteRecyclingCompositionStudies.pdf

Chen, H. (2005). *Practical Program Evaluation: Assessing and Improving Planning, Implementation, and Effectiveness*. SAGE.

Clifford, N., Cope, M., Gillespie, T., & French, S. (2016). *Key Methods in Geography*. SAGE.

Coryn, C. L. S., Noakes, L. A., Westine, C. D., & Schröter, D. C. (2011). A Systematic Review of Theory-Driven Evaluation Practice From 1990 to 2009. *American Journal of Evaluation*, *32*(2), 199–226. https://doi.org/10.1177/1098214010389321

Cost of Living in Seattle. (n.d.). Retrieved April 28, 2024, from https://www.numbeo.com/cost-of-living/in/Seattle

Creswell, J. W., & Creswell, J. D. (2018). *Research Design Qualitative, Quantitative, and Mixed Methods Approaches* (Fifth). SAGE Publications.

Crowe, S., Cresswell, K., Robertson, A., Huby, G., Avery, A., & Sheikh, A. (2011). The case study approach. *BMC Medical Research Methodology*, *11*(1), 100. https://doi.org/10.1186/1471-2288-11-100

Dagilienė, L., Varaniūtė, V., & Bruneckienė, J. (2021). Local governments' perspective on implementing the circular economy: A framework for future solutions. *Journal of Cleaner Production*, *310*, 127340. https://doi.org/10.1016/j.jclepro.2021.127340

Definition of REPAIR. (n.d.). Marriam-Webster Dictionary. Retrieved March 18, 2024, from https://www.merriam-webster.com/dictionary/repair

Department of Ecology. (n.d.). *Pollution prevention—Washington State Department of Ecology*. Retrieved March 29, 2024, from https://ecology.wa.gov/regulations-permits/guidance-technical-assistance/pollution-prevention

Diddi, S., & Yan, R.-N. (2019). Consumer Perceptions Related to Clothing Repair and Community Mending Events: A Circular Economy Perspective. *Sustainability*, *11*(19), Article 19. https://doi.org/10.3390/su11195306

Drobnič, S. (2023). Comparative Analysis. In F. Maggino (Ed.), *Encyclopedia of Quality of Life and Well-Being Research* (pp. 1238–1240). Springer International Publishing. https://doi.org/10.1007/978-3-031-17299-1_492

Ellen MacArthur Foundation. (2017). *A new textiles economy: Redesigning fashion's future*. http://www.ellenmacarthurfoundation.org/publications

European Commission. (n.d.). *Textiles strategy—European Commission* [Government website]. EU Strategy for Sustainable and Circular Textiles. Retrieved March 11, 2024, from https://environment.ec.europa.eu/strategy/textiles-strategy_en

European Commission. (n.d.). *Waste Framework Directive—European Commission*. Retrieved May 7, 2024, from https://environment.ec.europa.eu/topics/waste-and-recycling/waste-framework-directive_en

European Commission. (2021, February 2). *European Commission—Have your say* [Text]. European Commission - Have Your Say. https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12822-EU-strategy-for-sustainable-textiles_en

Flyvbjer, B. (2006). Five Misunderstandings About Case-Study Research. *SAGE Publication*, *12*(2), 219–245. https://doi.org/0.1177/1077800405284363

Groover. (2024, May 6). *Seattle-area home prices are on the rise. See what's happening near you*. The Seattle Times. https://www.seattletimes.com/business/real-estate/seattle-area-housing-market-picks-up-but-buyers-feel-the-squeeze/

Gwilt, A. (2014). What prevents people repairing clothes? : An investigation into community-based approaches to sustainable product service systems for clothing repair. *Making Futures Journal*, *3*. http://www.plymouthart.ac.uk/research/journalvol3/dr-alison-gwilt-what-prevents-people-repairing-clothes-an-investigation-int

Hawley, J. M. (2006). *TEXTILE RECYLING: A SYSTEM PERSPECTIVE*.

Hawley, J. M. (2014). Chapter 15—Textile Recycling. In E. Worrell & M. A. Reuter (Eds.), *Handbook of Recycling* (pp. 211–217). Elsevier. https://doi.org/10.1016/B978-0-12-396459-5.00015-5

Jäämaa, L., & Kaipia, R. (2022). The first mile problem in the circular economy supply chains – Collecting recyclable textiles from consumers. *Waste Management*, *141*, 173–182. https://doi.org/10.1016/j.wasman.2022.01.012

Juanga-Labayen, J. P., Labayen, I. V., & Yuan, Q. (2022). A Review on Textile Recycling Practices and Challenges. *Textiles*, *2*(1), Article 1. https://doi.org/10.3390/textiles2010010

Kamble, Z., & Behera, B. K. (2021). Upcycling textile wastes: Challenges and innovations. *Textile Progress*, *53*(2), 65–122. https://doi.org/10.1080/00405167.2021.1986965

Keiller, S., & Charter, M. (2016, May). *The second global survey of repair cafés: A summary of findings* [Monograph]. University for the Creative Arts - UCA; Centre for Sustainable Design, University for the Creative Arts. http://cfsd.org.uk/site-pdfs/Farnham%20Repair%20Cafe%20Survey%202016.pdf

King County. (n.d.). *Comprehensive Solid Waste Management Plan—King County, Washington* [Official government website]. King County. Retrieved March 26, 2024, from https://www.kingcounty.gov/en/dept/dnrp/waste-services/garbage-recycling-compost/solid-waste-planning-monitoring/comprehensive-solid-waste-management-plan

King County. (2020). *Demographic Trends of King County—King County, Washington*. https://www.kingcounty.gov/en/legacy/independent/forecasting/king-county-economy-status/king-county-economic-indicators/demographics

King County. (2021). *2020 Strategic Climate Action Plan* [Official government report].

King County. (2024). *Re+ Circular Economy Grant Program (2024-25 cycle)—King County, Washington*. https://www.kingcounty.gov/en/dept/dnrp/waste-services/garbage-recycling-compost/solid-waste-programs/re-plus/re-plus-grants-current

King County, D. of N. R. and P. S. W. D. (2014). *Post-Consumer Textiles: King County LinkUp Research Summary Report*.

King County SWD. (2019). *2019 Comprehensive Solid Waste Management Plan* (p. 471) [Official government report]. King County SWD Department of Natural Resources and Parks Solid Waste Division. https://cdn.kingcounty.gov/-/media/king-county/depts/dnrp/waste-services/garbage-recycling-compost/solid-waste-planning-monitoring/comprehensive-solid-waste-management-plan/2019-comp-plan.pdf?rev=50638e7e133e471890d46e9009df75dc&hash=F1B6056DD36B5739C569B5E8B40C9827

Krippendorff, K. (2018). *Content analysis. an introduction to its methodology: SAGE Research Methods Core* (Fourth Edition.). SAGE.

Maldini, I., Samira, I., Laitala, K., Vittersø, G., Jestratijevic, I., Mirena, A., & Vladimirova, K. (2021). Dress and the city: A comparative study of clothing and textiles environmental policy in five European cities. In *363-384*. Verlag der Technischen Universität Graz. https://doi.org/10.3217/978-3-85125-842-4-19

McNeill, L. S., Hamlin, R. P., McQueen, R. H., Degenstein, L., Garrett, T. C., Dunn, L., & Wakes, S. (2020). Fashion sensitive young consumers and fashion garment repair: Emotional connections to garments as a sustainability strategy. *International Journal of Consumer Studies*, *44*(4), 361–368. https://doi.org/10.1111/ijcs.12572

McQueen, R. H., Jain, A., McNeill, L. S., & Kozlowski, A. (2022). The role of resources in repair practice: Engagement with self, paid and unpaid clothing repair by young consumers. *Textile Research Journal*, *93*(2/3), 576–591. https://doi.org/10.1177/00405175221123067

McQueen, R. H., McNeill, L. S., Huang, Q., & Potdar, B. (2022). Unpicking the Gender Gap: Examining Socio-Demographic Factors and Repair Resources in Clothing Repair Practice. *Recycling*, *7*(4), Article 4. https://doi.org/10.3390/recycling7040053

McQueen, R. H., McNeill, L. S., Kozlowski, A., & Jain, A. (2022). Frugality, style longevity and garment repair – environmental attitudes and consumption behaviour amongst young Canadian fashion consumers. *International Journal of Fashion Design, Technology and Education*, *15*(3), 371–384. https://doi.org/0.1080/17543266.2022.2072958

Moalem, R. M., & Mosgaard, M. A. (2021). A Critical Review of the Role of Repair Cafés in a Sustainable Circular Transition. *Sustainability*, *13*(22), Article 22. https://doi.org/10.3390/su132212351

Newell, A. (2015). *Textile Waste Resource Recovery: A Case Study Of New York State'S Textile Recycling System*. https://hdl.handle.net/1813/40888

OR Foundation. (n.d.). *Dead White Man's Clothes*. OR Foundation. Retrieved February 19, 2024, from https://deadwhitemansclothes.org/intro

Potdar, B., McNeill, L. S., & McQueen, R. (2023). An investigation into the clothing repair behaviour of fashion-sensitive consumers. *International Journal of Fashion Design, Technology and Education*. https://doi.org/0.1080/17543266.2023.2285327

Regeringskansliet, R. och. (2020, December 9). *Producentansvar för textil – en del av den cirkulära ekonomin* [Text]. Regeringskansliet; Regeringen och Regeringskansliet. https://www.regeringen.se/rattsliga-dokument/statens-offentliga-utredningar/2020/12/sou-202072/

Richter, J. L., & Dalhammar, C. (2019). Stakeholders, drivers and barriers for local electronics repair: A case study of southern Sweden: 3rd PLATE Conference. *PLATE – Product Lifetimes and the Environment*. https://doi.org/10.14279/depositonce-9253

Rose, R. (1991). Comparing Forms of Comparative Analysis. *Political Studies*, *39*(3), 446–462. https://doi.org/10.1111/j.1467-9248.1991.tb01622.x

Schumacher, K. A., & Forster, A. L. (2022). Textiles in a circular economy: An assessment of the current landscape, challenges, and opportunities in the United States. *Frontiers in Sustainability*, *3*. https://www.frontiersin.org/articles/10.3389/frsus.2022.1038323

Schumacher, K., & Forster, A. L. (2022). *Facilitating a Circular Economy for Textiles workshop report* (NIST SP 1500-207; p. NIST SP 1500-207). National Institute of Standards and Technology (U.S.). https://doi.org/10.6028/NIST.SP.1500-207

Seattle Public Utilities. (n.d.). *2022 Solid Waste Plan Update: Moving Upstream to Zero Waste—Utilities | seattle.gov*. Retrieved March 26, 2024, from https://www.seattle.gov/utilities/about/plans/solid-waste/2022-plan-update

Seattle Public Utilities. (n.d.). *Solid Waste Management Planning—Utilities | seattle.gov* [Official government website]. Seattle Public Utilities. Retrieved March 26, 2024, from https://www.seattle.gov/utilities/about/plans/solid-waste

Seattle Public Utilities. (2021). *2021-2026 Strategic Business Plan*. https://www.seattle.gov/utilities/about/plans/solid-waste/zero-waste

Seattle Public Utilities. (2022). *2022 Solid Waste Plan Update: Moving Upstream to Zero Waste Chapter 4* [Official government report]. Seattle Public Utilities. https://www.seattle.gov/utilities/about/plans/solid-waste/2022-plan-update#chapter4wastepreventionandreuse

Skjott Linneberg, M., & Korsgaard, S. (2019). Coding qualitative data: A synthesis guiding the novice. *Qualitative Research Journal*, *19*(3), 259–270. https://doi.org/10.1108/QRJ-12-2018-0012

Sonnenberg, N. C., Stols, M. J., Taljaard-Swart, H., & Marx-Pienaar, N. J. M. M. (2022). Apparel disposal in the South African emerging market context: Exploring female consumers' motivation and intent to donate post-consumer textile waste. *Resources, Conservation and Recycling*, *182*, 106311. https://doi.org/10.1016/j.resconrec.2022.106311

Tellis, W. M. (1997). Application of a Case Study Methodology. *The Qualitative Report*, *3*.

The Fashion Act. (n.d.). *The fact sheet: The fashion sustainability and social accountability act* (p. 5). The Fashion and social accountability act. https://www.thefashionact.org/

Thidell, Å., Mnacakanjan, J., & Tojo, N. (2019). *Municipality approaches to citizen support in sustainable fashion consumption*.

UNEP. (2023). *UNEP Sustainability and Circularity in the Textile Value Chain A Global Roadmap* (p. 79). United Nations Environmental Programme. https://www.unep.org/resources/publication/sustainability-and-circularity-textile-value-chain-global-roadmap

US EPA, O. (2024). *Sustainable Materials Management: Non-Hazardous Materials and Waste Management Hierarchy* [Collections and Lists]. https://www.epa.gov/smm/sustainable-materials-management-non-hazardous-materials-and-waste-management-hierarchy

Van Ewijk, S., & Stegemann, J. A. (2016). Limitations of the waste hierarchy for achieving absolute reductions in material throughput. *Journal of Cleaner Production*, *132*, 122–128. https://doi.org/10.1016/j.jclepro.2014.11.051

Vedung, E. (2017). *Public Policy and Program Evaluation*. Routledge. https://doi.org/10.4324/9781315127767

Watson, D., & Palm, D. (2016). *Exports of used textiles by Nordic charities give net sustainability benefits* [Policy Brief]. Nordic Council of Ministers. https://www.norden.org/en/news/exports-used-textiles-nordic-charities-give-net-sustainability-benefits

Zacho, K. O., & Mosgaard, M. A. (2016). Understanding the role of waste prevention in local waste management: A literature review—Kristina O Zacho, Mette A Mosgaard, 2016. *SAGE Publication*. https://doi.org/10.1177/0734242X16652958

Zero Waste—Utilities | seattle.gov. (n.d.). [Zero Waste]. Seattle.Gov. Retrieved April 1, 2024, from https://www.seattle.gov/utilities/about/plans/solid-waste/zero-waste

Appendix

Appendix A – Interview request email outline

Dear [recipient],

My name is Lexi Malick, and I am a graduate student studying Environmental Management and Policy at Lund University in Sweden but am originally from the King County area. My thesis research revolves around investigating post-consumer textile waste management in King County as well as exploring avenues to promote the widespread adoption of garment repair practices. I am interested in speaking to you about how your organization runs.

I would greatly appreciate the opportunity to set up an interview with you soon. Your input will contribute significantly to my research. Please let me know if you are interested in speaking and if so, what dates and times suit you.

Thank you for considering my request, and I look forward to the possibility of speaking with you.

Best regards,

Lexi Malick

Alexa (Lexi) Malick
MSc Environmental Management and Policy
International Institute of Industrial Environmental Economics, Lund University
+1 (206) 724-8678

Appendix B – List of interviewees

Name	Organization	Position	Phase of research	Date	Duration	Mode of interview
Armine Ghalachyan	Washington State University	Assistant Professor, Department of Apparel, Merchandising, Design & Textiles	Phase I	2/2/2024	30 min.	Online video call
Ashima Sukhdev	Seattle Public Utilities	Climate Mitigation & Circular Economy Policy Advisor	Phase I & II	4/3/2024	30 min.	Online video call
Calley Dawson	FXRY	Founder & CEO	Phase II	3/11/2024	30 min.	Online video call
Chris Ackerley	Sustainable Capitol Hill	Communications volunteer	Phase II	4/15/2024	30 min.	Online video call
Clare Mason	Sustainable Capitol Hill	Volunteer coordinator	Phase II	3/4/2024	30 min.	Online video call
Jana Hawley	Academic/ Council for Textile Recycling	Director/ Board Member	Phase I	1/6/2024	30 min.	Online video call
Josh Epstein	Seattle Reconomy	Executive Director at Sustainable NE Seattle	Phase II	3/5/2024	30 min.	Online video call
Kami Bruner	Repair Economy Washington	Chief Convener	Phase II	3/13/2024	30 min.	Online video call
Patty Liu	King County Solid Waste Division	Project/ Program Manager III	Phase I & II	2/5/2024	30 min.	Online video call
Threadcycle Partner Org.	Organization X	N/A	Phase I	1/23/2024	30 min.	Online video call
Tali Raush	Refugee Artisan Initiative	Director of Programs & Business Development	Phase II	1/31/2024	1 hour	In person at RAI office
Tom Watson	King County Repair Events	Project manager	Phase II	2/26/2024	30 min.	Online video call
Xenia Dolovova	Furniture Repair Bank (FRB)	Director	Phase II	1/31/2024	1 hour	In person at FRB facility

Appendix C – Interview questions for Phase I

Name – Interview Guide

Time	Date	Location	Interviewee	Length	File name of recording

Introduction
Short intro about myself.
Purpose of the study
Re-explain purpose of the study and why I am interested in speaking with the interviewee.
Consent
Firstly, I would like to ask for your permission to record this interview.
Secondly, I would like to ask if you would like to stay anonymous in my study?
Have they signed the consent form yet?
General structure of the interview
This will be a semi-structured interview. Feel free to add any information you deem relevant.
Questions before starting the interview
Do you have any questions before starting the interview?
Opening question

1. Can you tell me a bit about your position?

Content questions

1. Are there any local governmental textile waste initiatives you are aware of?
2. Would you say that there is a robust or semi-robust post-consumer textile waste system in Washington state?
3. What do you see as the primary issues when managing post-consumer textile waste in the US context and the Washington state context?
4. What are your thoughts regarding transparency of organizations that collect textile waste?
    a. What are your thoughts on clothing exportation?
5. What are your thoughts on a textile EPR scheme or product stewardship?
6. Are there any other methods you see as effective for the future of managing textile waste?

For partners

1. Are you aware of Threadcycle?
2. What is your relationship with King County SWD/SPU?
3. What textiles do you accept?
4. What is the process of managing donated textiles?

Closing instructions
Ask for follow-up.

Appendix D – Interview guide for phase II

Name – Interview Guide

Time	Date	Location	Interviewee	Length	File name of recording

Introduction
Short intro about myself.
Purpose of the study
Re-explain purpose of the study and why I am interested in speaking with the interviewee.
Consent
Firstly, I would like to ask for your permission to record this interview.
Secondly, I would like to ask if you would like to stay anonymous in my study?
Have they signed the consent form yet?
General structure of the interview
This will be a semi-structured interview. Feel free to add any information you deem relevant.
Questions before starting the interview
Do you have any questions before starting the interview?
Opening question

1. Can you tell me a bit about your position?

Content questions

1. How did your organization develop?
2. What are the goals of the organization?
    a. Is there any specific messaging relating to reducing consumption?
    b. How do you see the organization evolving?
3. What barriers does your organization face? In terms of getting repairable clothes, in terms of communication, in terms of volunteers, in terms of money (keep barriers and drivers in back of head, when they talk about things in literature, probe a bit more)
    a. What barriers do residents face that prevent them from attending the events?
4. Do you have any method for tracking how many items are being repaired (diverted from the landfill)?
5. Where does funding for the organization come from?
    a. How can these initiatives sustain themselves in the future?
6. Do you know anything about the initiatives by King County? (Re+) What do you think about it? Can it be of use?
7. Can you envision your organization working closer with King County?
    a. If so, in what ways?
8. (If textiles are not included in the organization) Can you envision your organization expanding to include textile repair/ mending? Why or why not?
    a. If so, what resources would be needed?

Closing information
Ask for follow-up.

Appendix E – Comparative analysis matrix

	Barriers (-)				
	Marketing (-)	**Volunteers (-)**	**Space (-)**	**Goal alignment (-)**	**Finances (-)**
Existing Literature	Marketing was marked as at least "somewhat of a barrier" by nearly 55% of respondents in the survey distributed by Keiller & Charter (2016).	Ensuring continuity (which is often a result of dependency on volunteers) was marked as at least "somewhat of a barrier" by just under 50% of respondents in the survey distributed by Keiller & Charter (2016). Dependency on volunteer time risk lack of volunteer appreciation and potential burn-out (Moalem & Mosgaard, 2021). Ability to repair depends on the volunteer skillsets (Moalem & Mosgaard, 2021). Volunteer roles may include ever-increasing time commitment and effort (Bradely & Persson, 2022)	Finding a suitable venue was marked at least as "somewhat of a barrier" by roughly 25% of respondents in the survey distributed by Keiller & Charter (2016).	Not found in literature	Obtaining sufficient funding was marked at least as "somewhat of a barrier" by roughly 25% of respondents in the survey distributed by Keiller & Charter (2016).
Sustainable Capitol Hill (Tool library and repair events)	Marketing efforts are dependent on volunteer time and capacity (Ackerley) ***Connects to volunteers (-) in terms of constraints.***	Mending circle is growing but is limited to volunteer time and capacity (Mason) ***Connects to goal alignment (-) in terms of establishing goals with growth.*** Time, capacity, and turnover of volunteers impacts ability to get things done and continuity (Ackerley) Having skilled volunteers to maintain/repair tools and keep space organized (Ackerley)	Tool shop and the community shop are small which limits expansion of tool inventory (Ackerley)	Lack of alignment regarding goals for growth. "Do we just want to grow for growth's sake?" (Ackerley) ***Connects back to finances (+).*** Finances are available but don't know what to do with them.	Too much money through grants to know what to do with (Ackerley) **Connects to goal alignment (-)**
Seattle Reconomy (Tool libraries and repair events)	N/A	Desire to pay some employees for increased continuity but still figuring out a financial structure (Epstein) ***Connects to lack of finances (-)*** ***Connects to goal alignment (+)*** Can't hold volunteers accountable (Epstein) Some skills are missing (ex. business manager) (Epstein) ***Connects to lack of finances (-)*** ***Connects to goal alignment (+)*** For mending classes - due to sewing machines being different models, it can be hard for the instructor to be able to help with all of them (Epstein)	Currently renting but hoping to buy to aid financial independence and growth opportunities (Epstein) The greater Seattle area is expensive (Epstein) ***Connects to finances (-)*** How to address the increasing cost of living, and therefore high cost of space?	N/A	Greater funding would open up opportunities to expand (Epstein) ***Connects back to lack of space (-)*** Could pay professionals to give classes (Epstein)
Repair Economy Washington (Information hub)	N/A	Only one employee (Bruner)	N/A - online platform	N/A	Working to develop more paid repair jobs but adequate wages are a big concern (Bruner) ***connects to use of an integrated network.*** Various opportunities such as FXRY are also working to implement this.

Refugee Artisan Initiative (free service repair events)	N/A	N/A	Follow up email sent	N/A	Upcycled products are labor intensive and therefore have high prices to compensate the women who are employed (Raush)
King County Sponsored Repair Events	N/A	N/A	Occurs once a month at different locations (Watson) ***Connects to ensuring continuity through volunteers (-)*** ***Connects to ensuring continuity through space (-)***	Unknown how these programs will evolve over time, it depends on future management (Watson) No plan to increase frequency to more than once a month (Watson)	N/A
Furniture Repair Bank (Specific focus on furniture)	N/A	Volunteers need to be taught how to repair (Dolovova)	Renting a space that can only handle so much capacity (Dolovova)	N/A	Still developing revenue streams (Dolovova) ***Connects to the importance of implementing goal alignment (+)***
FXRY (paid garment repair)	N/A	N/A	N/A	N/A	As a paid service, people need to be willing to pay enough for repair (Dawson) ***Connects to integrated network*** as various actors are working towards this goal.
Additional comments from interviewees	N/A	As demand grows, there is an increasing administrative burden (Bruner) Continuity poses a challenge through volunteer turnover (Bruner) Distribution of items to volunteer houses causes items to get lost (most prominent within a pop-up model) (Bruner) ***Connects to the importance of space (-)***	"Space is always, always a challenge" (Bruner) Movement of materials from one location to another (fabric, demolition, engine parts), poses a challenge (Bruner) ***Connects to the importance of an integrated network*** to allocate resources effectively. Pop-up model is challenging because it creates concerns of accessibility (Burner) points to King County initiative, they could become more consistent also Clare saw results after some consistency		Hard to get funding when it is just repair, usually if they are a part of a tool library or another maker space (Dolovova) ***Connects to importance of integrated network.*** Funding is a large barrier many orgs. face (Bruner)

	Drivers (+)								Other factors
	Community interest (+)	**Volunteers (+)**	**Space (+)**	**Marketing (+)**	**Goal alignment (+)**	**Finances (+)**	**Paid employee (+)**	**Integration**	**Messaging**
Existing Literature	Repair Cafes are expanding worldwide.	Can act as both the organizers and repairers of repair cafes (i.e. they are critical actors) (Moalem & Mosgaard, 2021).	N/A	N/A	N/A	N/A	N/A	N/A	Bradely & Persson (2022) and Maldini et al. (2021) discuss how the messaging of consumption plays into their repair/reuse initiatives.
Sustainable Capitol Hill (Tool library and repair events)	Mending circle has seen a constant flow of people and has been so successful that it now takes place twice a month (Clare) Some people come to "just hang out" at the mending circle (Mason) ***Connects to messaging*** *through* promotion of community engagement	Mending circle has been able to grow due to commitment, consistency, and creation of a positive space by a volunteer (Ackerley) ***Connects to messaging*** through promotion of a positive environment.	Events take place in a church basement so there is not an issue of lacking space (Ackerley & Mason) Event space is next to an alley which can be utilized (Ackerley)	Know what communication platforms are most successful so can focus efforts (Ackerley) Mending circle event has been added to Repair Economy Washington's calendar (Mason) ***Connects to integrated network.***	Dependent to some degree on volunteer motivations (Ackerley)	Running the mending circle does not require many financial resources (Mason) No member fees (Mason)	Lack of goal alignment due in part to volunteer capacity (Ackerley) ***Connects to goal alignment (-)*** ***Connects to volunteers (-)***	Mentioned mending circle being included on the Repair Economy Washington website (Mason)	Oriented towards community engagement and being inclusive (Ackerley & Mason) (Does not focus on consumption reduction messaging, focuses on being inclusive)

Seattle Reconomy (Tool libraries and repair events)	Drive to increase all classes. People send in requests for mending classes (Epstein)	150-170 volunteers (Epstein) Volunteers are "our biggest strength" (Epstein) Volunteers allow suggested donation amounts to stay low (Epstein) Focus on communication with volunteers and encourage them to do things they are passionate about/ make them feel important (Epstein)	Larger space means greater opportunity (Epstein) ***Connects to goal alignment (+)***	Collaborating with other organizations throughout the State (Epstein) ***Connects to integrated network***	Goal to work alongside other repair/reuse orgs. (Epstein) Goal to pay employees (Epstein) Policy to accept many more tools than previously accepted (Epstein) ***Connects to space (-)*** as there is a need for increasing space with such a policy.	Able to sustain operations through member donations (Epstein) Ability to use 'grants for growth' to open new locations (Epstein)	Looking for admin employees to fill certain needs (Epstein) Wanting to pay specific volunteers for at least part time (Epstein) ***Connects to volunteers (-)***	Working to integrate many of the repair/reuse orgs. Together in one common space (Epstein)	People are interested in Reconomy for both the environmental component and the money saving component. Either way is fine if it gets people used to sharing (Epstein) (Points to the idea of not speaking as much about consumption)
Repair Economy Washington (Information hub)	N/A	Only one person (Kami Bruner) as the primary operator (Bruner)	Online platform for sharing information so space is not a barrier (Bruner)	N/A	Goal of organization is to raise the profile and accessibility of repair giving groups more of a public presence (Burner) Network development between organizations so they can support each other (Bruner) ***Connect to integrated network***	Funds from grants (Dolovova)	Runs through one paid employee (Bruner)	Spoke about the reuse commons initiative (Bruner)	"One of the underpinnings of this work is reducing consumption" (Bruner) The message is embedded in the text, not on the front page explicitly (Bruner)
Refugee Artisan Initiative (free service repair events)	Demand for public tailoring services in the Seattle area (Raush)	N/A	Follow up email sent	N/A	Goal to generate sustainable revenue to serve more refugee women (Raush) ***Connects to finances (-)***	Funding comes through public and private grants and selling upcycled items (Raush)	dependent on paid employees (Rausch)	N/A	N/A

King County Sponsored Repair Events	Pant repair is one of the most common items to repair (Watson)	N/A	Operated through libraries or community centers (Watson) ***Connects to both space (+) and space (-).*** These are common areas for such events to occur, however, they are limited in storage options.	N/A	Overall goal is to reduce waste and conserve natural resources (Watson) Connects to messaging. These goals are not clear expressed within the messaging. Top priorities are to promote safety, respect for all, and to help as many people as possible (Watson)	N/A	Somewhat facilitated by King County employee (Watson)	N/A	Waste reduction and conservation of resources is the general messaging but no requirements for what hosts should communicate (Watson)
Furniture Repair Bank (Specific focus on furniture)	N/A	Learned that volunteers don't need to have skills but can be taught (Dolovova) Utilizes channels / volunteer hubs to find volunteers (Dolovova) ***Connects to an integrated network.*** Take volunteers on a tour and make sure they understand their value (Dolovova) (encourgaing volunteers)	Rent a space in South Seattle (Dolovova)	Strategic advertisement on Facebook Seattle Zero Waste Groups went viral (Dolovova) ***Connects to integrated network.***	Clearly defined goals (Dolovova)	Public and private grants, donations, and revenue streams from selling refurbished furniture (Dolovova)	Organized by two paid employees (Dolovova)	N/A	N/A
FXRY (paid garment repair)	Held a trial run at a boutique and was very successful (Calley)	N/A	N/A	N/A	N/A	People are starting to learn the value of repair. They need to continue to be educated (Dawson) ***Connects to community interest (+)***	dependent on paid employees (Dawson)	Spoke about being included on the Repair Economy Washington page (Dawson)	No direct consumption reduction messaging. Do not want to shame people for consuming (Dawson)

Additional comments from interviewees	N/A	N/A	N/A	N/A	N/A	Re+ grant was able to provide Furniture repair bank with signing a lease (Liu) (Government support)	N/A	N/A	SPU is careful to not put all the responsibility on residents because change needs to happen upstream (Sukhdev)

Appendix F - Proposed updated intervention theory