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Adaptation of Sustainable Waste Management Practices from Finland to Enhance Household Waste Management in Sri Lanka

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Abstract

The aim of the current study is to adopt the sustainable waste management practices of Finland to enhance household waste management in Sri Lanka. The study has been conducted and data gathered by following a mixed method. The quantitative data was collected from 131 residents of Sri Lanka through an online survey and was analysed using statistical techniques to get insights into the current household waste management practices of Sri Lanka.

Along with this, the qualitative data was gathered by extracting six studies to analyse the sustainable waste management practices in Finland and the collected data was analysed using content analysis. The findings suggest that Finnish sustainable practices of waste management can be applied in Sri Lanka to enhance household waste management practices. The community and stakeholders can be engaged in these initiatives and the technology can be adopted to make the municipality and household waste management practices efficient in Sri Lanka.

Keywords

Sustainable waste management; Household waste; Finland; Sri Lanka

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1 INTRODUCTION

1.1 Background of the Study

Sri Lanka, an Asian island with a population of 21.9 million, faces significant challenges in waste management (ADB, 2021). The country's capital, Colombo, is a bustling hub for administration, education, and business, hosting 1.6 million individuals at a population density of 3300/Km^2 (Perera & Thibbotuwawa, 2022). Spanning an area of approximately 37 Km^2, Colombo has experienced a daily influx of approximately 0.2 million people (Ono, Sirisena, & Visvanathan, 2022, pp. 2-3). The amount of municipal solid waste (MSW) collected in Sri Lanka is 7000–7100 tons per day, the majority of which is unprocessed and disposed of in landfills (MoE, 2023). Only a small portion of the sludge underwent recycling and composting. However, it is worth noting that a significant proportion of Colombo's MSW consists of organic waste, which lends itself to composting. Given the lack of available land for waste disposal and the closure of existing sites owing to environmental and legal concerns, there is an urgent need to prioritize waste reduction through recycling and composting (Dharmasiri, 2019, p. 72).

In contrast, European Union (EU) countries participating in waste management projects boast a collective population of approximately 370 million, with Germany leading the pack at 80 million (Kumar, et al., 2021). The rate of municipal waste generation varies widely across these countries. For instance, Spain generates an average of 1.1 kg of waste per capita per day, while Finland produces 2.3 kg (Burneo, Cansino, & Yñiguez, 2020). The disposal methods differ significantly, with countries like Spain and the UK relying more heavily on incineration and landfilling compared to Finland. The recycling and composting rates also exhibit considerable variation. In the UK, Germany, and Spain, the recycling rates stand at 12%, 42%, and 29%, respectively, (Alves, 2024). Additionally, Austria leading with 63% and Finland with 43% exceling

in organic waste management (Amount of municipal waste is increasing, n.d). These disparities highlight the diverse social, economic, and cultural factors at play in Europe, as well as the range of available waste management technologies. Sri Lanka can draw upon this wealth of knowledge to make informed decisions regarding sustainable waste management practices.

1.2 Significance of the Study

The study is beneficial for the employees associated with waste management industries as the techniques used to manage household waste can create more employment and income for them. The resources can be recycled and reused which is beneficial for the environment and human health. The businesses selling recycled goods will also flourish and the economy of Sri Lanka will be enriched. By managing household waste properly, energy and fresh resources will be saved. Moreover, the waste will be reduced and the diseases that occur from the waste will be decreased.

1.3 Objectives of the Study

- To evaluate sustainable waste management practices in Finland.
- To assess household waste management in Sri Lanka's western province.
- To explore the possibility of implementing Finnish waste management practices in Sri Lanka.

The first objective involves analysing the household waste management process comprehensively, from collection to recycling. By examining each step, the researcher aims to understand Finland's sustainable waste management strategies.

For the second objective, the current practices are assessed and identified areas needing improvement. Insights gained have helped identify challenges and opportunities for better waste management.

Finally, the study has explored the possibility of implementing Finnish waste management practices in Sri Lanka. It assesses the feasibility and viability of adopting successful Finnish strategies in Sri Lankan households, considering infrastructure, technology, and stakeholder engagement. This evaluation has determined the practicality of implementing Finnish practices in Sri Lanka.

1.4 Scope of Limitations

The study emphasises the importance of stakeholder engagement in waste management initiatives and focuses specifically on the adaptation and implementation of waste management practices. While recognising the value of extensive stakeholder analysis and engagement strategies, this research narrows its scope to address primarily the challenges associated with adaptation and implementation. Although stakeholder involvement remains crucial, this study avoids extensive exploration in this area, reserving it for consideration within the context of implementation challenges and recommendations.

In terms of data collection, Sri Lanka faces practical constraints in establishing an efficient household waste management system due to its large population. Therefore, this study chooses to concentrate on the highly populated western province, which includes the country's capital. This decision is based on the practical need to streamline research efforts and overcome logistical challenges presented by the country's demographic landscape. Consequently, quantitative research and analysis have been focused on this region, while considering its representativeness within the broader Sri Lankan context.

As the study applies Finnish waste management concepts and strategies to the Sri Lankan context, it prioritises adaptation over intricate technological details. While acknowledging the importance of technology in waste management, this research focuses on the conceptual and strategic aspects of waste management transferability. Therefore, while recognising the significance of

technological advancements, this study does not extensively explore technical intricacies such as waste treatment methods or infrastructure requirements.

1.5 Thesis structure

Deliberately, the thesis systematically progresses by initially exploring the research context and conceptual framework. This chapter extensively examines into the problem statement, effectively framing the study within the context of enhancing household waste management in Sri Lanka through the adaptation of Finnish waste management practices.

Subsequently, an inclusive review of pertinent literature comprehensively covers sustainable waste management practices, circular economy principles, and the dynamics of household waste management in both Finland and Sri Lanka. Drawing inspiration from the diffusion of innovation theory, this well-grounded theoretical foundation guides subsequent analyses. Progressing further, the methodology chapter thoroughly outlines the research design, methods, and procedures. Given the cross-cultural nature of the study, careful considerations are given to data collection and analysis across diverse geographical contexts.

The practical investigations are classified into quantitative and qualitative research, with an emphasis on evaluating current household waste management practices in Sri Lanka's western province and comprehending sustainable waste management practices in Finland, respectively. Building upon the empirical findings, recommendations for implementation are formulated. These recommendations synthesize the insights gained from the comparative analysis of waste management practices in both countries, providing practical suggestions for adapting Finnish strategies to the specific context of Sri Lanka.

Finally, the thesis concludes with reflections on the research process and personal learning outcomes, providing a cohesive synthesis of the study's objectives and findings.

2 RESEARCH CONTEXT AND CONCEPTUAL FRAMEWORK

2.1 Problem Statement

In this study, the primary focus was to explore the concept of sustainable waste management practices in Finland and how effectively they were transferred to Sri Lanka in terms of improving household management in last. Along with this, the primary motive behind the research was to stem from the urgent needs that help in addressing the different environmental concerns while also improving the different waste management practices in Sri Lanka. Therefore, in order to overcome the different overarching problems, there have been three specific issues that were identified for the investigation.

In the initial stages, it is important to examine the present state of household waste management in Sri Lanka which includes the challenges it faces along with the current practices and the areas that need further improvement. On the other hand, studying the operational mechanisms regarding sustainable waste management practices in Finland helps in providing valuable understanding concerning the successful strategies and approaches that can be adopted in terms of the Sri Lankan context. Lastly, the assessment regarding the feasible and practical implementation of the waste management practices of Finland in Sri Lanka was important for identifying the different challenges and opportunities linked with the adoption of these strategies. Therefore, in terms of addressing these sub-problems, the primary goal of this research was to gain a detailed understanding of the dynamics of waste management in both countries that have ultimately formed a well-informed recommendation for improving the landscape of Sri Lanka.

2.2 Conceptual Framework

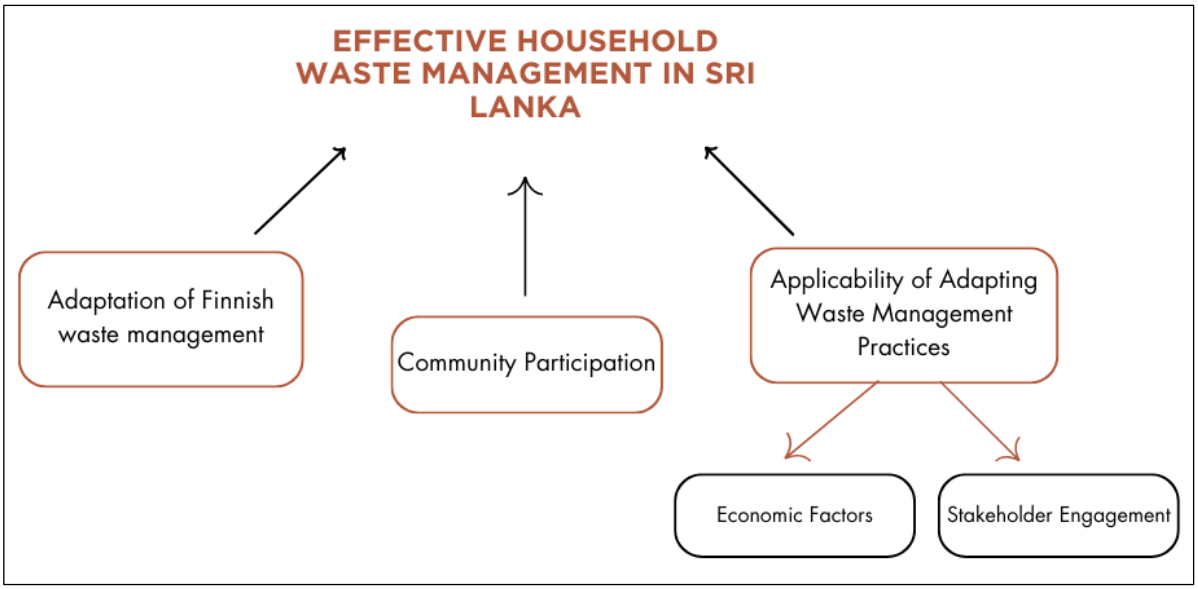

Figure 1. Conceptual framework

Source: (Own Illustration)

The above Figure 1 illustrates the conceptual framework that helps provide an in-depth understanding of the different fundamental ideas of the research by illuminating how they are associated with one another. This framework also clarifies the effect of each variable on household waste management in Sri Lanka. The following three features are described below:

2.2.1 Adaptation of Finnish Waste Management

This part looks at how sustainable waste management techniques can be applied and transferred from Finland to Sri Lanka. It explores the methods and approaches used to modify Finnish waste management models for the Sri Lankan environment, considering elements like policy frameworks, infrastructure, and technology.

2.2.2 Community Participation

The active participation and engagement of the local communities were considered to be important for the success of the different household waste management initiatives. This section also aims to look at the role that was played by the community plays in terms of waste management procedures which includes raising awareness through different campaigns and implementing different behavioural change interventions while also starting the different neighbourhood projects that resulted in supporting the environmentally friendly household waste management techniques.

2.2.3 Applicability of Adapting Waste Management Practices

The main focus of this sector was to assess the practical and viable introduction of Finnish waste management techniques in Sri Lanka. It also helps in evaluating the viability of the adaptation along with the economic factors which include allocation of the resources, sustainability and the cost effectiveness that was considered to be important. Subsequently, the active participation from the different governmental bodies, businesses and civil society organisations was also considered to be important for overcoming the different implementation obstacles and the cooperation of different solutions as stakeholder engagement was defined as the important success factor.

2.3 Hypotheses and Research Questions

In this study, the following hypotheses were established in terms of testing the assumptions set in the research.

- The adoption of Finnish waste management practices has a significant impact on the effectiveness of household waste management in Sri Lanka.
- H2: The increasing community participation which might result in improving household waste management practices in Sri Lanka.

- H3: Economic factors and stakeholder engagement significantly impact the practicality of adapting Finnish waste management practices in Sri Lanka.

The following research questions need to be answered to achieve the aim of the study.

- RQ1: How does the implementation of sustainable waste management practices from Finland impact the efficiency and sustainability of household waste management in Sri Lanka?

- RQ2: What role does community participation play in promoting sustainable waste management practices at the household level in Sri Lanka?

- RQ3: How do economic considerations and stakeholder engagement, such as cost-effectiveness and resource allocation, influence the feasibility of implementing Finnish waste management practices in Sri Lanka?

3 LITERATURE REVIEW

The Literature Review chapter serves as a critical analysis of existing scholarly research and theoretical frameworks relevant to the primary topic of this study, this chapter explores key concepts and factual findings pertaining to sustainable waste management practices, with a focus on household waste management in both Sri Lanka and Finland. In the initial stages, the providing of the overview of sustainable waste management principles usually covers different

topics such as waste types, sustainability techniques and the contribution of circular economy to waste management.

In the initial stages, the chapter focuses on exploring the current situation of Sri Lanka in regard to household waste management, while also outlining the different practices, problems and opportunities that were related to development. It is then followed with the examination of the different sustainable waste management practices adopted in Finland, which further helps in drawing the understanding from the adoption of successful strategies and initiatives that were also implemented. Subsequently, this chapter also focuses on exploring the potential concerning the adaptation of the Finnish waste management practices in terms of the Sri Lankan context, while also focusing on considering the different factors such as community participation in regards to the diffusion of the innovation theory, economic considerations and the engagement of stakeholder.

3.1 Sustainable Waste Management

According to Oktaviani et al., (2023) sustainable waste management consists of different practices that were considered to be viable both environmentally and economically for the handling of waste materials. It usually consists of a detailed approach that includes waste reduction, reusing, recycling, composition, waste-to-energy conversion and the practice regarding proper disposal. On the other hand, concerning the manufacturing sector, green manufacturing and the re-utilization of waste which includes carpet waste in the textile industry were also explored through the different innovative recycling methods such as the Vacuum-Assisted Resin Transfer Molding (VARTM) technique, which focuses on converting the waste into useful products (Kumar, Jaiswal, Kumar, Kumar, & Verma, 2023, pp. 230 - 243).

Consequently, it has been further highlighted that sustainable waste management practices were found to be influenced by different factors which include the behaviour of the stakeholder, different governmental policies, social

practices and engagement within the community. For instance, the environmentally friendly behaviour found among the stakeholders within the healthcare industry was considered to be important in regard to the development of sustainable waste management practices (Ardaniah, 2022, pp. 1232-1244). Along with this, in regards to the residents' perspectives and the social contexts help play a substantial role in terms of shaping waste management practices (Nguyen , Nguyen, Phung, & Yến-Khanh, 2023, pp. 15-25). Global sustainable development depends upon the integration of environmental policies along with green technologies and waste management which thus resulted in highlighting the needs concerning the vigorous policies and other innovative technologies (Behera, 2023, pp. 179-198).

In short, sustainable waste management is considered as a multifaceted concept that includes the integration of the economic, environmental and other social dimensions that help in managing the waste dependably. Along with this, it also needed a collective effort concerning the individuals, communities, businesses and the government in terms of implementing practices that were not environmentally sound but were considered to be socially equitable and economically practicable (Ardaniah, 2022, pp. 1232-1244), (Nguyen , Nguyen, Phung, & Yến-Khanh, 2023, pp. 15-30)

3.1.1 Waste and Types of Waste

Waste in general is considered as any substance or object that was discarded by the holders or further intending to be discarded, that is also needed to be discarded (Van Ewijk & Stegemann, 2020, pp. 1-7). It also helps in incorporating a broader range of materials that usually arise through different human activities, potentially including solids, liquids or contained gases. There are also different types of waste that are further divided into different categories which include municipal solid waste, hazardous waste, industrial waste and electronic waste which have their own specific features and disposal methods (Dehghani, Omrani, & Karri, 2021, pp. 205-213).

On the other hand, waste is defined as the materials that are usually discarded after being served for the primary purpose. The different types of waste were also categorised depending on their origin, composition and other potential re-use. Some of the common categories also include municipal solid waste (household waste), industrial waste, hazardous waste, medical waste, electronic waste (e-waste), and organic waste, among others (Bobulski & Kubanek, 2021, pp. 1-2).

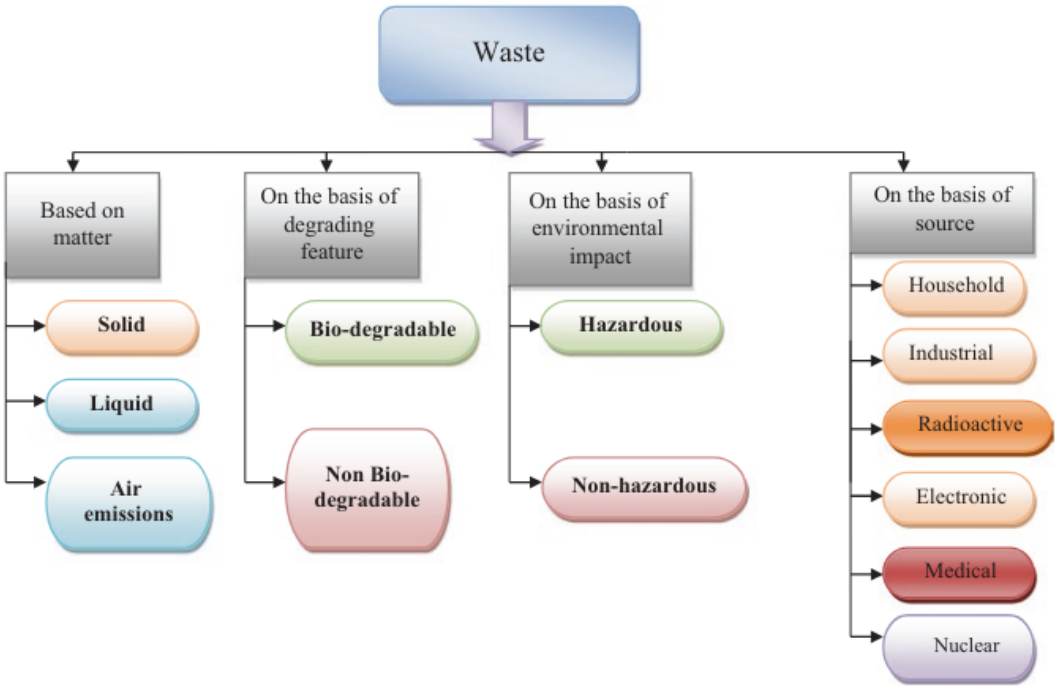

Figure 2 - Types of Waste

Source: (Mondal & Palit, 2019)

3.1.2 Household Waste

On the other hand, household waste, which is also considered domestic waste is defined as the subset of municipal solid waste that usually originates from everyday activities within the residential dwellings. It also includes different items which include food scraps, paper, cardboard, plastics, textiles, glasses and other materials that have been discarded from the homes (B J, et al.,

2023). Therefore, while the primary concept of waste is considered to be straightforward, the classification regarding the sorting of household waste was considered to be multifaceted primarily because of the diversity of the materials along with the need for the proper discrimination that helps in facilitating the recycling process along with reducing the environmental impact (Bobulski & Kubanek, 2021). Moreover, household waste management was also influenced by different factors which include public awareness, government policies and the advancement in the technology in terms of sorting and recycling of the waste (Bishnoi, Verma, Kushwaha, & Goswami, 2022).

There has been a rise in solid waste, especially household waste that poses a terrible consequence for the environment. Most of the high-income countries also focus on generating an inconsistent amount of waste, that predominantly consists of non-biodegradable materials including plastics, paper and metals (Jabeen, et al., 2023). Along with this, most of the middle and lower-income countries generate a higher fraction of organic waste, which reflects upon the different patterns of consumption and economic development levels (Iyamu, Anda, & Ho, 2020). There has been an improper disposal of household waste, that has been compounded through an inadequate waste management infrastructure which thus leads towards a widespread of land, water and air pollution.

There has been an emission of greenhouse gases from solid waste treatment and disposal, especially through open dumping and landfills that contributes to the substantial climate change. Most of the urgent actions were also overbearing in terms of addressing the escalating crisis for solid waste management, which necessitates innovative solutions while improving the regulatory frameworks and determining the efforts that were needed to mitigate the environmental impact regarding the generation and disposal of waste (Nguyen , Nguyen, Phung, & Yến-Khanh, 2023, pp. 1-8).

3.1.3 Circular Economy Principles of Waste Management

The circular economy principles in waste management focus on emphasising the use of sustainable resources that were considered to be helpful through creating a closed-loop system in which the materials were further reused, recycled, and regenerated instead of following the traditional linear of consumption and disposal (Zhidebekkyzy, Temerbulatova, Amangeldiyeva, & Sakhariyeva, 2023, pp. 16-18). Moreover, these principles were considered to be increasingly cohesive into different sectors which include waste management strategies that help in addressing the different economic, environmental, and social challenges that help in lowering the generation of waste while increasing the efficiency of different resources (Batista, et al., 2021, p. 312)

Yang (2022, pp. 20-25) has highlighted that in terms of compelling to note the circular economy that is found to be a promising concept, it was observed that there have been real-world obstacles concerning its implementation. For instance, the rise in the management expenses by themselves not only resulted in higher recycling and reusing rates since the state and environmental regulations were considered to be important for the additional factors. (Domenech & Borrion , 2022, pp. 1000-1293) also highlight that the transition of a circular economy in waste management not only needed technological innovation but it also needed stakeholder engagement while also focusing on changing the behaviour of the consumers.

In short, it can be concluded that the redefining of waste as a resource the circular economy principle in waste management also focuses on achieving sustainability. This also focuses on involving a structural change in the form of a linear to a circular strategy that mixes the treatment, recycling, and reduction methods at different levels of society and industries. Therefore, in terms of fully realising the potential of a circular economy, it helps governments, businesses, and individuals to work together while applying clearer principles in a complex (Iacovidou, Hahladakis, & Purnell, 2021).

3.2 Current State of Household Waste Management in Sri Lanka

(Kumara & Pallegedara, 2020) further explained that the existing state of household waste management in Sri Lanka is found to be categorised through a mix of outdated and developing disposal mechanisms, that usually have substantial support on burning and dumping within the premises, while also building a trend towards the municipal waste collection arrangements. It has been also identified that urban and wealthier households, especially those that have been headed by older and more literate individuals, were found to be more inclined to municipal services, while also focusing on gaining traction among convinced socio-economic subgroups (O'Hara, 2020, pp. 4-60). It has been further ensured that the average household was found generating approximately 2.61 kg/day of solid waste, with a willingness to pay for more improved services, which further indicates an acknowledgement of the need for better waste management (Hassan, Halim, Yusoff, Wang, & Wang, 2021).

(Alahakoon & Gunarathne, 2022) identified that E-waste management is considered a specific challenge, as the country was found facing difficulties in terms of building a comprehensive legal and policy framework that aims at addressing the increased generation of e-waste primarily because of social and economic developments. Subsequently, the management of plastic waste was considered a major concern, since most of the studies also suggested that Japan's strategies also aim at providing a model for improving the indirectness of the plastic value chain within Sri Lanka (Ono, Sirisena, & Visvanathan, 2022).

(Sudusinghe, Ratnayake, & Ranaweera, 2022) identified that the Spatial analysis through the use of a Geographic Information System (GIS) was found to have an identified suitable location for solid waste disposal for the specific municipalities, which hence highlights the necessity for the integration of different criteria in terms of a site selection process. There are some common methods for municipal solid waste disposal that usually remain open dumping since most of the management costs were allocated for the collection and transportation of the waste rather than disposal and treatment (Nanda & Berruti, 2021).

Moreover, sociocultural factors were also found to play an important role in the solid waste crisis, as there has been a symbolic consumption pattern, along with the cultural notions for dirt, social class, socio-ethnic beliefs and gender aspects that influence the generation of waste and other disposal practices (Ono, Sirisena, & Visvanathan, 2022). While concerning the youth, the Environmental Citizen Behaviour (ECB) focuses on reflecting the domestic waste disposal practices, since there have been different levels of ECB that impact the different choices for disposal methods (Sachitra, 2022).

It has been concluded that household waste management in Sri Lanka was under transitions which usually have a mixture of different traditional practices along with the steady shift towards a more structured waste collection and other disposal methods. Most of the challenges regarding e-waste and plastic management were found to be influenced by socio-cultural factors while also underscoring the complexity of the issues. The overall willingness of the household in terms of paying to improve the services while also identifying the appropriate disposal sites through the GIS analysis has a positive impact towards analysing the waste management crisis (Sudusinghe, Ratnayake, & Ranaweera, 2022). Still, there has been persistence regarding the open dumping along with the need for a comprehensive policy framework that aims at indicating that there is substantial work that needs to be completed (Nanda & Berruti, 2021).

3.3 Sustainable Waste Management Practices in Finland

Strict laws have been put in place throughout the nation to protect the environment, encourage the sustainable use of natural resources, and safeguard public health. Finland has made great strides toward meeting the challenging recycling targets set by the European Union thanks in large part to these regulations (GNF, 2022).

It has been identified that Finland has successfully named itself as the pioneer in the world in terms of environmentally friendly waste management

techniques that usually come through the management of MSW. There has also been a detailed and effective system that focuses on prioritising the recovery of the resources along with recycling and environmental protection which resulted in making the Finnish approach regarding waste management distinctive. There has also been successful management of the MSW in different parts of Finland primarily because of their extensive legislation that focuses on offering a strong basis regarding the different waste management procedures (Salmenperä, 2021, p. 292). There have also been strict laws that have been implemented throughout the nation in terms of protecting the environment while also focusing on encouraging the sustainable use of the different natural resources along with safeguarding public health. Thus, Finland has therefore made a great step in terms of meeting the challenges that recycled the different targets set by the European Union in terms of these regulations (GNF, 2022).

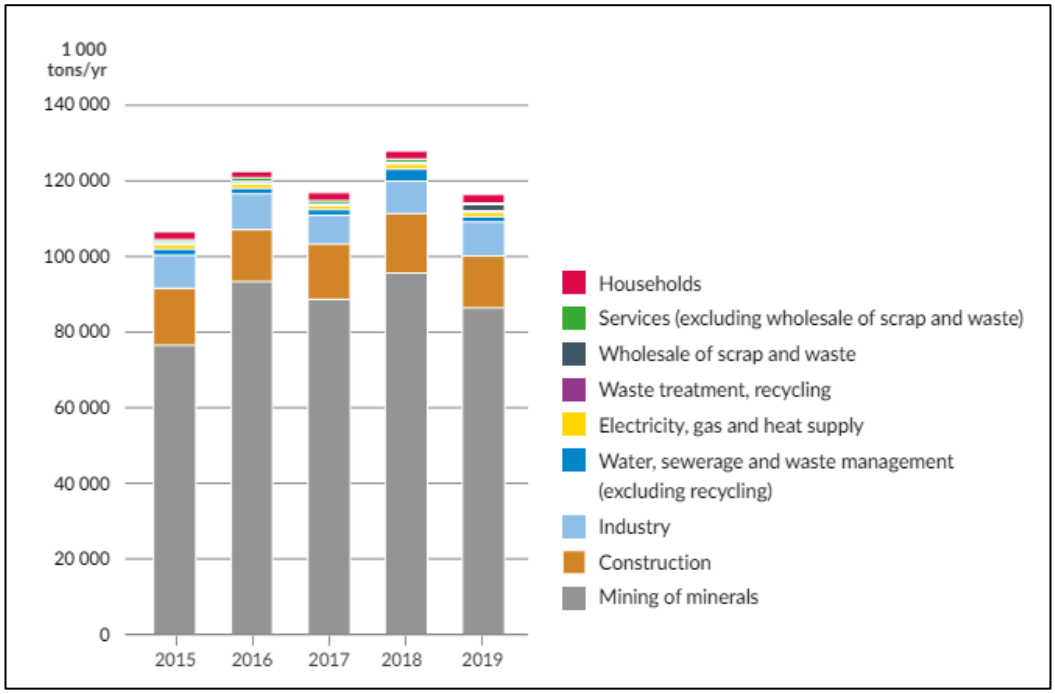

Figure 3 - Waste generation in Finland in 2015 – 2019

(GNF, 2022)

According to Sungkawati, (2024, pp. 01-13) it was highlighted that another feature that aims at setting down Finland's waste management was found to have values that highlight the cooperation between the producer corporations, private waste companies and municipalities and because of this cooperative approach, there has been a development of a coordinated and efficient waste management infrastructure that guaranteed the service accessibility for the citizen of the nation.

Along with this, the dedication of Finland in terms of technological advancement and innovation was considered to be instrumental in terms of improving the overall capacity for recycling and the recovery of waste. This resulted in the adoption of technological developments in waste treatment, along with reusing and recycling the rewarding business opportunities that emerge from the waste management value chain (Salmenperä, 2021, p. 292).

The household waste management system in Finland is quite unique which makes it stand out in the world. The commitment of Finland is to minimise the landfilling and maximise the recovery of resources which has been shown from the activities of source separation and a segregated collection of municipal waste (Peura, Voutilainen, & Kantola, 2022, pp. 143-153). Moreover, Finland has also promoted a culture that aims at recycling and sustainability as the residents were further advised to dump the waste into different bins such as paper, glass and other biowaste (Sandhi & Rosenlund, 2024, pp. 302-415). There has also been an effective sorting process that aims at improving the ways for collecting the waste showing that the recyclable materials that were also taken through landfill sites and sent to the different recycling zones help in lowering the waste (Pluskal, Šomplák, Nevrlý, Smejkalová, & Pavlas, 2021, p. 278)

Along with this, in accordance with the study by Leclerc & Badami, (2024, pp. 111-124), it was analysed that the adoption of Extended Producer Responsibility (EPR) programs aims at making household waste management in Finland even more substantial. There is also accountability regarding the collection of waste materials along with the recycling of the products by the producers in Finland. Because of this, there has been an environmental impact that resulted in lowering the prices as the producers were focused on encouraging the manufacturing of sustainable and recyclable products (Javaid, Haleem, Singh, Suman, & Rab, 2021). It has also been further highlighted that the commitment to sustainable waste management techniques has resulted in making Finland invest in even more waste-to-energy facilities. Therefore, through this, the non-recyclable waste has also been further transformed into energy, while lowering the nation's dependency on landfills and focusing on meeting the energy production targets (Royle, Chachuat, Xu, & Gibson, 2024, pp. 52-68).

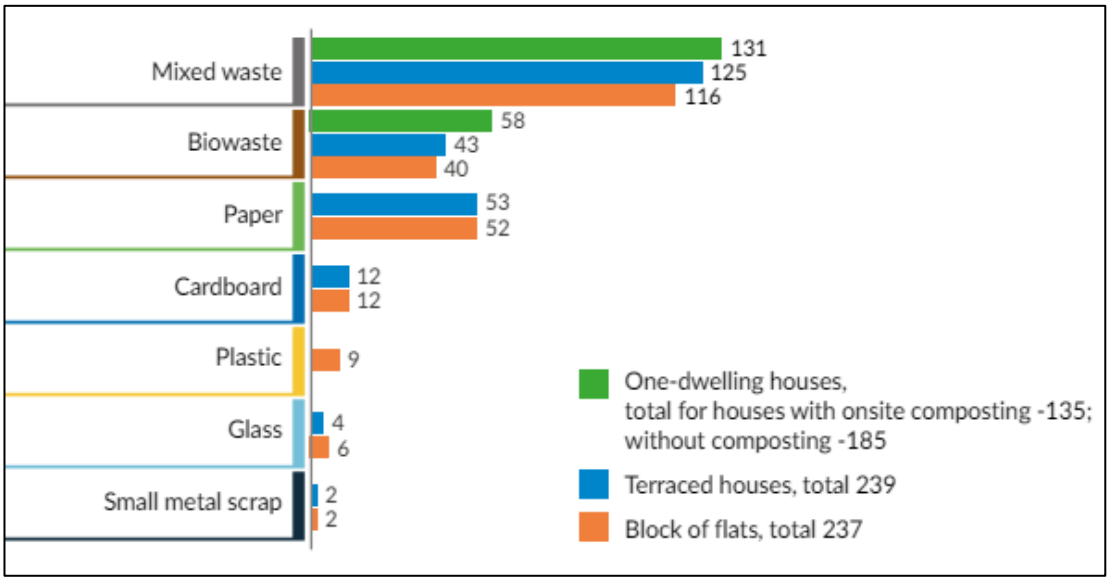

Figure 4 - Accumulation of Different Types of Waste in Different Types of Housing

(GNF, 2022)

It has been also highlighted that Finland was considered to be notable for having a high recycling and waste recovery rate when compared to different countries. It was also highlighted that Finland was considered a market leader in

lowering landfilling along with improving the recovery of the resources, as there are over 99% of MSW that was being used as a material or as energy (Pluskal, Šomplák, Nevrlý, Smejkalová, & Pavlas, 2021). Moreover, in terms of increasing the recycling rates and the evolution of a circular economy model, the nations also place strong importance on effective categorisation and distinct collection (Sungkawati, 2024).

It has been also highlighted that the sustainable waste management practices observed in Finland have positioned it as a world leader in the efficient management of MSW. Most of the practices are also supported by different laws, innovation and the passion that aims at encouraging recycling which usually favours public health, while also providing a healthy environment and the overall recovery of resources. Therefore, Finland has standardised the management of municipal waste that was adopted by other countries in order to make the system better.

3.4 Adaptation of Finnish Waste Management Practices to Sri Lanka

According to the analysis of the existing waste management practices, policies and conditions within Sri Lanka, there is a need to assess the feasibility of the adoption of waste management practices in Finland. Along with this, the Finnish waste management systems were also known for their overall efficiency and sustainability, resulting in involving a higher level of technology that has strict regulation, and a strong commitment to recycling and the minimisation of waste (Salmenperä, Pitkänen, Kautto, & Saikku, 2021, p. 280).

According to the literature, it has been indicated that Sri Lanka has been facing substantial challenges regarding the management of waste, predominantly electronic waste and has fully adopted different sustainable event management practices (Nawarathna & Arachchi, 2021, pp. 49-64). Sri Lanka lacks a comprehensive legal and policy framework that concerns e-waste management (Alahakoon & Gunarathne, 2022, pp. 107-127) and there are also different issues regarding construction material waste, precisely concrete waste

(Senarathna & Perera, 2021). The efforts have been implemented for management accounting innovations such as “Total Quality Management (TQM)” (Salmenperä, Pitkänen, Kautto, & Saikku, 2021, p. 280) and “Environmental Management Accounting (EMA)” (Alahakoon & Gunarathne, 2022) that have not been widespread. Along with this, the construction industry has also explored the adoption of new tools which include the “Last Planner System (LPS)” (Madushanka & Ranadewa, 2022, pp. 196-204) and the challenges concerning the implementation of sustainable construction (SC) practices (Wimalarathna, Fernando, & Kulatunga, 2023, pp. 1-14).

It was concluded that the adaptation of Finnish waste management practices also resulted in potential benefits for Sri Lanka, as the feasibility of an endeavour depended upon addressing the current challenges that were present within the country's waste management sector. It also includes improving the government commitment while developing a detailed legal framework and nurturing a culture of sustainability among citizens and industries (Alahakoon & Gunarathne, 2022, pp. 107-127). It would also require significant investment in technology, training, and infrastructure to align with the high standards of Finnish waste management systems (Nawarathna & Arachchi, 2021, pp. 49-64). Therefore, it also helps in tailoring down different approaches that resulted in considering Sri Lanka's distinct context while building upon the existing initiatives that were considered to be more practical in terms of directing the adaptation of Finnish waste management practices.

3.5 Community Participation in Sri Lanka

The literature shows that community participation in Sri Lanka was considered to be important for adapting to new changes, as has been evidenced by different studies across different sectors. In terms of environmental sustainability, there are different strategies that personified the carbon reduction in construction while also developing input from local experts, while suggesting that the involvement of the community was considered as a key for implementing the global relevant strategies in such a way that is was found to be suitable in

terms of Sri Lankan context (Kumari, Kulathunga, Hewavitharana, & Madusanka, 2022).

When considering the various roles that community participation plays, for example, even though community involvement is thought to improve mental health and environmental sustainability, the financial crisis and COVID-19 pandemic-related shift in education toward e-learning suggest a top-down strategy that places less emphasis on community input (Wimalarathna, Fernando, & Kulatunga, 2023, pp. 1-14). Furthermore, a collaborative approach that values community participation led to the development of a framework for medical professionalism in Sri Lanka through consensus among healthcare stakeholders (Ellawala, Chandratilake, & De Silva, 2021).

It has been also highlighted that community participation is considered a pivotal element in Sri Lanka while adapting to the new changes, as it focuses on ensuring that intercessions are culturally found to be relevant and are accepted socially (Kumari, Kulathunga, Hewavitharana, & Madusanka, 2022). As there has been a development of mental health services, environmental strategies, or frameworks for professionalism, it includes the community that leads towards more effective and sustainable outcomes. Along with this, there has been an extent and form of community participation that usually varies on different sectors and initiatives.

3.5.1 Diffusion and Innovation Theory

Diffusion and innovation theory, as outlined by Rogers, provides a framework for understanding how new ideas and technologies spread within a society (Bakkabulindi, 2014, p. 55). This theory is relevant to the implementation of new household waste management systems in Sri Lanka, as it can explain the factors influencing community participation in adopting such systems. The theory posits that the adoption of innovations is influenced by individual and social system characteristics, including perceived attributes of the innovation, such

as relative advantage and compatibility with existing values and practices (Yatigammana, Md Johar, & Gunawardhana, 2014, pp. 1-14).

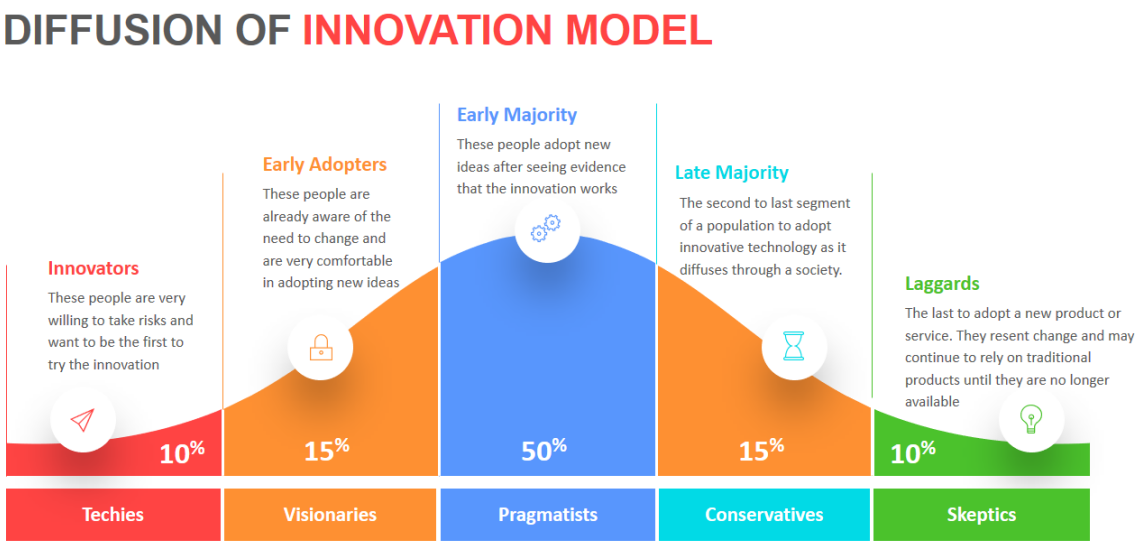

Figure 5 - Diffusion and Innovation Theory Model

(SemiColonWeb, 2021)

In the context of Sri Lanka, community participation in waste management has been shown to be crucial for the success of new systems. For instance, a community-driven household waste management system in the tea plantation sector has been operationalized successfully, aligning with the principles of a circular economy, and contributing to sustainable development goals (Gunarathne & Peiris, 2022). This suggests that when communities are engaged and the benefits of the new system are clear, diffusion of the innovation is more likely. However, the presence of a waste treatment facility alone does not guarantee increased youth participation unless accompanied by intensive interventions and stakeholder involvement (Naldi, 2023, pp. 40-47).

3.6 Economic Factors and Stakeholder Engagement in Sri Lanka

Salmenperä, Pitkänen, Kautto, & Saikku, (2021, p. 280) highlight that in the implementation of the new household waste management practices in Sri Lanka, economic factors such as household income levels, land ownership,

and expenditure patterns are usually considered to be important. The wealthier and urban households having literate heads are more likely to use municipal waste collection services, whereas the larger land size and higher income raise the likelihood of composting. Subsequently, households from different socio-economic backgrounds, except those urban ones focus on preferring the burning and dumping of waste on their premises (Ellawala, Chandratilake, & De Silva, 2021, pp. 49-59). This has been also suggested that economic status impacts the choice of waste disposal mechanisms, resulting in necessitating the tailoring of the different waste management policies that were considered to be important for affecting the economic disparities.

Moreover, stakeholder engagement is considered another critical characteristic. Sungkawati (2024) also focuses on the positive impact of community participation in solid waste management, especially the urban areas where the waste management system is inadequate. This study also suggests that the nurturing of community involvement substantially improves waste reduction while recycling and composting the efforts. (Peiris & Gunarathne, 2022) also identified the importance of stakeholder engagement, while also advocating strategies such as policy formulation, law enforcement, and public-private partnerships that help address the different challenges regarding e-waste and plastic waste management.

4 METHODOLOGY

The research methodology has been proposed to achieve the aim and objectives of the research based on the adaptation of sustainable waste management practices to enhance household waste management. The research has been conducted systematically to get the answers to each of the research questions. In this regard, (Mweshi & Sakyi , 2020) stated that a framework having proper guidelines and justifications is needed to identify, gather and analyse the data that comes under the domain of research methodology.

4.1 Research Design

Pawar (2020) highlighted that a research design provides a framework for planning to carry out systematic research. Moreover, the research design primarily focuses on determining the blueprint regarding the collection and the analysis of the data that was collected. This study uses the “mixed research method. The mixed-method research depends on the gathering of the data from the “qualitative and quantitative” methods since they aim at providing a complete understanding of the research problem as highlighted by (Nanthagopan, 2021). Subsequently, it was also evaluated by (Mezmir, 2020) that in “qualitative research method”, the statements and the opinions of the individuals or from the published sources concerning specific research problems are usually qualitative data since it includes the essence of experiences. Moreover, it was also observed that qualitative research also helps in collecting appropriate and rich data that helps in making the interpretations regarding the multiple views (Tomaszewski, Zarestky, & Gonzalez, 2020). Thus, the assessment concerning the adoption of sustainable practices regarding municipal waste from Finland was easily analysed through “qualitative research”. Therefore, the assessment of the adoption of sustainable practices for municipal waste from Finland can be analysed using “qualitative research”.

Additionally, to investigate the sustainable municipal waste management practices in Sri Lanka a “quantitative method” has also been selected. (Scheel, Tiokhin, Isager, & Lakens, 2021) described that theory and hypotheses are tested by measuring the variables of the study. Moreover, (Khoa, Hung, & Hejsalem-Brahmi, 2023) stated that “quantitative research” is used to obtain numeric data which is analysed to get concise and precise outcomes. Hence, a mixed-method research design has also been selected to get the information from both the selected geographies.

4.2 Research Methods

Based on the nature of the study, the researcher chooses the research methods and collect the data for analysis. The current study has collected data from both primary and secondary sources. (Cerar, Nell, & Reiche, 2021) assessed that the primary data is collected directly from the sources and can be regarded as first-hand knowledge because it is originally generated and contains the unprocessed form of data. The primary data is free from bias as it provides information about the experiences of the direct sources (Taherdoost, 2021). On the other hand, (Cheong, Lyons, Houghton, & Majumdar, 2023) evaluated that the secondary data is gathered and extracted from indirect sources which is considered as second-hand information. Additionally, the secondary data can be collected from already published sources and it saves time and energy for the researcher (Mwita, 2022). Henceforth, to assess the sustainable waste management practices of Finland which can be adopted in Sri Lanka both primary and secondary methods have been adopted.

4.3 Research Procedures

The tools for the collection of data were selected after the suitable design and research methods were chosen. The published sources; namely online journal articles were chosen to collect the qualitative data related to the waste management practices of Finland. It has been observed by (Chatfield, 2020) that the data obtained from indirect sources tends to save the time and effort of the researchers. In this study, the databases that were used to collect from ‘Emerald Insight’, “Scopus” and “ScienceDirect”. Moreover, the keywords that were used to search for the studies include “sustainability of waste management”, and “recycling of municipal waste” and these studies were based on Sri Lanka and Finland.

After searching the studies, they were further screened through the “Preferred Reporting Items for Systematic Reviews and Meta-Analyses” (PRISMA) flowchart. According to the study by (Page, et al., 2021), it was also highlighted

that the PRISMA flowchart further helps in selecting the studies that match the criteria through which the research was conducted. After screening, a total of 7 studies were gathered in terms of analysing and getting an understanding regarding sustainable waste management in Finland. Moreover, for collecting the quantitative data, the researcher has opted for a survey questionnaire. A questionnaire is determined as a research tool which consists of close-ended questions that need to be answered by the participants of the study. The questionnaire was generated on “Google Forms” and the link to the form was provided to the participants of the study to get it filled by them. The participants of the study were the residents of Sri Lanka whose age is between 20-50 years. The participants were recruited from social media platforms and the age was selected to get the mature responses. A total of 131 participants took part in the survey.

4.4 Survey

An online self-administered questionnaire was developed to get the opinions and views of the residents of Sri Lanka regarding the household waste management practices implemented in their areas. The questionnaire was close-ended, and the participants had to choose the option they think is right for them. A total of twenty-three questions were present in the questionnaire. The questionnaire is attached in ***Appendix A***. The consent of the participants was taken before collecting data from them.

4.5 Data Analysis

Islam (2020, pp. 10-15) highlighted that data analysis is one of the significant parts of research and is done by utilising logical reasoning and an analytical set of skills. The data has been interpreted to reveal the outcomes of the study to conclude. The secondary qualitative data was analysed using the content analysis method. Eakin & Gladstone (2020, p. 19) stated that the content analysis method is used to determine the patterns and presence of certain words or concepts within the qualitative data. The presence of the themes in the data

is identified by the researchers to analyse their meanings. Moreover, the collected primary quantitative data was analysed using the “statistical software SPSS version 21”. The numeric data has been tested to get the descriptive statistics and regression analysis which is required to test the proposed hypotheses. The findings from both methods were aligned to analyse the “adaptation of sustainable waste management practices in Finland to enhance household waste management in Sri Lanka.”

5 QUANTITATIVE RESEARCH – ANALYSIS OF CURRENT HOUSEHOLD WASTE MANAGEMENT PRACTICES IN SRI LANKA

The interpretation of the findings has been presented in this chapter which have been extracted from the gathered data related to the current household waste management practices being implemented in Sri Lanka. The interpretations have helped in drawing relevant conclusions which is needed to address the research objectives of the study.

5.1 Results

The focus of the current study is to identify the sustainable waste management practices of Finland which can be adopted in Sri Lanka to enhance its household waste management. In this regard, the data for analysing the current household waste management practices of Sri Lanka has been collected from 131 participants who are residents of Sri Lanka. An online form was provided to the participants which they have filled diligently, and the collected data has been analysed using SPSS version 21. The histograms are attached in ***Appendix B.***

5.2 Findings from Questionnaire

5.2.1 Demographics

Table 1. Gender of Participants

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	85	64.9	64.9	64.9
	Male	45	34.4	34.4	99.2
	Prefer not to say	1	.8	.8	100.0
	Total	131	100.0	100.0	

The findings in ***Table 1*** show the gender of the respondents of the survey in which out of 131 participants, 85 (64.9%) were female, 45 (34.4%) were male and only 1 (0.8%) did not mention their gender. Thus, the majority of participants were female residents of Sri Lanka.

Table 2. Age of Participants

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	21 to 30 years	74	56.5	56.5	56.5
	31 to 40 years	40	30.5	30.5	87.0
	41 to 50 years	13	9.9	9.9	96.9
	51 to 60 years	4	3.1	3.1	100.0
	Total	131	100.0	100.0	

Table 2 presents the ages of the participants of the study. Out of 131 participants, 74 (56.5%) belong to the age group of 21-30 years, 40 (30.5%) were between the ages of 3-40 years and 13 (9.9%) were 41-50 years old. Lastly, only 4 participants (3.1%) were of age between 51 to 60 years. Hence, the majority of the participants were of age between 21 to 30 years.

Table 3. Duration of Living in Sri Lanka

For how long you have been living in Sri Lanka

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fifteen to twenty years	1	.8	.8	.8
	Five to fifteen years	1	.8	.8	1.5
	Less than five years	3	2.3	2.3	3.8
	More than twenty years	6	4.6	4.6	8.4
	Since birth	120	91.6	91.6	100.0
	Total	131	100.0	100.0	

Table 3 shows that the participants were asked about the duration they have been living in Sri Lanka. Out of 131 participants, 120 participants (91.6%) were a resident of Sri Lanka since their birth, 6 participants (4.6%) had been living in Sri Lanka for more than twenty years and 3 participants (2.3%) were residents of Sri Lanka for less than five years. Along with this, 1,1 participants each (0.8%) were residents of Sri Lanka for five to fifteen years and fifteen to twenty years respectively. Thus, most of the respondents were living in Sri Lanka from the time of their birth.

5.2.2 Information Related to Current Household Waste Management Practices in Sri Lanka

Table 4. Satisfaction with Waste Collection Services

On a scale of 1 to 5, how satisfied are you with the current waste collection services in your area?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 (Very Dissatisfied)	38	29.0	29.0	29.0
	2 (Dissatisfied)	30	22.9	22.9	51.9
	3 (Neutral)	44	33.6	33.6	85.5
	4 (Satisfied)	16	12.2	12.2	97.7
	5 (Very Satisfied)	3	2.3	2.3	100.0
	Total	131	100.0	100.0	

In ***Table 4*** above, the respondents were inquired about their satisfaction level with the current waste collection services in their area. Out of 131 participants, 38 (29%) were very dissatisfied, 30 (22.9%) were dissatisfied, 44 (33.6%) were neutral, 16 (12.2%) were satisfied and only 3 participants (2.3%) were very satisfied. Therefore, it implies that the majority of the participants gave no opinion about the level of waste collection services in their areas.

Table 5. Segregation of Waste

How frequently do you separate your waste into different categories (e.g., recyclables, organic waste, non-recyclables)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Daily	59	45.0	45.0	45.0
	Monthly	4	3.1	3.1	48.1
	Never	6	4.6	4.6	52.7
	Rarely	10	7.6	7.6	60.3
	Weekly	52	39.7	39.7	100.0
	Total	131	100.0	100.0	

The values in ***Table 5*** present that the respondents were asked about their practices in separating the waste into different categories. Out of 131 participants, 59 participants (45%) daily separate the waste into different categories. Moreover, 52 (39.7%) weekly, 10 (7.6%) rarely, 6 (4.6%) never and 4 (3.1%) monthly separate the waste into different categories. Henceforth, it is identified that the majority of the participants daily separate the waste into recyclables, nonrecyclables and organic waste categories.

Table 6. Environmental Impact of Improper Waste Disposal

Are you aware of the environmental impact of improper waste disposal?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	3	2.3	2.3	2.3
	Yes	128	97.7	97.7	100.0
	Total	131	100.0	100.0	

The findings in ***Table 6*** present that the participants were asked about their awareness related to the environmental impact of improper waste disposal. In this regard, out of 131 participants, 128 (97.7%) were aware of the consequences and only 3 (2.3%) were not aware of the issues which can be created by the improper disposal of waste. Thus, the majority of participants have knowledge about improper waste disposal's impact on the environment.

Table 7. Awareness Campaigns

Do you think there is a need for more awareness campaigns on proper waste management practices in your community?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	3	2.3	2.3	2.3
	Yes	128	97.7	97.7	100.0
	Total	131	100.0	100.0	

Table 7 shows that the participants were inquired about their opinions regarding the need for more awareness campaigns on proper waste management practices in Sri Lanka. Out of 131 participants, 128 respondents (97.7%) agreed on this and only 3 (2.3%) said there is no need for more awareness campaigns. Therefore, the majority of the participants were in favour of more

awareness campaigns on proper waste management practices in the communities of Sri Lanka.

Table 8. Willingness to Participate in Projects

Would you be willing to participate in community projects aimed at improving waste management practices?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	15	11.5	11.5	11.5
	Yes	116	88.5	88.5	100.0
	Total	131	100.0	100.0	

Table 8 above depicts that the respondents were asked about their willingness to participate in community projects related to improving waste management practices. Out of 131 participants, 116 participants (88.5%) opted yes and only 15 (11.5%) opted no in the survey. Thus, it is identified that the majority of the participants are willing to be a part of the community projects which are aimed at improving the waste management practices in Sri Lanka.

Table 9. Community Participation in Enhancing Household Waste Management Practices

How important do you think community participation is in enhancing household waste management practices?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Important	19	14.5	14.5	14.5
	Neutral	4	3.1	3.1	17.6
	Very Important	108	82.4	82.4	100.0
	Total	131	100.0	100.0	

In ***Table 9*** above, the respondents were inquired about their opinion on the importance of the participation of the community in enhancing household management practices. In this regard, out of 131 participants, 108 (82.4%) opted for very important, 19 (14.5%) opted for important and only 4 (3.1%) opted for neutral. Therefore, it is identified that the majority of participants think that it is

of high importance for a community to take part in the campaigns in order to enhance household management practices.

Table 10. Familiarisation with Waste Management Practices

Are you familiar with the concept of sustainable waste management practices?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	8	6.1	6.1	6.1
	Yes	123	93.9	93.9	100.0
	Total	131	100.0	100.0	

Table 10 shows that the participants were asked about their familiarity with the concept of sustainable waste management practices. Out of 131 participants, 123 respondents (93.9%) opted for yes and only 8 (6.1%) opted for no. Thus, the majority of the participants are familiar with and have knowledge about sustainable waste management practices.

Table 11. Implementation of Waste Management Practices

Do you believe that implementing sustainable waste management practices can benefit the environment?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 (Strongly Agree)	121	92.4	92.4	92.4
	2 (Agree)	3	2.3	2.3	94.7
	3 (Neutral)	3	2.3	2.3	96.9
	4 (Disagree	1	.8	.8	97.7
	5 (Strongly Disagree)	3	2.3	2.3	100.0
	Total	131	100.0	100.0	

In ***Table 11*** above, the respondents were inquired about the benefits of the environment by the implementation of sustainable waste management practices. Out of 131 participants, 121 (92.4%) strongly agreed, 3 of each (2.3%) agreed, neutral and strongly disagreed. Only 1 participant (0.8%) disagreed

with this statement. Henceforth, it is observed that the majority of the participants strongly agreed that the implementation of waste management practices can be beneficial for the environment.

Table 12. Knowledge of Sustainable Waste Management Practices

How much knowledge do you have regarding the sustainable waste management practices of Sri Lanka?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A little	15	11.5	11.5	11.5
	Neutral	22	16.8	16.8	28.2
	Not very much	31	23.7	23.7	51.9
	Very little	1	.8	.8	52.7
	Very much	62	47.3	47.3	100.0
	Total	131	100.0	100.0	

The findings in ***Table 12*** present that the respondents were asked about their knowledge level regarding the sustainable waste management practices of Sri Lanka. Out of 131 participants, 15 participants (11.5%) had little knowledge, 22 (16.8%) were neutral, 31 (23.7%) did not have very much knowledge and only 1 (0.8%) had very little knowledge. Along with this, 62 (43.7%) have very much knowledge. Thus, it is identified that the majority of the participants have an immense knowledge about the sustainable waste management practices of Sri Lanka.

Table 13.Participation in the Initiatives

How likely are you to actively participate in initiatives that aim to implement more adequate waste management practices in Sri Lanka?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Likely	78	59.5	59.5	59.5
	Neutral	29	22.1	22.1	81.7
	Unlikely	7	5.3	5.3	87.0
	Very Likely	17	13.0	13.0	100.0
	Total	131	100.0	100.0	

In ***Table 13*** above, the respondents were inquired about their level of participation in the initiatives related to the implementation of waste management practices in Sri Lanka. Out of 131 participants, 78 (59.5%) were likely to participate, 29 (22.1%) were neutral, 17 (13%) were very likely to participate and only 7 participants (5.3%) were unlikely to participate in such initiatives. Therefore, it implies that the majority of the participants are likely to take part in the initiatives whose aim is to implement the appropriate waste management practices in Sri Lanka.

Table 14. Ways of Disposing Hazardous Waste Materials

How do you currently dispose of hazardous waste materials (e.g., batteries, chemicals)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Recycle at designated centres	16	12.2	12.2	12.2
	Store at home	15	11.5	11.5	23.7
	Throw in regular trash	61	46.6	46.6	70.2
	Throw or burn in open spaces due to no place to store	39	29.8	29.8	100.0
	Total	131	100.0	100.0	

Table 14 shows that the respondents were asked about the ways they dispose of hazardous waste materials. In this regard, out of 131 participants, 16 participants (12.2%) recycled at designated centres, 15 (11.5%) stored at home, 61 (46.6%) threw in regular trash and 39 (29.8%) threw or burned in open spaces due to unavailability of place to store. Thus, it is identified that the majority of participants dispose of the hazardous materials by throwing them into the regular trash.

Table 15. Collection of Waste by Municipality

How frequently is your waste collected by the municipality?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Once a week	34	26.0	26.0	26.0
	Once in two weeks	61	46.6	46.6	72.5
	Twice a month	4	3.1	3.1	75.6
	Twice a week	32	24.4	24.4	100.0
	Total	131	100.0	100.0	

In ***Table 15*** above, the respondents were inquired about the frequency of the collection of waste by the municipality. In this regard, out of 131 participants, 34 (26%) opted for once a week, 61 (46.6%) opted for once in two weeks, 32 (24.4%) opted for twice a week and only 4 participants (3.1%) opted for twice a month. Therefore, it implies that the municipality collects the waste once in two weeks in Sri Lanka.

Table 16. Availability of Waste Segregation Bins

How satisfied are you with the availability of waste segregation bins in your neighbourhood?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Dissatisfied	26	19.8	19.8	19.8
	Neutral	14	10.7	10.7	30.5
	Satisfied	12	9.2	9.2	39.7
	Very dissatisfied	74	56.5	56.5	96.2
	Very satisfied	5	3.8	3.8	100.0
	Total	131	100.0	100.0	

In ***Table 16*** above, the participants were asked about their satisfaction level with the availability of waste segregation bins in their neighbourhood. Out of 131 participants, 26 (19.8%) were dissatisfied, 14 (10.7%) were neutral, 12 (9.2%) were satisfied, 74 (56.5%) were very dissatisfied and only 5 (3.8%) were very satisfied. Hence, it shows that the majority of the participants were extremely dissatisfied with the availability of the waste segregation bins in their neighbourhood.

Table 17. Importance of Waste Segregation at Source

Do you believe that waste segregation at the source is important for effective waste management?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	131	100.0	100.0	100.0

Table 17 shows that the participants were asked to give their opinions regarding the segregation of waste at the source to enhance the effectiveness of waste management. All 131 participants (100%) opted yes to this statement.

Thus, it is identified that the segregation of waste at the source is highly significant for making waste management effective in Sri Lanka.

Table 18. Composting of Organic Waste

How often do you engage in composting organic waste at home?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Daily	15	11.5	11.5	11.5
	Monthly	13	9.9	9.9	21.4
	Never	26	19.8	19.8	41.2
	Rarely	71	54.2	54.2	95.4
	Weekly	6	4.6	4.6	100.0
	Total	131	100.0	100.0	

The values in ***Table 18*** show that the respondents were inquired about their engagement in composting organic waste at their homes. Out of 131 participants, 15 participants (11.5%) daily compost the organic waste at their homes. Along with this, 13 (9.9%) monthly, 26 (19.8%) never, 6 (4.6%) never, 71 (54.2%) rarely and only 6 (4.6%) participants weekly engage in these activities. Therefore, it is revealed that the majority of the participants rarely engage in composting organic waste at their homes.

Table 19. Incentives for Waste Management Practices

Are you aware of any incentives provided by local authorities for proper waste management practices?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	121	92.4	92.4	92.4
	Yes	10	7.6	7.6	100.0
	Total	131	100.0	100.0	

Table 19 above depicts that the respondents were asked about their awareness regarding the incentives provided by the local authorities for proper waste management practices. Out of 131 participants, 121 participants (92.4%) opted no and only 10 (7.6%) opted yes for this statement. Thus, it is identified

that the majority of the participants have no awareness of the incentives that the local authorities provide for proper waste management practices.

Table 20. Virtual Workshops and Training Sessions

Would you be willing to attend virtual workshops or training sessions on sustainable waste management practices?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Definitely No	1	.8	.8	.8
	Definitely Yes	11	8.4	8.4	9.2
	Not Sure	74	56.5	56.5	65.6
	Probably No	11	8.4	8.4	74.0
	Probably Yes	34	26.0	26.0	100.0
	Total	131	100.0	100.0	

The findings in ***Table 20*** show that the respondents were inquired about their willingness to attend virtual workshops and training sessions about sustainable waste management practices. In this regard, out of 131 participants, 11 participants (8.4%) opted for definitely yes, 74 (56.5%) were not sure, 11 (8.4%) opted for probably no, 34 (26%) opted for probably yes and only 1 (0.8%) opted definitely no. Henceforth, it is depicted that the majority of the participants were not sure to attend the virtual workshops and training sessions about sustainable waste management practices.

Table 21. Accessibility of Waste Management Services

How important is it for you that waste management services are easily accessible in your community?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 (Very Important)	108	82.4	82.4	82.4
	2 (Important)	13	9.9	9.9	92.4
	3 (Neutral)	6	4.6	4.6	96.9
	4 (Not Important)	3	2.3	2.3	99.2
	5 (Not Important at all)	1	.8	.8	100.0
	Total	131	100.0	100.0	

In ***Table 21*** above, the respondents were asked about their opinion on the importance of easy access to waste management services in their community. In this regard, out of 131 participants, 108 (82.4%) opted for very important,

13 (9.9%) opted for important, 6 (4.65) were neutral, 3 (2.3%) opted for not important and only 1 (0.8%) opted for not important at all. Therefore, it is revealed that the majority of participants think that it is of high importance for them to have easy access to waste management services in their community.

Table 22. Implementation of Advanced Waste Management Technologies

Do you think the implementation of advanced waste management technologies can improve waste collection efficiency?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	1	.8	.8	.8
	Yes	130	99.2	99.2	100.0
	Total	131	100.0	100.0	

Table 22 shows that the participants were inquired about their opinions regarding the implementation of advanced waste management technologies to improve waste collection efficiency. Out of 131 participants, 130 respondents (99.2%) opted for yes and only 1 (0.8%) opted no. Thus, the majority of the participants think that the efficiency of waste collection in Sri Lanka can be improved by the implementation of advanced waste management technologies.

Table 23.Challenges Hindering Effective Waste Management

In your opinion, what is the biggest challenge hindering effective waste management in your area?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Improper implementation of waste disposal methods	68	51.9	51.9	51.9
	Inadequate infrastructure	38	29.0	29.0	80.9
	Lack of awareness	19	14.5	14.5	95.4
	Limited community participation	6	4.6	4.6	100.0
	Total	131	100.0	100.0	

Table 23 depicts that the respondents were asked about their opinion on the biggest challenge that hinders effective waste management in their areas. In

this regard, out of 131 participants, 68 participants (51.9%) think the improper implementation of waste disposal methods, 38 (29%) said inadequate infrastructure, 19 (14.5%) think lack of awareness and only 6 (4.6%) think that the limited community participation are the biggest challenges. Therefore, it is identified that the majority of participants think that the improper implementation of the waste disposal methods is the biggest challenge in way of effective management of waste in Sri Lanka.

Table 24. Participation in Community Clean-up and Waste Management Programs

Have you ever participated in any community clean-up or waste management programs?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	70	53.4	53.4	53.4
	Yes	61	46.6	46.6	100.0
	Total	131	100.0	100.0	

The findings in ***Table 24*** show that the participants were inquired whether they had participated in any community clean-up or waste management programs. In this regard, out of 131 participants, 70 (53.4%) opted for no and 61 (46.6%) opted for yes to this statement. Thus, the majority of participants have never taken part in the community clean-up and waste management programs in Sri Lanka.

6 QUALITATIVE RESEARCH – SUSTAINABLE WASTE MANAGEMENT PRACTICES IN FINLAND

The current chapter presents the findings extracted from the six selected journal articles to get insights into sustainable waste management practices in Finland. The summary table is attached in Appendix C.

6.1 Findings from Summary Table

6.1.1 STUDY #1

According to the study by Reijonen, Bellman, Murphy, & Kokkonen (2021, pp. 88-97) in the study “Factors related to recycling plastic packaging in Finland’s new waste management scheme” reveal that attitudes significantly influence recycling behavior in Finland, while Subjective Norms (SN) have a minimal impact. This aligns with Finland's high individualism score on Hofstede’s IDV index, indicating a preference for individualism over collectivism.

The study also finds that respondents with positive attitudes perceive lower behavioral costs, supporting the low-cost hypothesis. Specifically, the perception of low costs significantly influences recycling behavior, considering two dimensions of Perceived Behavioral Control (PBC): objective costs (time and distance) and facilitating conditions (ease of obtaining information or handling waste).

Interestingly, obtaining recycling information has a negative impact on recycling behavior, contrary to expectations. This may be because experienced recyclers already possess the necessary information and are more concerned with what happens to the recycled material than with acquiring new information.

6.1.2 STUDY # 2

Pitkänen, et al., (2023, pp. 50-300) in their study “How to measure the social sustainability of the circular economy? Developing and piloting social circular economy indicators in Finland” analyzed the challenges associated with measuring social sustainability within the context of the Circular Economy (CE) transition. They identified the complexity of this task due to the absence of a clear and consistent definition of CE. The study noted that CE can be interpreted in various ways, especially when considering social aspects, which complicates the measurement of social sustainability. Additionally, the study highlighted the difficulty in demonstrating the changes brought about by CE development and policies without established measures. Various indicators were identified and assessed for their validity, utility, and reliability. The study found that a clear connection between CE and social sustainability is crucial for the relevance of these indicators. As Finland aims to become a global leader in CE, monitoring and piloting social indicators play a vital role in either supporting or challenging this ambition.

6.1.3 Study # 3

Salmenperä's (2021, p. 292) study, "Different pathways to a recycling society - Comparison of the transitions in Austria, Sweden and Finland," highlights the unique political, economic, and social lock-ins in Austria, Sweden, and Finland. Among these, Finland is noted for having a much stronger social lock-in compared to the other two countries. The study emphasizes the significant role of waste legislation in the transition of municipal solid waste (MSW) management. It points out differences in the organization of the Extended Producer Responsibility (EPR) system used for packaging, which typically impacts recycling performance from a waste stream perspective.

Furthermore, the study underscores the increasing attention on the circular economy (CE) in terms of sustainability and stakeholder roles. It delves into the concept of stakeholder interest by examining CE stakeholders in Finland. In the European Union, the responsibility of municipalities for collecting and

managing waste is often assumed. This assumption has facilitated a shift towards environmentally sound waste management, promoting inter-municipal cooperation to achieve economies of scale. This cooperation is crucial for implementing effective and sustainable waste management practices.

6.1.4 Study # 4

Marjamaa et al. (2021, pp. 50-62), in their study "A Sustainable Circular Economy: Exploring Stakeholder Interests in Finland," emphasize the growing research interest in the sustainability aspects of the Circular Economy (CE) and the role of stakeholders in promoting it. The study highlights that key stakeholders typically value sustainable CE and share a common interest in its promotion. This research contributes to CE literature by examining stakeholder collaboration and asserting that understanding stakeholder interests is crucial for fostering effective cooperation. The study finds that value-based motivations drive stakeholders' interest in CE, which in turn influences their actions. These motivations also facilitate the application of research knowledge and the development of solutions with global impacts at national, regional, and local levels. Thus, recognizing the diverse motivations of stakeholders is essential for implementing CE. The study also reveals that stakeholder expectations are linked to economic, social, and ecological factors.

6.1.5 Study # 5

The findings of (Zaikova, et al., 2022, pp. 1-52) in the article “Factors Influencing Household Waste Separation Behaviour: Cases of Russia and Finland” emphasize the significance of ubiquity and convenience in the waste collection system as key factors distinguishing different cases. In Finland, various waste containers are conveniently located near residential buildings and public spaces, promoting proper waste separation behavior. The study reveals that the widespread availability and convenience of the waste collection system play a crucial role in effective waste separation.

Furthermore, the study indicates that the maturity of the waste recycling system and the availability of information are important predictors of waste source-separation intention and behavior. The results demonstrate that the extended theory of planned behavior is useful in identifying factors influencing waste source-separation behavior in both the early-stage waste collection system in Saint Petersburg, Russia, and the more mature system in Finland.

6.1.6 Study # 6

(Peura, Voutilainen, & Kantola, 2022, pp. 143-153) in the study “From garbage to product and service systems: A longitudinal Finnish case study of waste management evolution” highlight that the findings of this study show that the reforming of WM helps in lowering the dumping that has been very successful in the Vaasa region.

The total amount of materials within the WM systems has increased the control and the documentation has become a part of the WM and the recycled materials were documented within the systems.

7 RECOMMENDATIONS FOR IMPLEMENTATION

The chapter presents the recommendations that Sri Lanka can follow to implement the sustainable waste management practices adopted after analysing the practices of Finland.

7.1 Recommendations

It has been analysed that the residents in Sri Lanka are not happy with the household waste collection services provided by the municipality. The residents in Sri Lanka are aware of the importance of waste management practices and they want to take part in the initiatives to enhance their knowledge regarding sustainable waste management practices. Moreover, the improper implementation of waste disposal methods has made sustainable waste management practices miserable in Sri Lanka. In this regard, the sustainable practices of Finland have been analysed and on the basis of this, the following recommendations have been made which Sri Lanka can follow to enhance its household waste management practices.

- The authorities in Sri Lanka can provide the cost to manage household waste as the government in Finland is practising as suggested by (Reijonen, Bellman, Murphy, & Kokkonen, 2021). The attitude of the people living in Sri Lanka needs to be developed in such a way that they take part in the training sessions and initiatives to handle household waste and adopt sustainable practices.
- Along with this, Sri Lanka authorities can encourage the stakeholders to gain interest in CE and advise the municipality to collect and manage the waste properly as indicated in the study of (Salmenperä, Different pathways to a recycling society–Comparison of the transitions in Austria, Sweden and Finland, 2021). The environmentally friendly sustainable practices must be applied in Sri Lanka. Moreover, the study by (Marjamaa, Salminen, Kujala, Tapaninaho, & Heikkinen, 2021) focuses

on developing the interest of stakeholders towards sustainable waste management practices. Thus, the stakeholders must be trained and educated to enhance the effectiveness of household waste management practices.

- The municipality must provide waste containers in the vicinity of residential buildings and public places in Sri Lanka and separate bins must be allocated for different types of waste which is also practiced in Finland as found by (Zaikova, et al., 2022).
- The municipality in Sri Lanka can adopt the technologies used in Finland to reduce waste and recycle it. Technological advancements can help in the segregation and sustainable management of household waste.

Thus, the above-mentioned recommendations can be adopted and implemented in Sri Lanka to enhance household waste management practices.

8 CONCLUSION

The study has found that the adoption of Finnish waste management practices can enhance the effectiveness of household waste management practices in Sri Lanka. Strict laws can be applied to protect the environment as Finland has applied to enhance sustainable waste management. The recycling of waste can be effective in making the resources useful and can protect the environment because natural resources are already in limited quantity and Finland is also following the same practice. Moreover, the private companies, producer corporations and municipalities work together in Finland to develop efficient sustainable waste management infrastructure which is also fruitful for the citizens and Sri Lanka can also adopt the same scheme and initiatives. The technological development for treating waste and recycling is quite efficient in Finland and Sri Lanka may follow it. It has been concluded that the municipal and household waste management practices are unique in Finland which makes it

prominent in the world. Finland is minimising landfilling and increasing the recovery of resources by segregating the waste at source. Thus, Sri Lanka needs to adopt these practices to promote sustainability and reduce the waste of resources.

Moreover, the participation of residents and the community can also improve household waste management practices in Sri Lanka. Along with this, the economic factors and the engagement of the stakeholders can also benefit from a significant impact on the adoption of Finnish waste management practices in Sri Lanka. It is concluded that households who are in urban areas and have resources and money can take part in initiatives of waste collection, composting and segregation. The engagement of stakeholders in Finland is very beneficial and Sri Lanka can also promote it to improve waste reduction and policies can be implemented to address the challenges of household waste management. Therefore, the recycling and sustainable waste management practices of Finland can be adopted in Sri Lanka to make household waste management efficient.

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10 APPENDICES

10.1 Appendix A – Questionnaire

SURVEY ON CURRENT HOUSEHOLD WASTE MANAGEMENT PRACTICES IN SRI LANKA AND THE POSSIBLITY OF IMPROVEMENTS USING FINNISH WASTE MANAGEMENT TECHNIQUES

Dear Participant,

I am Christabel Fernando, a student pursuing my Bachelor's degree at Satakunta University of Applied Sciences in Finland. As part of my academic research for my thesis, I am investigating sustainable household waste management practices and exploring the potential adaptation of Finnish waste management strategies to enhance waste management in Sri Lanka.

Your participation in this survey is invaluable in providing insights into the current state of household waste management and identifying areas for improvement. Rest assured that all responses provided will be treated with the utmost confidentiality and anonymity. Your identity will remain undisclosed in any thesis reports or related publications.

By sharing your perspectives and experiences, you are contributing to the advancement of sustainable waste management practices and environmental sustainability efforts. Your input is essential in shaping recommendations for a more environmentally friendly and efficient waste management system.

Thank you for dedicating your time to participate in this survey and for your valuable contribution to my bachelor's thesis research.

1. What is your gender?

- ○ Male
- ○ Female
- ○ Prefer not to say

2. Which age group do you belong?

- ○ Below 20 years
- ○ 21 to 30 years
- ○ 31 to 40 years
- ○ 41 to 50 years
- ○ 51 to 60 years
- ○ 61 to 70 years
- ○ Above 70 years

3. How long have you been living in Sri Lanka?

- ○ Since birth
- ○ Less than five years
- ○ Five to fifteen years
- ○ Fifteen to twenty years
- ○ More than twenty years

4. On a scale of 1 to 5, how satisfied are you with the current waste collection services in your area?

	1	2	3	4	5	
Very Dissatisfied	○	○	○	○	○	Very Satisfied

5. How frequently do you separate your waste into different categories (e.g., recyclables, organic waste, non-recyclables)?

- ○ Daily
- ○ Weekly
- ○ Monthly
- ○ Rarely
- ○ Never

6. Are you aware of the environmental impact of improper waste disposal?

- ○ Yes
- ○ No

7. Do you think there is a need for more awareness campaigns on proper waste management practices in your community?

- ○ Yes
- ○ No

8. Would you be willing to participate in community projects aimed at improving waste management practices?

- ○ Yes
- ○ No

9. How important do you think community participation is in enhancing household waste management practices?

- ○ Very Important
- ○ Important
- ○ Neutral
- ○ Not Important
- ○ Not Important at all

10. Are you familiar with the concept of sustainable waste management practices?

- ○ Yes
- ○ No

11. Do you believe that implementing sustainable waste management practices can benefit the environment?

	1	2	3	4	5	
Strongly Agree	○	○	○	○	○	Strongly Disagree

12. How much knowledge do you have regarding the sustainable waste management practices of Sri Lanka?

- ○ Very much
- ○ Not very much
- ○ Neutral
- ○ A little
- ○ Very little

13. How likely are you to actively participate in initiatives that aim to implement more adequate waste management practices in your region?

- ○ Very Likely
- ○ Likely
- ○ Neutral
- ○ Unlikely
- ○ Very Unlikely

14. How do you currently dispose of hazardous waste materials (e.g., batteries, chemicals)?

- ○ Recycle at designated centers
- ○ Throw in regular trash
- ○ Store at home
- ○ Throw or burn in open spaces due to no place to store

15. How frequently are your waste collected by the municipality?

- ○ Once a week
- ○ Twice a week
- ○ Once in two weeks
- ○ Twice a month

16. How satisfied are you with the availability of waste segregation bins in your neighborhood?

- ○ Very satisfied
- ○ Satisfied
- ○ Neutral
- ○ Dissatisfied
- ○ Very dissatisfied

17. Do you believe that waste segregation at the source is important for effective waste management?

- Yes
- No

18. How often do you engage in composting organic waste at home?

- Daily
- Weekly
- Monthly
- Rarely
- Never

19. Are you aware of any incentives provided by local authorities for proper waste management practices?

- Yes
- No

20. Would you be willing to attend virtual workshops or training sessions on sustainable waste management practices?

- Definitely Yes
- Probably Yes
- Not Sure
- Probably No
- Definitely No

21. How important is it for you that waste management services are easily accessible in your community?

	1	2	3	4	5	
Very Important	○	○	○	○	○	Not Important at all

22. Do you think the implementation of advanced waste management technologies can improve waste collection efficiency?

- ○ Yes
- ○ No

23. In your opinion, what is the biggest challenge hindering effective waste management in your area?

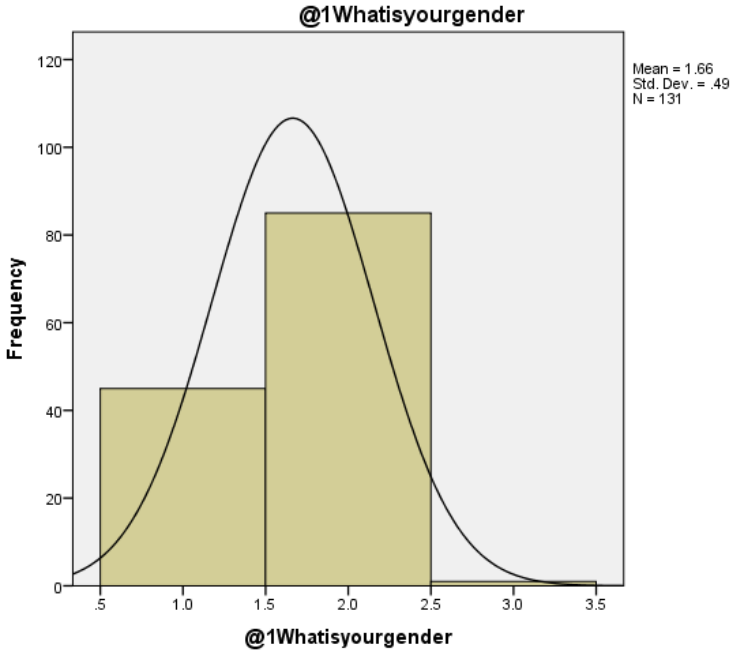
- ○ Lack of awareness
- ○ Inadequate infrastructure
- ○ Limited community participation
- ○ Improper implementation of waste disposal methods

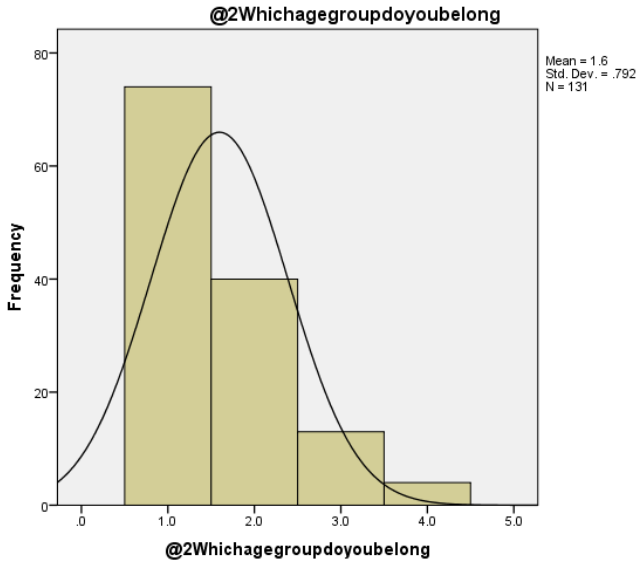
24. Have you ever participated in any community clean-up or waste management programs?

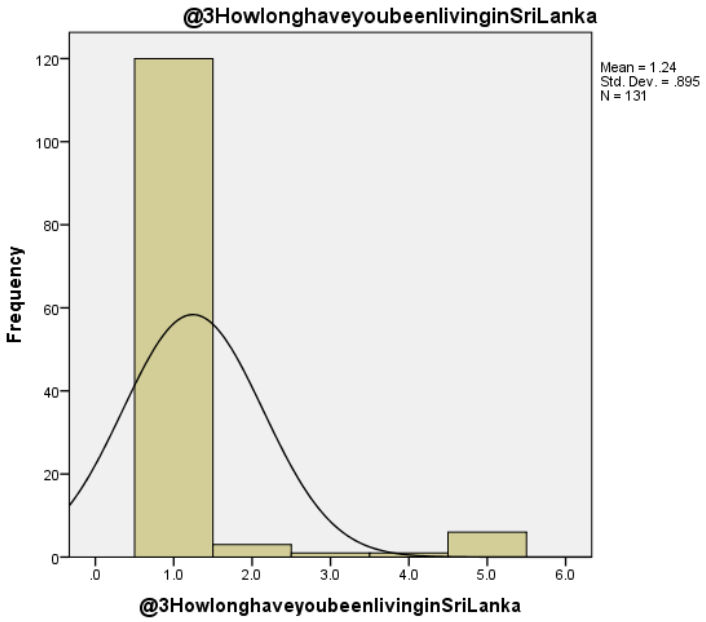
- ○ Yes
- ○ No

10.2 Appendix B – Histograms from SPSS

Histogram






@3Howlonghaveyoubeenlivinginsrilanka
Mean = 1.24
Std. Dev. = .895
N = 131
Frequency
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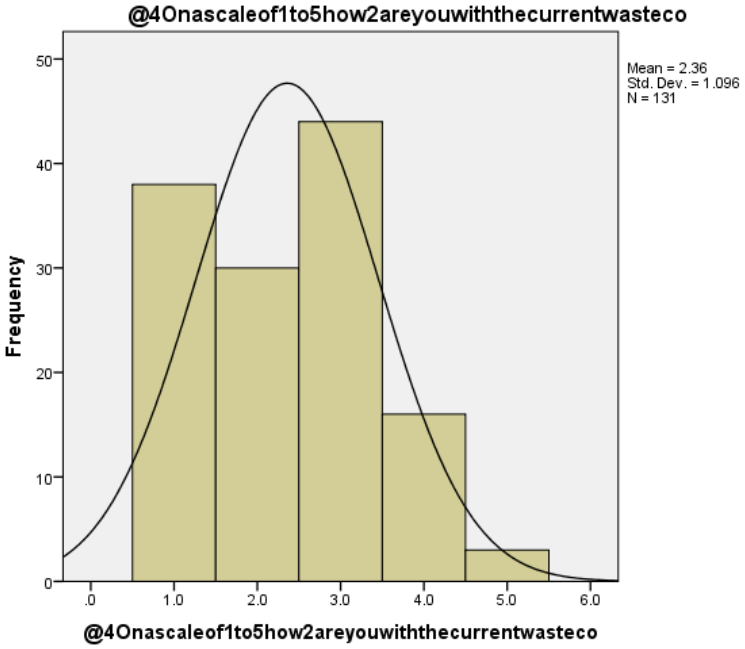
100
80
60
40
20
0
.0
1.0
2.0
3.0
4.0
5.0
6.0
@3Howlonghaveyoubeenlivinginsrilanka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Std. Dev. = 1.096
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Frequency
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40
30
20
10
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.0
1.0
2.0
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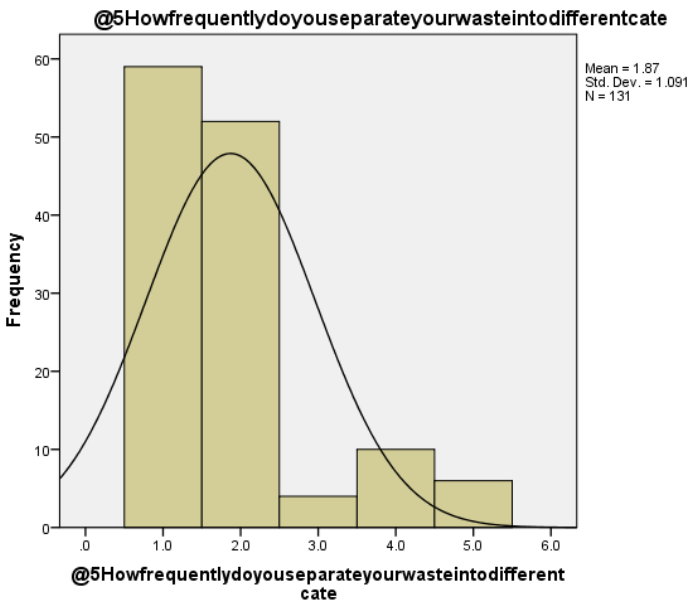
4.0
5.0
6.0
@4Onascaleof1to5how2areyouwiththecurrentwasteco


@5Howfrequentlydoyouseparateyourwasteintodifferentcate
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Frequency
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20
30
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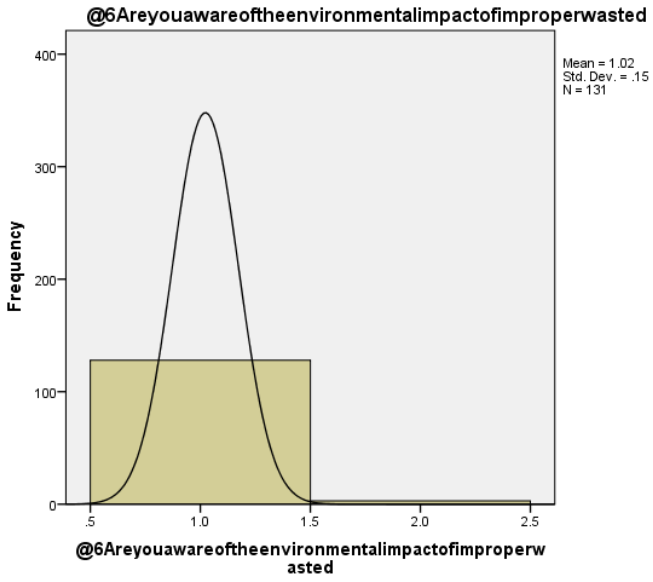
@5Howfrequentlydoyouseparateyourwasteintodifferent
cate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Std. Dev. = .15
N = 131
Frequency
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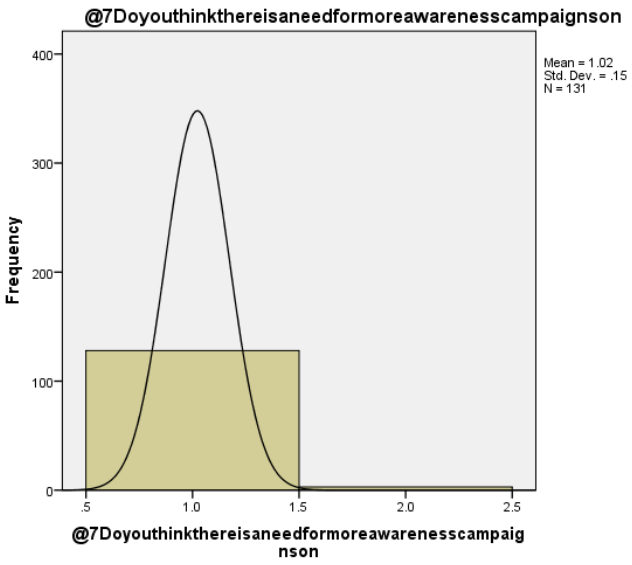
400
.5
1.0
1.5
2.0
2.5
@6Areyouawareoftheenvironmentalimpactofimproperw
asted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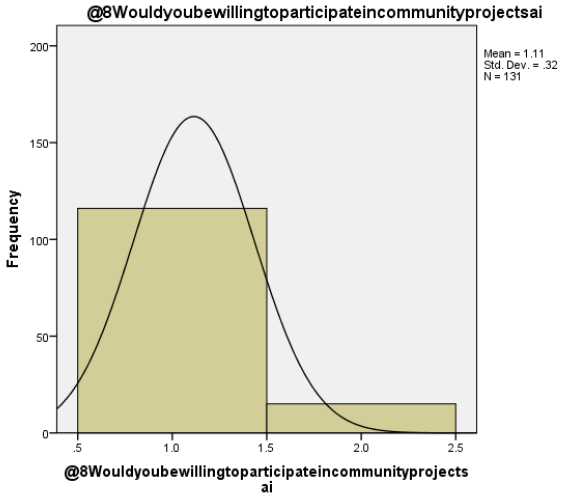
Mean = 1.02
Std. Dev. = .15
N = 131
Frequency
400
300
200
100
0
.5
1.0
1.5
2.0
2.5
@7Doyouthinkthereisaneedformoreawarenesscampaignson


@8Wouldyoubewillingtoparticipateincommunityprojectsai
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Frequency
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100
50
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1.5
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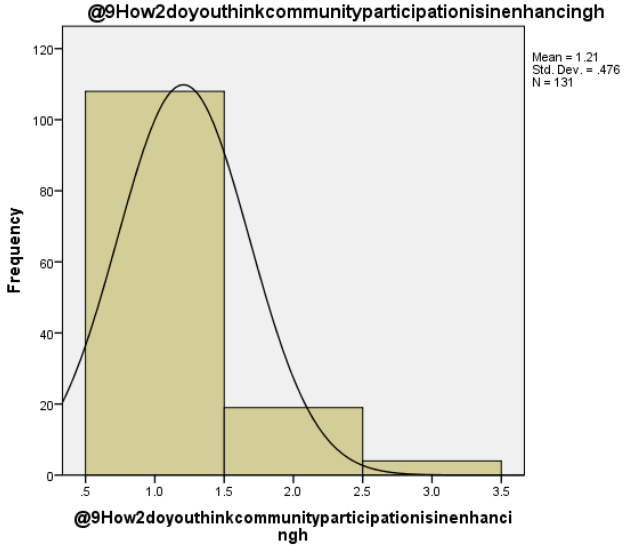
2.5
@8Wouldyoubewillingtoparticipateincommunityprojectsai


@9How2doyouthinkcommunityparticipationisinenhancingh
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Std. Dev. = .476
N = 131
Frequency
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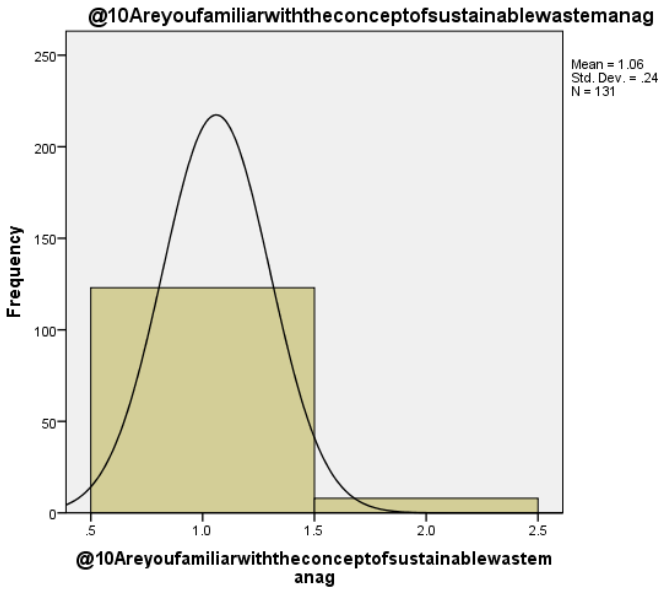
100
80
60
40
20
0
.5
1.0
1.5
2.0
2.5
3.0
3.5
@9How2doyouthinkcommunityparticipationisinenhancingh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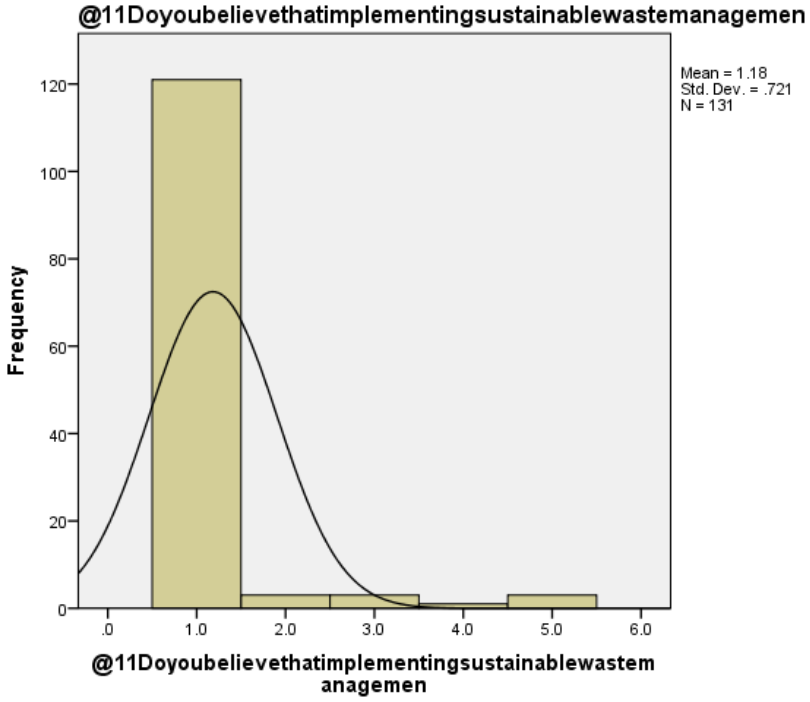
Std. Dev. = .24
N = 131
Frequency
250
200
150
100
50
0
.5
1.0
1.5
2.0
2.5
@10Areyoufamiliarwiththeconceptofsustainablewastem
anag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Std. Dev. = .721
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Frequency
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100
80
60
40
20
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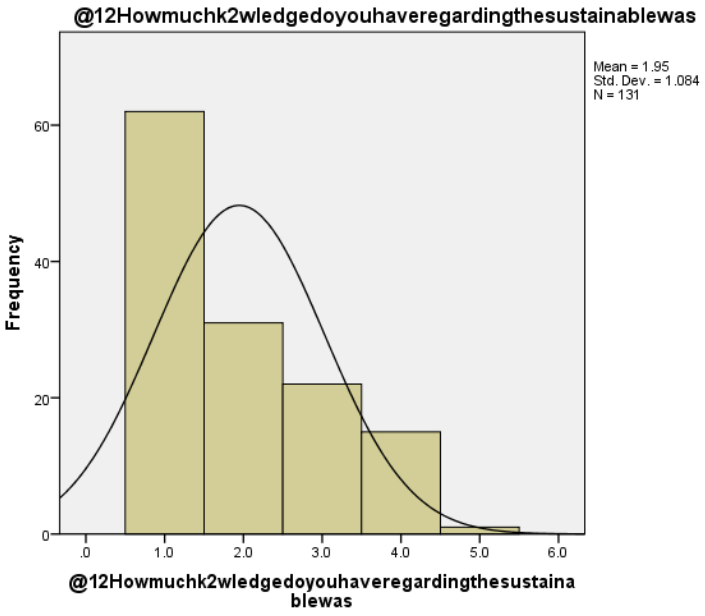
6.0
@11Doyoubelievethatimplementingsustainablewastem
anagemen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Mean = 1.95
Std. Dev. = 1.084
N = 131
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40
20
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1.0
2.0
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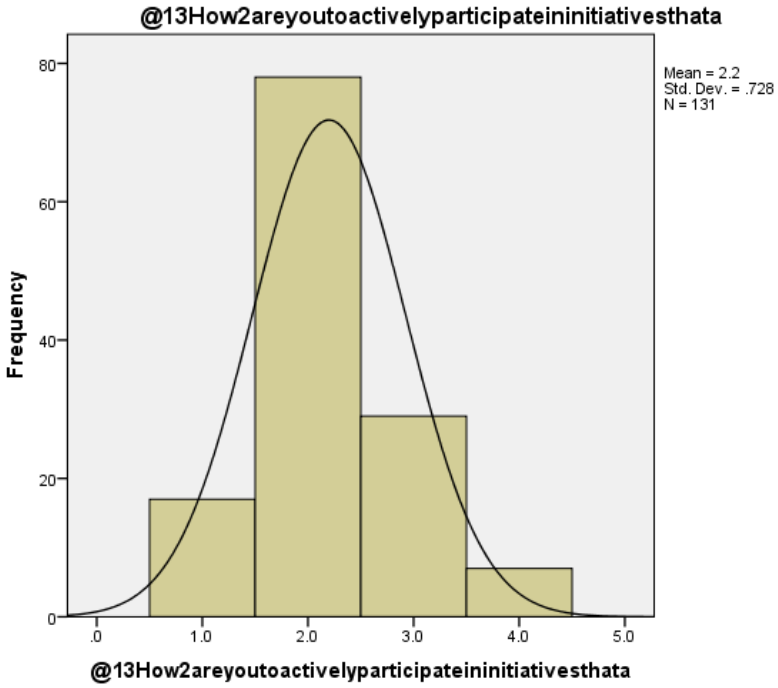
4.0
5.0
6.0
@12Howmuchk2wledgedoyouhaveregardingthesustainablewas


@13How2areyoutoactivelyparticipateininitiativesthata
Mean = 2.2
Std. Dev. = .728
N = 131
Frequency
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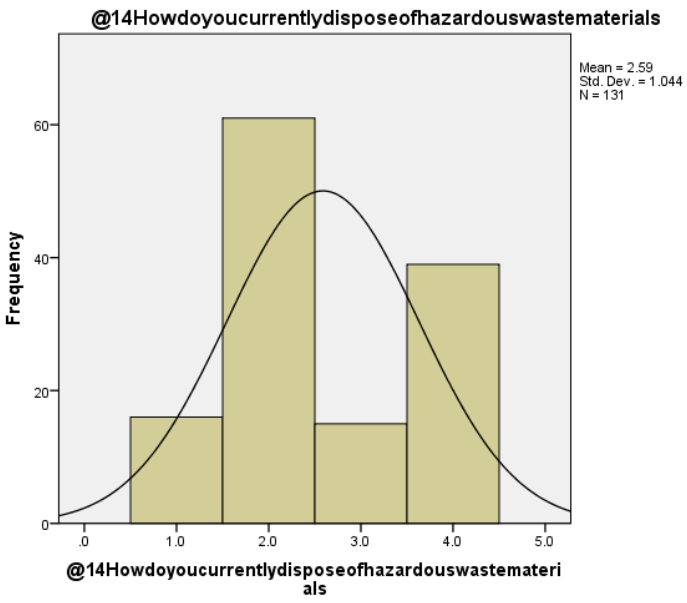
40
20
0
.0
1.0
2.0
3.0
4.0
5.0
@13How2areyoutoactivelyparticipateininitiativesthata


@14Howdoyoucurrentlydisposeofhazardouswastematerials
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Std. Dev. = 1.044
N = 131
Frequency
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40
20
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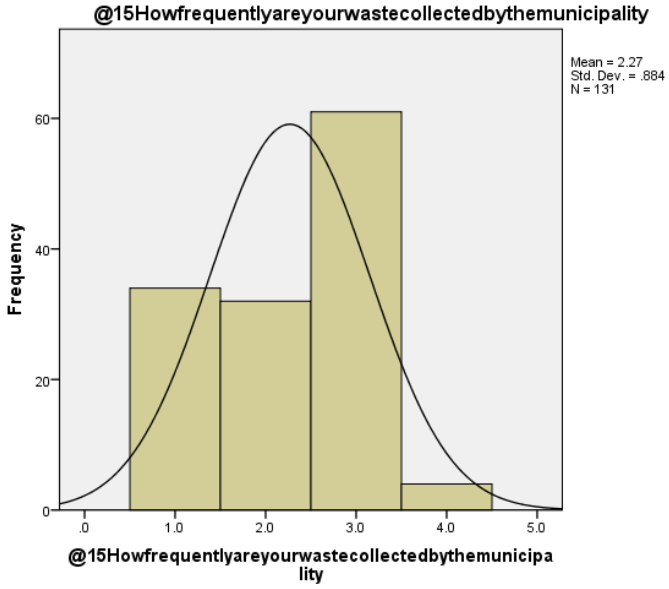
.0
1.0
2.0
3.0
4.0
5.0
@14Howdoyoucurrentlydisposeofhazardouswastemateri
als


@15Howfrequentlyareyourwastecollectedbythemunicipality
Mean = 2.27
Std. Dev. = .884
N = 131
Frequency
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20
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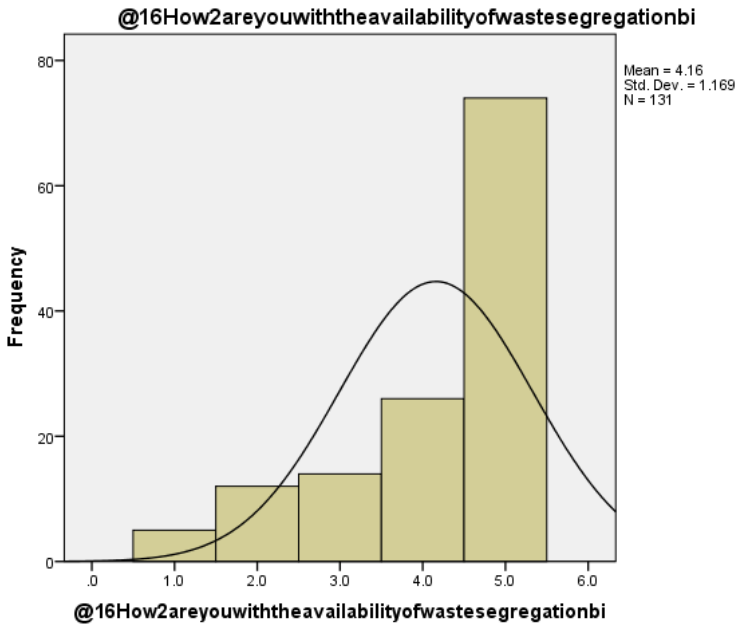
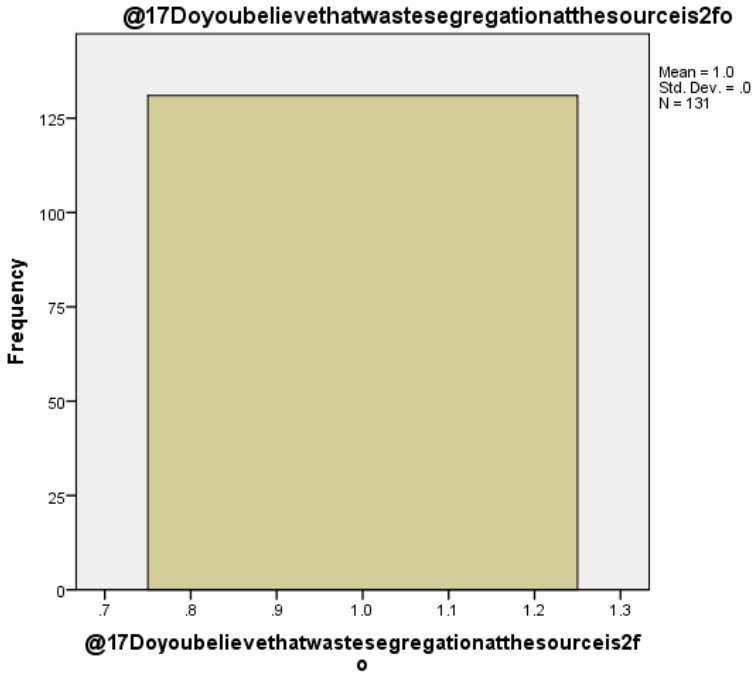
.0
1.0
2.0
3.0
4.0
5.0
@15Howfrequentlyareyourwastecollectedbythemunicipa
lity


@16How2areyouwiththeavailabilityofwastesegregationbi
Mean = 4.16
Std. Dev. = 1.169
N = 131
Frequency
80
60
40
20
0
.0
1.0
2.0
3.0
4.0
5.0
6.0
@16How2areyouwiththeavailabilityofwastesegregationbi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Std. Dev. = .0
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Frequency
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50
25
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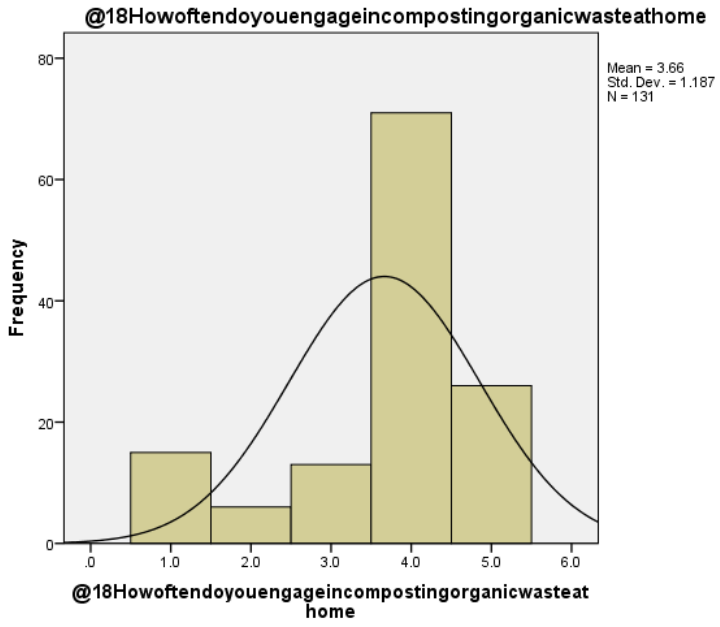
.7
.8
.9
1.0
1.1
1.2
1.3
@17Doyoubelievethatwastesegregationatthesourceis2f
o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20
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.0
1.0
2.0
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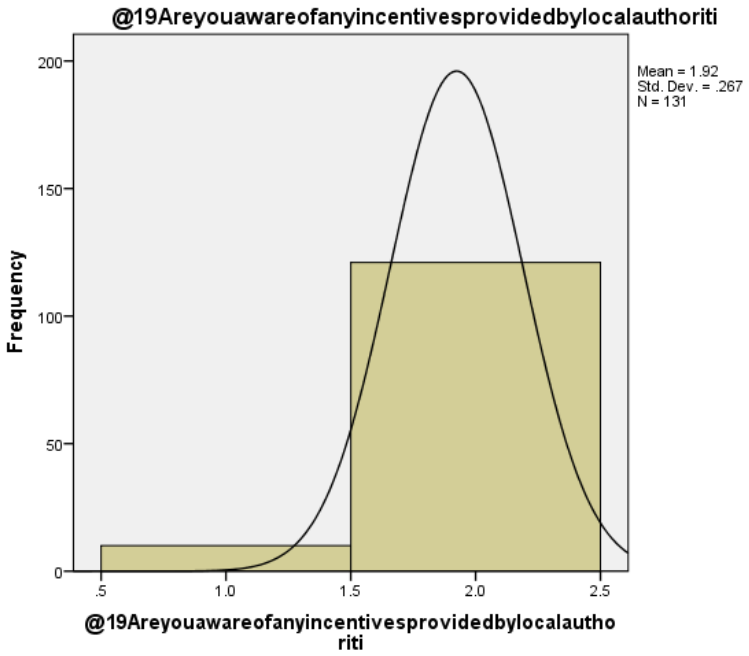
4.0
5.0
6.0
@18Howoftendoyouengageincompostingorganicwasteat home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Mean = 1.92
Std. Dev. = .267
N = 131
Frequency
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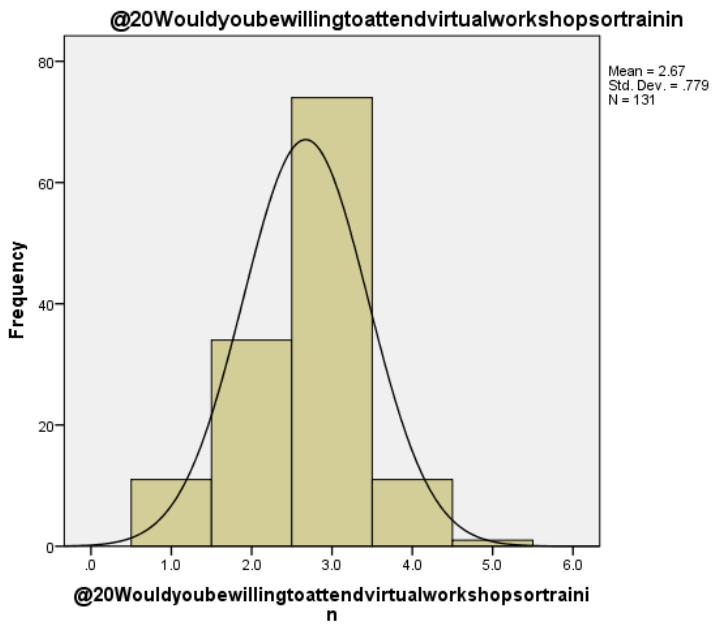
.5
1.0
1.5
2.0
2.5
@19Areyouawareofanyincentivesprovidedbylocalautho riti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N = 131
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40
60
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.0
1.0
2.0
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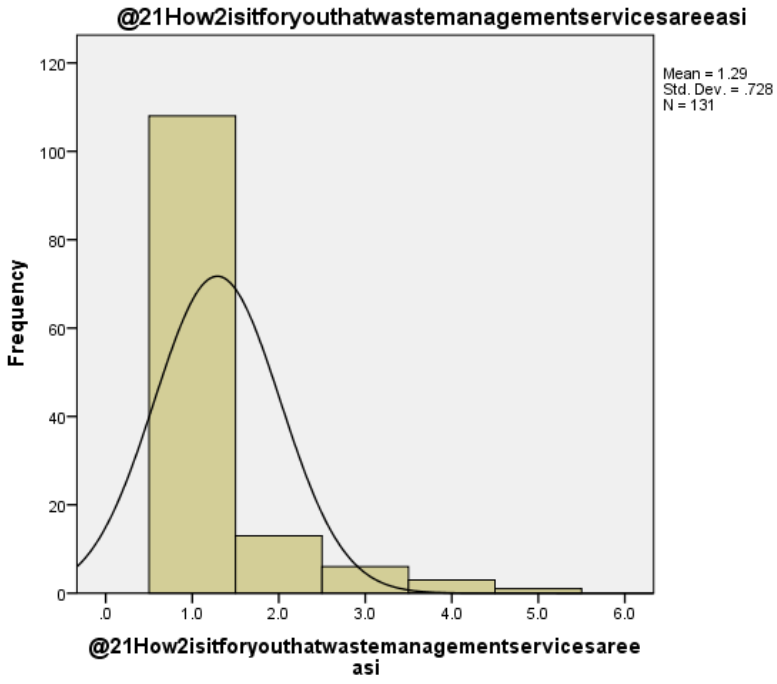
6.0
@20Wouldyoubewillingtoattendvirtualworkshopsortraini
n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Std. Dev. = .728
N = 131
Frequency
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40
60
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120
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3.0
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5.0
6.0
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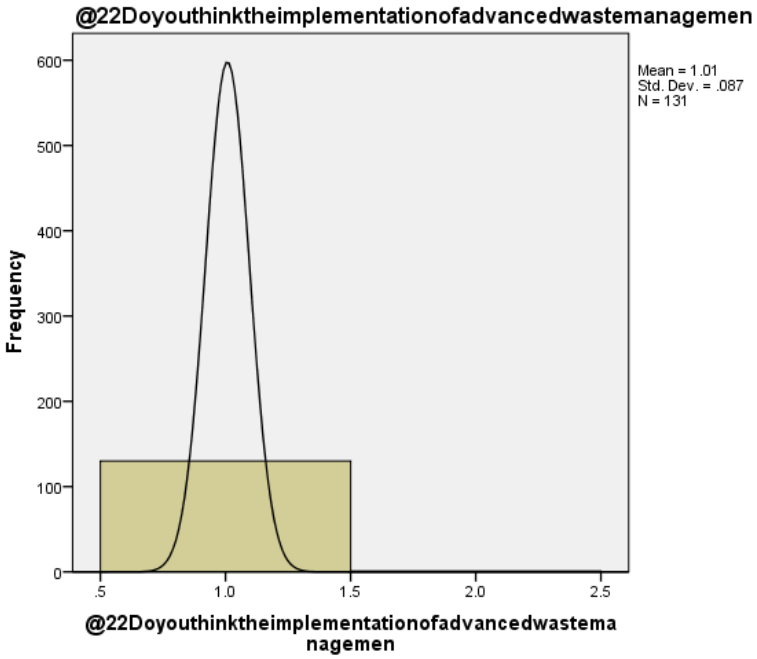
asi


@22Doyouthinktheimplementationofadvancedwastemanagemen
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Std. Dev. = .087
N = 131
Frequency
600
500
400
300
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.5
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1.5
2.0
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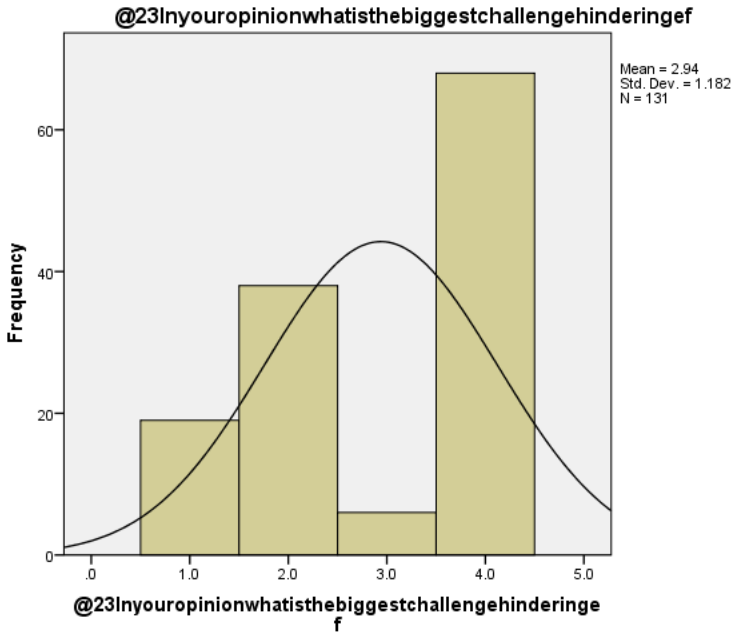
@22Doyouthinktheimplementationofadvancedwastema
nagemen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Std. Dev. = 1.182
N = 131
Frequency
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@23Inyouropinionwhatisthebiggestchallengehinderinge
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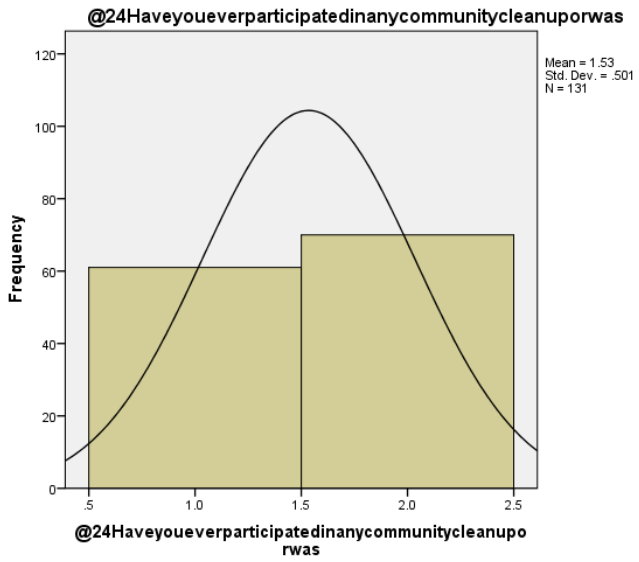
@24Haveyoueverparticipatedinanycommunitycleanuporwas
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Std. Dev. = .501
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Frequency
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100
80
60
40
20
0
.5
1.0
1.5
2.0
2.5
@24Haveyoueverparticipatedinanycommunitycleanupo
rwas

10.3 Appendix C - Summary Table

Year of Publication	Authors	Topic Name	Journal Published	Discussion	Methodology	Findings
2021	Reijonen et al.	“Factors related to recycling plastic packaging in Finland’s new waste management scheme.”	ScienceDirect	This research focuses on using the Theory of Planned Behaviour (TPB) that helps in examining the variables that are linked with the increased plastic waste acceptable levels of reliability instead of ease of dealing with the waste. Moreover, attitude and perceived behavioural control have a significant impact on	In this study, the data collection was carried out through the beginning of the EU-funded project development solutions. The snowball convenience sampling. The data was collected from general population distribution in Finnish and the	The findings of this study show that the significant influence of attitude on Finnish recycling behaviour has an insignificant influence on SN which supports Finnish individualism instead of collectivism.

				plastic recycling conscientiousness but the social norms do not have a significant effect.	sample size for this study was 727 responses. The data was analysed using the SEM (Structural Equation Modelling).	
2023	Pitkanen et al.	"How to measure the social sustainability of the circular economy? Developing and piloting social circular economy indicators in Finland."	ScienceDirect	The study focuses on responding to the research gap between the conceptual framework and the real-world example concerning the examples of monitoring the social sustainability of the Circular Economy (CE). The results	This study focuses on building strong political support that aims at being the forerunner of the CE. The indicators include material consumption, circular	The findings show that the aim of this study was to develop and pilot the indicators used to monitor the social sustainability of the CE in Finland while assessing the social impacts and the

				highlight the difficulty of measuring the social sustainability of the CE transition.	material use, waste amounts and recycling rates, the turnover of the CE businesses and CE innovations.	socio-cultural changes that were necessitated by the transformation. This study also highlights the findings of the previous studies in terms of the difficulty of monitoring social sustainability.
2021	Salmenpera	"Different pathways to a recycling society - Comparison of the transitions in Austria, Sweden and Finland."	ScienceDirect	This study focuses on identifying the characteristics that aim to represent the Municipal Solid Waste (MSW) transitions in Austria, Sweden and Finland. The	In this study, the data was presented in the form of a case study and the method used was qualitative method.	The findings of this study highlight that all three countries have political, economic and social lock-ins, but Finland

				EU legislation has a significant impact on waste management, waste policy and regulations with the descriptions of responsibilities and the different infrastructure and collection systems in waste management along with the different levels of general awareness, public-private cooperation and the national waste data accuracy that play an important in the recycling.	The data was collected either through policy documents or interviews. The interview data was collected from 10 experts and the data was analysed using thematic analysis.	seems to have much stronger social lock-ins as compared to the other countries. The waste legislation plays an important role in the transition of the MSW management. Another difference lies in the organisation of the EPR system for packaging, as they present a waste stream from the perspective of

						recycling performance.
2021	Marjamaa et al.	"A Sustainable Circular Economy: Exploring Stakeholder Interests in Finland."	Sage pub	The results discuss that CE in terms of sustainability and the role of stakeholders and their interest in the CE has gained increasing attention. This study focuses on the concept of stakeholders' interest in terms of examining the CE stakeholders in Finland.	The data was collected through the qualitative research methods. The data was collected through the semi-structured interviews and the sample size for this was 26 experts. The data was analysed using the content analysis.	The findings of this study focus on value-based motivation regarding sustainable CE that differs among the different stakeholders. The holistic promotion of the CE and sustainability was considered to be an important value in terms of the Finnish political agendas. Moreover,

						in terms of the national level stakeholders industry organisations and the RIS organisation have the same value-based motivation that has wider economic, social and ecological sustainability factors in terms of the long and short run.
2022	Zaikova et al.	“Factors influencing household waste separation	MDPI	The results highlight that the extended theory of planned behaviour helps in	The research method used in this study was the quantitative	The findings of this study show that the ubiquity and the convenience

		behaviour: Cases of Russia and Finland."		identifying the factors that affect the waste source-separation behaviour for the early-stage system in terms of collecting the recyclable waste in Saint Petersburg, Russia and a mature system in Finland.	research method while the data was collected through a questionnaire. The data was collected from the citizens of Saint Petersburg and the Finnish urban population. The data was analysed using the SEM method.	of the waste collection system are considered to be a factor that helps in making a distinct case study. In terms of the maturity of the system for the recycling of the waste collection, the availability of the information was considered to be an important predictor for the water source-separation

						intention and behaviour.
2022	Peura et al.	"From garbage to product and service systems: A longitudinal Finnish case study of waste management evolution."	ScienceDirect	The waste management solutions in the Vaasa regions were considered to be attractive in the neighbouring municipalities at the time of establishment. They face the same duties in terms of renewal of the WM practices which includes the closing of the old dumping sites and the reorganising of the collection and the treatment systems which	The research area of this study was the Vaasa region which is in Western Finland. The data used was the secondary data.	The findings of this study show that the reforming of WM helps in lowering the dumping that has been very successful in the Vaasa region. The total amount of materials within the WM systems has increased the control and the documentation has become a part of the WM and the recycled

				includes the reuse of waste.		materials were documented within the systems.