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Change in Sustainable Waste Management Behaviour in Oil Palm Community: Application of the Theory of Planned Behaviour

Safraa Sapawi [1], Albattat Ahmad [1,*], Marco Valeri [2] and Norhidayah Azman [3]

[1] Graduate School of Management, Management and Science University, Shah Alam 40100, Selangor, Malaysia; safraasapawi@msu.edu.my
[2] Organisational Behaviour, Faculty of Economics, Niccolo Cusano University, 00166 Rome, Italy; marco.valeri@unicusano.it
[3] Faculty of Business Management and Professional Studies, Management and Science University, Shah Alam 40100, Selangor, Malaysia; norhidayah_azman@msu.edu.my
* Correspondence: dr.battat@msu.edu.my

Abstract: The inability to effectively manage waste has evolved into one of the most significant challenges faced in oil palm plantations, and this failure has had an impact on the operations within the plantation. This study examines how attitudes (ATT), subjective norms (SN), and perceived behavioural control (PBC) affect both behavioural intention (BI) and sustainable waste management behaviour (SWMB) in the palm oil mills of Sabah, Malaysia. The theory of planned behaviour (TPB) serves as the primary theory in this research, which uses a conceptual framework. Distributed questionnaires to the top management of 133 oil palm mills were used to gather the data, and then they were processed using Smart-PLS V4. This research found out that SN and PBC have an influence on individuals' BI and SWMB adaptations in Sabah's oil palm mills. The SN was shown to have the strongest association between the SWMB and BI. However, attitudes resulted in no impact on either the intention to engage in sustainable waste management behaviour or on the actions themselves. Ultimately, the findings of this study will give a framework for the governance of palm oil waste in Malaysia by contributing to the development of a legislative and regulatory framework in this area that is more effective.

Keywords: attitude; subjective norms; perceived behavioural control; waste management behaviour; behavioural intention; sustainability

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1. Introduction

The government's initiatives to diversify agricultural exports have spurred a rapid development of the oil palm milling sector in Malaysia since the 1970s. A total of 112.91 million tonnes of fresh fruit bunches (FFBs) could be produced annually by the 452 operational mills in 2019. According [1], this sector greatly boosted the earnings of the oil palm industry in 2019, bringing in RM38.03 billion (USD 9.3 billion) [2]. Domestic demand for palm oil has been projected to rise by more than 200 percent to 1.4 million tonnes in 2035 for use in food, industrial non-edible products, and biodiesel, with exports expected to climb by more than 25 million tonnes [3] Given Malaysia's lack of arable land, it is crucial that the government and industry concentrate on using cutting-edge technologies to meet anticipated demand increases between 2021 and 2030. Additionally, due to commercial pressure from industrialised nations and in light of the alarming rates of deforestation and their effects on climate change and global warming, the government has been gradually emphasising the need for green oil palm farming [4].

The palm tree is rich in raw materials, with just 10% of them being oil and 90% being biomass wastes. In 1998, over 90 million tonnes of oil palm fruit were produced, but

between 43 and 45 percent of that amount was made up of mill byproducts like the empty fruit bunch (EFB), palm kernel shell (PKS), and fibre. Currently underutilised, oil palm waste has become a significant disposal issue, as have palm fronds and stems. In order to maximise energy recovery from wastes, it is desirable for both environmental and financial reasons. According to [5], Malaysian palm oil mills produced 84.74 million tonnes of waste biomass in 2010, of which 19.3 million tonnes were EFBs. However, as reported by the Malaysian Palm Oil Board (Bandar Baru Bangi, Malaysia) (2019), Malaysia produced 23.8 million tonnes of EFBs in the same year. A study by [5] found that only 30% of mills were successful in recovering oil palm EFB for use in other applications.

The sustainable waste management practises implemented in palm oil plantations of Sabah, Malaysia, align with the "green agenda" since they actively support the state's efforts to attain palm oil sustainability. Sabah has pledged to attain sustainability certification for all of its palm oil production by 2025, positioning itself as the pioneering jurisdiction worldwide to implement this comprehensive approach [6]. The state is improving integrated landscape management systems to promote the well-being of both people and the environment. This includes prioritising responsible value chains for palm oil and adopting climate-smart and eco-friendly practises [7]. In addition, the government and industry stakeholders are actively endorsing sustainable practises and standards, such as the Malaysian Sustainable Palm Oil (MSPO) certification. They are also adopting environmental management practises to reduce their ecological footprint and address the adverse effects on the environment [8]. The WWF and similar organisations are actively involved in promoting sustainable palm oil production, with a focus on saving orangutan and Bornean habitats [9]. These endeavours are in line with the "green agenda" since they advocate for ecological sustainability, the preservation of biodiversity, and the conscientious management of resources within the palm oil sector.

One of the most pressing issues in the conventional palm oil industry is the unproductive and ineffective treatment procedure for the remaining biomass. The placement of conventional palm oil refineries on plantations far from residential areas suggests that little consideration has been given to the living circumstances of workers. Poor waste management and low energy supplies, such as heat and electricity, are two examples. All agricultural activities, including the production of biomass, contribute as a substantial source of greenhouse gas emissions, primarily due to emissions from soil, despite the fact that it is believed that the carbon dioxide emissions from biomass are neutral [10]. The biomass residue and effluent waste produced annually by the palm oil industry are both significant sources of greenhouse gas (GHG) emissions. Due to the potential for long-term detrimental effects on human well-being, this issue is a key environmental concern for the industry [11].

The palm oil sector in Malaysia has generated considerable apprehension due to its association with environmental pollution problems resulting from the substantial waste produced by oil palm plants. As explained in the research conducted by [12], only 23% of oil palm biomass is utilised as boiler fuel in a palm oil mill, while the remaining 75% is discarded on site. The vast quantity of empty fruit bunches in Malaysia's extensive production of crude palm oil results in the generation of significant quantities of empty fruit bunches (EFBs), which represent a major threat to the environment [13]. Inadequate management and conservation of oil palm waste can lead to significant environmental repercussions [14]. To effectively address these challenges, it is imperative to implement long-term palm oil management strategies [15]. Pollution arises due to inadequate waste management practises. Hence, palm oil production has received extensive criticism due to the substantial and undeniable environmental harm it causes. The destruction and deterioration of tropical and subtropical ecosystems, which are home to the most diverse terrestrial ecosystems on Earth, are mostly attributed to the establishment of oil palm plantations [16].

A significant quantity of biomass, specifically the empty fruit bunch and palm oil mill effluents (POMEs), remains uncollected in the mills. The study conducted by [17] reveals

that the deterioration of empty fruit bunches (EFBs) leads to the emission of non-carbon dioxide greenhouse gases into the atmosphere. In addition to that, there was a study that was reported in 2022 on the Air Pollution Index (API) in Sabah where the data for this study had been collected between the years of 2010 and 2016. Sabah's API index has been brought to the forefront as the subject of this study. Regrettably, the measurement of the index has revealed a concerning pattern in the majority of the regions, particularly in Tawau, which is located in Kota Kinabalu. Tawau, in this particular region, has recorded the highest daily maximum average of Air Pollution Index (API) at 152.53, categorising it as Unhealthy (API: 101-200). However, Kota Kinabalu stands out with the highest average Air Pollution Index (API) score of 33.13. The area exhibits notable spatial variability in the daily API, with a coefficient of variation ranging from 29.87% to 36.06% [18]. With the exception of Keningau and Kota Semarahan, all stations in the Sabah Region display notable patterns.

Meanwhile, the term "intention" refers to one's subjective level of readiness to engage in a behaviour and is a product of one's mental framework. On top of that, ref. [19] asserts that behavioural intention is a trustworthy predictor of conduct. The theory of planned behaviour (TPB) has been widely used to study pro-environmental behaviour in recent years. In addition to being extremely effective at articulating pro-environmental goals, the TPB is frequently employed as a theoretical model in the majority of studies. It is assumed that intentions and behaviours are the same or very similar in many TPB-based research [20]. Nonetheless, [21] assert that altering a person's motivation does not ensure a corresponding alteration in behaviour. In order to close the intention–behaviour gap, researchers advise assessing whether individuals have specific plans (i.e., implementation intention) to create behaviours.

For this reason, we employed a TPB model in order to provide answers to two primary questions. What factor or variables influence intention and sustainable waste management behaviours the most? Are there variations in the way that cognitive and psychological factors relate to sustainable waste management behaviour between the imposition of intention and actual behaviour? Finding evidence-based solutions to these problems can aid in developing sustainable waste management systems in Malaysian palm oil mills, specifically in Sabah.

2. Literature Review and Research Hypotheses

2.1. Theory of Planned Behaviour (TPB)

Ajzen discovered the theory of planned behaviour (TPB) in 1991, which is renowned for being introduced as a typical social psychology framework. Based on the idea of the TPB, a person's intention guides their behaviour, which is then controlled by their attitude, subjective norm, and perceived behavioural control. The theory of planned behaviour describes the overall decision-making process of individual behaviour from the perspectives of information processing and the concept of expected value [22]. With the development of the reasoned action theory, the TPB was created. Its fundamental components are attitude, subjective norms, and behavioural control, all of which can be used to anticipate behavioural intents and actions [23].

The theory of planned behaviour evolved from the notion of reasoned action. As stated in the TPB, a person's behaviour is influenced by their intention to act and their perception of their ability to control their behaviour, whereas their intention to act is influenced by their attitude towards the behaviour, their perception of societal pressures and expectations (subjective norm), and their perception of their ability to control their behaviour. In this theory, individuals will be more willing to perform a behaviour when they have favourable attitudes towards performing the behaviour, perceive greater social pressures and expectations to perform the behaviour, perceive the behaviour to be easy and convenient, and perceive that they have the capacity to perform the behaviour [24]. As reported by [25], the TPB is a strong and effective theory that has been used extensively to explain a variety of personality behaviours, including pro-environmental behaviours like conserving energy, reduction, waste sorting, green purchasing, and low-carbon travel.

However, limited study was conducted in investigating SWMB among oil palm mills in Malaysia, through the TPB. Therefore, with this opportunity, this research is believed to fill the current research gap of social science within the industry.

2.2. Sustainable Waste Management Behaviour

In this study, the behaviour of sustainable waste management is analysed using the 3R practises, such as "Reduce, Reuse, and Recycle", which is also known as a waste management hierarchy [26,27]. Additionally, the hierarchy of waste management is another name for the 3R method. Besides, [28] claim that the adoption of 3R practises enabled SWMB strategies to be formed and aligned and to be divided into different categories, with a primary emphasis on the willingness of individuals to carry out waste management. In line with [29], this 3R practise is a very helpful activity that has been demonstrated to be able to impart countless benefits to society in terms of job vacancy availability, income production, and tax revenue. As stated by [30], reuse is the act of switching an item's primary use from one application to another. Recycling is often described as a process that turns waste into new resources, but this approach not only achieves the recycling objective but also generates financial benefits [30]. Furthermore, according to the Report on Recycling Information, residents must adopt profitable actions and practise less impactful material consumption in order for their country to maintain its competitiveness in the economy, prosperity contribution, and environmental protection. Nevertheless, using the 3R in SWMB for companies, particularly oil palm plantations, is a wonderful move, and this industry needs additional examination based on their lack of waste management in the field.

The 3R (reduce, reuse, recycle) practise is crucial in measuring waste management behaviour as it serves as the foundation for effectively managing waste and fostering a sustainable society that optimises material cycles and resource utilisation [31]. The 3R approach highlights the significance of diminishing trash output, utilising products again, and recycling resources to mitigate the environmental impact [32]. Research has demonstrated that both habits and ideal circumstances have a substantial role in waste recycling behaviour, and additionally, habits have a positive and significant influence on 3R behaviour [33]. Therefore, the assessment of 3R behaviour is essential in examining the efficiency of waste management strategies and promoting the effective utilisation of resources.

2.3. Attitude and Sustainable Waste Management Behaviour

According to [34] attitude is a mental state of readiness organised through experience that has a directive or dynamic effect on the people it is associated with. In resonance with [35], attitude is the propensity or tendency to respond in a particular way to an item, circumstance, or value, typically accompanied by deep feeling and emotion. Another way to think of attitude is as the stick that tends to guide the direction of learning and application.

The findings of a study that was carried out by [3] indicate that attitude has emerged as the most important component in relation to the classification behaviour of domestic garbage. As reported by [36], another recent study on sustainable waste management practices among Malaysian academicians demonstrated a relationship between attitude and sustainable waste management practices. Individual waste management behaviour is influenced by both rationally grounded altruistic-oriented ideas and attitudes [37]. In addition, [38] demonstrated that science students' opinions regarding trash management were consistent with this study. Meanwhile, [39] emphasise the role that attitude contributes in encouraging waste management practices. Nonetheless, it recognises that the relationship between these two variables is complicated and dependent on external circumstances. An intriguing distinction between attitudes and behaviours in the waste management sector has been found by the performed research. Therefore, the following hypothesis is proposed:

Hypothesis 1 (H1). *There is relationship between attitude and sustainable waste management behaviour.*

2.4. Subjective Norms and Sustainable Waste Management Behaviour

A number of research studies have acknowledged that subjective norms can be associated with various research disciplines, including climate change issues [40], cosmetic product purchasing behaviour [41], and waste segregation-at-source behaviour, despite the fact that there is still a lack of research demonstrating that subjective norms act as predictors for this behaviour. According to numerous studies [42], subjective norms is the strongest predictor, followed by attitude. Indeed, respondents stated that a key factor in influencing their own recycling behaviour is the behaviour of their referents.

Concurrently, [43] has noted that when people are open to the societal norm and, more significantly, embrace the norm, recycling behaviours can be changed. This claim is strongly related to the idea of a subjective norm, according to which an individual is persuaded to act in a way that is ideal depending on the endorsement and support of significant social groups [44]. On top of that, [45], who found that the behaviour of others will be influenced by their awareness of the recycling actions of others, raised the same concern. However, a different finding was retrieved from [3], where SN was not significant towards waste classification behaviour in Guangzhou, China. A similar result was identified by [46] in that no relationship between subjective norms and actual behaviour was recorded amongst farmers. Hence, due to the inconsistent results derived by the existing research, consequently, the following hypothesis is put forth:

Hypothesis 2 (H2). *There is a relationship between subjective norms and sustainable waste management behaviour.*

2.5. Perceived Behavioural Control and Sustainable Waste Management Behaviour

Correspondingly, [40] claimed that no specific research has been conducted in Malaysia that focuses on waste segregation-at-source behaviour by using perceived behavioural control as a predictor. The ongoing challenges in Malaysia's long-term implementation of waste segregation-at-source behaviour still call for a larger and better assessment of the current scenario in order to increase the efficiency and efficacy of this policy. Investigating the impact of perceived behavioural control on the behaviour of Malaysian palm oil mills towards waste management at the source is the goal of this study. Individual belief and perception will have a considerable impact on the responsiveness, cultural values, and efficacy of the municipal solid waste management system. Many people had the opinion that their own actions could not significantly affect a certain issue or activity.

Additionally, a study conducted in a professional setting found that attitudes and subjective norms, along with the perceived behavioural control, showed a positive relationship with higher engagement in waste separation activities [47]. There is a positive relationship between both recycling intention and behaviour towards perceived behavioural control [48]. The environmental aspect of this problem stems from the belief and perception that personal behaviour execution can reduce pollution. Furthermore, [49] determined the probability that a specific behaviour would be portrayed in order to have an influence that could be felt. Therefore, due to the existing research that provides numerous positive relationship results on perceived behavioural control and actual behaviour, the following theory is put forth.

Hypothesis 3 (H3). *There is a relationship between perceived behavioural control and sustainable waste management behaviour.*

2.6. Attitude and Behavioural Intention

Any change in attitude will result in an alteration in behaviour since attitude affects behaviour [50]. In order to satisfy their constantly shifting needs and desires, people fre-

quently acquire, modify, or give up attitudes [51]. It is challenging to tell whether people have control over the waste recycling processes because people's behaviours and viewpoints are so unpredictable [52]. In order to find the best solutions to the waste generation issue, waste management experts and researchers have reportedly been attempting to study people's attitudes and behaviours. The word "attitude" describes an emotion, either positive or bad, towards other people that affects how one behaves. Several studies had demonstrated that the role of attitude as the main factor in behavioural study no longer consistently exhibits statistical significance. Attitude was found to have a weak relationship with behavioural intention in a study on the behavioural practice of waste separation [53]. Plus, the lowest impact on the relationship between attitude and behavioural intention was also found by [54].

Nevertheless, a study conducted by [55] revealed that attitude has a greater impact on behavioural intention than other factors. Moreover, a scientific inquiry about the disparity between intention and behaviour has provided insight into the influence of attitude intensity on behavioural intention. As claimed by [56], this study indicates that attitude has a crucial role in shaping both intention and subsequent behaviour. A further in-depth examination is required considering the many inconsistencies in discoveries and facts from existing research. As a result, this study's fourth hypothesis is as follows:

Hypothesis 4 (H4). *There is a relationship between attitude and behavioural intention.*

2.7. Subjective Norms and Behavioural Intention

Since subjective norms concentrate on expectations that a person has about how others evaluate their behaviour, the opinions of coworkers relate to waste management activities in the firm [52]. According to [57], there is a moderately substantial correlation between subjective expectations and sustainable development. According to numerous studies, behavioural intentions are greatly influenced by subjective norms, which they perceive to be reinforced by social groups or other organisations that they are a part of [58]. The current investigation, conducted by [37] was designed to examine the relationship between subjective norms, attitudes, and perceived behavioural control in relation to behavioural intention to conduct waste management among university students in China. This study's findings suggest that there was an association between subjective norms and behavioural intention. Furthermore, a study conducted by [59] investigated the factors influencing residents' waste separation intention in Hanoi, Vietnam. This study utilised the theory of planned behaviour as its theoretical framework and employed a combination of social surveys and semi-structured interviews. The present study examines the determinants that impact the behavioural intention of Hanoi people to engage in waste separation activities and it was determined that there is a positive relationship between attitude and subjective norms, and the intention of residents to separate garbage. However, [60] found that despite having a considerable impact on intention, subjective norms have a clear positive influence on behaviour, but there is a negligible relationship between subjective norms and behavioural intention. As a result of these conflicting findings from the present study, the researcher proposes this hypothesis:

Hypothesis 5 (H5). *There is a relationship between subjective norms and behavioural intention.*

2.8. Perceived Behavioural Control and Behavioural Intention

A small number of scientific studies have suggested that perceptions of behavioural control have a significant influence on behaviour. On the other hand, it has been found that when it comes to reducing waste at work, an individual's behaviour is solely determined by their perception of their ability to regulate their behaviour [61]. Behavioural interventions in waste reduction require a sense of labour empowerment. When it comes to implementing connected empirical plans and maintaining environmental sustainability, businesses must also endeavour to provide their employees with a sense of authority and flexibility [20,62].

According to [63,64], the main psychological components are those that may motivate and stimulate action as well as ease of conduct and behaviour control. In the study executed by [48], it was found that there was a positive relationship between the perceived behavioural control and the perception towards one's ability to influence both behaviour and intention towards recycling. On the other hand, [65] found that perceived behavioural control had the greatest impact on families' intentions to adhere to solid waste management practises. The following supposition was made as a result:

Hypothesis 6 (H6). *There is a relationship between perceived behavioural control and behavioural intention.*

2.9. Behavioural Intention and Sustainable Waste Management Behaviour

A study implemented by [66] suggests that the hypothesis takes into account the beneficial influence of intention on behaviour in relation to reducing food waste. By adopting the TPB, citizens' behavioural intentions are reported, and behaviour affects how people practice a behaviour of recycling and waste management behaviour as in the larger context. The finding from [67] revealed empirical proof of the significant influence where behavioural intention has a significant effect on waste separation behaviour. Based on the results of the structural equation modelling analysis conducted by [68], the main determinants impacting behavioural intention were found to be moral commitments, perceived policy efficacy, and perceived behavioural control. This study's results indicate that behavioural intention is the main factor influencing waste separation behaviour. Meanwhile, a study conducted by [69] has highlighted the significance of intention as a primary factor influencing behaviour. The research provided evidence for the considerable influence of behavioural intention on waste separation activity. Thus, the following hypothesis is put forth.

Hypothesis 7 (H7). *There is a relationship between behavioural intention and sustainable waste management behaviour.*

Based on the developed literature debates above, the theoretical framework illustrates the relationships among the variables included in the seven research hypotheses as depicted in Figure 1.

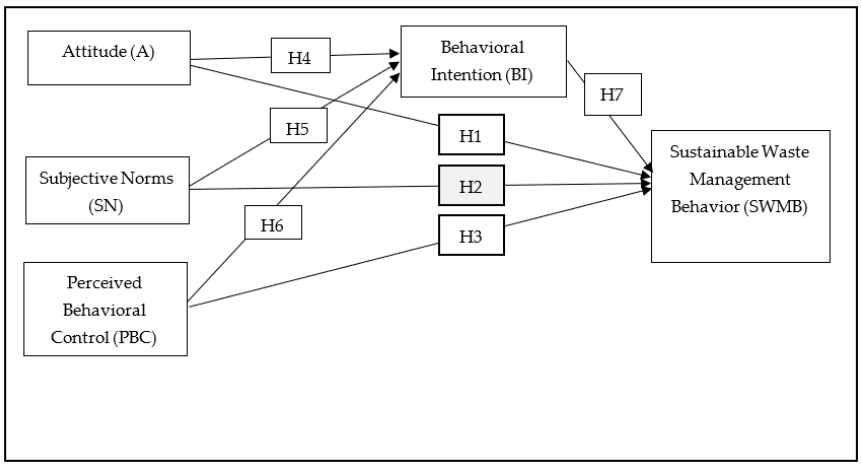

Figure 1. Conceptual framework and research hypotheses (H1–H7) of TPB model measuring behavioural intention (BI) to sustainable waste management behaviour (SWMB) in Sabah's oil palm mills. H1, Hypothesis 1; H2, Hypothesis 2; H3, Hypothesis 3; H4, Hypothesis 4; H5, Hypothesis 5; H6, Hypothesis 6; H7, Hypothesis 7. Source: [23,24].

Since the TPB is adopted in this study, the three antecedents of attitude, subjective norms, and perceived behavioural controls were enrolled as the independent variables,

while sustainable waste management behaviour was the dependent variable to measure the actual behaviour in oil palm mills in Sabah, Malaysia. On top of that, the role of behavioural intention in this framework is an acting dependent variable, in order to measure the direct relationship of independent variables towards the intention.

3. Methodology

3.1. Survey Instrument

With oil palm mills in Sabah, Malaysia, serving as the study population, this research's design took a deductive or quantitative approach. Cross-sectional research is the preferred method since it just requires a single data collection point and may be applied to a variety of research projects [70]. Furthermore, the sampling frame was probability sampling as this study already had a specific sample frame, and we used a census sampling technique. The tool for this study was a self-administered, closed-ended online questionnaire, and the data were obtained using a convenience sampling technique employing 47 items. Convenience sampling is accessible to respondents, affordable, and simple [71]. The questionnaires were distributed to the respective respondents of the top management level of oil palm mills through a Google form. The questionnaires were adapted from the related research literature and were filtered by the Palm Oil Committee from trusted industry before we proceeded to data collection. An ethical approval letter received from the Ethics Committee of university was attached together in the email which reflects that the information retrieved will be kept confidential, while the collected data will only be used for the purpose of this research.

In keeping with earlier studies, this research used a five-point Likert scale to measure the essential indicators. First off, in line with [37], waste reduction, reuse, and recycling (3R) expectations are reflected in the measurement scale on how waste management behaviour is exercised. The questions for this section were adapted to meet the suitability of waste management behaviour practice in oil palm mills. Quantitative standards are essential in facilitating the implementation of recycling, reusing, and decreasing practises in the oil palm business. This study examined the utilisation of cycled oil palm biomass waste as a means to enhance soil health and decrease the reliance on fertilisers. The biomass, including clipped palm fronds and empty fruit bunches, contains a substantial amount of silicon, which is a crucial factor for maintaining the health of oil palm plantations. This study suggests the practise of reintroducing oil palm biomass to planted regions as a means to preserve soil fertility, particularly by replacing the soil with silicon [72]. On top of that, they have also emphasised on the significance of implementing a circular economy model in the oil palm industry. This model involves minimising waste and maximising resource efficiency through the reduction, reuse, and recycling of resources that are currently not fully utilised in the traditional linear economy. These examples illustrate the role of quantitative standards in promoting the oil palm industry's use of recycling, reusing, and reducing practises. Additionally, the measuring items for attitude (ATT) include how oil palm mills perceive the practice of sustainable waste management [36,73,74]. Secondly, subjective norm (SN) is determined by how external factors, such as other palm oil companies, the government, clients, stakeholders, shareholders, the general public, and the company's partners, believe that the oil palm mill should practice sustainable waste management [36,74,75]. Thirdly, the degree to which the oil palm mill has complete control over its use of sustainable waste management is a measure of perceived behavioural control (PBC) [36,75,76]. Finally, the intention of the palm oil mill to engage in sustainable-behaviour-related activity is used to determine the behavioural intention [73,76–78].

3.2. Data Collection

A group of millers from a palm oil mill in Sabah, Malaysia, served as the population of this study's assessment. Due to the considerable expansion of palm oil mills there, as indicated by the Malaysian Palm Oil Board (MPOB) in 2022, Sabah was used as the research study location. The population of oil palm mills in Malaysia is tabulated in

Figure 2. The officer responsible for overseeing the census of palm oil mills in Malaysia, including the peninsula, Sabah, and Sarawak, provided this vital information via email. The specific details of oil palm mills and their representatives were gathered in this study, including their complete address, phone number, email address, name, affiliation, and office numbers. The respondents were contacted by email, while phone calls and email were used for follow-up. The information related to every palm oil estate in Sabah that is now operational, around 133 millers, was obtained. The Chief Executive Officer (CEO) and other high-management-level members, including managing directors and managers of palm oil mills, received the survey questionnaires. The data collectors, which were coming from our research team and were advised and trained by institution, also received advice from the MPOB representative as the body that monitors the oil palm mill activity in Malaysia.

3.3. Assessment Method

A variance-based SEM is employed in this thesis and is called the partial least squares technique. It is possible to analyse data that do not follow a normal distribution using the more reliable PLS-SEM approach. Last but not least, in terms of structural model assessment, the PLS's main objective is not to choose which alternative model best matches the data, but rather to validate and predict the theoretical model presented in the literature [79]. PLS can "estimate" since it correlates the residuals for manifest and latent variables [80]. The variable-based method known as partial least squares (PLS) is frequently used to assess component-based approaches for structural equation models. It is frequently referred to as a soft modelling approach since it does not rely on the assumption of a standard distribution [81]. In consonance with [82], PLS should be used for developing theories (exploratory factor analysis) or testing hypotheses (confirmatory factor analyses). Additionally, PLS SEM can generally be utilised successfully in trials with a small number of samples [83]. The researcher can evaluate the path coefficients of the structural model and the factor load of the measurement model with the aid of PLS path modelling [84].

By applying the crucial indications of standardised loadings, Cronbach's alpha, composite reliability, and average variance extracted, the construct reliability and validity were first evaluated. By estimating the suggested structural model, linkages that are causal and interactive between the latent constructs were then discovered. The running output of SmartPLS also included the findings of variance inflation factors (VIFs) for all latent variables because the multicollinearity issue may cause the causal effects in the estimate model to be biased. The worry for the common technique bias is eliminated if the VIFs derived from the whole collinearity assessment do not exceed 3.3 [85]. Additionally, the R2 coefficient of determination, which has a range of 0 to 1, gauges how well the model predicts the future. In other words, R2 shows how much of the dependent variable's variability in the structural model can be explained by the explanatory factors by calculating the combined impact of the exogenous variables on endogenous variables. Last but not least, [86] has introduced effect size f2 (f2 values of 0.35, 0.15, and 0.02 are regarded as large, medium, and small effect sizes, respectively), which is crucial to determine how the R2 changes if a specific exogenous construct is left out of the model [87]. When determining how much an explanatory or mediating variable contributes to the R2 of the dependent variable in a structural model, the effect size (f2) is particularly helpful. The structural equation modelling will then come next. All the hypotheses in this study are evaluated because estimations of hypothesised linkages between constructs were evaluated in the structural model evaluation as shown by path coefficients and related t-statistics produced through bootstrapping [88].

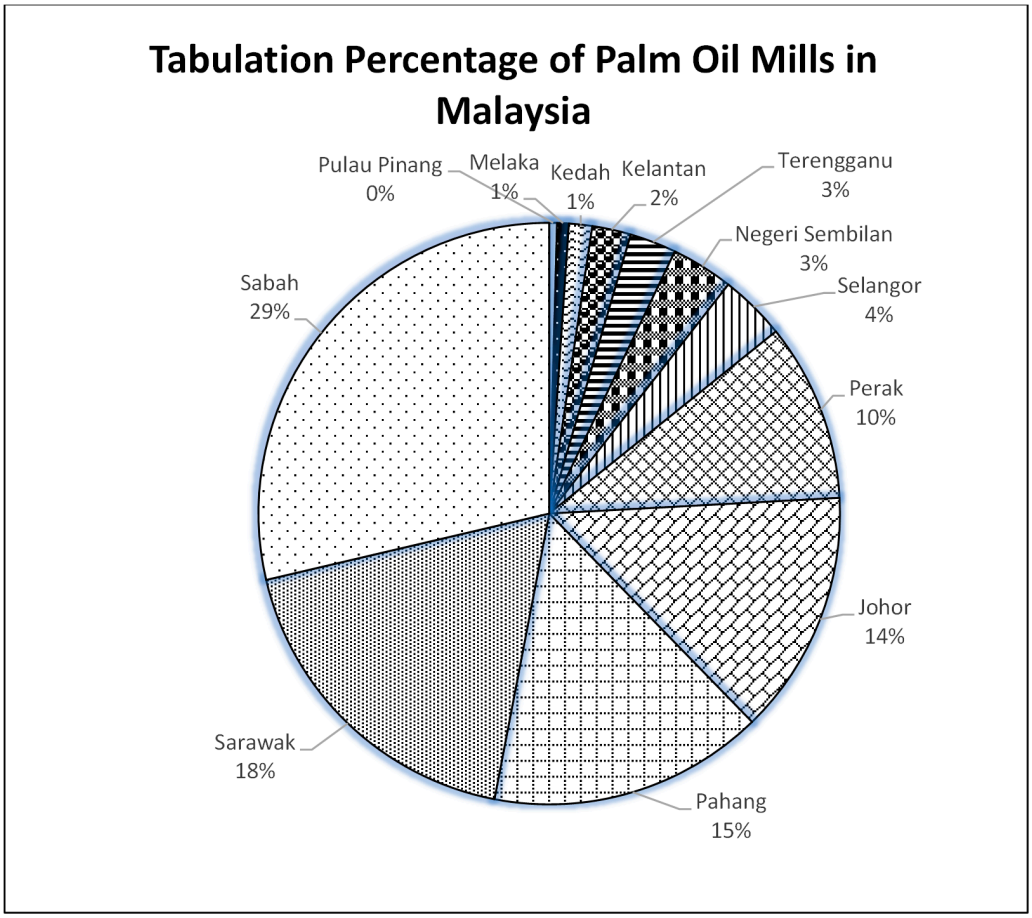

Figure 2. Tabulation percentage of palm oil mills by country in Malaysia in the year of 2022. Sabah has been reported as the state in Malaysia with the largest palm oil mill contribution with 29%. Source: [2].

4. Results and Discussion

4.1. Profile of Respondents

Five months of conducting the online survey resulted in 121 total responses (response rate: 91%) (see Table 1. Due to the challenges the research team encountered in penetrating the management circle and obtaining the relevant respondent contact information, we concentrated on the management level in this study, where the person in charge is accountable for making operational decisions. As a result, the survey takes longer than expected to complete and receive the returned questionnaires. Many follow-ups must be carried out while taking into account their hectic timetable and activity. Table 1 displays the demographic data of respondents, which includes gender, age, race, degree of education, and monthly income in addition to some generic information.

Male respondents make up more than 96% of the sample, and the majority (33.88%) of them are between the ages of 41 and 50. The respondents are a mix of races, including Malay (34.71%), Chinese (27.27%), Indian (12.40%), and others (25.62%). Another important fact is that 42.98% of respondents, or those who completed the survey, had at least a high school graduation. With 28.10%, SPM graduates are the second-highest group, followed by degree holders (27.27%) and master's degree holders (1.65%). Significantly, this sample may be able to be generalised into the adaptation of sustainable waste management behaviours within the oil palm industry in the area of Sabah, Malaysia.

Table 1. Profile of respondents.

Demographic Profile	Number	%
Gender		
Male	117	96.69%
female	4	3.31%
Age		
<30 years old	7	5.79%
31–40 years old	26	21.49%
41–50 years old	41	33.88%
51–60 years old	32	26.45%
>61 years old	15	12.40%
Race		
Malay	42	34.71%
Chinese	33	27.27%
India	15	12.40%
Others	31	25.62%
Educational level		
SPM	34	28.10%
Diploma	52	42.98%
Degree	33	27.27%
Master	2	1.65%
PhD	0	0.00%
Monthly Income		
<RM1000	3	2.48%
RM1001–3500	31	25.62%
RM3501–6000	58	47.93%
RM6001–8500	22	18.18%
RM8501 and above	7	5.79%

4.2. Construct Reliability and Validity

The content validity, convergent validity, and divergent validity of the construct measurements were examined. Before releasing the questionnaire, the Malaysian Palm Oil Board (MPOB)'s customer service division helped us assess the potential list of management levels. These are the individuals who are close to the respondents and have an enormous amount of managerial expertise. The questionnaire was altered multiple times on their expert advice.

The convergent validity test was used to determine whether a latent variable is adequately explained by its observable variables. The standardised loading coefficient, Cronbach's alpha, composite reliability, and average variance extracted are used to assess construct reliability and convergent validity [89]. If the standardised loading coefficients of the items on the related constructs are greater than 0.7, measurement scales are considered to have strong convergent validity [90]. As a result, the observed items with standardised loading coefficients below 0.7 were removed from the estimation model. Table 2 shows the standardised loading coefficients for each item, demonstrating that all conditions were met. The lowest recorded standardised loading coefficient was 0.882, and the maximum was as high as 0.973.

Table 2. Indicator validity, construct reliability, and convergent validity. ATT1–7, attitude 1–7; BI3–7, behavioural intention 3–7; PBC1–7, perceived behavioural control 1–7; SN1–7, subjective norms 1–7; SWMB1–6; sustainable waste management behaviour 1–6.

Variable	Item	Factor Loading	Cronbach's Alpha	(rho_a)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Attitude	ATT1	0.91	0.967	0.968	0.972	0.833
	ATT2	0.918				
	ATT3	0.934				
	ATT4	0.931				
	ATT5	0.882				
	ATT6	0.92				
	ATT7	0.895				
Behavioural Intention	BI3	0.921	0.967	0.968	0.974	0.884
	BI4	0.946				
	BI5	0.933				
	BI6	0.943				
	BI7	0.957				
Perceived Behavioural Control	PBC1	0.939	0.979	0.98	0.982	0.889
	PBC2	0.953				
	PBC3	0.95				
	PBC4	0.959				
	PBC5	0.952				
	PBC6	0.939				
	PBC7	0.906				
Subjective Norms	SN1	0.954	0.980	0.98	0.983	0.892
	SN2	0.928				
	SN3	0.958				
	SN4	0.958				
	SN5	0.956				
	SN6	0.942				
	SN7	0.913				
Sustainable Waste Management Behaviour	SWMB1	0.95	0.981	0.981	0.984	0.913
	SWMB2	0.951				
	SWMB3	0.957				
	SWMB4	0.956				
	SWMB5	0.968				
	SWMB6	0.951				

As shown in Table 2, all six of the constructions simultaneously produced Cronbach's alpha values that ranged from 0.967 to 0.981, which is much higher than the required value of 0.7. As stated by [91], a coefficient greater than 0.8 denotes a high degree of construct dependability and internal consistency. Additionally, all CR values—which range from 0.972 to 0.984—exceed the acceptable cutoff of 0.7. These findings suggest that the constructs have strong convergent validity. Additionally, the AVE indications are higher

than the 0.5 criterion, ranging from 0.833 to 0.913. Thus, the measuring scales for the constructs have excellent overall internal consistency, reliability, and convergent validity.

Next, discriminant validity was investigated using the Fornell–Larcker criterion. As claimed by [92], the square roots of AVE for all latent constructs must be larger than the correlations between any other constructs. Table 3 reports the square roots of the AVE, shown in the diagonal and in bold, and the off-diagonal elements demonstrate how the constructions are intercorrelated. In every instance, it seems that the on-diagonal AVE square roots are far higher than the inter-construct correlations. This suggests that the model has met the requirements for discriminant validity.

Table 3. Fornell–Larcker criterion. ATT, attitude; BI, behavioural intention; PBC, perceived behavioural control; SN, subjective norms; SWMB, sustainable waste management behaviour.

	ATT	BI	PBC	SN	SWMB
ATT	**0.825**				
BI	0.753	**0.750**			
PBC	−0.751	−0.745	**0.810**		
SN	0.820	0.709	−0.888	**0.805**	
SWMB	0.758	0.739	−0.924	0.713	**0.816**

Square root of AVE in bold on diagonal.

The heterotrait–monotrait ratio (HTMT) of correlations was evaluated to confirm the discriminant validity of the reflective parts of this investigation. This new criterion is considered to be the most difficult evaluation of discriminant validity. The HTMT technique reveals the genuine correlation between two completely reliable latent variables, and a value higher than 0.90 shows a lack of discriminant validity [83]. However, the confidence intervals of the HTMT must not include the number 1. The HTMT results for this study are presented in Table 4, which demonstrates that all of the ratios were less than 1, which satisfied the criteria for establishing discriminant validity, and that the measures' discriminant validity was satisfactory. If the value is less than 1, it is obvious that the two elements are distinct. Therefore, the lower they are, the more divergent they are. All cross-loading correlations are smaller than 1 according to Table 4. As a result, the discriminant validity is once again strengthened.

Table 4. Heterotrait–monotrait ratio (HTMT). ATT, attitude; BI, behavioural intention; PBC, perceived behavioural control; SN, subjective norms; SWMB, sustainable waste management behaviour.

	ATT	BI	PBC	SN	SWMB
ATT					
BI	0.777				
PBC	0.77	0.806			
SN	0.822	0.822	0.806		
SWMB	0.777	0.763	0.742	0.811	

As a methodical approach for determining the presence of collinearity and the common method bias, the complete collinearity test developed by [93] was advised by [85]. Since all inner VIFs among the latent constructs range from 1.000 to 3.090 and are below the threshold of 3.3, the whole collinearity test produced satisfying VIFs (Table 5). As a result, the research model is free of usual technique bias.

Table 5. VIF value. ATT, attitude; BI, behavioural intention; PBC, perceived behavioural control; SN, subjective norms; SWMB, sustainable waste management behaviour.

	BI	SWMB
ATT	2.556	3.090
BI		1.478
PBC	2.842	1.448
SN	1.477	1.000

4.3. Structural Equation Model

The hypothesised structural links between attitude, subjective norms, perceived behavioural control, behavioural intention, and sustainable waste management practises were examined by estimating the structural model after the construct reliability and validity were established (Figure 3). The model's predictability was evaluated in terms of the determination coefficient with reference to the R2 value for the dependent latent constructs. Nevertheless, [80] suggest that R2 should have a minimum value of 10%. According to Figure 3, the behavioural intention (BI) construct's R2 values show that up to 91.4% of the construct variability was explained by the attention (ATT), subjective norms (SN), and perceived behavioural control (PBC) constructs. The model's explanatory factors had explained 89.6% of the variability in sustainable waste management behaviour (SWMB). These parameters define an acceptable level of predictability.

Five of the structural model's hypotheses were supported (at p value 0.1) based on the standardised path coefficients, t-value, and p-value displayed in Table 6, however, two other hypotheses were not. Subjective norms, perceived behavioural control, and behavioural intention are all statistically significant positive predictors of sustainable waste management behaviour (H2, H3, and H7), as seen in Table 6. Concurrently, subjective norms and perceived behavioural control both support the development of behavioural intention (H5 and H6). H1 (=0.034, t = 0.604, p = 0.546) and H4 (=−0.025, t = 0.428, p = 0.669) are two insignificant hypotheses. The findings show that attitudes have no influence on sustainable waste management behaviours, nor do they affect behavioural intentions.

Table 6. PLS-SEM path coefficient, T-statistic, and hypothesis path. ATT, attitude; BI, behavioural intention; PBC, perceived behavioural control; SN, subjective norms; SWMB, sustainable waste management behaviour.

Hypothesis	Variables	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	p Values	Test Result	F^2 Value	Effect Size
H1	ATT → SWMB	0.034	0.041	0.055	0.604	0.546	Not Supported	0.007	small
H2	SN → SWMB	0.319	0.320	0.083	3.860	0.000	Supported	0.026	small
H3	PBC → SWMB	−0.615	−0.607	0.095	6.471	0.000	Supported	0.085	small
H4	ATT → BI	−0.025	−0.016	0.059	0.428	0.669	Not Supported	0.005	small
H5	SN → BI	0.352	0.356	0.100	3.529	0.000	Supported	0.025	small
H6	PBC → BI	−0.651	−0.639	0.107	6.063	0.000	Supported	0.104	small
H7	BI → SWMB	0.500	0.503	0.124	4.047	0.000	Supported	0.409	Large

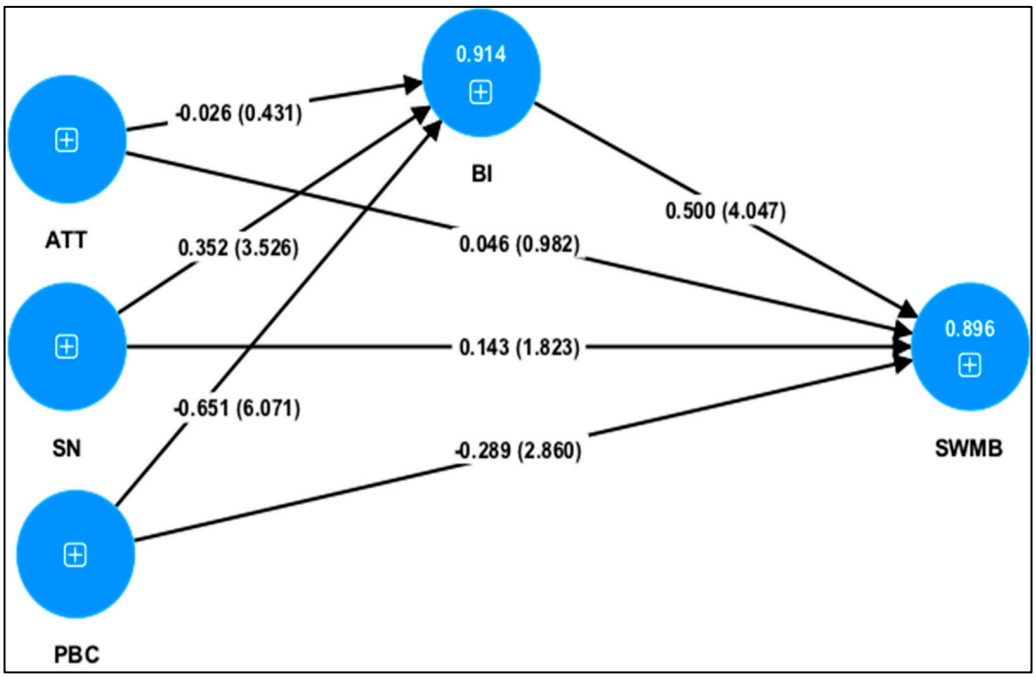

Figure 3. Structural model assessment. ATT, attitude; BI, behavioural intention; PBC, perceived behavioural control; SN, subjective norms; SWMB, sustainable waste management behaviour.

R2 basically shows how much the variability in the dependent variable can be explained by the predictive variables. The effect size f2 can be quite helpful in determining how much the dependent variable might change if an external variable is removed in this way. The dependent variable in this study is sustainable waste management practises. However, in relation to attitude, subjective norms, and perceived behavioural control, behavioural intention has evolved into an acting dependent variable. In order to determine how much the external variables are affecting the acting dependent variable (behavioural intention), the f2 was also calculated. The F-square is used to calculate effect size (small => 0.02, medium => 0.15, large => 0.35) [86]. The impact of attitude, subjective norms, and perceived behavioural control on sustainable waste management behaviours has a tiny effect size that is less than 0.02 (f2 = 0.007, f2 = 0.026, and f2 = 0.085, respectively), as indicated in Table 6 and advised by [87]. As opposed to this, the influence of attitude, subjective norms, and perceived behavioural control on behavioural intention likewise has a minor effect size (f2 = 0.005, f2 = 0.025, and f2 = 0.104, respectively). It is important to acknowledge that behavioural intention towards sustainable waste management activity has a significant effect size, measuring 4.047 (greater than 0.35).

4.4. Discussion

This study's findings firstly support the hypothesis that subjective norms (H2) and perceived behavioural control (H3) have a positive effect on behaviour adaption for sustainable waste management in oil palm mill plantations in the Sabah region. The finding that subjective norms had a large impact (H2) is consistent with the study by [94], who looked at how households manage their garbage. H2 implies that their beliefs are supported by social groups or other companies that work with them [58]. This demonstrates how external influences including the government, clients, stakeholders, shareholders, as well as the general public and partners, have impacted the palm oil mills to adopt sustainable waste management practises. This result is in line with the practice that has been exercised by estates as reported by [95], which is that all estates host stakeholder meetings every year, inviting the local population, government agencies, small farmers, and labour unions to discuss their efforts to promote sustainability and to provide a forum for the stakeholders to voice their concerns. In another study that was conducted by [96] regarding the adoption

of sustainable practice adoption amongst smallholders of oil palm farmers in Thailand, the farmers disclosed that the group leader and members influence other farmers to join the group, attend the meetings, and take the trainings necessary to become adopters. This outcome is in line with the findings of [97], who discovered the significance of individual or group opinions in decision making.

The findings of a significant result on perceived behavioural control towards sustainable waste management behaviour (H3) are in agreement with [98] study examining the influence of perceived behavioural control and other influencing factors on waste segregation-at-source activity. H3, on the other hand, contrasted with a study by [99] out on Malaysian paddy farmers, who were examined for their adoption behaviour and intention towards sustainable agriculture. Both results for perceived behavioural control in affecting sustainable waste management behaviour and intention were found to be significant. This study's findings are not surprising, considering that a significant amount of earlier research has found that an individual's behaviour when it comes to reducing waste at work is solely determined by their subjective perception of perceived behavioural control [61]. This demonstrates that top management at the company and the company itself made the decision to implement sustainability at the mill. This is partly in line with the findings of [97], who discovered that farmers' intentions to adopt innovations relating to sustainable practice were influenced by their perceptions of having adequate resources which boost their confidence in adoption. A study conducted by [100], has corroborated this finding. It revealed that smallholder planters who perceive the collection of oil palm residue as easy and possess confidence in their ability to do so are more likely to have the intention to engage in sustainable management practises and, consequently, have a tendency to supply oil palm residue.

This study's findings support the favourable influence of subjective norms (H5) and perceived behavioural control (H6) as important factors that can affect behavioural intention. The existence of positive responses that the respondents provide has effects on particular persons; hence, good intentions are built up, which explains the positive impact of subjective norms on behavioural intentions. This H5 finding is in agreement with works by [3,46,66,101], and goes against [102] study, which represents people as rebellious due to negative feedback to other people's influences, which causes people to antagonise their influences. In conclusion, it is abundantly obvious that the external factors including the stakeholder for instance are crucial for developing the behaviours of reuse, reduce, and recycling. The important finding of perceived behavioural control (H6) supports the study by [101], which examined the behavioural intention to use environmentally conscious food packaging. However, it has been found that when it comes to reducing waste at work, an individual's behaviour intention is solely determined by their perception of behavioural control [61]. This study demonstrates that for behaviour interventions in waste reduction, an impression of workforce empowerment is essential. When it comes to implementing linked empirical programmes and maintaining environmental sustainability, organisations must also try to provide their staff with a sense of power and flexibility [20,62]. Therefore, we believe that a major factor affecting the decision to implement sustainability in oil palm mills is the company and top management. Additionally, attention towards top management and stakeholders should be prioritised. Greater emphasis should be placed on the boards of directors and other key stakeholders in waste management surveys, since they hold significant influence in establishing waste management policies and practises inside organisations. The study on the complex issue of waste management reveals that the actions and perspectives of stakeholders have a substantial influence on the results of waste management [103]. The boards of directors possess the authority to shape waste management practises by virtue of their supervisory and decision-making responsibilities [104]. They have the ability to establish waste reduction objectives, assign resources for waste management, and ensure adherence to waste management regulations. Furthermore, the involvement and active participation of stakeholders in waste management governance may improve the efficiency and durability of waste management practises [105]. It is

important to incorporate sustainability into governance and management systems and this demonstrates the significance of board structure, composition, and diversity in fostering sustainability [106].

Attitudes have led to negligible findings for both behavioural intention (H4) and sustainable waste management behaviour (H1). According to [3,36,37,107,108], the attitude towards sustainable waste management behaviour (H1) reported in this study had a negligible impact. One explanation could be that, in the context of evaluating behaviours related to the management of solid waste, attention is typically a key predictor. While oil palm plantations in Sabah appear to be adopting sustainable behaviours due to enforcement and influence from senior management, government, consumers, stakeholders, shareholders, public community, and company's collaborators, this may be due to the fact that these groups have been enforcing these behaviours. This claim has been reinforced by subjective norms and perceived behavioural control, both of which have had a considerable influence on behaviours and intentions related to sustainable waste management. The fact that PBC is significant means that the top management, including the board of directors and the company itself, which play a significant role in the decision making of sustainable practices in the mills and plantations, has influenced the implementation of sustainable behaviours within palm oil mills in Sabah. As claimed by [109], the board of directors is made up of a number of individuals with different backgrounds in expertise who work together to coordinate the firm's operations. Therefore, oil palm plantation mills should concentrate on policies that can improve employee attitudes towards waste reduction and on SWMB implementation tactics. Positive workplace attitudes typically increase the likelihood of successfully implementing SWMB.

According to the findings of this study, the influence of attitude on behavioural intention (H4) was insignificant. The study by [54] also found that although the relationship between attitude and behavioural intention is significant, it is the weakest of the relationships that were examined. These other relationships included those between attitude, subjective norms, and perceived behavioural control towards sustainable waste management behaviour. The relationship between behavioural intention and perceived behavioural control has the greatest strength, followed by that between behavioural intention and subjective norm. However, this discovery almost implies the outcome indicated by H4. The results from [110], where attitude exerted the second-lowest relationship strength towards behavioural intention, are almost in agreement with this. This supports the earlier finding that although people have positive opinions, they do not practice waste separation, while perceived behavioural control was the one that showed the highest relationship in that study. As explained by [111], who have a different perspective on attitude, it is frequently challenging to determine whether these factors have any influence on waste management because people's attitudes and behaviours are highly subjective and unpredictable. This is why there are conflicting results regarding attitude.

Additionally, H7 revealed that behavioural intention significantly affected behaviours related to sustainable waste management. As demonstrated by [112], positive attitudes and positive normative issues result in higher intentions to implement sustainable activities. The stated result (H7) validates these findings. This showed that human beings are expected to act on their intentions when opportunities are available. Negative attitudes and a lack of concern for normative issues both seem to have a role in limiting the willingness of individuals to adapt. Another study that strengthens the result of H7 was conducted by [113] who found that household behavioural intention has a large impact on how much people recycle, reuse, and reduce in their homes. The partial least squares approach was used to analyse the data, which were gathered from 670 Malaysian households. H7 was further supported by [114], who discovered that behavioural intention significantly affects how fruit and vegetable waste (FVW) is managed. The results of further research addressed the influence of behavioural intentions. As stated by [66], the theory also takes into account the behaviour-changing effects of purpose. Meanwhile, [115], indicate evidence that behavioural intentions affect waste reduction behaviour by assessing the attitudes

and behaviours of 491 workers at a construction site in Shenzhen, China. [116] studies citizens' recycling behaviour using the TPB and finds that citizens' behavioural intentions affect their recycling behaviour using a sample of 2004 respondents in South African metropolitan areas. [19] indicate that the proof that behavioural intentions have a positive effect on reducing waste and obtain insight into consumers' behaviour towards food waste. Additionally, the importance of this behavioural intention finding for sustainable waste management behaviours has demonstrated that company intentions might affect how sustainability practices are implemented in the mills.

5. Conclusions

According to our understanding, this study is the first of its sort to be conducted in the palm oil industry and the selected location, Sabah, Malaysia. The contribution of this study is able to add to the limited body of work on adopting sustainable practices that takes socio-psychological concerns into account, basically in the Malaysian context. The results of the interaction effect made in the present study are different and unique from previous researchers; thus, this study adds to the existing academic knowledge. The research has relevance to Malaysia's government policy which is the National Solid Waste Management Policy. The collected data are also crucial to support government policy in palm oil mill management decisions and are able to become the foundation of the action plan for the task force committee as well as assist in the *Transformasi Nasional* 2050, or TN50 plan. The research will garner sustainable waste management behaviour data of palm oil mills in Sabah as the primary finding, with the THREE main criteria being to reuse, reduce, and recycle (3R) waste.

It has been demonstrated that subjective norms affect waste management intentions as well as practices. For the company to continue the good practice of sustainable waste management, there should be a program related to sustainability that may be implemented within all stakeholders of palm oil plantations. It would be very useful for everyone if stakeholders visited the oil palm waste area and participated in a knowledge transfer or information sharing session addressing the effective sustainability of the Standard Operating Procedure (SOP). In fact, the government's support is a key factor in the broad application of sustainability in oil palm mills. As a result, knowledge sharing and professional education help to shape conservation-related purposes and decisions. Therefore, in order to reduce waste from palm oil mills, it is advised that the relevant authorities for the entire industry identify all the behaviours that assist the mills in managing the oil palm waste. We believe that it is important to establish educational programs based on these behaviours, such as how to recycle oil palm empty fruit bunches as a potential option for biofertiliser formulation, and how to recycle empty fruit bunches, POME, and palm kernel shells to be converted into activated carbon.

The limitations of this study should also be taken into consideration. Theoretically, this study limits itself to three independent variables; it would be useful to include other factors such as cost, government support, or organisational behaviour in the framework. In addition, this study only concentrates on the oil palm plantation in Sabah, so it may not be entirely representative of Malaysia. Although this study's findings largely concur with the proposed paradigm, they are obviously restricted by the context of the research design. The targeted respondent then concentrated on the management level, and it would be useful to investigate all levels of employees in an oil palm mill, particularly the director's board since PBC has impacted the relationship for both intention and actual behaviour. Future research should employ a qualitative approach, and some questions should be revised and refined to match the qualitative standards of the research methodology.

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References

1. Begum, H.; Alam, A.S.A.F.; Er, A.C.; Ghani, A.B.A. Environmental sustainability practices among palm oil millers. *Clean Technol. Environ. Policy* **2019**, *21*, 1979–1991. [CrossRef]
2. Malaysian Palm Oil Board. FFB Yield & Crude Palm Oil Yield of Oil Palm Estates. 2019. Available online: http://bepi.mpob.gov.my/index.php/en/yield/yield2019/yield2019.html (accessed on 5 August 2020).
3. Gan, B.; Zhang, C. Influencing factors of urban residents' garbage classification and recycling behavior driving mechanism in artificial intelligence environment. In *IOP Conference Series: Earth and Environmental Science*; IOP Publishing: Bristol, UK, 2020; Volume 619, p. 012006.
4. Begum, R.A.; Siwar, C.; Pereira, J.J.; Jaafar, A.H. Attitude and behavioral factors in waste management in the construction industry of Malaysia. *Resour. Conserv. Recycl.* **2009**, *56*, 321–328. [CrossRef]
5. Roslan, A.; Kamarudin, M.F.; Nordin, A.B.A.; Simeh, M.A. A study on the Malaysian oil palm biomass sector—Supply and perception of palm oil millers. *Oil Palm Ind. Econ. J.* **2011**, *11*, 28–41.
6. Ng, J.S.C.; Chervier, C.; Carmenta, R.; Samdin, Z.; Azhar, B.; Karsenty, A. Balancing ambitions and realities: Stakeholder perspectives on jurisdictional approach outcomes in Sabah's Forests. In *Environmental Management*; Springer: Berlin/Heidelberg, Germany, 2023; pp. 1–15.
7. Anibaldi, R.; Rundle-Thiele, S.; David, P.; Roemer, C. Theoretical underpinnings in research investigating barriers for implementing environmentally sustainable farming practices: Insights from a systematic literature review. *Land* **2021**, *10*, 386. [CrossRef]
8. Mohd Hanafiah, K.; Abd Mutalib, A.H.; Miard, P.; Goh, C.S.; Mohd Sah, S.A.; Ruppert, N. Impact of Malaysian palm oil on sustainable development goals: Co-benefits and trade-offs across mitigation strategies. In *Sustainability Science*; Springer: Berlin/Heidelberg, Germany, 2022; pp. 1–23.
9. Ruysschaert, D.; Salles, D. The strategies and effectiveness of conservation NGOs in the global voluntary standards: The case of the Roundtable on Sustainable Palm Oil. In *The Anthropology of Conservation NGOs: Rethinking the Boundaries*; Springer: Berlin/Heidelberg, Germany, 2018; pp. 121–149.
10. Galán-Martín, Á.; del Mar Contreras, M.; Romero, I.; Ruiz, E.; Bueno-Rodríguez, S.; Eliche-Quesada, D.; Castro-Galiano, E. The potential role of olive groves to deliver carbon dioxide removal in a carbon-neutral Europe: Opportunities and challenges. *Renew. Sustain. Energy Rev.* **2022**, *165*, 112609. [CrossRef]
11. Kahar, P.; Rachmadona, N.; Pangestu, R.; Palar, R.; Adi, D.T.N.; Juanssilfero, A.B.; Manurung, I.; Hama, S.; Ogino, C. An integrated biorefinery strategy for the utilization of palm-oil wastes. *Bioresour. Technol.* **2022**, *344*, 126266. [CrossRef] [PubMed]
12. Parinduri, L.; Sulaiman, O.K. Biomass analysis at palm oil factory as an electric power plant. In *Journal of Physics: Conference Series*; IOP Publishing: Bristol, UK, 2018; Volume 1007, p. 012053.
13. Wen, A.L.K.; Chew, J.J.; Yiin, C.L.; Lock, S.S.M. Thermal degradation behavior and kinetic modeling of green solvents-delignified biomass: A sustainable biomass-to-energy approach. In *Value-Chain of Biofuels*; Elsevier: Amsterdam, The Netherlands, 2022; pp. 89–103. [CrossRef]
14. Ngwelum, C.C. Palm Waste Management and Environmental Sustainability in Sombo Community, Cameroon. Cameroon (27 July 2021). Available online: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3894522 (accessed on 15 March 2023).
15. Faridah-Hanum, I.; Salleh, M.N. Tertiary forestry Education Beyond 2020: The case for Malaysia. *J. Trop. For. Sci.* **2018**, *30*, 439–445. [CrossRef]
16. McFarland, B.J.; McFarland, B.J. The Context of tropical rainforest deforestation and degradation. In *Conservation of Tropical Rainforests: A Review of Financial and Strategic Solutions*; Springer: Berlin/Heidelberg, Germany, 2018; pp. 7–58.
17. Saritpongteeraka, K.; Natisupacheevin, K.; Tan, C.; Rehman, S.; Charnnok, B.; Vaurs, L.P.; Leu, S.Y.; Chaiprapat, S. Comparative assessment between hydrothermal treatment and anaerobic digestion as fuel pretreatment for industrial conversion of oil palm empty fruit bunch to methane and electricity-A preparation study to full scale. *Fuel* **2022**, *310*, 122479. [CrossRef]
18. Sentian, J.; Sayzni, M.N.; Payus, C. Assessing short term air quality trend in Malaysia based on air pollution index (APi). In *IOP Conference Series: Earth and Environmental Science*; IOP Publishing: Bristol, UK, 2022; Volume 1103, p. 012002.
19. Aktas, E.; Sahin, H.; Topaloglu, Z.; Oledinma, A.; Huda, A.K.S.; Irani, Z.; Kamrava, M. A consumer behavioural approach to food waste. *Enterp. Inf. Syst.* **2018**, *31*, 658–673. [CrossRef]
20. Anuar, M.M.; Omar, K.; Ali, A. The influence of internal factors on consumer's green consumption behavior. *Int. J. Adv. Appl. Sci.* **2017**, *4*, 238–242. [CrossRef]

21. Fife-Schaw, C.; Sheeran, P.; Norman, P. Simulating behaviour change interventions based on the theory of planned behaviour: Impacts on intention and action. *Br. J. Soc. Psychol.* **2007**, *46*, 43–68. [CrossRef] [PubMed]
22. Blake, J. Overcoming the "Value-Action Gap" in Environmental Policy: Tensions between National Policy and Local Experience. *Local Environ.* **1999**, *4*, 257–278. [CrossRef]
23. Ajzen, I. Consumer attitudes and behavior: The theory of planned behavior applied to food consumption decisions. *Riv. Econ. Agrar.* **2015**, *70*, 121–138. [CrossRef]
24. Xu, X.; Wang, S.; Yu, Y. Consumer's intention to purchase green furniture: Do health consciousness and environmental awareness matter? *Sci. Total Environ.* **2020**, *704*, 135275. [CrossRef] [PubMed]
25. Wang, S.; Wang, J.; Zhao, S.; Yang, S. Information publicity and resident's waste separation behavior: An empirical study based on the norm activation model. *Waste Manag.* **2019**, *87*, 33–42. [CrossRef] [PubMed]
26. Jereme, I.A.; Siwar, C.; Begum, R.A.; Talib, B.A.; Alam, M.M. Assessing Problems and Prospects of Solid Waste Management in Malaysia. *e-Bangi* **2015**, *10*, 70–87. Available online: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2942939 (accessed on 16 February 2022).
27. Wan, C.; Cheung, R.; Shen, G.Q. Recycling attitude and behaviour in university campus: A case study in Hong Kong. *Facilities* **2012**, *30*, 630–646. [CrossRef]
28. Esmaeilifar, R.; Iranmanesh, M.; Shafiei, M.W.M.; Hyun, S.S. Effects of low carbon waste practices on job satisfaction of site managers through job stress. *Rev. Manag. Sci.* **2020**, *14*, 115–136. [CrossRef]
29. Almasi, A.; Mohammadi, M.; Azizi, A.; Berizi, Z.; Shamsi, K.; Shahbazi, A.; Mosavi, S.A. Assessing the knowledge, attitude and practice of the kermanshahi women towards reducing, recycling and reusing of municipal solid waste. *Resour. Conserv. Recycl.* **2019**, *141*, 329–338. [CrossRef]
30. Peng, C.L.; Scorpio, D.E.; Kibert, C.J. Strategies for successful construction and demolition waste recycling operations. *Constr. Manag. Econ.* **1997**, *15*, 49–58. [CrossRef]
31. azimi Jibril, J.D.; Sipan, I.B.; Sapri, M.; Shika, S.A.; Isa, M.; Abdullah, S. 3R s critical success factor in solid waste management system for higher educational institutions. *Procedia-Soc. Behav. Sci.* **2012**, *65*, 626–631. [CrossRef]
32. Sawalkar, R.S.; Undale, S.; Muluk, S.; Mude, G.; Saxena, V.D.; Pasumarti, S. Strategic waste management practices for environmental sustainability—A case of Indian university. *Manag. Environ. Qual. Int. J.* **2023**. *ahead-of-print*. [CrossRef]
33. T'ing, L.C.; Moorthy, K.; Mei, C.Y.; Yin, F.P.; Ying, W.Z.; Khong, C.W.; Chern, G.Z.; Lin, T.Z. Determinants of 3Rs behaviour in plastic usage: A study among Malaysians. *Heliyon* **2020**, *6*, e05805.
34. UN-Habitat. State of the World's Cities 2006/7. US: Earthscan. 2006. Available online: https://unhabitat.org/state-of-the-worlds-cities-20062007 (accessed on 1 February 2023).
35. Hockin, S. *Survivism: An Attitude Movement with Managerial Intelligences toward Existential Change*; Page Publishing Inc.: New York, NY, USA, 2023.
36. Muniandy, G.; Anuar, M.M.; Foster, B.; Saputra, J.; Johansyah, M.D.; Khoa, T.T.; Ahmed, Z.U. Determinants of sustainable waste management behavior of Malaysian academics. *Sustainability* **2021**, *13*, 4424. [CrossRef]
37. Wu, L.; Zhu, Y.; Zhai, J. Understanding waste management behavior among university students in China: Environmental knowledge, personal norms, and the theory of planned behavior. *Front. Psychol.* **2022**, *12*, 771723. [CrossRef]
38. Yusuf, R.; Fajri, I. Differences in behavior, engagement and environmental knowledge on waste management for science and social students through the campus program. *Heliyon* **2022**, *8*, e08912. [CrossRef]
39. Wittenberg, I.; Fleury-Bahi, G.; Navarro, O. Environmental attitudes in context: Conceptualisations, measurements and related factors of environmental attitudes. *Front. Psychol.* **2023**, *14*, 1219471. [CrossRef]
40. Masud, M.M.; Al-Amin, A.Q.; Junsheng, H.; Ahmed, F.; Yahaya, S.R.; Akhtar, R.; Banna, H. Climate change issue and theory of planned behaviour: Relationship by empirical evidence. *J. Clean. Prod.* **2016**, *113*, 613–623. [CrossRef]
41. Haque, A.; Anwar, N.; Tarofder, A.; Ahmad, N.; Sharif, S. Muslim consumers' purchase behavior towards halal cosmetic products in Malaysia. *Manag. Sci. Lett.* **2018**, *8*, 1305–1318. [CrossRef]
42. Goh, E.; Ritchie, B.; Wang, J. Non-compliance in national parks: An extension of the theory of planned behaviour model with pro-environmental values. *Tour. Manag.* **2017**, *59*, 123–127. [CrossRef]
43. Sorkun, M.F. How do social norms influence recycling behavior in a collectivistic society? A case study from Turkey. *Waste Manag.* **2018**, *80*, 359–370. [CrossRef] [PubMed]
44. Ajzen, I. The theory of planned behavior: Frequently asked questions. *Hum. Behav. Emerg. Technol.* **2020**, *2*, 314–324. [CrossRef]
45. Trudel, R. Sustainable consumer behavior. *Consum. Psychol. Rev.* **2019**, *2*, 85–96. [CrossRef]
46. Jiang, L.; Zhang, J.; Wang, H.H.; Zhang, L.; He, K. The impact of psychological factors on farmers' intentions to reuse agricultural biomass waste for carbon emission abatement. *J. Clean. Prod.* **2018**, *189*, 797–804. [CrossRef]
47. Shah, P.; Yang, J.Z. When virtue is its own reward: How norms influence consumers' willingness to recycle and reuse. *Environ. Dev.* **2023**, *48*, 100928. [CrossRef]
48. Bhutto, M.Y.; Rūtelionė, A.; Šeinauskienė, B.; Ertz, M. Exploring factors of e-waste recycling intention: The case of generation Y. *PLoS ONE* **2023**, *18*, e0287435. [CrossRef] [PubMed]
49. Steinemann, S.T.; Geelan, B.J.; Zaehringer, S.; Mutuura, K.; Wolkow, E.; Frasseck, L.; Opwis, K. Potentials and pitfalls of increasing prosocial behavior and self-efficacy over time using an online personalized platform. *PLoS ONE* **2020**, *15*, e0234422. [CrossRef]

50. Isa, N.K.M. Sustainable Campus and Academic Staff's Awareness and Behaviour in Malaysia's Institutions of Higher Learning: A case study of UPSI. *Geografia* **2016**, *12*, 89–99.
51. Desa, A.; Ba'yah Abd Kadir, N.; Yusooff, F. A study on the knowledge, attitudes, awareness status and behaviour concerning solid waste management. *Procedia-Soc. Behav. Sci.* **2011**, *18*, 643–648. [CrossRef]
52. Tam, V.W.; Hao, J.J. Attitudes towards recycling on construction sites. In *Proceedings of the Institution of Civil Engineers-Waste and Resource Management*; Thomas Telford Ltd.: London, UK, 2016; Volume 169, pp. 131–136.
53. Zamani-Farahani, H.; Musa, G. The relationship between Islamic religiosity and residents' perceptions of socio-cultural impacts of tourism in Iran: Case studies of Sare'in and Masooleh. *Tour. Manag.* **2012**, *33*, 802–814. [CrossRef]
54. Gusti, A.; Isyandi, B.; Bahri, S.; Afandi, D. The behavioral intention to implement sustainable waste management on primary school students in city of Padang, Indonesia. *Int. J. Innov. Appl. Stud.* **2015**, *13*, 309.
55. Huang, Y.C. Integrated concepts of the UTAUT and TPB in virtual reality behavioral intention. *J. Retail. Consum. Serv.* **2023**, *70*, 103127. [CrossRef]
56. Conner, M.; Norman, P. Understanding the intention-behavior gap: The role of intention strength. *Front. Psychol.* **2022**, *13*, 923464. [CrossRef] [PubMed]
57. Arvola, A.; Vassallo, M.; Dean, M.; Lampila, P.; Saba, A.; Lähteenmäki, L.; Shepherd, R. Predicting intentions to purchase organic food: The role of affective and moral attitudes in the Theory of Planned Behaviour. *Appetite* **2008**, *50*, 443–454. [CrossRef] [PubMed]
58. Al Mamun, A.; Saufi, R.A.; Mohiuddin, M.; Fazal, S.A. Recycling intentions and behaviors among informal micro-entrepreneurs in Kelantan, Malaysia. *World J. Entrep. Manag. Sustain. Dev.* **2019**, *15*, 123–138. [CrossRef]
59. Nguyen, T.K.N. The determinants of individuals' waste separation intention in an urbanizing city: A case study of Hanoi, Vietnam. *Habitat Int.* **2023**, *137*, 102835. [CrossRef]
60. Taufique, K.M.R.; Vaithianathan, S. A fresh look at understanding Green consumer behavior among young urban Indian consumers through the lens of Theory of Planned Behavior. *J. Clean. Prod.* **2018**, *183*, 46–55. [CrossRef]
61. Davis, G.; O'callaghan, F.; Knox, K. Sustainable attitudes and behaviours amongst a sample of non-academic staff: A case study from an Information Services Department, Griffith University, Brisbane. *Int. J. Sustain. High. Educ.* **2009**, *10*, 136–151. [CrossRef]
62. Ofstad, S.P.; Tobolova, M.; Nayum, A.; Klöckner, C.A. Understanding the mechanisms behind changing people's recycling behavior at work by applying a comprehensive action determination model. *Sustainability* **2017**, *9*, 204. [CrossRef]
63. Conway, L.G., III; Repke, M.A. The psychological contamination of pro-environmental consensus: Political pressure for environmental belief agreement undermines its long-term power. *J. Environ. Psychol.* **2019**, *62*, 12–21. [CrossRef]
64. Ibrahim, R.Z.A.R.; Saputra, J.; Bakar, A.A.; Dagang, M.M.; Nazilah, S.; Ali, M.; Yasin, M.A.S.M. Role of supply chain management on the job control and social support for relationship between work-family conflict and job satisfaction. *Int. J. Supply Chain. Manag.* **2019**, *8*, 907–913.
65. Fikadu, S.D.; Sadore, A.A.; Agafari, G.B.; Agide, F.D. Intention to comply with solid waste management practices among households in Butajira town, Southern Ethiopia using the theory of planned behavior. *PLoS ONE* **2022**, *17*, e0268674. [CrossRef] [PubMed]
66. Soorani, F.; Ahmadvand, M. Determinants of consumers' food management behavior: Applying and extending the theory of planned behavior. *Waste Manag.* **2019**, *98*, 151–159. [CrossRef] [PubMed]
67. Hu, J.; Tang, K.; Qian, X.; Sun, F.; Zhou, W. Behavioral change in waste separation at source in an international community: An application of the theory of planned behavior. *Waste Manag.* **2021**, *135*, 397–408. [CrossRef]
68. Babazadeh, T.; Ranjbaran, S.; Kouzekanani, K.; Abedi Nerbin, S.; Heizomi, H.; Ramazani, M.E. Determinants of waste separation behavior Tabriz, Iran: An application of the theory of planned behavior at health center. *Front. Environ. Sci.* **2023**, *11*, 985095. [CrossRef]
69. Concari, A.; Kok, G.; Martens, P.; Brink, N. Investigating the Role of Goals and Motivation on Waste Separation Behavior Through the Lens of the Theory of Reasoned Goal Pursuit. In *Environmental Management*; Springer: Berlin/Heidelberg, Germany, 2023; pp. 1–13.
70. Sekaran, U.; Bougie, R. Metode Penelitian Untuk Bisnis: Pendekatan Pengembangan Keahlian Edisi 6 Buku 1. 2017. Available online: https://perpustakaan.ibik.ac.id/index.php?p=show_detail&id=31784&keywords= (accessed on 15 March 2023).
71. Cresswell, J.W.; Plano Clark, V.L. *Designing and Conducting Mixed Method Research*, 2nd ed.; Sage: Thousand Oaks, CA, USA, 2011.
72. Cheah, W.Y.; Pahri, S.D.R.; Leng, S.T.K.; Er, A.C.; Show, P.L. Circular bioeconomy in palm oil industry: Current practices and future perspectives. *Environ. Technol. Innov.* **2023**, *30*, 103050. [CrossRef]
73. Gusti, A. The relationship of knowledge, attitudes, and behavioral intentions of sustainable waste management on primary school students in city of Padang, Indonesia. *J. Appl. Environ. Sci.* **2016**, *11*, 1323–1332.
74. Maichum, K.; Parichatnon, S.; Peng, K.C. Application of the extended theory of planned behavior model to investigate purchase intention of green products among Thai consumers. *Sustainability* **2016**, *8*, 1077. [CrossRef]
75. Tommasetti, A.; Singer, P.; Troisi, O.; Maione, G. Extended theory of planned behavior (ETPB): Investigating customers' perception of restaurants' sustainability by testing a structural equation model. *Sustainability* **2018**, *10*, 2580. [CrossRef]
76. Wang, G.; Wei, Y.; Qiao, S.; Lin, P.; Chen, Y. *Generalized Inverses: Theory and Computations*; Springer: Singapore, 2018; Volume 53.
77. Nduneseokwu, C.K.; Qu, Y.; Appolloni, A. Factors influencing consumers' intentions to participate in a formal e-waste collection system: A case study of Onitsha, Nigeria. *Sustainability* **2017**, *9*, 881. [CrossRef]

78. Thi Thu Nguyen, H.; Hung, R.J.; Lee, C.H.; Thi Thu Nguyen, H. Determinants of residents' E-waste recycling behavioral intention: A case study from Vietnam. *Sustainability* **2018**, *11*, 164. [CrossRef]
79. Sosik, J.J.; Kahai, S.S.; Piovoso, M.J. Silver bullet or voodoo statistics? A primer for using the partial least squares data analytic technique in group and organization research. *Group Organ. Manag.* **2009**, *34*, 5–36. [CrossRef]
80. Falk, M.; Miller, A.G. Infrared spectrum of carbon dioxide in aqueous solution. *Vib. Spectrosc.* **1992**, *4*, 105–108. [CrossRef]
81. Chin, J.L. Introduction to the special issue on diversity and leadership. *Am. Psychol.* **2010**, *65*, 150. [CrossRef] [PubMed]
82. Urbach, N.; Ahlemann, F. Structural equation modeling in information systems research using partial least squares. *J. Inf. Technol. Theory Appl. (JITTA)* **2010**, *11*, 2.
83. Reinartz, W.; Haenlein, M.; Henseler, J. An empirical comparison of the efficacy of covariance-based and variance-based SEM. *Int. J. Res. Mark.* **2009**, *26*, 332–344. [CrossRef]
84. Hair, J.F.; Ringle, C.M.; Sarstedt, M. Partial least squares: The better approach to structural equation modeling? *Long Range Plan.* **2012**, *45*, 312–319. [CrossRef]
85. Latan, H.; Noonan, R.; Matthews, L. Partial least squares path modeling. In *Partial Least Squares Path Modeling: Basic Concepts, Methodological Issues and Applications*; Springer: Berlin/Heidelberg, Germany, 2017.
86. Cohen, J. Set correlation and contingency tables. *Appl. Psychol. Meas.* **1988**, *12*, 425–434. [CrossRef]
87. Cheah, J.H.; Sarstedt, M.; Ringle, C.M.; Ramayah, T.; Ting, H. Convergent validity assessment of formatively measured constructs in PLS-SEM: On using single-item versus multi-item measures in redundancy analyses. *Int. J. Contemp. Hosp. Manag.* **2018**, *30*, 3192–3210. [CrossRef]
88. Hair, J.; Hair, J.F., Jr.; Sarstedt, M.; Ringle, C.M.; Gudergan, S.P. *Advanced Issues in Partial Least Squares Structural Equation Modelling*; Sage Publications: Washington, DC, USA, 2023.
89. Hair, J.F., Jr.; Hult, G.T.M.; Ringle, C.M.; Sarstedt, M.; Danks, N.P.; Ray, S.; Hair, J.F.; Hult, G.T.M.; Ringle, C.M.; Sarstedt, M.; et al. Evaluation of reflective measurement models. In *Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R: A Workbook*; Springer: Berlin/Heidelberg, Germany, 2021; pp. 75–90.
90. Hair, J.F., Jr.; Sarstedt, M.; Hopkins, L.; Kuppelwieser, V.G. Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *Eur. Bus. Rev.* **2014**, *26*, 106–121. [CrossRef]
91. Hair, J.F.; Risher, J.J.; Sarstedt, M.; Ringle, C.M. When to use and how to report the results of PLS-SEM. *Eur. Bus. Rev.* **2019**, *31*, 2–24. [CrossRef]
92. Hair, J.F.; Black, W.C.; Babin, B.J.; Anderson, R.E. *Multivariate Data Analysis*; Pearson Prentice Hall: Upper Saddle River, NJ, USA, 2010.
93. Kock, N.; Lynn, G. Lateral collinearity and misleading results in variance-based SEM: An illustration and recommendations. *J. Assoc. Inf. Syst.* **2012**, *13*. [CrossRef]
94. Jusoh, Z.M.; Arif, A.M.M.; Osman, S.; Salleh, R.M.; Kadir, N.A.A. Factors that influence the behaviour of household solid waste management towards zero waste. *Malays. J. Consum. Fam. Econ.* **2018**, *21*.
95. Nor Ahmad, S.N.H.J.N.; Amran, A.; Siti-Nabiha, A.K. Symbolic or substantive change? How a Malaysian palm oil company managed sustainability issues in words and deeds. *Qual. Res. Account. Manag.* **2022**, *19*, 473–510. [CrossRef]
96. Rodthong, W.; Kuwornu, J.K.; Datta, A.; Anal, A.K.; Tsusaka, T.W. Farmers' perceptions and likelihood of adoption of the roundtable on sustainable palm oil practices in Thailand. *Environ. Dev.* **2023**, *47*, 100883. [CrossRef]
97. Borges, J.A.R.; Lansink, A.G.O.; Ribeiro, C.M.; Lutke, V. Understanding farmers' intention to adopt improved natural grassland using the theory of planned behavior. *Livest. Sci.* **2014**, *169*, 163–174. [CrossRef]
98. Cheng, K.W. Attitude, perceived behavioral control and subjective norms in waste segregation-at-source behavior: An empirical study. *Sustain. Bus. Soc. Emerg. Econ.* **2020**, *2*, 83–93. [CrossRef]
99. Adnan, N.; Nordin, S.; Abu Bakar, Z. Understanding and facilitating sustainable agricultural practice: A comprehensive analysis of adoption behaviour among Malaysian paddy farmers. *Land Use Policy* **2017**, *68*, 372–382. [CrossRef]
100. Chin, H.C.; Choong, W.W.; Alwi, S.R.W.; Mohammed, A.H. Using Theory of Planned Behaviour to explore oil palm smallholder planters' intention to supply oil palm residues. *J. Clean. Prod.* **2016**, *126*, 428–439. [CrossRef]
101. Dalila, D.; Latif, H.; Jaafar, N.; Aziz, I.; Afthanorhan, A. The mediating effect of personal values on the relationships between attitudes, subjective norms, perceived behavioral control and intention to use. *Manag. Sci. Lett.* **2020**, *10*, 153–162. [CrossRef]
102. Taylor, S.; Todd, P. An integrated model of waste management behavior: A test of household recycling and composting intentions. *Environ. Behav.* **1995**, *27*, 603–630. [CrossRef]
103. Salvia, G.; Zimmermann, N.; Willan, C.; Hale, J.; Gitau, H.; Muindi, K.; Gichana, E.; Davies, M. The wicked problem of waste management: An attention-based analysis of stakeholder behaviours. *J. Clean. Prod.* **2021**, *326*, 129200. [CrossRef] [PubMed]
104. Nahum, N.; Carmeli, A. Leadership style in a board of directors: Implications of involvement in the strategic decision-making process. *J. Manag. Gov.* **2020**, *24*, 199–227. [CrossRef]
105. Woldesenbet, W.G. Stakeholder participation and engagement in the governance of waste in Wolkite, Ethiopia. *Environ. Chall.* **2021**, *3*, 100034. [CrossRef]
106. Latif, R.A.; Yahya, N.H.; Mohd, K.N.T.; Kamardin, H.; Ariffin, A.H.M. The influence of board diversity on environmental disclosures and sustainability performance in Malaysia. *Int. J. Energy Econ. Policy* **2020**, *10*, 287–296. [CrossRef]
107. Babaei, A.; Alavi, N.; Goudarzi, G.; Teymouri, P.; Ahmadi, K.; Rafiee, M. Household recycling knowledge, attitudes and practices towards solid waste management. *Resour. Conserv. Recycl.* **2015**, *102*, 94–100. [CrossRef]

108. Eneji, C.V.O.; Eneji, J.E.O.; Ngoka, V.N.; Abang, M. Attitude towards waste management and disposal methods and the health status of Cross River State, Nigeria. *SCIREA J. Agric.* **2017**, *1*, 231–247.
109. PeiZhi, W.; Ramzan, M. Do corporate governance structure and capital structure matter for the performance of the firms? An empirical testing with the contemplation of outliers. *PLoS ONE* **2020**, *15*, e0229157. [CrossRef]
110. Yu, S.; Lu, T.; Qian, X.; Zhou, W. Behavioral intention analysis of waste separation in China—Case study of Hangzhou using theory of planned behavior. *Int. Rev. Spat. Plan. Sustain. Dev.* **2018**, *6*, 63–77. [CrossRef]
111. Tam, V.W.; Le, K.N.; Wang, J.Y.; Illankoon, I.C.S. Practitioners recycling attitude and behaviour in the Australian construction industry. *Sustainability* **2018**, *10*, 1212. [CrossRef]
112. Zeweld, W.; Van Huylenbroeck, G.; Tesfay, G.; Speelman, S. Smallholder farmers' behavioural intentions towards sustainable agricultural practices. *J. Environ. Manag.* **2017**, *187*, 71–81. [CrossRef] [PubMed]
113. Chengqin, E.K.; Zailani, S.; Rahman, M.K.; Aziz, A.A.; Bhuiyan, M.A.; Gazi, M.A.I. Determinants of household behavioural intention towards reducing, reusing and recycling food waste management. *Nankai Bus. Rev. Int.* **2022**. *ahead-of-print*. [CrossRef]
114. Abadi, B.; Mahdavian, S.; Fattahi, F. The waste management of fruit and vegetable in wholesale markets: Intention and behavior analysis using path analysis. *J. Clean. Prod.* **2021**, *279*, 123802. [CrossRef]
115. Li, J.; Zuo, J.; Cai, H.; Zillante, G. Construction waste reduction behavior of contractor employees: An extended theory of planned behavior model approach. *J. Clean. Prod.* **2018**, *172*, 1399–1408. [CrossRef]
116. Strydom, W.F. Applying the theory of planned behavior to recycling behavior in South Africa. *Recycling* **2018**, *3*, 43. [CrossRef]