

## THE EFFECTS OF OWNER-MANAGERS' BEHAVIOURAL PATTERNS ON INVESTMENT DECISIONS AMONG SMALL-SCALE RECYCLING FIRMS IN TANZANIA

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### Abstract

Owner-managers make decisions on behalf of their firms. This study used cross-sectional data to investigate how owner-manager's behavioural factors influence investment decisions in terms of choice of recycling investments, share of recycling investment in the portfolio, and level of diversification in the waste recycling sector. Three analytical techniques were employed to analyse the data: the multivariate probit model to explore the effects of owner-manager's behavioural factors on the choice of specific waste recycling investments, multiple linear regression analysis to determine their influence on waste recycling investment share, and an ordered logistic regression model to study their effects on levels of diversification within the recycling investment portfolio. The results indicate that investors' attitudes and subjective norms significantly affect both their choice of specific waste recycling investments and the level of diversification within the recycling investment portfolio, while perceived behavioural control significantly affects the decision on waste recycling investment share. The research did not find evidence that attitude and subjective norms affect investment share nor that perceived behavioural control affects investment choice and the level of diversification. These findings highlight the importance of considering owner-manager's behavioural factors in promoting sustainable and effective investment strategies in the waste recycling sector. Policymakers should develop programs to enhance positive attitudes toward waste recycling investments. Additionally, training programs for owner-managers should focus on increasing perceived behavioural control by improving access to resources and skills. Furthermore, social influence campaigns could be leveraged to strengthen the subjective norms supporting waste recycling investments.

**Keywords:** Investment decision, Recycling, Circular economy, Attitude, Subjective norms, Perceived behavioural control.

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## **Introduction**

Investment in recycling has several benefits to the global mission of mitigating climate change and protecting the earth's limited resources and biodiversity for future generations (World Economic Forum, 2021). It is also a good investment avenue as waste generation keeps increasing (Senzige, Nkansah-Gyeke, Makinde, & Njau, 2014). In Tanzania, the wastes generated are estimated to be around 12.1 million to 17.4 million tonnes per year (United Republic of Tanzania, 2020), which signifies large waste resources and potential investment opportunities in the waste recycling streams with a positive contributing factor to global climate change. Unfortunately, despite the availability of this investment opportunity, conducive investment climate and incentives provided by the government to attract more investments in various waste recycling, Tanzania's recycling rate is still very low. Data shows that out of around 241kg to 347kg (ranging from 5% to 10%) of waste generated per capita per year, Tanzania recycles 12.05kg to 34.7kg of waste per person per year. This is an average of 23kg per capita per year (URT, 2020) or an average of 7.8%. The current recycling rate is far less than the target set by the African Union, which requires all cities of member states to recycle at least 50% of the waste they generate. It is also relatively lower compared with neighbouring country Kenya, where the rate is currently 10% (Government of Kenya, 2020).

Globally, small-scale recycling firms, famously called “scrap dealers”, are recognised as key participants and investors in the recycling value chain (Conke, 2018; Kitole, Tibamanya, & Sesabo, 2023; UNIDO, 2019). Similarly, in Tanzania, the National Solid Waste Management Strategy recognises Small and Medium Enterprises (SMEs) as one of the instruments for strengthening solid waste management through entrepreneurial activities, whereby recycling is considered as an income-generating venture (United Republic Tanzania, 2018). The main issue, which is unknown, is why there is low investment in this industry. What is it that determines the investment decisions among small scale waste recycling firms in Tanzania? The benefits from waste recycling may not be realised without knowing what determines the investment decision among small scale waste recycling firms and, therefore adopting appropriate strategies to promote the same.

Studies conducted in different sectoral contexts indicate that owner-managers behaviour influence investment decisions (Akhtar & Das, 2019; Depoers & Jérôme, 2020; Gopalakrishna-Remani, Jones, & Wooldridge, 2016; Kaur & Kaushik, 2016; Maritim, Muturi, Kosgei, & Ranyimbo, 2022; Ngcamu, Quaye, Horvey, & Jaravaza, 2023; Sivaramakrishnan, Srivastava, & Rastogi, 2017; Yulandreano & Rita, 2023). Despite these studies being on different sectoral context, they have also shown varying results, which render their use in this context less relevant to knowing what influences investment decisions among small-scale waste recycling firms in Tanzania. Moreover, it is also not known whether behavioural issues matter in influencing investment decisions.

This study, therefore, was intended to determine factors influencing investment decisions among small-scale recycling firms in Tanzania. Specifically, whether or not the owner-managers' behavioural factors namely attitude; subjective norms; and perceived behavioural control affect

the choice of a specific waste recycling investment; the share of waste recycling investment in the portfolio; and the level of diversification within waste recycling investments.

### **Theoretical foundation**

The theory of planned behaviour (TPB), derived from the theory of reasoned action (TRA), explains how salient individual beliefs influence behavioural intentions and subsequent behaviour (Ajzen, 1991). It is widely applicable and robust in predicting various behaviours across disciplines. TPB posits that an individual's behaviour is driven by behavioural intentions, influenced by attitudes toward the behaviour, subjective norms, and perceived behavioural control. Attitudes are overall evaluations of the behaviour, subjective norms involve beliefs about whether significant others think the behaviour should be performed, and perceived behavioural control refers to the perceived ease or difficulty of performing the behaviour (Ibrahim & Arshad, 2018). Attitudes, subjective norms, and perceived behavioural control each have primary determinants. Attitudes depend on beliefs about the likely outcomes of the behaviour and the evaluation of these outcomes. Subjective norms are shaped by normative beliefs about significant others' preferences and one's motivation to comply with these expectations. Perceived behavioural control is influenced by beliefs about having the necessary abilities, resources, and opportunities to perform the behaviour successfully, considering both internal factors (e.g., skills, information) and external factors (e.g., opportunities, barriers) (Ibrahim & Arshad, 2018). These elements collectively determine the intention and actual behaviour, such as an investor's decision to invest in a waste recycling business, influenced by perceived risks, returns, social pressures, and available resources.

The TPB has been extensively applied in various contexts, including investment decisions, both alone and with other theories (Ibua, 2017; Kim & Stanton, 2016). Empirical studies have utilized TPB to examine how attitudes, subjective norms, and perceived behavioural control affect investment decisions across different sectors and countries (Akhtar & Das, 2019; Ibrahim & Arshad, 2018; Kaur & Kaushik, 2016; Sivaramakrishnan et al., 2017; Yang et al., 2020). For instance, Kaur and Kaushik (2016) explored investor behaviour towards mutual funds, while Yang et al. (2020) assessed private sector participation in healthcare via Public-Private Partnerships in China. Applying TPB to the context of waste recycling investment is relatively new, providing insights into how behavioural factors influence investment decisions in small-scale recycling firms in Tanzania, regarding investment type, size, and diversification (Kaur & Kaushik, 2016).

### **Empirical reviews**

#### **Attitude and Investment Decision**

The influence of investors' attitude on intention to invest has been variously studied (Akhtar & Das, 2019; Raut, Das, & Kumar, 2018; Sivaramakrishnan et al., 2017) with contradicting results. For example, in a study by Sivaramakrishnan and Srivastava (2017) on attitudinal factors, financial literacy, and stock market participation, it was found that attitude had a negative impact on intention to invest in the equity markets in India. Contrary to this, other studies report attitude to have a positive influence on individuals' intention to engage in various behaviours. Such studies

include investment decisions in the stock market (Akhtar & Das, 2019; Maritim et al., 2022; Raut et al., 2018); investment decisions in mutual funds (Kaur & Kaushik, 2016); participation in green purchase (Indriani, Rahayu, & Hadiwidjojo, 2019); participation in PPP-Health care (Yang et al., 2020) And other more contexts. All these studies focused on the intention to invest. This study looked beyond the intention. The study determined the influence of attitude on not just intention but on actual investment behaviour in waste recycling.

Apart from its effect on choice of an investment option, investor's attitude has been reported to have influence on share or size of an investment in the portfolio. In another instances, it has been reported that attitude towards risk have significant effect on the share of investment in common stocks (Ebeid, 2008; Maritim et al., 2022). Furthermore, in the wine sub sector, attitude has been reported to have influence on size and scope decisions among maple syrup producers (Velardi, Leahy, Collum, McGuire, & Ladenheim, 2023).

The influence of attitude on the level of diversification has been documented in various sectors. For example, in the agriculture sector, it has been reported that farmers' positive attitude influence their livelihood diversification (Reddy, Nataraju, & Lakshminarayan, 2020). A negative relationship between risk aversion and portfolio diversification has also been reported (Li, Li, & Li, 2015). This suggests that attitudes exert a key influence on investment behaviour, particularly within the scope of choice of investment, share of investment, and portfolio diversification.

### **Subjective Norms and Investment Decisions**

Subjective norms have been studied in different contexts and different decision domains, including investment decisions in terms of choice of investment type, size of investment, and level of diversification. Regarding the influence of subjective norms on the choice of investment, various studies in different contexts have portrayed mixed results. For example, in a study to determine predictors of investment intentions in Indian stock markets, subjective norms showed a weak positive effect on investment intention (Akhtar & Das, 2019). However, in a study on the behavioural intention of the private sector's participation in PPP projects in China, subjective norms had no effect at all (Yang et al., 2020; Zhang, Gu, Shan, Xiao, & Darko, 2018). Subjective norms have also been reported to have a significant effect on individuals' intentions regarding investing in socially responsible investments (Thanki, Shah, Rathod, Oza, & Burduhos-Nergis, 2022) and in purchase intention of green products (Raut, 2020; Sethi & Jain, 2020; Sharma & Gupta, 2011).

Regarding the influence of subjective norms on the share of investment in the portfolio, studies have shown mixed results. Subjective norms have been portrayed to have no influence on size and scope decisions among maple syrup producers (Velardi et al., 2023). But on the other side, community social capital has been shown to have a negative impact on capital allocation inefficiency, meaning that they have a positive effect on capital allocation efficiency (Bhandari & Bhuyan, 2023). Whether or not subjective norms can affect the share of recycling investment among small scale recycling firms in Tanzania remains to be answered.

Regarding the influence of subjective norms on the level of diversification, empirical literature, on the one hand, indicates that friends (subjective norms) play an important role in motivating farmers to go for diversification (Reddy et al., 2020; Rehima, Belay, Dawit, & Rashid, 2013). In the contrary, another study about diversification among Australian olive growers has found that the influence of subjective norms on olive growing diversification is largely not yet confirmed (Duarte Alonso & Krajsic, 2015; Reddy et al., 2020). So far, there is scanty evidence about the effect of subjective norms on investment decisions in the recycling subsector. These inconclusive results across various sectors call for an investigation in the recycling subsector, too.

### **Perceived Behavioural Control and Investment Decisions**

Perceived behavioural control (PBC) refers to people's perceptions of the ease or difficulty of conducting a particular behaviour and the amount of control they need over the behaviour (Ajzen, 1991). Researches on the effect of perceived behavioural control of individuals on performing various behaviour are many but with mixed results. For example, PBC was reported to be positively significantly influencing behavioural intention to participation in healthcare service delivery via Public-Private Partnership in China (Yang et al., 2020); participation in PPP projects in China (Zhang et al., 2018) and on individual investment intention on various assets (Deng, Ong, & Qian, 2018). This support the findings that perception of control shapes decision making (Wang, Yang, & Delgado, 2021); in capital markets (Ali, Zani, & Kasim, 2014; Paramita, Isbanah, Kusumaningrum, Musdholifah, & Hartono, 2018; Raut et al., 2018; Schmidt, 2010); and in technology adoption (Kitole et al., 2023). But in few cases, perceived behavioural control had no effect on investment decisions such as in Raut et al., (2018).

Perceived behavioural control has also been reported to have influence on another dimension of investment decision called share of a specific investment in the portfolio. One study in the wine production has indicated that PBC influence the size and scope of decisions among maple syrup producers (Velardi et al., 2023). This findings also is in line with that on the investment decision in the capital market, where research have shown that; individuals with a strong internal economic locus of control are more likely to hold a larger share of equity in their investment portfolio (Salamanca, de Grip, Fouarge, & Montizaan, 2020; Salamanca, de Grip, Fouarge, & Montizaan, 2016; Uhr, Meyer, & Hackethal, 2019). Unfortunately, the influence of the firm's perceived behavioural control on investment decisions in the waste recycling sub-sector is not documented.

In this study we investigated how owner-manager's attitude, subjective norms, and perceived behavioural control influence investment decisions in terms of choices of a specific waste recycling; share of recycling investment in the portfolio, and level of diversification in the waste recycling sector. In the next section we present the data and methodology used.

## **Data and Model Estimation**

### **The Data**

This study used cross-sectional data collected from owner-managers of small-scale recycling firms in Tanzania. The firms are located in five Municipals of Dar es Salaam region namely Ilala, Temeke, Kinondoni, Ubungo, and Kigamboni. Dar es Salaam city was purposely selected because

it is considered the third-fastest growing city in Africa and tenth in the world, and it generates the highest amount of solid waste compared to all the other metropolitan cities in Tanzania (Biswas & Singh, 2021). The solid wastes in Dar es Salaam present a potential business opportunity for scrap dealers. Cross-sectional research design was employed as it allows for the examination of relationships between factors at a specific point in time and is cost-effective for gathering data from a large and dispersed population (Kitole et al., 2023; Utouh & Kitole, 2024).

The population was all 437 members of Tanzania Recyclers Cooperative Society (TERECOS) based in Dar es Salaam. The sample size for the study consisted of 400 firms, determined using the Cochran formula (Israel, 1992). The stratum sample, which was the five Municipalities (i.e. Ilala, Temeke, Kinondoni, Ubungu and Kigamboni) within Dar es Salaam City, was obtained proportionately to the size of the stratum to allow representative sample of the entire population. Simple random sampling was used to select small scale recycling firms (scrap dealers) in each Municipal. The sample drawn from the population per stratum was Ilala 105 out of 115; Temeke 120 out of 131; Kinondoni 67 out of 74; Ubungu 73 out of 80; and Kigamboni 35 out of 37.

### Model estimation

Three models namely multivariate probit, multiple linear and ordered logistic were used in this study based on the nature of the dependent variable. The multivariate probit model was used to examine the effects of owner-manager's behavioural factors on the choice of a specific waste recycling investment. The decision to use the model is based on the fact that managers' decision to choose waste recycling is based on the probability event of non-mutually exclusive that two or more choices can happen simultaneously (Kitole & Sesabo, 2024; Theodory & Kitole, 2024). The log-likelihood function used is:

$$\sum_{i=1}^N \log Pr(y_i | X_i \beta, \Sigma) \quad (1)$$

Where  $Y_i$  is the choice of owner-manager; and  $X_{is}$  are owner managers' behavioural factors; and  $\beta$  are the regression coefficients.

On the other hand, to estimate the effect of owner-managers behavioural factors on waste recycling investment share, our study employed multiple linear regression (MLR) models as the result of the outcome variable being continuous and falling into the Gauss Markov theorems (Kitole & Genda, 2024). The operational MLR model used is:

$$Y = a + \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon_1 \quad (2)$$

Whereas  $Y$  is the share of waste recycling investment in the portfolio,  $\beta_0$  is the regression constant or intercept,  $\beta_1, \beta_2, \beta_3$  are the regression coefficients,  $X_1$  is investor's attitude;  $X_2$  is investor's subjective norms;  $X_3$  is investor's perceived behavioural control and  $\varepsilon$  is the error term.

Finally, the study employed the ordered logistic regression model to estimate effects of the owner-manager's behavioural factors on the levels of diversification within waste recycling investment portfolio. The analytical modelling for the objective was guided with the equation that:

$$y^* = \beta' x_i + \varepsilon_i; -\infty < y_i^* < \infty$$

Whereas  $y_i^*$  represents levels of diversification,  $\beta'$  is a vector of parameters that should be estimated,  $x_i$  is an observed vector of non-random explanatory variable, which shows the characteristic of  $i^{\text{th}}$  Variable, and  $\varepsilon_i$  presents an error term which is logistically distributed (Kitole et al., 2023).

The ordered logit model was expressed as follows:

$$\log \left[ \frac{y_j(x_i)}{1 - \gamma_i(x_i)} \right] = \mu_j - [\beta_1 x_{1i} + \beta_2 x_{2i} + \dots + \beta_k x_{ki}] \quad (3)$$

Whereby  $j = 1 \dots, J$ ;  $i = 1 \dots, n$

In which,  $y_j$  is a cumulative probability;  $\beta'$  is the column vector and of  $\beta_1, \beta_2 \dots \beta_3$  parameters and  $x_i$  is the column vector of explanatory variables.  $\mu_j$  is only dependent on the probability of predicting the category and is not dependent on explanatory variables.

Making decisions about using variables' values in estimation is very important because the marginal effect depends on the values of all independent variables. Since total probability always equals 1, then the total marginal effect for each variable is equal to 0. Not only that, but also it should be noted that the marginal effect is not a direct binary variable, and it can be obtained by calculating the difference between the two possible probabilities. Therefore, in this study, the diversification levels under examination were described as very high diversification, high diversification, moderate diversification, very low diversification, and not diversified. Table 1 presents variable measurements as adopted from various literature and the theory of planned behaviour, which was used to provide the theoretical basis for the problem setting.

**Table 1 Variable measurements**

Component	Variables	Scale	Reference
Investment decisions	Choice of recycling investments	Nominal scale: 1= invested in specific waste(s) 0=Not invested in specific waste	Massini and Menichetti (2013)
	Share of recycling investment	Continuous scale: the ratio of recycling investment in the portfolio	Cheraghi et al (2019); Masini and Menichetti
	Level of diversification within the recycling portfolio	Ordinal scale in terms of the number of waste categories the firm has invested in, whereby: 1= Not diversified (1 category) 2 = Very low diversification (2 categories)	Masini and Menichetti(2013)
Owner-manager's behavioural Factors	Investor's Attitude	Likert scale/ordinal	(Yang et al., 2020; Zhang et al., 2018)
	Subjective Norms	Likert scale/ordinal	
	Perceived Behavioural Control	Likert scale/ordinal	

**Source: researcher constructs from literature review (2024)**

## Results

### Descriptive Results

Descriptive results in Table 2 indicate that with regard to investment choices of recycling firm owners, the most popular options are: plastic (76.25%), metals (71%), papers (36.50%), and glasses (29.75%). Only a small portion of small-scale recyclers (26%) have selected e-wastes as their investment avenue.



**Table 2 Frequency Distribution of Investment Choice/Share/Diversification**

<b>Variables</b>	<b>Investment Choice/Share/Diversification</b>	<b>Frequenc y</b>	<b>Per cent</b>
Recycling Investment Choices (Mutually exclusive)	Plastics	305	76.25%
	Metals	284	71%
	Papers	146	36.50%
	Glasses	119	29.75%
	E-Wastes	104	26%
Share of recycling investment in the portfolio	Invested in recycling only	11	2.75%
	Invested in both recycling and non-recycling business	389	97.25%
Level of diversificatio n within small scale recycling investments	Not diversified	131	32.75%
	Very low level of diversification	120	30%
	Moderate level of diversification	57	14.25%
	High level of diversification	44	11%
	Very high level of diversification	48	12%

Results in Table 2 also indicate that the majority of surveyed recycling firms (97.25%) do not exclusively invest in recycling, but rather, they are involved in other business lines, either to spread risk or to take advantage of additional business opportunities. Only 2.75% invest exclusively in recycling business venture.

With regard to the level of diversification within small scale recycling firms; results indicate that 67.25% of the sampled firms have diversified their investments within the recycling investment portfolio. Meaning that they deal with more than one waste category. The Possible reason for this trend could be that firm owners would wish to hedge against market fluctuations or tap into multiple revenue streams. The remaining 32.75% of recycling firm owners have only invested in a single category of waste, possibly due to lack of capital or abilities in terms of knowledge.

In summary, the frequency distribution of recycling firm owners’ characteristics presented in Table 2 provides a comprehensive overview of the choices, share and diversification levels within recycling firm owners. These findings can serve as a foundation for further research and policy considerations aimed at promoting diversity and sustainable investment practices within the recycling sector.

## Empirical Results

### Influence of Owner-managers' Behavioural Factors on Specific Waste Recycling Investment Choice

Empirical findings presented in Table 3 indicate that the attitude of recycling investment owners has a significant positive influence on the choice of all five categories of waste recycling investments categories, namely plastics, metals, papers, glasses, and e-waste. This finding supports previous findings that attitude influences investment decision (Akhtar & Das, 2019; Indriani et al., 2019; Kaur & Kaushik, 2016; Sivaramakrishnan et al., 2017; Yang et al., 2020)

**Table 3: Effects of owner's manager's behavioural factors on specific waste recycling investment choice**

Variables	(1)	(2)	(3)	(4)	(5)
	Plastics	Metals	Papers	Glasses	E-waste
Attitude	<b>0.416***</b> (0.169)	<b>0.754***</b> (0.191)	<b>1.158***</b> (0.283)	<b>1.444***</b> (0.232)	<b>0.922***</b> (0.213)
Subjective norms	<b>0.247***</b> (0.074)	0.113 (0.073)	<b>0.208***</b> (0.075)	<b>0.226***</b> (0.076)	0.040 (0.075)
Perceived behaviour control	0.104 (0.104)	-0.030 (0.104)	0.098 (0.104)	0.132 (0.116)	0.193 (0.111)
Constant	-2.352*** (0.704)	-3.030*** (0.828)	-6.547*** (1.368)	-8.249*** (1.067)	- 5.595*** (0.931)
Observations	400	400	400	400	400
*** p<0.01, ** p<0.05, * p<0.1 Robust standard errors in parentheses					

Furthermore, results indicate that the subjective norms of owners of small-scale recycling firms also influence investment choices for plastics, papers, and glasses. The subjective norms, however, did not significantly affect investment choices for metals and e-waste. These findings suggest that firm owners' perceptions of social norms have different effects on investment choices for different waste types. These findings are in line with previous studies which insist that subjective norms, particularly the influence of financial advisors, have been reported to significantly impact various decision-making (Raut, 2020; Sethi & Jain, 2020; Sharma & Gupta, 2011).

These current findings suggest that while subjective norms play a significant role in influencing investment decisions for specific waste types among small-scale recycling firm owners, their influence may vary across different waste categories. The significant effect observed for plastics, papers, and glasses implies that social norms play a crucial role in influencing investment behaviour in these areas. On the contrary, the insignificant effects on metals and e-waste suggest that other factors may be more influential in determining investment decisions for these waste types than just subjective norms.

Overall, the current findings highlight the importance of considering the effects of subjective norms on investment decisions within the waste recycling industry. Policymakers and industry stakeholders should consider the varying influence of subjective standards across different waste categories when formulating measures to encourage more investment practices in the waste recycling industry. Further research is needed in order to explore more about the fundamental factors driving the relationship between subjective norms and investment decisions in waste recycling sub sector.

Regarding the effect of perceived behavioural control on the choice of specific recycling investment in the portfolio; results indicate that perceived behavioural control does not significantly influence firm owners in making specific investment choices. The perceived behavioural control coefficient was not statistically significant. This finding contradicts with prior research where perceived behavioural control has been demonstrated to play a significant role in investment decisions across various sectors (Deng et al., 2018; Thanki et al., 2022; Wang et al., 2021).

The inconsistency in results between the current study and the documented literature suggests that the influence of perceived behavioural control on investment decisions may vary depending on the specific circumstances. In our case of small-scale recycling firms, the insignificance of perceived behavioural control could be attributed to the fact that operating such firms requires relatively less capital and possibly less complicated decision-making processes compared with traditional investment sectors like capital markets. Nevertheless, more inquiry is required to investigate the insignificant effect of perceived behavioural control toward investment choices in the recycling sub sector and how they might differ from other sectors.

### **The Influence of Behavioural Factors on Share of Recycling Investment in the Portfolio**

Results in Table 4 show the influence of owner-manager behavioural variables, namely attitude, subjective norms, and perceived behavioural control, on the proportion of waste recycling investment in the firm's investment portfolio. The dependent variable, the share of recycling investment, was measured as the proportion of the value of investment in waste recycling to the total investments made by the firm.

The OLS model diagnostic tests were conducted to confirm that the assumptions of linear regression were not violated. These assessments involved inspecting multicollinearity, normality, and heteroskedasticity. In all aspects, it was found that there was no multicollinearity problem in the model. The mean VIF for all variables was 1.155. The Breusch-Pagan / Cook-Weisberg test was performed to ascertain whether there was any proof of constant variance in the residuals of the model. The Prob>chi2 was 0.4751, and therefore, we could not reject null on constant variance, indicating that there was no heteroskedasticity problem.

We conducted skewness and kurtosis tests for normality. The skewness (Pr-skewness) and Kurtosis Pr (kurtosis) values were 0.309 and 0.693 respectively. These are within the recommended range of +3 and -3 for skewness and less than 10 for Kurtosis. These results indicate the probability of obtaining the observed skewness and kurtosis in a normal distribution. In this

case, a high Pr (skewness)/Pr (kurtosis) value suggests that the skewness of the variable is not significantly different from what would be expected in a normal distribution.

After conduction the above tests for the assumptions of an OLS model, and were all found to warrant the use of an OLS model to determine the effect of behavioural factors on the share of recycling investment. The OLS results are shown in Table 4.

**Table 4: Effects of Owner-managers' Behavioural Factor on Waste Recycling Investment Share**

Variables	OLS
	Recycling Investment share
Attitude	0.040 (0.024)
Subjective norms	-0.011 (0.015)
<b>Perceived behaviour control</b>	<b>0.035**</b> <b>(0.015)</b>
Constant	0.298*** (0.107)
Observations	400
R-squared/Pseudo r-squared	0.040
Prob > F/Prob>chi2	0.016
*** p<0.01, ** p<0.05, * p<0.1 Standard errors in parentheses	

The OLS regression results indicate that perceived behavioural control has a positive and significant influence on managers' decisions about their firms' recycling investment share. The coefficient for perceived behaviour control is 0.035 (p-value = 0.017). This result implies that when managers feel that they have the ability to control and invest in recycling practices, then they tend to allocate a higher proportion of their investment to recycling than to their other businesses. These findings also support the previous findings, which found that individuals with a strong internal economic locus of control are more likely to hold a larger share of equity investments in their investment portfolio (Salamanca et al., 2020; Uhr et al., 2019).

We did not find any evidence of the influence of attitude and subjective norms on recycling investment shares in the firm's portfolio. These results are contrary to those in previous studies, which indicated that attitude has a positive and significant influence on the decision about the size of the investment. (Ebeid, 2008; Maritim et al., 2022; Velardi et al., 2023)Such results may be due to the fact that increasing the size of investments in the portfolio is not just a matter of having a positive attitude alone; other factors, such as financial ability and market knowledge, are very important.

The insignificant influence of subjective norms is in line with previous studies, which show that subjective norms have no influence on size and scope decisions among maple syrup producers. (Velardi et al., 2023) However, this appears to contradict previous findings, which say that family cultural values have a positive impact on family financial asset allocation. (Z. Li & Jin, 2023) and on capital allocation decisions (Bhandari & Bhuyan, 2023).

Such results suggest that subjective norms may not uniformly influence investment decisions, especially the size of investment across different contexts. In our case, the perception of the community and other influential people to the investors may be the source of discouragement to investors not to invest more in industries such as recycling. For that matter, more research may be needed to gain more understanding of how behavioural factors have shown such results.

**The Influence of Behavioural Factors on the Level of Diversification within Recycling Investment Portfolio**

More diversification within small scale recycling firms is one indication of the high level of investment within the recycling sub-sector. Since there is a small level of investment in the recycling sub-sector in Tanzania, this low level of investment may likely be attributed to the fact that these investors have not diversified much. In other words, most of them have invested in a single waste category, leaving other waste categories unexplored. For that matter, the current study was meant to test the effect of behavioural factors on the level of diversification within the recycling investments portfolio.

An ordered logistics regression was used to determine the effect of behavioural factors (attitude, subjective norms, and perceived behavioural control) on the level of diversification within a waste recycling investment portfolio. The result of this analysis is shown in Table 5.

**Table 5: Effect of Behavioural Factors on the Level of Diversification within the Waste Recycling Investment Portfolio**

Variables	Ordered Logistic regression
	Level of diversification
Attitude	2.665*** (0.295)
Subjective norms	0.477*** (0.103)
Perceived behaviour control	0.207 (0.147)
Observations	400
Pseudo r-squared	0.118
Prob>chi2	0.000
*** p<0.01, ** p<0.05, * p<0.1 Standard errors in parentheses	

Results in Table 5 indicate that investors' attitude has a significant positive influence on the level of diversification within the recycling investment portfolio ( $p < 0.01$ ). This implies that recycling firm managers with positive attitudes toward recycling have a higher likelihood of engaging in diversification strategies. Such results are in line with a previous study that farmers' positive attitude influence their livelihood diversification. (Reddy et al., 2020).

The results also indicate that subjective norms have a positive and significant influence on the level of diversification within the recycling investment portfolio. That is stronger social norms supporting recycling led to a higher likelihood of recycling firm managers engaging in diversification strategies. Such a result is in line with empirical literature, which indicates that friends (subjective norms) play an important role in motivating farmers to diversification (Reddy et al., 2020; Rehima et al., 2013).

## Conclusion

Investment decisions in environmentally friendly ventures such as waste recycling are an important area of research, not only in the current times but also in the future, if all nations would like to achieve a circular economy and its related benefits. This study has attempted to shed light on behavioural factors influencing investment decisions among small-scale recycling firms in Tanzania. The study concludes that owner-managers attitudes and subjective norms have a significant influence on both the choice of specific waste recycling investments and the level of diversification within the recycling investment portfolio.

Moreover, subjective norms have also been found to have a significant effect on investment decisions, particularly on investment choices and diversification strategies, although subjective norms have demonstrated varying effects across different contexts and sectors. Finally, perceived behavioural control did not show a significant influence on specific investment choices or the level of diversification but was found to have a significant positive influence on managers' decisions regarding the share of recycling investment in the portfolio.

Based on these findings, policymakers are advised to take note of the significant effect of attitude and subjective norms on investment decisions by putting in place measures that will promote a positive attitude toward investing in waste recycling. Such measures may include educational campaigns. On subjective norms, in order to promote more support from the community, more policy support and awareness programs about the scrap dealer business are required. Results on perceived behavioural control imply that there is a need to empower managers to have confidence and control over their recycling business.

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