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Exploring Sustainable Behaviour Among International Students: A Case Study of Waste Management in VOAS Housing

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ABSTRACT:

The aim of this study is to explore sustainable waste management behaviour among International Student living in VOAS (Vaasa Student Housing Foundation) housing. The behaviour is examined by focusing on daily practices including waste sorting, and recycling behaviours. As most of the international students resides in student housing, understanding the factor shaping these behaviours are imperative for enhancing sustainable practices. The research of this study is based on two theories Theory of Planned Behaviour and the Value Belief Norm theory. These theories help to understand how individual perceived behaviour, social influences and personal norms influence their sustainable behaviours. To identify sustainable behaviour a quantitative research method was applied, and the data were collected through web survey. For the data collection, at first VOAS Housing were contacted through email after that survey questions were emailed to the respondent by VOAS from which 115 responses are received from international students residing in VOAS housing. The questionnaire was measured by formulating three hypothesis based on key factors including perceived behaviour control (H1), subjective norms(H2), personal norms(H3), and sustainable waste management behaviour (dependent variable). Demographics studies, descriptive statistics, reliability analysis, correlation and regression analysis were applied to identify the factors influencing sustainable behaviours. The findings shows that Personal Norm is the strongest factors of sustainable waste management behaviour, suggesting that international students who feel morally responsible for pro-environmental behaviour show consistent in sustainable behaviour. Perceived Behaviour Control also show significant factor that influenced sustainable behaviour, highlighting the importance of clear waste sorting guidelines, access to infrastructure facilities. Subjective norms did not significantly promote sustainable waste management among international students indicating that social expectations by peer pressure does not influence behaviour in VOAS housing. Practical recommendations are also mentioned to VOAS to focus on improving waste infrastructures, clear communication for waste sorting guidelines, and initiate community engagement programme.

KEYWORDS: Behaviour, Sustainable Behaviour, Sustainable Housing, Pro-Environmental Behaviour, Sustainable waste management

Contents

Pictures

Figure

Tables

Abbreviations

Abbreviations	Full-term
VOAS	Vaasa Student Housing Foundation
TPB	Theory of Planned Behaviour
VBN	Value Belief of Norm Theory
PBC	Perceived Behavioural Control
SN	Subjective Norms

PN	Personal Norms
SWMB	Sustainable Waste Management Behaviour
PEB	Pro-environmental Behaviour

1 Introduction

The agenda for sustainable development by 2030 is that everyone in the world should be responsible for achieving the goal, and the government will set the policies and framework to implement this agenda, which concerns the sustainable use of water, electricity, and waste management (UNESCO, 2017). Higher education centres are recognized as key platforms for implementing the United Nations Agenda 2030 Sustainable Development Goals through academic curriculum, research, and institutional practices (Gherhes and Cernicova-Buca, 2025)

These efforts highlight the importance of sustainability in addressing the global environmental issues and encouraging responsible resource use. While policies and global practices impart an important role in encouraging sustainability, people's actions and daily practices are equally important in supporting these goals. Hence, understanding how individuals adapt sustainable practices in their everyday lives is important.

1.1 Background and Context

Sustainable behaviour in daily life has become a global concern due to the constantly increasing pressure on natural resources caused by the growing population, rising consumption, and rapid urbanisation. Environmental behaviour includes the activities humans do that have a positive impact on the environment, such as recycling, growing plants, and supporting financially that promote conservation (Aviste & Niemiec, 2023).

Sustainable behaviour is not automatic or direct, but it is mostly influenced by available information, belief systems, and norms (Djossouvi et al., 2024). Culture determines behaviour, and strict cultural norms help people understand how they can or cannot behave (Streimikiene et al., 2023). Universities are largely recognized to play an imperative role in promoting sustainable behaviours (Leal Filho et al., 2016). An international student comes from different backgrounds, and some may not be familiar with the recycling, energy conservation, or waste management rules in Finland.

However, many households remain insufficiently aware of the importance of waste management and the positive impact of small everyday actions on the sustainable management of water resources (Gheres & Cernicova-Buca, 2025). Likewise, previous research indicates that waste management behaviour among students is shaped by a combination of personal norms, subjective norms, perceived behavioural control, and environmental knowledge. Studies applying an extended theory of planned behaviour environmental concern, and education influence waste-related behaviour both directly and indirectly through norms and perceived behavioural control (Wu et al., 2022).

Student housing is a critical component of university life that represents the key area where sustainable practise can be implemented. However, encouraging sustainable practises among international students can be challenging. Students from diverse cultures and educational backgrounds come with different understandings of exposure to sustainability concepts, but there exists a commitment gap with the students (Emanuel & Adama, 2011). This disconnect can lead to inconsistent or non-compliant sustainable behaviours in shared living spaces.

Student housing represents a diverse residential community in which shared facilities shape everyday consumption behaviour. Additionally, international students bring diverse cultural backgrounds and consumption norms, which may further affect sustainability related behaviour within student housing. Therefore, this thesis aims to explore the sustainable behaviour among international students in VOAS housing, focusing on waste management. To be effective, sustainability programs in student housing should be both culturally sensitive and easy to understand using unambiguous language, visuals, or multilingual support. Universities also play a vital role in implementing sustainable development, as they influence students' knowledge, values, and day to day practices.

The goal is to identify behavioural patterns, key barriers, and proper strategies for promoting more effective sustainability in student housing.

1.2 Research questions and objectives of the study

To understand sustainable behaviour among international students, it is not only necessary to study what students do, but also to understand the reasons why they act in certain ways and the factors that influence their actions. Therefore, this study primary aim is to explore sustainable behaviours related to the management of waste among international students living in VOAS housing.

Our study focuses on the following research questions:

1. What are the sustainable behaviours and what are its influential factors regarding waste management?
2. How do individual perceptions and social influences affect sustainable waste management behaviours?

This paper summarizes key objectives aimed at acheiving an in-depth understanding of the research questions and guiding the exploration of sustainable behaviours factors that influence international students' behaviours.

- To examine the behaviour patterns of management of waste among international students.
- To explore factors shaping both sustainable behaviours among international students.
- To identify the level of awareness among international students towards sustainable behaviours.
- To determine challenges and opportunities for improving sustainable behaviour.

1.3 Delimitations of the study

Firstly, the thesis specifically emphasises the behaviour of international students who live only in the student housing environment. Local students and other international students who are accommodated in private housing are excluded from the study. This

delimitation concentrates on a comprehensive study of sustainable behaviours within a corresponding comparable housing area, followed by shared facilities, institutional regulations and guidelines, and shared living arrangements may shape behavioural patterns.

Secondly, this paper particularly emphasizes aspects of sustainability behaviour in everyday residential life. It especially studies waste management behaviours, which are globally acknowledged in sustainability studies as primary factors of household-level environmental impact. The existing research already focuses on household waste as a major source of environmental pollution due to the growing global population and improper waste management in households (Wirani et al., 2024). On the other hand, other imperative sources of sustainable behaviour, including the consumption of patterns of food, usage of water and electricity, abandoned bicycles and furniture, and carbon footprints, are not studied within the scope of this research.

Thirdly, the paper studies international students self-reported sustainable behaviours and their level of environmental awareness and perceptions. To support the research, data are collected through surveys rather than direct measurement of quantities of waste collected. This process corresponds to behavioural research in environmental education that focuses on perceptions and reported practices to identify key behavioural drivers and barriers (Kollmuss & Agyeman, 2002). The self-reported data is commonly applied to identify pro-environmental behaviour, and the data is considered valid and appropriate to strengthen the study of sustainable behaviour (Kormos & Gifford, 2014). Furthermore, to study the sustainable behaviour among international students, surveys are carried out with self-reported data to ensure strong reliability, the objective of the studies, the applicability of the results, and a robust comparison of variables that support the findings (Mahlaole, 2025).

1.4 Definition of the key terms

The key terms used in the thesis are defined below:

Behaviour: Behaviour of the people is influenced by several factors, such as the way people live, values followed by the people, and their attitudes, which are the predictors of the environment friendly behaviour (Wendlandt Amézaga et al., 2021). Behaviour is also influenced by external factors such as cultural and social factors and internal factors such as individual motivation, values, attitudes, ecological awareness, and engagement (Streimikiene et al., 2023). Hence, to study the behaviour is also most important for this thesis topic.

Sustainable Behaviour: Sustainable behaviour is the action of an individual that protects the environment and satisfies human needs with the least damage and promotes the circular economy (Streimikiene et al., 2023). Even a minor change in sustainable behaviour leads to a huge change in the environment, so understanding this term becomes crucial.

Sustainable Housing: Sustainable living balances social, economic, and environmental systems to fulfil present wants and maintain over a long-term for future generation needs. This calls for transforming existing economic and social structures to create an equitable future, thriving, and ecologically responsible (Naim et al., 2024).

Pro-Environmental Behaviour: Environmental knowledge can be defined as the people's knowledge of information about the environment and act sustainably. Environmental knowledge includes the ability to define the environmental problems and their effects (Streimikiene et al., 2023). The behaviour of people can be determined by giving sufficient knowledge of the environment.

According to the Norm Activation Model theory, pro-environmental behaviour is determined by three factors; personal norms, sense of responsibility, and anticipating the effects. Additionally, personal norms can serve as a crucial motivating factor in environmental behaviours such as energy and water savings, also people are intended to

participate in protecting the environment assuming that it will lead to a better world for every human because they are aware of the environmental consequences (Fang et al., 2019).

Sustainable waste management: Sustainable waste management refers to the behaviours such as minimizing food waste, using recycling facilities, and proper waste sorting. It is predicted that the world's yearly waste will reach 3.4 billion tons by 2050 (Wu et al., 2022). Hence, it becomes necessary to understand the waste management behaviour because it would cause significant threats to public health as well as the environment.

1.5 Main theories and concepts

This thesis will study sustainable behaviours of international students living in VOAS housing through the Theory of Planned Behaviour (TPB), Value-Belief-Norm (VBN), Social Norms Theory (SNT), Norm Activation Model (NAM), Self-Determination Theory (SDT) and Social Practice Theory (SPT), which are explained below.

Theory of Planned Behaviour

Theory of Planned Behaviour (TPB) developed by Ajzen (1991), is commonly used psychological theories to understand and predict individual behaviour, including their sustainable behaviours. This theory explains the intention of an individual is shaped by three key factors: attitude towards the behaviour, whether they see sustainable as favourable or unfavourable, subjective norms, perceived social pressure or opinions of housemates or peers, and their perceived behavioural control, which determine to what extent do they feel compelled to act on sustainable actions such as reducing energy use or recycling (Ajzen, 1991). In VOAS residents, this theory can help to study how international students' sustainable action is influenced by their cultural backgrounds, personal beliefs, and by their peers.

Value-Belief-Norm (VBN) Theory

Value-Belief-Norm (VBN) Theory, developed by Stern et al. (1999), offers a value-based framework explanation to understand an individual's environmental behaviours. VBN Theory suggests that an individual's environmental action is likely to be shaped when they possess robust environmental values, such as biospheric or altruistic, that influence them to believe environmental threats are actual and consequential, lead individuals to feel a moral obligation to act sustainably (Stern et al., 1999). In a multicultural housing like VOAS, this theory can help to explore how cultural backgrounds, life experiences, and upbringing shape international student willingness to adapt sustainable practices.

Social Norms Theory

This theory focuses on how individual behaviour is influenced by other perceptions of social norms. Social norms, which can be determined between descriptive norms- beliefspracticedhat is commonly practiced and injunctive norms what is socially accepted and not accepted by others (Cialdini et al., 1990). This theory is relevant for this study, living in VOAS housing, the behaviour of roommates and other tenants is often visible, and interaction with them is frequent. Living in shared housing like VOAS, International students may practice or reject sustainable behaviours influenced by visible practices of peers in their surroundings.

Norm Activation Model

The norm activation model was developed by (Schwartz, 1977) to predict pro-environmental behaviours of people. Previous studies have applied this theory in various contexts, such as energy use, carbon footprint, and responsible technology acceptance. This theory emphasizes that individuals may sacrifice their own self- interest for the collective good, as it is rooted in altruistic behaviour. According to NAM, people are more likely to engage in environmental issues and reflect pro-environmental behaviour when they

understand the adverse consequences of their actions on others and themselves (Fang et al., 2019). In the context of housing, this model will explain how their personal norms and sense of responsibility drive their behaviour.

Self-Determination Theory

This theory is a widely used framework for understanding human motivation. SDT distinguishes between intrinsic motivation, driven by personal growth, close relationships, and extrinsic motivation, driven by external rewards and recognition. Research influenced by SDT has shown that intrinsic motivation promotes pro-environmental behaviours such as energy conservation, recycling, or water saving, whereas extrinsic motivation may result in less sustainable outcomes (Aviste & Niemiec, 2023). In the context of VOAS housing, SDT helps explain why students may or may not engage in sustainable practices and what kind of motivation they may require influencing their behaviour.

Social Practice Theory

This theory is useful for understanding how society can move towards sustainability. It emphasizes that sustainability is not only about adapting innovative technologies but also requires people to act differently and challenge established habits and expectations. Social Practice Theory (SPT) focuses on social innovations and the ways people engage in activities. People's behaviour in everyday life is not merely a result of their attitudes; it is also seen as a set of routines, habits, and collective practices. Change occurs when these practices are recognized. This theory can be applied to several types of social transitions and provides an alternative perspective for understanding social transformation (Laakso et al., 2024). In our study, we can relate this theory by focusing on the self-practices individuals engage in, rather than only on their behaviour and motivation.

1.6 Structure of the thesis

This thesis paper is structured into eight chapters to explore sustainable behaviour (Waste management) among international students in VOAS housing. Chapter 1 introduces the background and context of the study, clearly highlights the research questions and objectives, describes the theory used in the study, and defines keywords and delimitations of the study. It also includes an overall structure of the thesis.

Chapter 2 provides a thorough and explanatory evaluation of academic literature related to sustainable behaviour patterns, specifically focusing on waste management and recycling behaviour and their determinants including culture, language barriers, migration, norms, and habits formation from home countries, to understand the behaviour pattern of international students. This chapter also highlighted the research gap.

Chapter 3 explores key theoretical frameworks and concepts to describe pro-environmental behaviour, prioritizing a behavioural and theoretical approach based on sustainability research. It reviews observed studies on the waste management practices among international students with a particular focus on student housing. It further formed hypotheses framework based on theories that help to examine influential factors such as perceived behavioural control, Subjective norms, and personal norms.

Chapter 4 demonstrates VOAS as a case company, explaining the current strategy, which includes practices to maintain waste management. Additionally, it discusses challenges regarding waste management in VOAS, including space constraints, shared bins, transient populations, and infrastructure problems.

Chapter 5 explains the research methodology by describing the quantitative approach applied for this study and the reasoning for its selection. The section outlines the process of data collection and survey. It will also explain the research design and data analysis procedures. This chapter also discussess about the reliability and research ethics.

Chapter 6 highlights and evaluates the study findings based on the collected data. The outcomes are structured according to sustainable behaviours in waste management. This chapter presents patterns, similarities, and variances among international student's behaviour and identifies the factors that influence sustainable practices within the VOAS housing. The findings are presented based on the research questions and the conceptual framework developed.

Chapter 7 highlights and compares the study with prior existing academic findings. It points out the contribution of the research, explains the limitations, theoretical links with previous studies, and alignment of research questions and objectives with the research results.

Chapter 8 is the last part of the thesis, concluding the findings of the study, points out the contribution of the research, giving feedback to the VOAS, and suggesting future research directions.

2 Literature Review

This chapter is the most important in the thesis, as it critically examines the existing literature regarding student behaviour in waste management. This section aims to understand the behaviours, habits, and knowledge regarding waste management by analysing the previous studies on the topic.

The existing literature and theories provide a beneficial lens for examining how the behaviour is determined and what factors influence people to manage the waste properly. Overall, the literature review has provided the chance to understand what is known and unknown about the specific topic and how this study might fill the gap.

To provide a structured understanding of the topic, this literature review is organized into various subsections. The first subsection discusses waste management and recycling behaviour, highlighting the importance of recycling, key behaviour changes theories, and factors influencing involvement.

The second subsection explores cultural influences of environmental behaviour, including the impact of migration, backgrounds, and norms on sustainable practices. The third subsection examines the challenges faced by students in apartments, such as infrastructure challenges, and the number of people living in the apartments, which may affect recycling behaviours. Finally, the fourth subsection will discuss the behaviour change frameworks and identify the existing research gaps that this study aims to address.

2.1 Waste management and recycling behaviour

In this world, the volume of waste is increasing faster than the rate of Urbanization (Hoornweg & Bhada-Tata, 2012). As countries become more stable, the purchasing power of people and living standards increases, which results in a high consumption of good, as a result, there will be an increase in waste (Hoornweg & Bhada-Tata, 2012).

Hence, waste management is crucial for healthier living and maintaining a green environment.

Waste management is a process to limit the use of resources, production of waste, and to help reduce the impact on the environment and health of the population (Van Ewijk & Stegemann, 2023). It consists of the collection, recovery, treatment, and disposal of waste. Waste management plays a key role in making the environment clean and healthy, and adapting proper recycling behaviour will protect the environment and save energy. Recycling behaviour in student housing environments is influenced by social norms, behavioural control, and the environment. (Öktem et al., 2023) found that perceived behavioural control has significant effects on university students recycling behaviour. This indicates that students are more likely to recycle properly when they observe their peers doing, and when they believe that recycling is easy and manageable.

The change in the climate and environmental degradation make it necessary to understand the attitude of human behaviour toward the environment (Söderberg et al., 2022). The practice of living sustainably has become a major concern in today's society, due to raising awareness of the social, economic, and environmental issues. Hence, it becomes necessary to understand the practises of people living in the society for waste management behaviour.

As studied by Söderberg et al. (2022), found that recycling behaviour is positively associated with attitudes towards recycling, norms, and behavioural control. The study also highlights the importance of factors such as accessibility, cleanliness, and the convenience of recycling facilities. Barriers, including limited information, limited space in apartments, and poorly maintained waste rooms, were found to reduce participation in proper waste sorting. These findings suggest that waste management behaviour in student accommodation is influenced by individual motivation and physical environment.

A study conducted in the UAE by Waxin et al. (2025) found that perceived behavioural control (PBC) plays an important role in shaping waste sorting intentions. A moderate level of PBC suggests that although students believe that they can engage in waste sorting, practical challenges can limit participation. When guidelines are unclear, waste sorting is believed to be unclear. Inconvenience and confusion regarding sorting rules may therefore act as a barrier to waste sorting intentions.

2.1.1 Importance of recycling

Recycling is one of the cornerstones of sustainability waste management, and is important in reducing the environmental impacts of growing global waste production. As patterns of consumption increase and urban populations increase, the amount of solid waste continues to rise, which puts pressure on natural resources and leads to pollution and emissions of greenhouse gases (Hoornweg & Bhada-Tata, 2012; Geyer et al., 2017). In this context, recycling is a sensible and strategic solution as it diverts waste from landfilling and curbs the consumption of raw materials and the energy required for production processes (Lazarevic et al., 2010). By bringing materials back into the circle of material flows, recycling is part of the idea of resource efficiency and of the circular economic methods that seek to reduce waste and preserve the length of the life cycle of materials (Geissdoerfer et al., 2017).

By far the more important aspect of recycling, however, is the social and behavioural significance. It highlights conscious environmental awareness and responsible consumption behaviour, which helps reinforce pro-environmental identity and lifestyle of consumption and behaviour (Whitmarsh & O'Neill, 2010). Research shows that recycling behaviour is based on knowledge, attitudes, perceived behavioural control, and social norms, which refers to recycling not only being a technical process for waste management, but also a behaviour that is embedded in social contexts (Ajzen, 1991; Geiger et al., 2019). When strategically supported with focused infrastructure and rules, recycling can be normalised in communities and institutions (Thomas & Sharp, 2013).

In the environment of university and student housing, the importance of recycling is remarkably high because of the concentration of people in the same place and the sharing of the facilities. Studies in the research settings of universities reported that environmental concern, social norms, and facility availability are found to significantly influence the recycling participation of students (Sallaku, 2019; Öktem et al., 2023). Therefore, the promotion of recycling with student housing is not only a necessity from an environmental standpoint, but also necessary for the development of long-term sustainable behaviour, amongst future professionals and decision-makers.

2.1.2 Determinants of sustainable waste management behaviour

Sustainable waste management behaviour is influenced by several factors such as attitudes towards the environment, social norms, motivation, and challenges (Daoud et.al, 2025). Research highlighted that environmental concern is an important motivator for recycling behaviour, with a considerable number of students reporting that they recycle to protect natural resources and conserve energy. When a person gains more environmental knowledge, he/she will understand the consequences and develop a positive attitude towards waste management procedures (Wu et al., 2022). Research indicates that gamified knowledge to promote recycling can strengthen young people’s understanding of waste sorting and develop pro-environmental practices (Diah et al., 2012).

Social influence plays a significant role in shaping recycling behaviour. Studies have found that parental habits on recycling significantly influence the children's behaviour on recycling (Daoud et al., 2025). Hence, the role of family involvement in promoting sustainable behaviour in waste management is important. When waste management is practised regularly, it may evolve as a routine work, which will increase the likelihood of continued engagement and as established habits are often resistant to change (Söderberg et al., 2022).

Motivation in individuals plays an important role in recycling, it has been said that it is categorized into two parts external motivation and internal motivation. For example, if

a person feels that it is good to protect the environment by developing the proper recycling habits it is considered as internal motivation, and people who recycles in order to save money or to avoid fines and considers this activity as mandatory is an external motivation (Varotto, 2017).

2.1.3 Barriers to sustainable waste management behaviour

Barriers to sustainable behaviour are influenced by a range of factors that can limit people's ability to participate in waste management behaviour. These factors are commonly classified as internal and external barriers, including social, psychological, and structural influences (Dioba et al., 2024).

Internal barriers include attitudes that they may feel that engaging in an environmental action will make them feel lose something positive or useful, and time convenience, as a result, they compromise to act pro-environmentally. Likewise, individuals may be forgetful or feel lazy to put in the effort to sustain habits such as switching off the lights or recycling (Thondhlana & Hlatshwayo, 2018).

External barriers include the structural influences, such as a study reported that while the residents had the waste bin in every floor, but there were no waste separation bins in students' rooms, which resulted in non-separation of the waste. Similarly, the location of recycling bins is far from the accommodation as a result, people felt walking to the recycling point was an inconvenience, which resulted in negligence in recycling (Thondhlana & Hlatshwayo, 2018).

Knowledge about recycling also plays a vital role in waste recycling behaviour. A study found that people are lacking main information on how composite products should be sorted, and they want more specific information about this in the garbage room or on the landlord's website. This was especially observed by internationals, where they believed that the waste sorting process may be different and they stop doing the proper recycling (Söderberg et al., 2022). Hence, information and knowledge play a significant role in overcoming the barriers to recycling. Knowledge gap leads to sorting failure

because participants often do not know how to do and they never learn that they are creating mistakes.

Likewise, social influence also plays an important role in recycling, in urban areas or tourist cities where there is a dense population, and local communities are less connected, and individuals who have recently moved to the place and doesn't have developed strong ties with the communities are less likely that he/she will not recycle (Varotto, 2017).

2.2 Cultural as an influential factor in recycling behaviour

Consumer waste management and awareness behaviour vary across countries, and are influenced by the ideology of consumers, knowledge of recycling practices, and demographic characteristics (Kumar, 2019). In a cross-cultural context, it was found that environmental awareness is high in developed or developing countries and a study conducted in New Zealand found that environmental concerns positively predicted pro-environmental behaviour among European New Zealanders, but the result was not in favour of the Asian New Zealanders.

In developed countries, people have an individualistic culture where people act according to their personal values and environmental beliefs, whereas in less developed countries, people have a collectivistic culture which is guided by social norms and expectations. However, the advanced recycling systems and government regulations can strengthen social norms and encourage people with a collectivistic culture to gradually encourage them to adapt responsible waste management behaviour (Mintz et al., 2019).

Research suggests that subjective norms are a strong indicator of waste management behaviour among students, which argues that social influence plays an important role in getting more people involved in recycling practices. Hence, institutions can support responsible behaviour by organizing programmes that enhance strong social norms through peer networks, workshops, and social media activities (Wu et al., 2022). Such

initiatives will help students to be more concerned about recycling despite cultural differences.

2.2.1 Cultural values and sustainability

Different countries have various levels of knowledge related to the environment, concerns towards recycling, and social and cultural understanding. These differences in awareness and social norms will help to explain why environmental behaviour is different across regions (Riaz et al., 2023). One of the most used frameworks for understanding cultural influence is Hofstede's cultural dimensions, which consists of power distance, individualism versus collectivism, masculinity versus femininity, uncertainty avoidance, and long-term orientation (Davari et al., 2024). Here it will discuss power distance and individualism versus collectivism as these factors are most useful for understanding cultural values and environmental behaviour because these two dimensions relate to social responsibility and environmental practices.

Power distance refers to the unequal distribution of power, categorised as high power distance and low power distance. In high power distance cultures, people are obliged to follow what is taught and follow leaders without question, whereas low power distance cultures prioritise equality, participation, and shared decision making (Nagy & Molnárné, 2018). A study has shown that a prominent level of power distance culture in society is associated with a low level of engagement in the environment (Riaz et al., 2023). According to the sustainability ranking, Finland, Iceland, Sweden, and Denmark were at the top of the list in terms of engagement in sustainability, so it can be assumed that low power distance has a positive impact on environmental behaviour (Nagy & Molnárné, 2018).

Collectivism and Individualism dimensions are two varied factors, where people from a collectivistic society express more concerns about the people and society, and are more likely to exhibit pro-environmental values and positive attitudes towards sustainability. Individualistic cultures are less likely to consider the impact on the environment and have low social responsibility (Chwialkowska et al., 2020). A study conducted on students

in Korea with various cultural backgrounds found that students with a high degree of collectivism are more likely to engage in pro-environmental behaviour (Riaz et al., 2023).

For example, as discussed above, students from high distance power culture may assume that it is not their responsibility to care about recycling. In an individualistic culture, people may show a less positive attitude towards recycling. Hence, to encourage them, VOAS can explain that recycling is everyone's task and promote community participation instead of rules, appoint green ambassadors, or organize small sustainability projects.

2.2.2 Migration and environmental practices

People who migrate may have different thoughts and experiences of environmental practices, such as waste sorting, since sustainable practices are often shaped by cultural and social norms. In some countries, waste may not be sorted at the household level, or it can be done following different systems. Hence, people who come from another country may take some time to adjust their waste-sorting behaviour in a new place (Hellwig et al., 2019).

Cultural beliefs can also influence attitude towards waste management (Chwialkowska, et al., 2019), a study conducted in Tibet found that cleanliness was associated with a means of getting rid of misfortune and welcoming good fortune, which develops a positive attitude among residents towards waste separation (Miao et al., 2025). However, if people have a recycling habit in the past, they will engage in recycling activities automatically, without making any conscious decisions in terms of waste management (Geiger et al., 2019).

Communication tools such as visual symbols and colour waste bins can help immigrants adapt to new waste sorting systems. Research finds that non-verbal communication may help people from diverse countries adapt to sorting practices even before they know the local language (Hellwig et al., 2019). For example, the introduction of new bins

containing correct sorting information led to a decrease in incorrectly disposed waste by 70% (Rousta et al., 2015).

2.2.3 Language barriers

International students face several intercultural learning challenges, such as adaptation, language, academic, and environmental knowledge (Riaz et al., 2023). Providing education on sustainable behaviour is still a major challenge for higher education institutions however, adapting to the host culture and getting the required knowledge and skills encourages students to actively participate in the sustainable development of their surroundings (Yassin et al., 2020).

A study conducted in Sweden found that, although the information regarding waste management was distributed, people reported that they were not able to read the instructions due to language barriers or the information was distributed at an inappropriate time, such as when they were focused on adjusting to a new home or country. Also, people who have stayed in Sweden for almost 15 years reported that language is still a barrier to them when seeking information (Rousta et al., 2016). These challenges may also influence students' ability to understand sustainability related information.

Immigrants who travel to another country may need several types of information in terms of housing, health, jobs, and education, and if these needs are not met, it will be difficult for immigrants to integrate into the unfamiliar environment (Wang et al., 2020). Universities can promote sustainable behaviour to students by organizing recycling programmes or appointing youth leaders to share their green lifestyle and sustainable stories through social media such as TikTok, Instagram, or Facebook (Wu et al., 2022). Such a strategy may enable them to feel more confident in overcoming the language barriers and participate in recycling activities.

People who migrate to other countries may not be familiar with the laws and regulations due to the language barriers and the limited availability of information to them. They

may not know the process of waste sorting either, and they have to know the process by guidance or knowing by themselves, hence the study found that providing information in the language of those groups will probably increase the participation in waste sorting behaviour (Hellwig et al., 2019).

2.2.4 Norms and habits formation from home countries

Recycling is a normal behaviour, but not everyone is motivated to recycle or regards it as a part of an activity to perform as an everyday task (Thomas & Sharp, 2013). Theory of Planned Behaviour (TPB) emphasizes that behavioural intentions are influenced by three main motivational factors, and they are Attitude, Subjective Norms, and Perceived Behavioural Control (Ajzen, 1991). Subjective norms refer pressure that an individual receives from peers, friends, and society to act in an environmentally friendly way, and this kind of act may influence an individual to change his/her behaviour to engage in waste recycling (Nawaz et al., 2025). Attitude is an emotional state that makes individuals act in a certain way and act responsibly.

People change their behaviour or habits once they migrate to a country where waste management is practiced widely. However, a study has found that when immigrants carry a culture of their home country, for example, in some cultures, food plays an important role in demonstrating hospitality. When guests visit, food is offered widely, so if leftover food is not separated properly, resources such as biogas cannot be produced from it. Also, in some cultures, there is a stereotype that waste is considered unhygienic and is perceived as labor-intensive work, and people often try to avoid recycling practices (Hellwig et al., 2019).

Habits explain the strong relationship between individuals past behaviour and their behaviour involvment in the waste recycling process (Nawaz et al., 2025). Social Norms motivate the individual's recycling behaviour. A study conducted in Sweden found that people who migrated from other countries were not motivated to recycle, but the social

norms of Sweden to recycle as a culture encourage them to change their habits and participate in recycling activities (Rousta et al., 2016).

2.3 Research gap

Previous research has extensively examined students sustainable and waste management behaviour, particularly focusing on factors such as environmental knowledge, attitudes, and social norms. Many empirical studies have analysed university students' recycling and waste management practices and found that behavioural intentions are influenced by personal norms, perceived behavioural control, and environmental awareness (Öktem et al., 2023). In addition, research on younger generations has highlighted that although sustainability is considered important, there is often a gap between attitudes and actual behaviour (Zámečník & Tahal, 2025). These studies are quantitative and focus on general student groups or broader groups without considering specific living environments.

In the specific context, other studies have tried to examine sustainable behaviour within household and housing contexts, giving importance to the role of living conditions, infrastructure, and social environments in shaping waste-related practices. For instance, research on social housing and household waste management shows that environmental behaviour is influenced by factors such as shared facilities, social norms, and intervention strategies (Bal et al., 2021; Sembiring et al., 2024). In the Finnish context, studies have also examined recycling behaviour and identified the importance of incentives and behavioural drivers in encouraging sustainable practices (Abila & Kantola, 2019). However, these studies focus on general populations or households and do not specifically address student housing environments or the experiences of international students.

Despite the growing body of literature on sustainable behaviour, there is an apparent lack of research that combines these perspectives. Existing research does not sufficiently examine the sustainable behaviour of international students living in shared housing environments, where cultural background, common facilities, and daily living practices may

significantly influence behaviour. Therefore, there is a need for context-specific empirical research that explores how international students behave towards sustainable practices in shared living environments such as VOAS in Finland. This study aims to address this gap by analysing international students' daily environmental behaviour and identifying the key factors influencing their sustainable practices.

Table 1. Summary of Identified Research Gap

Population	Context	Focus	Limitation / Gap	Study (Author, Year & Title)
University students	China	Waste behaviour	No housing context; not international students	Wu et al. (2022) – Waste management behaviour among university students
University students	General	Recycling behaviour	No shared housing; not international students	Öktem et al. (2023) – Determinants of students' recycling behaviour
Young population	Czechia	Sustainability attitudes	Not specific to students or housing	Zámečník & Tahal (2025) – Gen Z sustainability attitudes
Housing residents	Netherlands	Sustainable behaviour	Not students; not international	Bal et al. (2021) – Social housing and sustainable behaviour
Households	Indonesia	Waste sorting	Not students; no shared housing	Sembiring et al. (2024) – Household waste sorting

General consumers	Finland	Recycling behaviour	Not student-focused; no housing context	Abila & Kantola (2019) – Recycling behaviour in Finland
International students	VOAS (Finland)	Sustainable behaviour	Addresses identified gap	Our study

3 Hypothesis

A robust theoretical framework is required to understand sustainable waste management behaviour, explaining why individuals engage in environmentally responsible ways. Behavioural change theories play a significant role in sustainable research and help to understand that behaviour is influenced not only by environmental knowledge but also by practical conditions, attitudes, social norms, and values. Therefore, simply being environmentally aware does not lead to responsible behaviour (Nuojua et al., 2024), these theories show the complex relationship among individual behaviour, social norms, and surrounding environmental or situational conditions.

In the context of waste management, behaviour change theories are peculiarly linked because practices including waste sorting, recycling, and reducing waste heavily relies on everyday decisions. The study shows that waste management behaviour is shaped by individual attitudes and perceived control over action. In the case of student housing, these factors are considered significant as students behaviour toward waste management may be impacted by peer interactions, shared facilities such as recycling bins, and institutions waste collection system.

3.1 Framework of Hypothesis

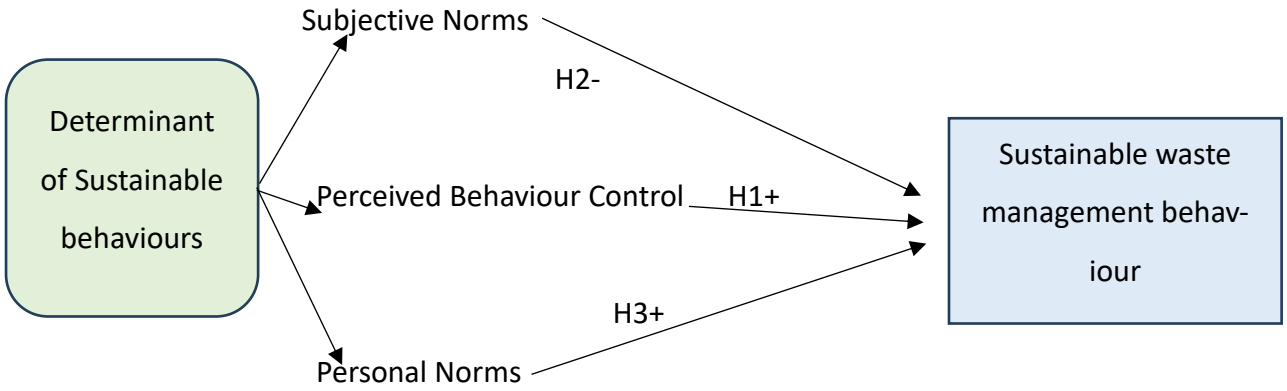


Figure 1. Framework of Hypothesis

3.2 Theory of Planned Behaviour

The theory of Planned Behaviour (TPB), proposed by Icek Ajzen (1991), explains how human behaviour is guided by behavioural intentions. Attitudes give the concept of whether an individual believes that a particular behaviour is good or bad. In the study of waste management, this means students' beliefs towards the importance of recycling and waste management are more likely to contribute to those behaviours (Ramayah et al., 2012). Subjective norms refer to the individual's perceived social expectations to behave in a certain manner. Simply, how individuals engage in specific behaviour to match this behaviour (Yadav & Pathak, 2017). Perceived behaviour control (PBC) is the assessment of how individuals perceive behaviours as easy or difficult to perform. This includes access to recycling facilities, proper infrastructure, clear instructions on waste sorting can certainly shape students' participation in sustainable waste management (Wang et al., 2022; Cheng & Tung, 2014). From the study of TB in environment science, it is verified that perceived behaviour is the significant factor that promotes intention to perform sustainable behaviour and international student intention to act relies on combined factors such as attitudes, subjective norms, and perceived behaviour (Si et al., 2019). By studying these three factors, which help to identify individuals' motivation to behave or hinder sustainable behaviour in student housing.

For a comprehensive understanding of sustainable behaviours, these three components are particularly relevant in studying waste management in the context of student housing. According to Yuriev et al. (2020), TPB theories have been widely used in research of environmental behaviour, specifically recycling and waste management, because it helps researcher in understanding factors that shape environmental behaviours. A previous study conducted in student housing supports the use of TPB theory to examine recycling behaviours. Söderberg (2022) highlight that in student housing, recycling behaviours are significantly influenced by positive environmental attitudes and perceived behaviour control.

The study of the Theory of Planned Behaviour allows us to examine sustainable waste management behaviour among international students living in VOAS housing. This framework aims to study students' attitudes toward sustainability, perceived behaviour control, and social influences, the research examines the factors that motivate or obstruct sustainable waste management practices in student housing. The following hypothesis is developed using the Theory of Planned Behaviour.

Hypothesis (H1): Perceived behavioural control significantly influences sustainable waste management behaviour.

Hypothesis (H2): Subjective norms significantly influence sustainable waste management behaviour.

3.3 Value Belief Norm Theory

The Value Belief Norm (VBN) theory developed by Stern (1999), the theory proposes that personal values influence environmental beliefs, developing beliefs about environmental responsibilities and awareness of consequences, which activate personal norms that guide sustainable behaviours. Simply allowing individual to follow corrective actions for pro-environmental behaviour. This framework has been applied to study behaviour, solid waste management, and explain how personal values shape norms and beliefs that promote intention and sustainable behaviour practices (Al Mamun et al., 2022).

According to previous research on these theories, values are identified as a stable framework that facilitates environmental behaviours. For example, Biospheric refers to the concern for the well-being of living things, egoistic concern for self-interest, and altruistic concern for the well-being of other people (Schultz & Zelezny, 2003) These values crucially influence and shape environmental beliefs, which are required to generate awareness of consequences and ascription of responsibilities for environmental problems, causing guilt and self-accomplishment to develop pro-environmental behaviours (Raghu and Rodrigues, 2020). Al Mamum et al. (2022) highlights that when individuals become

aware of environmental problems and sense responsibility to engage for sustainable practices, personal morals are activated, it effectively promotes the intention and behaviour to practice sustainable waste management.

In the case of student housing, VBN theory demonstrates that students environmentally values shape their beliefs towards the environmental consequences of improper waste disposal. These beliefs develop personal norms, create responsible behaviours related to effective waste management, including proper waste sorting and recycling. Based on this theoretical framework, the following hypothesis is developed.

Hypothesis (H3): Personal Norms significantly influence sustainable waste management behaviours.

3.4 Conceptual explanations of variables

In this study, sustainable waste management behaviour is treated as the dependent variable as it identifies key outcomes that this paper aims to examine. This behaviour includes waste sorting, recycling, and waste reduction in student housing, which are considered key indicators to understand what students do in everyday practices. The main aim of studying this behaviour is to understand key factors encouraging or preventing students from participating in these behaviours. Similarly, in this research, sustainable waste management behaviour is measured by practical actions, such as whether students regularly follow waste sorting rules and separate waste even when it is inconvenient.

To explore why this behaviour happens, the paper focuses on factors derived from two developed theories, TPB, and VBN theory. The TPB explains the role of attitudes, subjective norms, and perceived behavioural control, while the VBN theory focuses the crucial role of personal norms promoting pro-environmental actions. Perceived behaviour control is considered because people are most likely to act when they feel ease or difficulty to perform a given behaviour. In student housing, students may want to recycle but they

may be unaware of how the recycling system works, or facilities may not be easily accessible, making waste sorting difficult. Examining these factors help to understand both knowledge and practical obstacles, shows how perceived behaviour control influences behaviour.

This paper also explores social influence because human behaviour is mostly influenced by others. Subjective norms demonstrate how an individual believes of social pressure to perform or not perform a specific behaviour. However, subjective norm is a social expectation that puts considerable pressure in individual on waste sorting practices that significantly reported as higher frequencies in everyday practices (Xia et al., 2021). In student housing, when an individual lives in shared accommodation or family housing, their behaviours may adjust each other behaviours accordingly. Studying this factor helps to understand social expectations and peer influence on shape behaviour in everyday waste management practices.

Additionally, the paper focuses on personal norms, an individual's moral responsibility. Apart from social pressure, personal norms come within the individual's sense of moral responsibility to act sustainably. People behaviour is often guided by moral obligation, which make environmentally responsible to sort waste correctly and feel guilty when they do not act sustainably. By studying these factors help to understand students' motivation that drive sustainable behaviours

In student housing, sustainable behaviour is shaped by both individual motivations and situational conditions such as recycling facilities and social influence. Therefore, in this study, sustainable waste management behaviour is considered as a dependent variable and the social norms, personal norms, perceived behaviour control, and attitudes is treated as independent variables. Along these factors, other control variables such as age, gender, region, and length of stay in Finland are also included in exploring sustainable waste management behaviour. However, these control variables are also focused on understanding the basic concept, such as their experience, cultural norms, and

knowledge related to sustainable waste management. For example, students who have lived in Finland for a longer period might be familiar with the waste management system and guidance. Therefore, including these variables also helps to analysis of factor influencing sustainable waste management behaviours among international students.

4 VOAS as a case company

VOAS is the largest student accommodation provider in Vaasa, making it essential to understand how the residents behave in waste management practices. And it aligns with Finland's broader sustainability goals, it has focused on the environmental work, such as managing the waste, electricity, water, procurement, and communication (VOAS, 2024).

Student housing VOAS may face difficulty in encouraging sustainable behaviour among international students due to language barriers, lack of awareness, or cultural habits. In the VOAS housing context, the diversity of cultural backgrounds, shared living accommodation, and exposure to a new recycling system may develop an attitude towards negligence in recycling. Hence, understanding the behavioural patterns of its international residents becomes critical.

Maintaining an effective waste management system can be a challenge when students come from several backgrounds. International students should have varying levels of familiarity with the recycling system adapted in Finland. Students who come to study from a different country is called international students. Due to the different cultural background and temporary resident status, students may not feel a sense of community (Singh et al., 2022). Due to this, they may also avoid the sustainability behaviour in the community they live in. Therefore, VOAS, as a student housing, should understand the cultural values and the pattern of behaviour people bring from their country to encourage sustainable habits.

4.1 Current strategy for waste management in VOAS housing

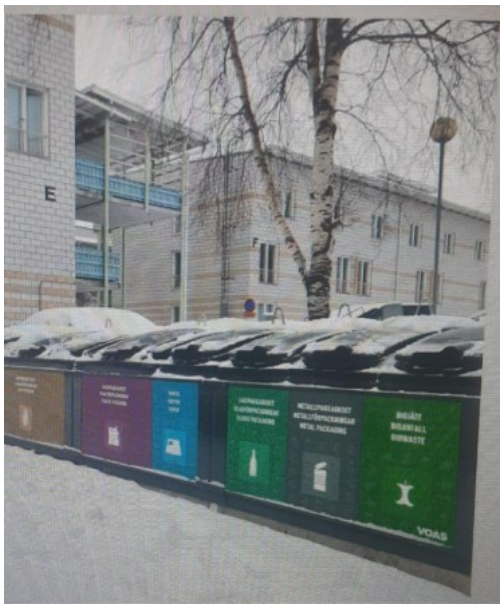
VOAS was founded in 1972 and have been working to make a friendly housing in Vaasa for over 50 Years. They provide housing facility to all the students from all over the world who study in Vaasa and VOAS owns about 1700 apartments and various business premises. VOAS has also taken step toward sustainable living practices within its residents (VOAS, 2025).

VOAS has clearly instructed the tenants on their website by saying “Please sort your waste properly; recycling is good for the environment, and by recycling correctly, you will help keeping the waste disposal costs down. Waste disposal costs affect, for example, the rent of the apartments.” This shows that VOAS is concerned about the environment and always encouraging the good practices regarding recycling of the waste. VOAS has switched to Molok deep-disposal containers and has the goal to reach recycling rate by 55% by 2027 (VOAS, 2024). Since there is high tenant turnover in VOAS housing there is difficulty to get the up-to-date recycling data, hence to solve this issue and to achieve the goal for 2027, they have collaborated with local waste management company Stromossen, to make sure that information regarding the recycling reaches to the targeted customers and make the correct and up to date information regarding waste management (VOAS, 2024).

VOAS has always tried to become visible and responsible towards the environment by utilising the communication channels such as social media and the press. The environmental responsibility theme is always at the top priority and part of their annual report, where past year activities are reviewed, and ongoing progress in environmental work is monitored. VOAS has received the reward for the well-done environmental work where they fulfilled the 10 criteria required by Eco-Compass. VOAS believes that environmental work is a shared responsibility and the micro, good choice in everyday life ultimately, becomes the most important choice, from which more sustainable and environmentally friendly practices develop over time (VOAS, 2024).

VOAS has given information on their website to separate the waste into Biowaste, Carton packages, Batteries, Plastic packages, Mixed waste (combustible waste), Glass packages, Metal packages, and paper (VOAS, 2025). They have also given the link for the Stromossen website, where tenants can get more information regarding how to segregate the waste with the sorting guide, and giving proper information regarding the waste

reception stations and eco points. Assorted colour waste bins are placed at a recycling point in VOAS housing to make residents know where and how to segregate the waste.



Picture 1. Illustration for VOAS recycling point with coloured bins, (VOAS website).

4.2 Waste management challenges for VOAS housing

Student housing refers to residential accommodation specially designed for university students where multiple individuals live in shared common facilities often with common kitchen, waste facilities, and communal areas. These types of resident housing are specially designed to provide affordable housing for students, including international students. In these housing institutions sustainable practices among international students have increasingly emphasized, especially waste management and recycling. However, effective waste management in student housing is often more complex than in individual homes because waste management behaviour is not only influenced by behavioural dynamics but also by physical layout, shared responsibilities, and social interactions.

The research on students' accommodation illustrates that even residents show positive attitudes towards sustainability practices and are concerned about environmental issues, their waste management behaviours often remain inconsistent due to practical barriers

within the housing environment (Söderberg et al., 2022). One major challenge in student housing is poor infrastructures such as insufficient recycling areas can hamper international students' ability to sort waste correctly, decreasing participation rates (Woodard & Rossouw, 2021).

Additionally, space limitations in individual resident or shared kitchens may hinder the ability to separate waste effectively, as there may not be enough spaces for multiple dustbins. Furthermore, in shared apartments bin systems can create more confusion, which leads to contamination of waste when residents are unaware whether others are sorting waste correctly. International students who are living for a short period in student housing, who have diverse cultural backgrounds and their unfamiliarity with the local recycling rules may reduce the waste management sorting systems. According to Berglund et al. (2022), a cross-cultural study indicates that recycling system and infrastructure extensively vary from countries which directly impact the way students follow waste sorting in new environments.

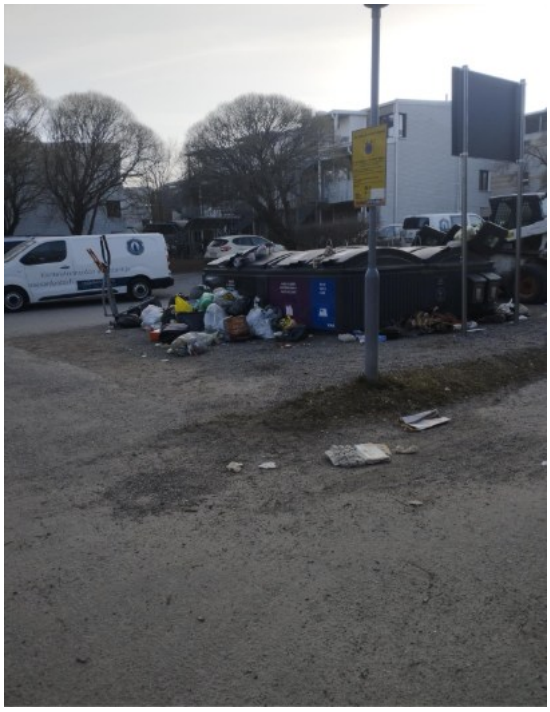
4.2.1 Infrastructure problems

In the subject of waste management, infrastructure means organizational facilities and systems that help residents sort, dispose of, and collect their waste effectively. This means availability and right places of dustbins, clear labels and signs, proper access to waste disposal areas, frequent collection of waste, and these facilities are designed within residential environments. Proper infrastructure plays an important role in large density resident areas such as student housing because it highly influences resident waste management behaviours.

The common infrastructure-related issues in waste management are the lack of clearly labelled signs and easily accessible dustbin areas. When waste sorting instructions are not clearly provided, and containers are marked poorly, residents are more likely to dispose of waste incorrectly (Dahlén & Lagerkvist, 2010). Another challenge is accessibility, if the waste disposal area is located far away from the residing units, or bins are

frequently full of waste, this may lead to discouragement among residents to sort waste correctly (Söderberg et al., 2022). In student housing, language barriers can bring complications because many residents are international students. A lack of obvious signs and local language instructions creates confusion among residents, leading to misinterpretation of waste disposal guidelines (Pham, 2020).

Behavioural theory explains why infrastructure shapes residents waste management behaviours. According to the Theory of Planned Behaviour, perceived behavioural control describes that people behaviour is likely to be affected by how they think it is easy or difficult to perform (Ajzen, 1991). When waste infrastructure is insufficient such as waste on containers overflowing or labelled incorrectly applied, residents may see waste sorting as difficult and impractical, therefore reducing their willingness to sort waste effectively. The study demonstrates that correctly designed waste containers, accessibility and clearly marked disposal areas can notably enhance waste management (Bernstad, 2014). In student housing, with a large number of international students residing some are willing to recycle, but with confusing and unclear label bins, and overflow of waste, some residents leave their household waste beside the bins, lay them in the dumpster ground or dispose in the wrong dumpster, such as disposing bio waste in plastic recycling containers (Walker, 2026). Therefore, it is imperative to study infrastructure challenges for a better understanding of the effectiveness of waste management within VOAS residential areas.



Picture 2. Example of waste overflow at a VOAS recycling point in Palosaari, illustrating infrastructure (photo taken by the author).

4.2.2 Space constraints

Space constraints play a crucial role in influencing waste sorting and recycling behaviours among residents especially in densely populated residential areas such as VOAS housing, which include studio apartments, family apartment, and shared units. In such accommodations, storage areas and kitchen spaces are often constrained, reducing the feasibility of sorting waste in multiple bins. This limitation affects recycling systems where residents require to segregate waste to multiple bins such as bio waste, plastic, cartoon, paper, and mixed waste. Without adequate space to store multiple bins students may feel unwilling to put such effort into waste management, thereby decreasing recycling participation rates (Bernstad, 2014).

The study shows that physical and structural behaviours are likely to shape waste management behaviours. Söderberg et al. (2022) state that students who are aware of environmental issues, limitations of space and inconvenient waste management settings

decline consistent recycling participation in student housing. Similarly, research shows waste management behaviours in densely populated areas demonstrate that small kitchen areas and overcrowded shared apartments discourage habits of proper waste sorting behaviours because residents focus on a convenient way rather than putting extra effort into sorting separated waste or spatial adjustment Söderberg et al., 2022). As per Juliana et al. (2022), studies suggest that convenience play role in promoting sustainable behaviour when students are willing to recycle when the waste sorting requires less effort.

The literature suggests that waste recycling behaviour is not only determined by people positive attitude towards sustainability, awareness or willingness but also driven by structural and physical limitations of the housing settings. Thereby, space layout plays a significant role in influencing sustainable waste management.

4.2.3 Shared bins

In the context of shared student housing, shared bins are common, where multiple residents dispose of waste rather than in individual bins. In such cases, waste sorting is a shared responsibility among respective residents but creates complexities that can reduce recycling participations. The primary issue related to shared bins among residents is waste contamination. When waste is incorrectly sorted and disposed of by even a small group of people, recyclable waste can be mixed with other general waste, which decreases the effectiveness of recycling streams (Dahlen & Lagerkvist, 2010). As per Middha and Horne (2024), research on apartment waste management identifies low recycling practice and high contamination of waste, where almost 70% recycling waste was wasted due to sorting errors in the shared bin housing.

In densely populated housing, when people see that waste is incorrectly disposed of can make this behaviour look normal. This associates to diffusion of responsibility, which shows that individuals in a group are less likely to act or feel personal accountability when they are in a group (Darley & Latane, 1968). When residents are using shares bins,

they assume that others will sort and dispose of waste correctly, reducing their own accountability.

An individual behaviour is strongly affected by how other people behave. If residents see poor waste management, such as contamination, incorrect sorting, and the disposal of waste, or low recycling efforts, their attitudes may shift towards non-compliance : if they do not recycle correctly, I will not either. This matter is distinctly similar in culturally diverse international student housing such as VOAS. Students who come from different countries with different recycling habits, rules, and systems. If there are no clear shared standards and consistent behaviour reminders, this increases confusion, which leads to more contamination of waste and decrease sense of responsibility.

Picture 3. Shared waste bins at VOAS housing, illustrating improper sorting due to limited bins (photo taken by the author).

4.2.4 Transient populations

Transient population is temporary residents in a specific area with high mobility, often challenging local management and infrastructure. In student housing like VOAS these types of population are commonly found residing. Such temporary stay creates obstacles

for an individual to build stable routines and long-term commitment to local environment practices.

The higher residential mobility lowers the participation in waste management. When residents consider their stay as only temporary, they are less likely to take a sense of responsibility towards maintaining environmental practices within the local community. Similarly, temporary residents often lack adequate knowledge of local recycling practices and rules, sorting systems, which also further limit recycling participation rates (Söderberg et al., 2022).

This case is particularly common in student housing, as many the population is international students. International students often face challenges when they move to new environments, such as understanding how the local dispose waste and recycling systems. Recycling systems can vary from country to country, such as in terms of waste containers colour coding, sorting guidelines, and how strictly rules are followed. These kinds of differences may generate uncertainty about recycling correctly and make it harder for them to develop sustainable habits.

5 Method

The deductive approach is more appropriate in this research since the study aims to examine the correlation between the variables which include perceived behavioural control, social norms, and behavioural intentions of international students to sustainable waste management behaviour. The purpose is not to produce new theory but to investigate the applicability of existing theoretical concepts in the context of the problem of student housing. This is in line with the most prominent rule of deductive reasoning, whereby theory comes first before facts are gathered and then it is put under empirical test.

Similarly, deductive research are more often deemed to be related to quantitative research, where data are gathered as numerical figures and analysed with the help of statistical software. The analysis of the survey data in this study is carried out with the aid of SPSS because it is possible to identify patterns, correlations, and associations between variables. This is a systematic and designed procedure that increases the reliability and objectivity of findings. Hypothesis testing and statistical validation are common in deductive methods (Kumar, 2024), thus appropriate in projects that seek to generate generalizable outcomes.

Even though the main logic of this work is deductive, it should also be admitted that research processes are not necessarily linear. (Okoli, 2023) emphasizes that distinct types of inductive, deductive, and abductive inductive theory can enhance each other in one study as they all support some aspects of reasoning and interpretation. In this study, although it is more of a deductive structure, there is an element of interpretation in analysing the statistical outcomes and the way they can be interpreted. This is a sign of a small amount of flexibility in the research process, whereby findings can be used to further refine existing theoretical beliefs.

Unlike inductive methods, where theory is formed based on raw data, the purpose of the current study is not to formulate new theoretical frameworks. The inductive research tends to look at patterns and themes of observation that are directly due to the

qualitative data and therefore the theory can be based on observations or interviews. As the predefined variables and structured survey questions are to be used in this research, it aligns more with deductive reasoning. The information obtained is utilized to test the hypotheses that are formed from the existing theories.

Similarly, the idea of the abductive approach sheds some additional light into the possibility of interrelation of research approaches. (Dubois & Gadde, 2002) state that abductive research is based on an ongoing process of interaction between theory and data, in which the research framework can change throughout the research process. While this approach is more commonly applied in qualitative or case study research, it highlights the dynamic nature of research in general. However, in our research, we are not so flexible, where the design of the research is organized and directed by the pre-determined variables and the methods of statistical analysis.

Overall, the deductive research approach offers a coherent and consistent structure for our study. It allows the researcher to verify theoretical assumptions based on quantitative data and be consistent and transparent in the research process. The study, through the implementation of the statistical analysis to test the variations of variables, would help in the enhanced understanding of international students' behaviour on sustainable housing in the VOAS context. This will both enhance the validity of the results and ensure that the study is based on an established theoretical framework and is tested and verified based on real data. This chapter explains the research methods used in the study and describes how the research was conducted. The purpose of this study is to examine international student’s behaviour and awareness regarding waste management in student residences. First, we will first discuss different research paradigms and methods, which will form the philosophical and theoretical foundations of the work. We will then discuss the research approach we used for this study and explain the reason behind choosing this approach.

Moving forward, we will discuss the sampling size, our targeted population, and why we chose those groups to study and discuss the methodological choice between qualitative and quantitative strategies and justify our choice. Similarly, in the last part, we will then discuss the variables we chose and the software we used to analyse our data and discuss key statistical metrics and how they are analysed. The following sections will help the reader understand the reason for choosing the methods and how the research design helps to address the research questions and test the proposed hypothesis.

5.1 Research philosophy

Before conducting the research, it is necessary for the researcher to know their approach or research paradigm upfront. When a researcher selects the correct paradigm, it gives shape to the study, including methods to find the research answers, hypothesis formulation, and interpretation of the results. They shape the ontological, epistemological, and methodological foundations of the research process and are therefore essential to consider (Turin et al., 2024).

Positivism, interpretivism, and constructivism are the most common paradigm researcher use. The positivist paradigm assumes that there is a single objective reality that can be measured, observed, and understood. This supports the use of scientific methods to explain and predict relationships between the variables. Researchers adapting this paradigm typically use quantitative methods such as hypothesis testing, surveys, or experiments to identify relationships (Park et al., 2020).

In contrast, the interpretivist and constructivist paradigms argue that reality is socially constructed and subjective, they focus on the qualitative methods, such as ethnographic studies and interviews to understand the individuals experience (Pulla & Carter, 2018). This theory is used to understand the human behaviour and social phenomenon. However, use of this approach is difficult because sometimes it fails to measure the complex human behaviour (Pulla & Carter, 2018).

Another approach is the Pragmatist Paradigm, which combines both the quantitative and qualitative methods, gives importance to problem-solving, and analyses what best addresses the research problem. It encourages the use of any methods that helps best to understand the research question (Kaushik & Walsh, 2019).

Understanding these paradigms is important for the thesis because the choice determines how the data is collected and analysed, and how the findings are interpreted. For our thesis, we have chosen the positivist paradigm approach as our research seeks to measure the sustainable behaviour of students in waste management in terms of personal norms, perceived behavioural control, and subjective norms, and test hypotheses through statistical analysis. The positivist paradigm will allow us to use quantitative analysis where we can measure our dependent and independent variables.

5.2 Research Process and Case Company Selection

The case company selected for this thesis was VOAS, which provides student accommodation services for both local and international students in Vaasa, Finland. We choose this company because being an international student and staying in the VOAS, made us feel to study sustainability- related behaviour among students living in studio, or shared apartments. Sustainable way of living in student housing, especially related to environmental responsibility, generated the idea for selecting the case company and research area.

Initially, we sent a proposal to VOAS and showed our interest in conducting thesis to examine sustainable behaviour related to water consumption, electricity usage, and waste management practices in student housing. However, after discussions with VOAS, it was known that the company was facing challenges particularly related to waste management practices among students living in the residences. Hence, it was suggested that the research should focus more specifically on waste management behaviour, as this area was considered more relevant and beneficial for the case company.

Following further discussion with the thesis supervisor, the research topic was refined, and we narrowed to focus on waste management behaviour of international students

who are staying at VOAS residences. Narrowing the scope of the study helped establish an identified research direction and that helped us to allow a deeper investigation into sustainable waste management practices among students.

Throughout the research process we got a support from our thesis supervisor and VOAS. Thesis supervisor provided academic guidance and feedback regarding the research structure, theoretical framework, questionnaire design, and data analysis process. The case company supported the research by providing contextual understanding regarding waste management challenges in student residences. In addition to this our survey link was distributed to the residents from VOAS email, which helped us a lot to reach the response within brief period of time.

We independently learned from the literature review, designed the questions, and analysed the collected data using SPSS, and interpreted the findings of the study. Overall, the collaboration between the researcher, the thesis supervisor and the case company contributed to the completion of the research process and the development of the study.

5.3 Research Design and Data Collection

This thesis used quantitative research design to identify international students waste management behaviour in VOAS residences. Data were collected through a structured online survey questionnaire which was designed by using Webropol. The questionnaire was developed based on past literature, concepts, factors related to pro-environmental behaviour and sustainable waste management practices.

The questionnaire consisted of demographic questions which included Age group, Region of the respondent home country, Length of stay in VOAS and Gender. Similarly, there were four subsections of the questions related to sustainable behaviour questions. Three section was designed for the independent variables, and One section was designed for the dependent variable. Each section was coded separately.

To identify the age group, it was designed as Under 20, 21-30 and 30 and above. To know about the country respondent belong we used region such as Europe, Asia, Africa, South America and Others. Length of stay in VOAS was separated by Less than 6 months, 6-12 Months, 1-2 Years and More than 2 Years. Gender was denoted by Male, Female and Preferred not to say.

Likewise, Likert Scale was used to measure the behaviour of the students to support quantitative analysis. The Likert scale is commonly used as a psychometric measurement tool in quantitative research for measuring opinions, perceptions, and attitudes (Likert, 1932). The participants of the survey were asked to indicate their level of agreement with different statements from Strongly disagree to strongly agree, where strongly agree was coded by 5 and strongly disagree was coded by 1.

Altogether, there were 4 questions to identify the demographics variables, and 5 statements to identify the independent variable (Perceived Behavioural Control), 5 statements to identify the independent variable (Subjective Norms), 4 statements to identify the independent variable Personal Norms) and 5 statements to identify the Dependent Variable (Sustainable Waste Management Behaviour).

The survey was opened from April 15 to April 24, we received 121 response in total out of which 115 were the valid response from the participants. Invalid responses were excluded from the analysis.

5.4 Reliability and Research Ethics

In the thesis reliability analysis of the variables used is done by testing Cronbach's Alpha. This test must be done to validate and know about the accuracy of the data interpretation (Adeniran, 2025). The reliable score is between 0 and 1, for instances if the score is 0.90 it is meant that 90% of the variable statements are accurate and reliable (Adeniran, 2025).

Below we have calculated the reliability score of both dependent and independent variable.

Table 2. Cronbach's Alpha Score

Variable	Variable Type	Number of Statements	Measurement Scale	Cronbach's Alpha	Reliability Interpretation
Perceived Behavioural Control (PBC)	Independent Variable	5	5-point Likert Scale	0.791	reliability
Subjective Norms	Independent Variable	5	5-point Likert Scale	0.701	reliability
Personal Norms	Independent Variable	4	5-point Likert Scale	0.853	reliability
Sustainable Waste Management Behaviour	Dependent Variable	4	5-point Likert Scale	0.832	reliability

Above table shows the Cronbach's Alpha analysis values. The results indicate that all variables achieved acceptable reliability levels.

Ethical consideration was considered throughout the research process. Participation in the survey was voluntary, and the consent were asked from the participants, and were informed about the purpose of the study before answering the questionnaire. The participants had the right to decide whether they wanted to participate in the study, and they could exit anytime, during the process.

To protect the privacy and confidentiality, no personal information such as name, phone numbers, or email addresses was collected from the participants. The were verified anonymously and used only for academic research purpose.

Possible biases were considered during the research process. Since the researcher is living in VOAS housing, personal experience and familiarity with the living environment could influence the interpretation of the findings and designing the research questions. There may also be the bias while designing the questionnaire, where structure of certain statements would unintentionally guide respondents toward environmentally friendly answers or opinion related to sustainable behaviour.

In addition, respondents may have demonstrated social bias by providing answers that appeared more environment responsible than reflecting their actual behaviour. Also, the study focused students living in VOAS housing and findings of the study may bot fully represent all student's populations or housing contexts in Finland.

To reduce all the possible biases, the questions was developed based on previous academic literature and established theoretical frameworks rather than personal assumptions. Neutral word was used in the questions as much as possible, and participants remained anonymous to encourage honest responses from participants.

6 Data Analysis

The study adapts a quantitative research approach, which focuses on collecting data using the survey method, which will be analysed statistically. Quantitative research is suitable for this study because it examines the effect of an independent variable on an outcome of dependent variable and can be expressed numerically (Laxman et, al, 2000).

The research is based on the survey. A structured questionnaire is used as the main research method to collect data from the participants. The questionnaire will include closed-ended questions to measure the students' awareness, attitudes and knowledge related to sustainability and waste management practices.

The study focuses on examining the behavioural patterns of international students staying in VOAS housing. The collected data are later analysed using descriptive statistical methods to identify patterns and trends in the students' attitudes towards the waste management behaviour. For our research, we have chosen VOAS as a case company to understand the waste management behaviour.

6.1 Respondent Profile

This section presents the demographic characteristic of the respondents who agreed to participate in the study. Variables such as gender, age group, region of origin and length of stay in Finland were included in the study to understand the background of the respondents. These demographic factors are relevant, as they may influence respondent's environmental awareness, level of adaptation to local waste management practices. For example, student who have lived in Finland for a longer period may be more aware about the local waste management practices, sorting regulations, and available environmental services compared to newly arrived students.

Table 3. Demographic Profile

	Category	Frequency	Valid Percent
Age group	Under 20	2	1.7
	21-30	63	54.8
	30 and above	50	43.5
	Total	115	100
Missing	System	6	
Gender	Male	49	42.6
	Female	65	56.5
	Preferred not to say	1	0.9
	Total	115	100
Missing	System	6	
Region of Origin	Europe	21	18.4
	Asia	82	71.9
	Africa	10	8.8
	Others	1	0.9
	Total	114	100
Missing	System	7	
Length of stay	Less than 6 months	19	16.5
	6-12 months	33	28.7
	1-2 years	38	33
	More than 2 years	25	21.7
	Total	115	100
Missing	System	6	

Age group is an important demographic variable, as it may influence respondents' environmental awareness and sustainable waste management behaviour. Different age categories may have varying attitudes toward recycling and waste reduction practices.

From the age distribution of participants, we obtained a total of 121 responses, out of which 115 were valid response obtained, while 6 respondents records were missing. The majority of the age group of participants belonged to the age group of 20-30, representing 54.8% of valid responses. Respondents aged 30 and above accounted for 43.5%, while only 1.7% of respondents were under 20 years old. The findings indicate that most participants are adults and the student age who are current resident at VOAS housing.

Gender is an important demographic variable, as differences in environmental attitudes, daily behaviour and participation in sustainable activities may vary across individuals. Understanding the gender distribution of respondents helps provide a broader view of sample composition and allows better interpretation of sustainable waste management behaviour of residents.

The gender distribution of respondents presents out of 121 total responses, 115 valid responses were recorded, while 6 responses were missing. Among the valid responses, female respondents represented the largest group with 56.5% (65 respondents), where male respondents are 42.6% (49 respondents). Only 0.9% (1 respondent) preferred not to disclose their gender. The results indicate that the survey received responses from diverse group of participants, with slightly higher representation of female respondents.

Region of origin is an important demographic factor, as students coming from different geographical backgrounds might show varying cultural practices, degrees of environmental awareness, and previous experience with waste sorting systems. Understanding in which the people who answered the survey are from can help us understand the diversity of the sample and how their actions when it comes to sustainable waste management might be different.

The findings show that participants came from different geographical regions, reflecting the diverse nature of the student population. This migration of international study is

important for the study, as it allows the study to capture the wider range of perspectives, experiences, and behaviour related to recycling and waste management behaviour. It shows that more population are migrated from Asia region representing 71.9% of total respondents and followed by Europe and Africa. This will be helpful for our study to understand the behaviour towards sustainable waste management practices.

Length of stay in Finland is an important demographic variable, as it may affect respondent's familiarity with local waste management systems, sustainable living practices, and recycling regulations. Students who have lived in Finland for a longer period may have had more opportunities to adapt to local environmental expectations and develop waste sorting habits as per the local guideline instructed.

The length of stay of respondents in VOAS residence demonstrates out of 121 total responses, 115 valid responses were observed, while 6 responses were missing. Among the valid responses, the largest group of respondents had lived in VOAS for 1-2 years, representing 33.0% i.e (38 respondents). This was followed by respondents who had lived in VOAS for 6 to 12 months, accounting for 28.7% (33 respondents). Respondents who had stayed for more than 2 years represented 21.7% (25 respondents), while 16.5% (19 respondents had lived in VOAS for less than 6 months. The findings indicated that most respondents had moderate to longer residence experience, which may contribute to greater familiarity with waste sorting recycling process.

6.2 Descriptive Statistics

Descriptive statistics were used to summarize the responses collected from international students residing in VOAS housing. This analysis provides an overview of respondent's thoughts and belief regarding the factors influencing sustainable housing behaviour. The descriptive statistics include mean values and standard deviations for each construct measured in the study.

The mean score was used to identify the average level of agreement with each statement, while the standard deviation was used to measure the dispersion of responses. Higher mean values indicate stronger agreement with the statements, whereas lower mean values reflect lower agreement. A smaller standard deviation suggests that respondents had similar opinions, while a larger standard deviation indicates more variation in responses.

The descriptive analysis was conducted for the main study variables, namely Perceived Behavioural Control, Environmental Awareness, Social Influence, Personal Beliefs and Concerns, and Behavioural Intention. The results of each construct are presented in the following subsections.

6.2.1 Perceived Behavioural Control

Perceived Behavioural Control refers to the extent to which respondents perceive that they have the knowledge and sufficient resources to engage in a sustainable housing behaviour within VOAS residence. It reflects student’s confidence in their ability to perform environmentally responsible behaviours such as recycling, reducing waste, and managing resources effectively.

Descriptive statistics were used to examine respondent's thoughts of Perceived Behavioural Control through mean values and standard deviations. The results presented in Table 6 provide an overview of the level of agreement and consistency of responses regarding the Perceived Behavioural Control items.

Table 4. Perceived Behavioural Control

Descriptive statistics					
	N	Minimum	Maximum	Mean	SD
I know how to recycle my household waste	114	1	5	4.24	0.823
I know how to take my household waste for recycling	114	1	5	4.14	1.003
I know the services municipalities provide for recycling	114	1	5	3.55	1.263
I have plenty of opportunity to recycle	113	1	5	3.48	1.135
I find it easy to follow waste sorting guidelines in my accommodation	115	1	5	3.84	1.167
Valid N (listwise)	113				

Descriptive statistics of PBC are shown in Table 6. The scores average ranged between 3.84 and 4.24, suggesting a favourable attitude of the respondents towards their recycling self-efficacy. The greatest mean score was noted for **“I know how to recycle my household waste" (M = 4.24, SD = 0.823)**, suggesting that the survey participants were familiar with recycling. **The respondents also agreed that they know how to collect household waste for recycling** (M = 4.14, SD = 1.003).

Another statement, **"I find it easy to follow waste sorting guidelines in my accommodation", also achieved a positive mean score (M = 3.84, SD = 1.167)**, implying that respondents were in moderate agreement with the statement.

Yet, respondents were less sure about recycling services and opportunities provided by municipalities, as the statement **“I know the services municipalities provide for recycling” (M = 3.55, SD = 1.263)** and **"I have plenty of opportunity to recycle"** (M = 3.48, SD = 1.135) got relatively lower mean scores. **The standard deviations ranged between 0.823 and 1.167**, which shows moderate variation. The low standard deviation for the first statement confirms greater agreement among respondents, while higher standards deviations reveal different views on municipal recycling services and recycling opportunities.

Overall, the findings suggest that respondents largely believe themselves as capable of recycling household waste, although improvements in awareness of local recycling services and access to recycling opportunities may further strengthen sustainable housing behaviour.

6.2.2 Subjective Norms

Subjective Norms refer to the social pressure people experience from society who are important to them, such as friends, family members, roommates, or the society, regarding engagement in sustainable housing behaviours. It reflects the environment to which social influence encourages respondents to practice behaviours such as recycling and reducing waste and act in an environmentally friendly way.

Descriptive statistics are used to examine respondents’ perceptions of Subjective Norms through mean values and standard deviations. The results presented in Table 7 provide an overview of the level of agreement and consistency of responses related to social influence on sustainable housing behaviour.

The mean values and standard deviations of each statement are discussed in the following table.

Table 5. Data Related to Subjective Norms

Descriptive statistics					
	N	Minimum	Maximum	Mean	SD
People around me expect me to sort waste properly	114	1	5	3.46	1.184
I feel social pressure to act in an environmentally responsible way	113	1	5	2.89	1.404
I am influence by social expectations to behave sustainably	114	1	5	3.46	1.277
My friends and peers encourage me to recycle	115	1	5	3.12	1.251
I would feel uncomfortable I did not follow waste sorting practices like others	114	1	5	4.08	1.090
Valid N (listwise)	111				

In the table it has been observed that the mean scores ranged between 2.89 and 4.08, suggesting mixed perceptions about the social influence on sustainable waste management behaviour. The statement **"I' would feel uncomfortable if I did not follow waste sorting practices like others"** received the highest mean (M = 4.08, SD = 1.090), indicating respondents were influenced by some common waste sorting practices and norms of the country they are living in.

Average agreement was found for the statements **“People around me expect me to sort waste properly”** (M = 3.46, SD = 1.184) and **“I am influenced by social expectations to behave sustainably”** (M = 3.46, SD = 1.277), suggesting that the respondents somewhat had expectations from others in terms of sustainable behaviour. A mean of 3.12 (SD =

1.251) was found for the statement **“My friends and peers encourage me to recycle"**, indicating a neutral to slightly positive perception of peer encouragement.

The lowest mean was obtained for "**I feel social pressure to act in an environmentally responsible way"** (M = 2.89, SD = 1.404), indicating that respondents do not strongly perceive social pressure. **The standard deviations (SD) ranged from 1.090 to 1.404**, suggesting moderate variability. The large standard deviation for a social pressure indicates a variation in social feeling among respondents, while low variation was found for discomfort from not following a typical waste sorting practice.

Overall, the findings indicated that Subjective Norms had a moderate influence on respondent’s sustainable housing behaviour, with indirect social expectations appearing stronger than direct pressure from others such as friends and family.

6.2.3 Personal Norms

Personal Norms refers to the willingness of a person to behave in an environmentally friendly way. Person feels that it is their duty to perform accordingly. They engage in activities such as recycling or reducing the waste, and they perform these activities based on their own values and beliefs.

Descriptive statistics were used to examine how much respondents engage in an recycle activities based on their own moral obligations. The result presented in the table provide an overview of the level of agreement and consistency of responses related to individual’s moral responsibility towards sustainable housing behaviour.
The values of mean and standard deviations of each statement are discussed in the following table below.

Table 6. Personal Norms

Descriptive statistics					
	N	Minimum	Maximum	Mean	SD
I feel morally obligated to sort my waste	115	1	5	4.23	1.087
I feel responsible for reducing environmental harm	114	1	5	4.39	0.992
I would feel guilty if I did not recycle	115	1	5	4.27	1.012
I believe it is my personal duty to act sustainably	114	1	5	4.46	0.997
Valid N (listwise)	113				

From the table above the average mean scores ranged from 4.23 to 4.46, and were high, indicating that respondents mostly agree that they have personal responsibility for sustainable action. The highest average value was for the statement **"I believe it is my personal duty to act sustainably"** (M = 4.46, SD = 0.997), suggesting that respondents have a belief in personal responsibility for sustainability.

Similarly, respondents agreed with the statements **"I feel responsible for reducing environmental harm"** (M = 4.39, SD = 0.992), **"I would feel guilty if I did not recycle"** (M = 4.27, SD = 1.012) and **"I feel morally obligated to sort my waste"** (M = 4.23, SD = 1.087). These results indicate that the respondents are very intrinsically motivated and ethically committed toward sustainable housing practices. The standard deviations range from 0.992 to 1.087, which indicates low to moderate variability. This suggests there was high agreement among respondents, with some variability.

Overall, the findings suggest that Personal Norms has a strong influence on sustainable housing behaviours as respondents are driven by their sense of moral responsibility and personal responsibility to act sustainably.

6.2.4 Sustainable Waste Management Behaviour

Sustainable Waste Management Behaviour refers to the practices of the respondents, related to proper waste handling, such as sorting waste, recycling, reducing waste generation and following the waste shorting guidelines in the accommodation they live in. It reflects the extent to which respondents translate their knowledge, habits, and norms into real environmentally responsible actions.

Descriptive statistics were used to examine respondents sustainable waste management behaviour through mean values and standard deviations. The result presented in table 9 provide a reflection of the level of engagement of the people in sustainable waste management practices.

Table 7. Sustainable Waste Management Behaviour

Descriptive statistics					
	N	Minimum	Maximum	Mean	SD
I separate waste even when it is inconvenient	115	1	5	3.81	1.115
I actively try to reduce the amount of waste I produce	115	1	5	3.90	1.103
I follow waste sorting rules consistently	115	1	5	3.97	1.112
I participate in recycling whenever possible	114	1	5	3.98	1.047
Valid N (listwise)	114				

The mean score ranged between 3.81 and 3.98, suggesting that the respondents have a moderate to high level of engagement in sustainable waste management. The statement with the highest mean value was **“I participate in recycling whenever possible"** (M =

3.98, SD = 1.047), indicating that respondents generally engage in recycling activities when it is convenient for them.

Likewise, **respondents also demonstrated positive behaviour in terms of practising to waste sorting regulations** (M = 3.97, SD = 1.112), and **trying to reduce waste** (M = 3.90, SD = 1.103). This suggests that the respondents have positive behaviour towards waste management in their everyday routines. The statement with the lowest mean score was **"I separate waste even when it's inconvenient"** (M = 3.81, SD = 1.115), which suggests that convenience plays a role in the performance of sustainable practices.

The standard deviations ranged from 1.047 to 1.115, suggesting moderate variability. This indicates that although many respondents participate in sustainable practices, there are variations in the consistency of their behaviour.

In summary, this suggests that respondents demonstrate moderate sustainable waste management practices, with higher engagement in convenient behaviours and lower engagement in behaviours requiring more effort. Bases, on these findings, VOAS should prioritize reducing the inconvenience. Well-located waste sorting points, clear instructions, and user-friendly systems can promote consistent waste management practices among residents.

6.3 Correlation Analysis

Table 8. Correlation Analysis

	Variables		1	2	3	4
1	PBC	Pearson Correlation	1	0.290**	0.373**	0.535**
		Significant level		0.002	<0.001	<0.001
2	Subjective Norms	Pearson Correlation	0.290**	1	0.432**	0.355**

		Significant level	0.002		<0.001	<0.001
3	Personal Norms	Pearson Correlation	0.373**	0.432**	1	0.695**
		Significant level	<0.001	<0.001		<0.001
4	SWMB	Pearson Correlation	0.535**	0.355**	0.695**	1
		Significant level	<0.001	<0.001	<0.001	

Note: **Correlation is significant at the 0.01 level (2-tailed)

To explore sustainable behaviour among international student, quantitative research was conducted to identify the factors affecting sustainable behaviour. The correlation analysis was used to examine the key relationships between four variables: Perceived Behaviour Control, Subjective Norms, Personal Norms and Sustainable Waste Management Behaviour. The analysis was conducted on 115 international students residing in VOAS housing. The purpose of conducting this analysis is to identify how the above variables are connected and to find out which factors are strongly correlated with sustainable waste management behaviour.

6.3.1 Correlation between Personal norms and sustainable waste management behaviour

From the analysis of the above table, the SWMB dependent variable and all three independent variables present meaningful relationships. Among them, the analysis shows that Personal norms have the strongest correlation with SWMB ($r=0.695$, $p<0.001$). This analysis presents a highly significant positive correlation, meaning that student who feel personally environmental responsible are more likely to engage in sustainable behaviour practices. This correlation indicates that personal values play a crucial role in shaping their consistency in sustainable behaviour.

6.3.2 Correlation between PBC and sustainable waste management behaviour

From the above correlation analysis table, it is observed that PBC shares the second strongest correlation with SWMB ($r=0.535$, $p<0.001$). This relation explains that students who have knowledge, access to opportunities and confidence to manage waste effectively are likely to participate in sustainable waste management behaviour. From the practical aspects, it highlights the importance of ensuring that students who have knowledge, access to the infrastructure facilities, and a sense of responsibility to perform sustainable behaviour within the student housing.

6.3.3 Correlation between social norms and sustainable waste management behaviour

On the other hand, the correlation between subjective norms and SWMB shows weaker relations ($r=355$, $p<0.001$). This correlation analysis explains that social influence such as peer pressure or one expectation from the community, does not drive sustainable waste management behaviour among international students.

6.3.4 Inter-correlation among independent variables

Apart from the relationships between the dependent variable and the independent variables, it is imperative to conduct a correlation analysis between the three independent variables. PBC and SN show a moderately positive correlation between them ($r=0.432$, $p<0.001$). Their correlation indicates that students who get stronger social expectations about sustainability are likely to adapt personal moral obligations as their own. Similarly, between PBC and personal norms has a moderate positive relation ($r=0.373$, $p<0.001$). This relationship explains that students who believe personal moral obligations towards sustainability tend to perceive themselves as more knowledgeable and capable of performing sustainable behaviours. Lastly, PBC and subjective norms have a weaker intercorrelation ($r=0.290$, $p=0.002$). The finding from the analysis indicates that behavioural control is more individually developed which is more shaped by knowledge and capacity rather than by what an individual student expects from their surroundings.

Overall, the correlation analysis among the variables presents a clear and logical understanding of the factors influencing sustainable behavior among international students living in VOAS housing. All correlations highlight positive and significant results at the level 0.001, validating that perceived behaviour control, subjective norms and personal norms are all connected meaningfully with sustainable waste management behaviour, through to varying degrees.

Personal norms share as a single strongest correlate (r=0.695), reinforcing that students' internal values and moral obligation play a significant role in developing sustainable behaviour. PBC (r=0.535) demonstrates that students who are intended to act sustainably require practical resources and infrastructure support to perform their actions. Subjective norms (r=0.355), which have a weaker driver, but subjective norms are quite moderately associated with personal norms (r=0.432) refers that supportive housing surroundings can help to develop individual commitment to sustainability over time. The analysis concludes that sustainable waste management behaviour is not just developed by one factor, but it comes from a combination of factors, personal values, perceived behaviour, and social influence of the environment around them.

6.4 Regression Analysis

In this chapter, multiple regression analysis is carried out to examine how sustainable behaviour among international students is affected by personal norms, perceived behaviour, and subjective norms. The regression analysis model gives both predictive and explanatory perceptions of the three independent variables influencing the dependent variable (sustainable waste management behaviour) Three independent variables are included in this regression analysis model: personal norms, perceived behaviour control, and subjective norms. These variables are theoretically formed from the TPB and Value belief norm theory.

Table 9. Regression Analysis

Independ Variables	Unstandardized Coefficients B	STD.Error	Standardized Coffi-cients Beta	Sig.
PBC	0.352	0.075	0.317	<0.001
Subjective Norm	0.018	0.074	0.017	0.804
Personal Norm	0.599	0.076	0.569	<0.001
Dependent Variable: SWMB				

Firstly, personal norms appeared as the strongest predictor of sustainable waste management behaviour (B=0.569, P<0.001). This result indicates that student internal moral obligations strengthened awareness of consequences and a sense of responsibility, which are the key drivers of sustainable actions. Secondly, perceived behaviour control was also a statistically significant predictor (B=0.317, p<0.001). Students who feel more capable of performing waste management behaviour, such students who have sufficient knowledge and access to recycling facilities, are increasingly participating in sustainable behaviour. This outcome reconciles with Ajzen (1991) Theory of Planned Behaviour, which recognizes perceived behaviour control as a key factor for both actual and intentional behaviour. Lastly, in this model subjective norms did not significantly predict behaviour (B=0.017, p=0.804). The results suggest that perceived expectations and social pressure from peers do not consider performing certain actions. Therefore, this analysis presents subjective norms to have a weaker impact on developing habitual behaviours.

By associating descriptive statistics, reliability analysis, correlation analysis, and regression analysis, a more thorough and reliable analysis of the hypothesis is obtained. In this study, three hypotheses are developed, and each hypothesis is evaluated using statistical evidence that identifies the relationship between each independent variable and dependent variable. All hypothesis testing results are presented in a table.

H1: Perceived behavioural control significantly influences sustainable waste management behaviour among international students.

As per the statistical testing of the independent variable influence on dependent variables, Hypothesis 1 is supported. The results suggest that perceived behaviour control is a determinant to increase sustainable behaviour when such behaviour is likey to depend on accessibility, infrastructure facilities, knowledge such as well-maintained waste disposal areas, waste sorting guidelines, and labelled recycling stations (Bardus and Massoud, 2022). Therefore, statistical outcomes significantly play a role in developing sustainable waste management behaviour.

H2: Subjective norms significantly influcene sustainable waste management behaviour among international students.

From the testing of an independent variable, Hypothesis 2 is not supported. The variance between the significant correlation ($r=0.355$, $p<0.001$) and non-significant regression analysis ($B=0.017$, $p=0.804$) it is analysis suggested there is no association between subjective norms and sustainable waste management behaviour. Additionally, it was noticed that shared variance between subjective norms with other two factors, especially personal norms ($r=0.432$, $p<0.001$). The results suggested that social influence has not direct impact on sustainable behaviour, furthermore, students who are adjusting in unfamiliar sustainable cultural environment peer pressure or expectation does not have adequate consistent influence on sustainable behaviour. Therefore, findings do not suggest a potential role of subjective norms influencing sustainable behaviour.

H3: Personal Norms significantly influence sustainable waste management behaviour among international students.

The analysis is based on clear and underlying evidence from the strongly supported Hypothesis 3. This hypothesis is developed from the Value Belief Norm theory to examine pro-environmental behaviour as the most reliable attribute that makes individuals act in

sustainable ways. In VOAS housing students, sustainable behaviour is most powerfully driven by what they personally feel obligated.

Table 10. Hypothesis Testing Summary

Hypothesis	Pearson r	Standardized coefficients beta	P value	Decision
H1: PBC	0.535**	0.317	<0.001	Supported
H2: SN	0.355**	0.017	0.804	Not supported
H3: PN	0.695**	0.569	<0.001	Strongly supported

7 Discussion

This thesis set out to analyse the variables that affect sustainable waste management behaviour in an international student with particular focus on the subjective norms, personal norms, and perceived behavioural control. The analysis has been carried out with the help of descriptive statistics, reliability analysis, correlation analysis, and multiple regression analysis to obtain a clear picture of the relationships between the variables.

The descriptive statistics show that respondents tend to show a positive tendency towards sustainable waste management behaviour in general. The average score of the items of sustainable behaviour lies between about 3.81 and 3.98 indicating that students are moderately involved in the activities like waste separation, recycling, and minimisation of waste production. This is an indication of a relatively high level of awareness and engagement in sustainable practices among the respondents.

Personal norms had the highest mean value in terms of independent variables compared to all the constructs. As an example, the finding that students have a strong sense of moral responsibility towards environmental sustainability as seen in items like the responsibility to mitigate environmental harm (mean = 4.39) and viewing sustainability as a personal responsibility (mean = 4.46) shows that students have a strong ethical sense of responsibility towards the environment.

In the same way, the perceived behavioural control also showed the comparatively high mean values, especially, regarding the knowledge about the recycling (mean = 4.24) and the knowledge about how to handle household waste (mean = 4.14). This implies that learners tend to believe that they can take sustainable measures. Nevertheless, there are some products like awareness of municipal services (mean = 3.55) and availability of opportunities (mean = 3.48) that suggest that there could be some external limitations to behaviour.

However, subjective norms have relatively lower mean values. Although respondents admit that the individuals surrounding them put pressure on them to act in a sustainable manner (mean = 3.46), the intensity of perceived social pressure to act in a way that is environmentally responsible is comparatively lower (mean = 2.89). This implies that the presence of social influence does not necessarily mean that it is a good motivational factor towards sustainable behaviour among international students.

The reliability analysis indicates that all measurement scales in this study are internally consistent and reliable. The values of alpha of all constructs are above the acceptable value of 0.7, which means that the reliability is good. In particular, the levels of reliability of personal norms ($\alpha = 0.853$) and sustainable waste management behaviour ($\alpha = 0.832$) are high, whereas the levels of internal consistency of perceived behavioural control ($\alpha = 0.791$) and subjective norms ($\alpha = 0.701$) are acceptable. This guarantees that the measurement items with which the study was carried out are reliable and can be analysed further.

The correlation analysis findings indicate that sustainable waste management behaviour is positively and significantly related to all the variables. Personal norms are the most closely related to behaviour ($r = 0.695$, $p < 0.001$), which implies that moral responsibility and sustainable behaviours are closely related. There is also a strong positive relationship between perceived behavioural control ($r = 0.535$, $p < 0.001$), indicating that students who believe that they can do sustainable behaviour have a higher likelihood of committing the behaviour. The relationship between the subjective norms and the other topics is moderate ($r = 0.355$, $p < 0.001$), which means that the social influence affects the issue, but less significantly.

In addition, multiple regression analysis gives a more insight on the predictive ability of the variables. The general model is also statistically significant ($F = 49.356$, $p < 0.001$) which means that the independent variables are collectively significant in explaining sustainable behaviour. The model describes the sustainable waste management behaviour

variance of about 57.2 percent (R 2 = 0.572) which can be said to be a significant amount of explanatory power.

Of the predictors, personal norms are identified as the most important and significant predictor of behaviour ($\beta = 0.569$, $p < 0.001$), and the perceived behavioural control (0.317, $p < 0.001$). These results demonstrate that internal (personal responsibility and perceived ability) are critical in determining sustainable behaviour. However, the subjective norms were statistically non-significant, indicating that social pressure or external expectation do not significantly predict behaviour in this case.

Generally, the results of this research reveal that the sustainable waste management behaviour of international students is mainly influenced by internal factors and not external social factors. The perceived ease of undertaking sustainable behaviour and personal values seem to be the most significant influences on behaviour.

7.1 Link with Previous Studies

Our hypothesis was derived from the two theories, Theory of planned behaviour and Value belief norm theory. Under Theory of Planned Behaviour two hypothesis were developed. We measured how Perceived Behaviour Control, Subjective Norms and Personal Norms influence sustainable waste management behaviour. Our study found that Perceived Behaviour Control and Personal Norms positively influence sustainable waste management behaviour, whereas Subjective Norms have no influence on waste management behaviour.

This study has found that the results are in line with other past studies which have demonstrated the relevance of internal factors in influencing sustainable behaviour. An example of study is Waxin et al. (2025) and Söderberg et al. (2022), which demonstrated a significant impact of personal norms and a perceived control on the behaviour of recycling and waste management. Similarly, the findings of the current research study have

shown that the strongest predictor of behaviour is personal norms, and then perceived behavioural control, highlighting the role of moral responsibility and perceived ability.

Also, the vital role of personal norms in this research is supported by the previous studies which employed the value belief Norm Theory, and which suggested that the moral obligation is the central element in pro-environmental behaviour. Likewise, Li et al. (2023) have discovered that personal norms are a critical factor in influencing environmental behaviour among students, supporting the significance of internal motivation.

Nevertheless, the results obtained about subjective norms are dissimilar to a few past investigations. Although previous studies, including Waxin et al. (2025) found that subjective norms can have a significant impact on behaviour, the current study discovered that subjective norms are statistically insignificant. This disparity can be explained by the fact that the context of international students is such that cultural diversity and language barriers can diminish the consistency of social expectations and limit the impact of social pressure.

Moreover, it has been argued in the past that young people tend to have a high level of environmental concern, but this is not necessarily reflected in behaviour. As an example, Zámečník and Tahal (2025) discovered that despite the high awareness of the sustainability concept among Generation Z, they might be less willing to act. This confirms the results of the current research, in which not all influencing factors yield equal effect in behaviour.

The results of this study add value to the existing literature by confirming the significance of personal norms and perceived behavioural control and contribute to previous research by showing that social influence may not be a key ingredient that influence the sustainable waste management behaviour.

7.2 Theoretical Explanation

In this paper, two theoretical frameworks are applied to guide the research: the TPB and VBN theory. In this section, theoretical explanation is provided to confirm the extent to which the statistical results of this study match with theories that promote sustainable behaviour. By connecting the findings of data, this section explains to what degree the research has successfully addressed research questions and objectives.

7.2.1 Theory of Planned Behaviour alignment with results

In this study, TPB was used by measuring perceived behaviour control and subjective norms to identify sustainable waste management behaviour. According to Ajzen, perceived behaviour control demonstrates individual's perception of ease or difficulty of performing certain behaviour, which plays a significant to influence behavioural intention. From the survey data and its findings, PBC significantly and positively shape sustainable behaviour among international students living in VOAS housing and these results was validate by statistical analysis from correlation ($r=0.535$, $p<0.001$), and regression analysis (B:0.317, $p<0.001$). Furthermore, the descriptive statistics analysis confirmed that who have knowledge and confident in their ability to recycle ($M=4.24$, $SD=0.823$), how to dispose of household waste ($M=4.14$, $SD=1.003$), but lower scores were obtained where awareness of recycling services provided by municipal($M=3.55$, $SD=1.263$) and recycling opportunities ($M=3.48$, $SD=1.135$).

These results shows that even though student have basic knowledge of waste disposal, infrastructure barrier and are unaware of local system decrease perceived behaviour and sustainable behaviour. This paper finding also align with earlier research carried out in student housing by Söderberg, Wester, and Jonsson (2022) recycling behaviour is influenced by perceived behaviour control when there are clear recycling instructions, accessible to facilities and convenient.

As per the subjective norms proposed by TPB, social influence such as peers, roommates play a role in influencing behaviour, however, in this study finding subjective only partially encourage sustainable behaviour. As per the statistical regression analysis (B=0.017, P=0.804), subjective norms did not significantly and independently promote behaviours. Similarly, descriptive statistics suggest that students respond reported lower scores for direct social influence (M=2.89, SD=1.404) and encouragement to recycle by peer (M=3.12, SD=1.251).

In VOAS housing, transient residents and diverse cultural backgrounds from different countries reside. When international students come from divergent backgrounds, they may have limited peers and students who are adapting in new country and new culture there may be less influence by peer pressure.

7.2.2 Value Belief Norm Theory and its association with results

The VBN Theory is applied in this research to study how personal norms an independent factor, influence sustainable waste management behaviour. The survey data findings collected from the self-reported behaviour of international students living in VOAS housing provide strong support for personal norms. The Pearson correlation analysis, regressions analysis along with descriptive statistics validate the alignment.

The collected respondent data consistently examine high mean scores across all personal norms. These meaning international student feel morally obligated to sort waste (M=4.23, SD=1.087), feel responsible (M=4.39, SD=0.992), feel guilty if they don't recycle(M=4.27, SD=1.012), and believe it is a personal duty to act sustainably (M=4.46, SD= 0.997). This outcome is theoretically significant because it suggests strong and consistent moral obligations among the respondent group. In this multicultural and transient student housing, students who feel morally responsible for awareness of environmental consequences are the most consistent participations in sustainable waste management behaviour.

The finding of this study successfully addressed the research questions and objectives at the beginning of the thesis. Perceived Behaviour Control and Personal Norm have noteworthy influence on sustainable waste management behaviour, supporting the component of Theory of Planned Behaviour. Respondents were motivated to recycle on their own, because they believe this is their responsibility to short the waste and engage in recycling activities. However, if there will be more opportunity to recycle and if the landlord organizes activities, targeting the tenant regarding waste recycling will influence and motivate the individuals to recycle more.

Our study found that social influences do not have direct influence on sustainable waste management behaviour. Rather than engaging in recycling activities by getting influenced by peers or society, people engaged in the activities willingly and they have knowledge related to recycling. Organizing more activities related to waste management is likely to motivate individuals and engage in more sustainable practices.

7.3 Study Limitations

While studying sustainable behaviour among international students, valuable insights have been gained along with several limitations acknowledged. Firstly, this paper relies upon self-reported survey data, which may introduce susceptible response bias data. Students who participate in this survey may not have accurately mentioned their actual habits, and similarly, may have overemphasized their sustainable behaviours because of social agreeableness. Due to this, survey findings may not fully coincide with real behaviour in everyday practices.

Secondly, this research only focuses on international students living in VOAS housing and excludes local students, as well as different resident housing, which restricts the applicability of the findings. Thirdly, to understand sustainable behaviour data is obtained by a quantitative method, which limits the comprehensive understanding of students' perspectives, motivations, and experiences. While qualitative method may help to achieve valuable insights. However, statistical methods help determine relationships, but it does not fully cover the factors, reasons or contextual factors influencing behaviour.

In this study region and length of stay in Finland are considered control variables, with diverse cultures among international students may limits to fully understand the dynamic environment with diverse cultural values, beliefs, and practices on sustainable behaviour. Lastly, the design of the study where the data is collected at duration of the research however, it does not fully demonstrate transform of behaviour of international students where they have adapted to the Finnish waste management system during their stay.

8 Conclusions

The findings of the thesis concluded that international students exhibit a moderate to elevated level of engagement in sustainable waste management practices. The descriptive results show that students are actively involved in activity such as recycling, waste separation, and reducing waste generation. This indicate that there are a general awareness and willingness among students to adapt environmentally responsible practices within student housing environments.

Perceived Behavioural Control was found to have a significant positive influence on behaviour. This result suggests that students are more likely to engage in sustainable practices when they feel capable of doing so and when they are provided with necessary resources and knowledge. Factors such as clear recycling systems, accessible disposal facilities, and understanding of waste management procedures contribute to higher willingness to recycle. This also supports the theory of TBP where behaviour is determined based on perceived ease or difficulty.

Likewise, Subjective Norms was found to have a negative influence on behaviour. This indicate that social pressure or expectations from others do not significantly affect students' behaviour in the context. This may be due to diverse cultural backgrounds of students where social norm may vary among students. Additionally, language barriers and differences in communication may limit the impact of social influence, making it less effective in shaping behaviour.

8.1 Recommendation

Improving waste management infrastructure

While studying perceived behaviour control, physical accessibility, and infrastructure facilities play a significant role in sustainable behaviour. To encourage more recycling participation, recycling bins must be kept near to student residences. Additionally, as shown

in Figure 2, waste bins number and capacity must be increased with the frequency of waste collection because overflowing of bins discourages recycling habits and leads to incorrect waste disposal. Focusing on infrastructure, it led to strengthening perceived control.

Focusing on communication and awareness

Another major obstacle is the lack of clear guidelines and knowledge on waste sorting. Firstly, all waste management guidelines should be provided to all international students in an understandable language. While communicating guidelines, it should be presented visually, such as posters and signage must include a clear image of waste items, which helps to explain the correct way of waste sorting. As there are already colour coding bins in disposal areas in VOAS housing, they can make it more efficient by adding the following pictures in respective bins, which helps to reduce confusion and improve waste sorting.

Figure 3. Picture illustrating bio waste, mixed waste in the Nummela waste sorting point (photo taken by author)

Strengthening social influence

This study has identified that sustainable behaviour is not influenced by social influence. But the green ambassador programme can be introduced where international students actively promote sustainable waste management behaviour within their residences.

Similarly, housing-based campaigns and competitions can be introduced where students share videos or their everyday waste sorting habits of how they sort waste and recycle, this could increase active participation by providing a feasible incentive such as groceries or gift vouchers.

Policy and collaboration with the university and waste management companies

Collaborate with the university and waste management companies to develop awareness of waste management. This can be achieved by developing a program like Vaasa Hack, where students can participate in the program and discuss sustainable waste management behaviors, the importance of waste sorting, and how they can adapt to the VOAS waste management practices. At the same time, students who participate in the program can get academic credits.

Additionally, consistent monitoring and feedback systems should be implemented by showing which housing areas or building areas are recycling correctly for example, Palosaari Ahventie building recycled 20% more this month, when students see that their building is performing sustainable behaviour correctly, it make more morally obligated to perform recycling habits.

Addressing Cultural differences in recycling practices and supporting transient students

In VOAS, a large number of international students reside with diverse cultural backgrounds, impact the waste management system. It is necessary to give support for cultural adaptation, demonstrating the importance of the Finnish recycling system and how individual participation is important. To address this, all new students should be provided with recycling guidelines with basic instructions for waste sorting and how bins are labelled. To encourage participation, a visually stimulative presentation can be sent to new residents, such as a video of the impact of improper waste sorting in student

housing, how their proper sorting habits can bring changes, at the same time mentioning Finnish waste management regulations. Time signage and reminders can be kept in the apartment's kitchen spaces. This act can help to reinforce correct practices over a time.

Hence, to improve sustainable waste management behaviour among international students, it is necessary to determine behavioural and structural barrier. Therefore, having improved infrastructure and clear communication, helping them adapt to a new waste management system culture, could help to increase the everyday practices within housing.

8.2 Future Research

This study provides various insights into sustainable waste management behaviour among international students; however, there are several opportunities for further research. First, we have taken only international students and focused on one housing provider. Further studies could include a larger and more diverse sample size, and can study behaviour. This study provides various insights into sustainable waste management behaviour among international students, however there are several opportunities for further research. First, we have taken only international students and focused one housing provider. Further studies could include a larger and more diverse sample size and can study behaviour across universities and cities in Finland to improve generalizability of the findings.

Second, this study focused on selected components of the Value- Belied Norm Theory and Theory of Planned Behaviour. Future research can include other theories and add situational factors, to provide a more detail understanding of sustainable behaviour. Likewise qualitative research methods such as interviews and focus groups, could be used to gain deeper understanding of the challenges faced by international students.

Finally, future research could explore the effectiveness of specific interventions, such as awareness campaigns or improved waste management systems, in promoting sustainable behaviour.

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Appendices

Appendix 1. Questionaries

Do you voluntarily agree to participate in the study?

Demographic Information

1. Age group
2. Region of your home country.
3. Length of stay in VOAS.
4. Gender

Independent Variable

Part 2: Perceived Behavioural Control (H1)

1. I know how to recycle my household waste
2. I know how to take my household waste for recycling
3. I know the services municipalities provide for recycling
4. I have plenty of opportunity to recycle
5. I find it easy to follow waste sorting guidelines in my accommodation.

Part 3: Subjective Norms (H2)

1. People around me expect me to sort waste properly
2. I feel social pressure to act in an environmentally responsible way.
3. I am influenced by social expectations to behave sustainably
4. My friends and peers encourage me to recycle
5. I would feel uncomfortable if I did not follow waste sorting practices like others.

Part 4: Personal Norms (H3)

1. I feel morally obligated to sort my waste

2. I feel responsible for reducing environmental harm

3. I would feel guilty if I did not recycle

4. I believe it is my personal duty to act sustainably

Dependent Variable

Part 5: Sustainable Waste Management Behaviour

1. I separate waste even when it is inconvenient

2. I actively try to reduce the amount of waste I produce

3. I follow waste sorting rules consistently

4. I participate in recycling whenever possible.