The Determinants of Residents' Recycling Intention in Kuala Nerus, Terengganu

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Abstract
Waste management and recycling have emerged as critical issues in Malaysia's economy and ecology. It's encouraging to see recycling rates rise in Malaysia, but the country has a long way to go. Recycling is not widely practiced among Kuala Nerus's population. Therefore, the purpose of this research is to investigate what influences people in Kuala Nerus to recycle. The study gathered its data from a street survey conducted in Kuala Nerus, Terengganu, which yielded 260 replies. The information was collected using online questionnaires completed by the respondents themselves. The respondent's details were kept confidential. Attitude, knowledge, perceived moral obligation, inconvenience, and subjective norms were all found to have positive correlations with recycling intention among Kuala Nerus residents. This research adds to the existing literature on recycling by elucidating the nature and importance of attitude, knowledge, inconvenience, perceived moral obligation, and subjective norms in predicting recycling intention. The findings have important policy implications, including the need for public authorities to actively promote recycling as a progressive social movement. To further encourage people to recycle, public authorities should increase access to recycling centers.
Keywords: Recycling Intention, Recycling, Municipal Solid Waste Management (MSWM), Theory of Planned Behavior

Introduction
     It is getting increasingly complex and challenging to handle MSWM worldwide, and this is especially true in developing countries. The public's health, the environment, and the aesthetic appeal of urban areas are all negatively impacted when home solid trash is not managed properly (Khalil et al., 2017). This is why governments all around the world have implemented recycling programs to encourage citizens to reduce their waste. Mandatory recycling rules, waste pricing systems, curbside recycling collection, trash separation

containers in communities, and marketing efforts for recycling behaviors are all examples of government interventions that can range from mandatory to optional (Tencati et al., 2016).

Reduced waste generation and increased recycling rates are expected to result from policies that address the underlying psychological variables that motivate citizens to recycle (Graham-Rowe et al., 2015). Recovery of recyclable materials and lessening of the waste stream's negative effects on the environment are both possible thanks to careful waste management (Gundupalli et al., 2017). Reprocessing and reusing waste materials is a sustainable practice known as recycling. Moreover, it lessens the garbage that gets hauled off to the dump (Rudnik, 2010). To alleviate the overflowing waste and energy crisis, widespread recycling among the population is essential. An ever-growing mountain of garbage is a serious ecological issue in many nations. The sheer volume of trash generated in Malaysia highlights the importance of citizen involvement in garbage management through reuse and recycling (Ridzuan et al., 2017).

Unfortunately, Malaysia has an extremely poor recycling rate. A total of 28.1% of waste in 2019 was recycled in Malaysia, per the (Malaysian Investment Development Authority, 2021). When compared to countries like South Korea (57%), Germany (48%), Australia (36%), and Denmark (36%), the rate is low (Tiseo, 2022). Natural disasters, congested drainage systems, a rise in garbage, higher management expenses, and global warming/climate change/extreme weather like flash floods are all potential outcomes of Malaysia's dismal recycling rates (Roslan & Said, 2022).

Kuala Nerus is one of the more highly urbanized regions in the state of Terengganu. Because of its status as an urban region, Kuala Nerus generates a lot of trash. This is due in large part to its rapidly expanding population and changing topography (Mohd Zaki, 2016). Only a small percentage of people in Kuala Nerus recycle, according to a 2016 study by Mohd Zaki. It was noted in 2022 that Kuala Nerus, Terengganu, had issues with its solid waste management. Scholars and policymakers alike need a complete understanding of individuals' behavioral intentions to recycle to increase recycling intention and, by extension, recycling practices (Wan et al., 2017).

Research Objective: to examine factors associated with recycling intentions among residents in Kuala Nerus, Terengganu.

Literature Review

The term "recycling intention" is used to describe a person's intent to recycle (Park & Ha, 2014). In the literature on recycling intent, social psychological variables and models have been used. Ajzen's (1991) Theory of Planned Behavior (TPB) is the most used framework for analyzing recycling intentions. It is a developed version of TRA (the Theory of Reason Action) (Fishbein & Ajzen, 1975). The TPB has proven to be a valuable tool for studying and predicting the motivations behind future actions in the natural world (Armitage & Conner, 2001). According to Ajzen (1991), TPB can accommodate new variables if they contribute significantly to the explanation. The TPB's flexibility in accommodating new variables from different theories is one of its main strengths (Khalil et al., 2017). Therefore, the research model is strengthened by adding many independent factors, including familiarity with the topic, perceived difficulty, and a sense of moral obligation.

An individual's attitude is a representation of how they value given conduct. If a person is inclined to engage in the conduct, it's because they like it (Wan et al., 2017). Previous research has discussed how individuals' attitudes toward recycling may catalyze the development of recycling motivations (Sulaiman et al., 2019). According to Sulaiman et al. (2019), a person's attitude can have a favorable effect on their motivation to recycle. This claim is based on the research of Pamuk and Kahriman-Pamuk (2019), who found that there is a strong correlation between recycling awareness and attitudes among Turkish educators.

Individuals who are cognizant of the difficulties associated with recycling are more inclined to take part in such initiatives, as stated by (Schultz et al., 2013). Knowledge and information are crucial variables in affecting people's recycling awareness; this is supported by the positive correlation between recycling information and the percentage of recycled materials found by (Oskamp et al., 1998). It was highlighted by Al Mamun et al (2019) that specialized recycling expertise can considerably and positively affect several facets of recycling. Awareness of the environment, say many environmentalists, is the key to reducing pollution. Optimal resource utilization is another benefit that may be facilitated by this (Al Mamun et al., 2019). Understanding recycling behavior, according to Oskamp et al. (1998), involves familiarity with both the types of trash that need to be separated and the locations of recycling containers.

One's feeling of moral obligation can be characterized as the belief that they have a moral duty to engage in particular actions. When an ethical dilemma arises, this becomes very apparent (Sulaiman et al., 2019). Several studies on recycling intentions have indicated that a person's sense of moral obligation is positively related to their recycling intentions (Chen & Tung, 2010; Chu & Chiu, 2003; Park & Ha, 2014).

The term "inconvenience" is used to describe a problem state that may contribute to an individual's distress when engaging in specific actions (Derksen & Gartell, 1993). Some residents may feel uneasy about recycling, for instance, because it requires a significant time commitment. Previous research suggests that convenience may be the single most important factor in explaining why people don't recycle (Suwandari et al., 2012). Since it takes more time and energy to collect and sort garbage, and since it requires special equipment and disposal strategies, many people view this as an unworkable solution. The user's attitude and behavior are greatly influenced by the ease of implementation, which includes things like learning the rules, setting up the tasks, and gaining access to the environment's programs.

The term "subjective norm" is used to describe the extent to which one is influenced by the positive evaluations of one's behavior and outlook expressed by other people (Ajzen, 1991). Like an attitude, a subjective norm is a person's internalized consensus of what constitutes appropriate behavior in a given social setting (Ajzen, 1991). People's recycling intentions are influenced by the social norms that are important to them, according to the existing body of research (Bobek & Hatfield, 2003; Ramayah et al., 2012). Subjective norms are linked to students' intentions to recycle in Malaysia, according to research by Sulaiman et al. (2019). Teachers in Turkey may be encouraged to recycle by social pressure, according to a theory proposed by (Pamuk and Kahriman-Pamuk, 2019). Following the aforementioned review of literature, we postulate the following:
H1: Attitude is positively associated with recycling intention.

H2: Knowledge is positively associated with recycling intention.
H3: Perceived moral obligation is positively associated with recycling intention.
H4: Inconvenience is positively associated with recycling intention.
H5: Subjective norms are positively associated with recycling intention.

Research Methodology

Data was collected through the use of questionnaires in this investigation. All of the collected information was analyzed using SPSS, a statistical program for the social sciences, version 26. As an individual citizen of Kuala Nerus, Terengganu, he or she serves as the study's unit of analysis. It's important to note that while the respondents were supposed to represent Kuala Nerus, Terengganu residents, they were selected at random from the surrounding area. The study gathered its data from a street survey conducted in Kuala Nerus, Terengganu, which yielded 260 replies. In this study, all continuous variables were measured on a 5-point Likert scale to guarantee uniformity in results. This is because the bulk of the original instruments used in the study were Likert-type scales, which preserve their metric properties regardless of the number of points. The information was collected using online questionnaires completed by the respondents themselves. The respondent's details were kept confidential.

Findings

Demographic Profile

There were 260 valid responses obtained from the street survey described in the earlier section. The respondent profile is presented in Table 1. The majority of the sample was Male (52.3%), Malays (96.2%), and aged between 18 to 29 years old (37.7%).

Table 1
Demographic Profile of the Respondents

Profile	Frequency(n)	Percentage(%)
	N: 260	
Gender		
Male	136	52.3
Female	124	47.7
Races		
Chinese	5	1.9
Indian	3	1.2
Others	2	.8
Malay	250	96.2
Ages		
18-29 Years Old	98	37.7
30-39 Years Old	97	37.3
40-49 Years Old	29	11.2
50 Years Old and Above	36	13.8

Preliminary Analyses
Reliability Results

Reliability or internal consistency is to measure Cronbach's alpha. Cronbach's alpha reliability coefficient range between 0 and 1 (Gliem & Gliem, 2021). For Cronbach statistic, perfect value in reliability is 1, 0.90-0.99 considered excellent, 0.80-0.89 as very good, 0.70-0.79 as good, 0.60-0.69 as acceptable, and 0.00-0.59 as worst. Based on table 2, Cronbach's alpha for recycling intentions is (.952), attitude (.945), knowledge (.719), perceived moral obligation (.838), inconvenience (.897) and subjective norms (.931) were more than .6, thus were considered acceptable and reliable.

Table 2
Reliability Results

Constructs	No. of Items	a Value
Dependent Variable		
Recycling Intention	4	.952
Independent Variables		
Attitude	5	.945
Knowledge	4	.719
Perceived Moral Obligation	4	.838
Inconvenience	4	.897
Subjective Norms	3	.931

Normality Result

According to Brown (2021), the range of +3 and -3 are acceptable values for Skewness, and the range of +10 and -10 are acceptable values for Kurtosis. Table 3 shows the normality results of the variables. All variables of the study are found to be normal since the values of Skewness and Kurtosis are within the normality range specified by (Brown, 2021).

Table 3
Normality Results

Construct		Mean	Standard Deviation	Skewness	Kurtosis
Dependent Variable					
Recycling Intention		2.9317	1.16555	-.351	-1.451
Independent Variables					
Attitude		2.8585	.99960	0.22	-1.553
Knowledge		3.0337	.99979	-.316	-.990
Perceived	Moral	3.1769	.96310	-.638	-.916
Obligation					
Inconvenience		2.5173	1.54351	-.549	-1.250
Subjective Norms		2.9218	1.20393	-.409	-1.466

Correlation Results

One method of expressing effect sizes is in terms of strength of association. The most well-known variant of this approach is the Pearson correlation coefficient, r. Using Pearson r, effect sizes are always less than 1.0, varying between -1.0 and +1.0 with 0 representing no effect and +1 or -1 being the maximum effect. Cohen (1988) provides guidelines for interpreting the strength of a relationship (Effect Sizes). The value of more than .70 can be considered as very high, .51 (large), .36 (medium) and .14 (small) effects of relationship. Table 4 depicts that the the strengths of the relationship between attitude (r= .503), knowledge (r= .613) and subjective norms (r= .517) and recycling intentions were high. Meanwhile, perceived moral obligation (r= .473) and inconvenience (r= .222) have moderate relationship with recycling intention. Furthermore, all predictors are positively related to recycling intention. Hence, hypotheses 1,2,3,4, and 5 can be accepted.

Table 4
Correlation Results

		Recycling Intention
Attitude	Pearson Correlation	.503**
	Sig.	.000
	N	260
Knowledge	Pearson Correlation	.613**
	Sig.	.000
	N	260
Perceived Moral Obligation	Pearson Correlation	.473**
	Sig.	.000
	N	260
Inconvenience	Pearson Correlation	. 222**
	Sig.	.000
	N	260
Subjective Norms	Pearson Correlation	.517**
	Sig.	.000
	N	260

Discussion

This study revealed that attitude is positively correlated with recycling intention. This finding is in line with the findings of the study carried out by (Ridzuan et al., 2022). Ridzuan et al (2022) contend that an individual with a positive attitude about recycling is more likely to recycle because they believe that recycling will benefit them as well as others. Taylor & Todd (1995) also explained both personal and social benefits that influenced individuals' attitudes toward waste minimization behavior. Personal benefits include monetary savings, whereas social benefits include environmental preservation, pollution reduction, and resource conservation.

People who are aware of the obstacles to recycling are more likely to participate in recycling programs, according to (Schultz et al., 2013). There is a positive association between recycling information and the proportion of recycled materials, according to Oskamp et al. (1998), suggesting that knowledge and information are essential variables in affecting people's recycling awareness. Knowledge of the environment has a big impact on the intention to recycle (Elayan & Ibrawish, 2017). A high level of knowledge can help to build a good attitude toward environmental challenges (Al Mamun et al., 2019). Furthermore, De Young (1989) stated that supplying the public with recycling information was critical in motivating people to participate in recycling programs.

Sulaiman et al (2019) found a significant association between perceived moral obligation and recycling intention among UTHM students. This is consistent with the findings of Sulaiman et al (2019), who discovered a substantial link between Inconvenience and Recycling Intention in their study. Recycling can be deemed inconvenient if it is complicated or needs more effort than just disposing of rubbish in a single bin. The cost of discomfort can be decreased by introducing proper policies and methods. It is critical to understand the disruptive costs associated with each feature of recycling behavior while establishing such a

policy or system. According to Martin et al (2006), if an individual perceives a lack of recycling facilities and local pickup, he or she is less inclined to recycle.

According to the findings, the majority of respondents felt obligated to recycle, and recycling is the obligation of everyone in the community. Previous research has found that subjective norms have a considerable influence on the proclivity to buy green things (Mahmud & Osman, 2010). Numerous studies have found that there is a link between recycling intention and subjective norms (Chen & Tung, 2010; Papagiannakis & Lioukas, 2012; Sidique et al., 2010). According to Wan et al (2017), subjective norms could boost the chance of recycling for persons with a good experience attitude and motivate people with inadequate awareness of the benefits of recycling activities to engage in recycling behaviors. People respond to social standards to gain favor from relevant ones while avoiding blame from others (Comber & Thieme, 2013; White et al., 2009).

Conclusion

Waste management has been noted as a serious environmental issue in many urban areas, including those in the Association of Southeast Asian Nations (ASEAN) countries. Despite an increase in recycling rates from 21 to 24.6 percent, Malaysia still falls well behind the world leader, Germany, which has a recycling rate of 56 percent. Recycling must be pushed in Malaysia due to the numerous environmental benefits it provides (Ridzuan et al., 2022).

All variables (attitude, knowledge, perceived moral obligation, inconvenience, and subjective norms) were shown to be connected with recycling intention among Kuala Nerus people, according to the findings. It is reasonable to conclude that the vast majority of inhabitants favor recycling. They believe that recycling is a good, sensible, pleasurable, or rewarding action to engage in. This research adds to the recycling literature by elucidating the nature and importance of attitude, knowledge, inconvenience, felt moral obligation, and subjective norms in determining recycling intention.

Based on the findings, practical implications were drawn that public authorities should encourage recycling as a desirable societal trend. The messages are proposed to inform households about the necessity of recycling. Furthermore, public authorities must provide additional recycling facilities to encourage residents to participate in recycling practices. The government should launch a recycling awareness campaign to educate people about the benefits of recycling for both themselves and the environment. This will help to strengthen those who already have a positive attitude toward recycling as well as change those who have a negative attitude about recycling. Some of the topics that should be highlighted in the recycling campaign include the health and environmental effects of households' inadequate attitude toward garbage disposal. Furthermore, emphasis should be placed on personal gain, particularly the financial benefit associated with recycling through the sale of recyclable materials. The government should educate and persuade people that the benefits of recycling are not just for the environment and themselves, but also for others. Hence, the government should implement programs that increase households' intrinsic and moral motivation to recycle.

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References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211.

Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: a metaanalytic review. *Br. J. Soc. Psychol. 40*(4), 471–499.

Bobek, D. D., & Hatfield, R. C. (2003). An investigation of the theory of planned behavior and the role of moral obligation in tax compliance. *Behav. Res. Account*., 13–38.

Brown, T. A. (2021). *Confirmatory factor analysis for applied research*. New York: Guilford

Chen, M., & Tung, P. (2008). The Moderating Effects of Perceived Lack of Facilities and Implementation Performance of Policies On Consumers' Recycling Intentions, *Environment and Behavior*.

Chu, P. Y., & Chiu, J. F. (2003). Factors influencing household waste recycling behavior: Test of an integrated model 1. *Journal of Applied Social Psychology, 33*(3), 604-626.

Comber, R., & Thieme, A. (2013). Designing beyond habit: Opening space for improved recycling and food waste behaviors through processes of persuasion, social influence and aversive affect. *Personal and Ubiquitous Computing, 17*(6), 1197-1210

De Young, R. (1989). Exploring the Difference Between Recyclers and Non-Recyclers: The Role of Information. *Journal of Environmental Systems, 18*(4), 341-351

Derksen, L., & Gartell, J. (1993). The Social Context of Recycling. *American Sociological Review, 58*, 434-442

Elayan, M., & Ibrawish, E. (2017). Factors influencing the implementation of recycling: evidence from Ayla Aviation Academy in Jordan. *International Journal of Economic Perspectives, 11*(1), 354-377.

Fishbein, M., & Ajzen, I. (1975). *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*: Addison-Wesley Pub. Co

Gliem, J. A., & Gliem, R. A. (2021). *Calculating, interpreting, and reporting Cronbach's Alpha Reliability Coefficient for Likert-Type Scales*

Graham-Rowe, E., Jessop, D. C., & Sparks, P. (2015). Predicting Household Food Waste Reduction Using an Extended Theory of Planned Behaviour. *Resour. Conserv. Recycl., 101*, 194–202.

Gundupalli, S. P., Hait, S., & Thakur, A. (2017). A Review on Automated Sorting of Source-Separated Municipal Solid Waste for Recycling. *Waste Manag. 60*, 56–74.

Khalil, M. S., Abdullah, S. H., Abd Manaf, L., Sharaai, A. H., & Nabegu, A. B. (2017). Examining the Moderating Role of Perceived Lack of Facilitating Conditions on Household Recycling Intention in Kano, *Nigeria, Recycling 2*(18), 1-22.

Mahmud, S. N. D., & Osman, K. (2010). The determinants of recycling intention behavior among the Malaysian school students: An application of theory of planned behaviour. *Procedia Soc. Behav. Sci.,* 119–124.

Malaysian Investment Development Authority (MIDA). (2021). Circular economy: where are we now and how do we even begin. https://www.mida.gov.my/circular-economy-where-are-we-now-and-how-do-we-even-begin/

Martin, M., Williams, I. D., & Clark, M. (2006) Social, Cultural and Structural Influences on HouseholdWaste Recycling: A Case Study. *Resour. Conserv. Recycl. 48*, 357–395.

Zaki, M. N. H. (2016). *Development of solid waste management plan in Kuala Nerus, Terengganu. Pahang*: Universiti Malaysia Pahang.

Oskamp, S., Burkhardt, R. L., Schultz, P. W., Hurin, S., & Zelezny, L. (1998). Predicting Three Dimensions of Residential Curbside Recycling: An Observational Study. *The Journal of Environmental Education, 29*(2), 37-42.

Pamuk, S., & Kahriman-Pamuk, D. (2019). Preservice teachers' intention to recycle and recycling behavior: the role of recycling opportunities. *International Electronic Journal of Environmental Education, 9*(1), 33-45.

Papagiannakisa G., & Lioukas S. (2012). Values, attitudes and perceptions of managers as predictors of corporate environmental responsiveness. *Journal of Environmental Management.*

Park, J., & Ha, S. (2014). Understanding consumer recycling behavior: Combining the theory of planned behavior and the norm activation model. *Family and Consumer Sciences Research Journal, 42*(3), 278-291.

Park, J., & Ha, S. (2014). Understanding consumer recycling behavior: Combining the theory of planned behavior and the norm activation model. *Family and consumer sciences research journal, 42*(3), 278-291.

Ramayah, T., Lee, J. W. C., & Lim, S. (2012). Sustaining the environment through recycling: An empirical study. *Journal of Environmental Management, 102*, 141–147.

Ridzuan, M. R., Abd Rahman, N. A. S., Hussin, N. S., & Awang, N. (2017). Recycling Endeavours Among The P.P.R Residents In Kuala Lumpur: A Qualitative Approach. *Malaysian Journal of Sustainable Environment, 3*(2), 117-138.

Ridzuan, M. R., Zani, M. A., Abd Rahman, N. A. S., Rabun, M. N., & Yaacob, N. A. (2022). Solid Waste Management And Recycling Practices Among PPR Sri Pantai Residents: A Move Towards Sustainability. *International Journal of Academic Research in Business and Social Sciences, 12*(9), 1007 – 1027.

Roslan, M. B., & Said, M. S. (2022). *Amalan kitar semula masih rendah, halangan capai sasaran 40 peratus menghalang 2025*. Kuala Lumpur: Bernama.

Rudnik, E. (2010). *Compostable Polymer Materials (Google eBook), 1st ed.; Elsevier: Amsterdam,* The Netherlands.

Schultz, P. W., Bator, R. J., Large, L. B., Bruni, C. M., & Tabanico, J. J. (2013). Littering in context Personal and environmental predictors of littering behavior. *Journal Environment and Behavior, 45*(1), 35-39.

Sidique, S. F., Lupi, F., & Joshi, S. V. (2010). The effects of behavior and attitudes on drop-off recycling activities. *Resources, Conservation and Recycling, 54*(3), 163–170.

Sulaiman, N. Shiau, W. C., & Yi, S. O. (2019). Factors Influencing Recycling Intention among University Students, *International Journal of Innovative Technology and Exploring Engineering, 8*(8), 2278-3075.

Suwandari, L., Julina & Miftah, D. (2012). The Effect of Inconvenience of Recycling and the Importance of Recycling toward Recycling Behavior.

Taylor, S., & Todd P. (1995). An integrated model of waste management behaviour: A test of household recycling and composting intentions. *Journal of Environment and Behavior, 27*(5), 603–30.

Tencati, A., Pogutz, S., Moda, B., Brambilla, M., & Cacia, C. (2016). Prevention policies addressing packaging and packaging waste: Some emerging trends. *Waste Management, 56*, 35-45.

Tiseo, I. (2022). Global recycling rates of munipical solid waste 2020,by select country. Statista.

Wan, C., Shen, G. Q., & Choi, S. (2017). Experiential and instrumental attitudes: Interaction effect of attitude and subjective norm on recycling intention. *Journal of Environmental Psychology,* https//10.1016/j.jenvp.2017.02.006

White, K. M., Smith, J. R., Terry, D. J., Greenslade, J. H., & McKimmie, B. M. (2009). Social influence in the theory of planned behaviour: The role of descriptive, injunctive, and in-group norms. *British Journal of Social Psychology, 48*(1), 135-158.