

FACTORS INFLUENCING WASTE MANAGEMENT IN MALAYSIA

Farah Saniah Mohd Zabidi¹, Noor Azlin Mohd Kasim², Sarimah Ahmad³, Nor Hazanah Miskan⁴

^{1,2,3,4}Lecturer at Faculty of Business Innovation and Technology, University Melaka

Corresponding author email : farahsaniah@unimel.edu.my

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ABSTRACT

The purpose of this paper is to ensure factors that influence waste management practices to sustainable development and economic growth in Malaysia. This paper develops a conceptual framework to improve waste and recycling management by local government and generate wealth to the country, where the factors that influence waste management practices can be identified by educational, social-economic and institutional. The conceptual framework of waste management contributes to government the important factors that can improve waste management implementations and increase wealth through the strategic factors. Document analysis are used to obtained information from different sources to have much knowledge about the issues under consideration and assist in contextualise the research within subject by providing background knowledge and a wide range of facts. This paper finds that waste management can lead to generating wealth if the development of numerous initiatives by the Malaysian government towards sustainable development in waste management practices.

Keywords: Waste to wealth, Educational factors, Income, Institutional factors, Sustainable Development.

FAKTOR-FAKTOR YANG MEMPENGARUHI PENGURUSAN SISA DI MALAYSIA

ABSTRAK

Tujuan kertas kerja ini adalah untuk memastikan faktor-faktor yang mempengaruhi amalan pengurusan sisa kepada pembangunan mampan dan pertumbuhan ekonomi di Malaysia. Kertas kerja ini membangunkan rangka kerja konsep untuk menambah baik pengurusan sisa dan kitar semula oleh kerajaan tempatan dan menjana kekayaan kepada negara, di mana faktor-faktor yang mempengaruhi amalan pengurusan sisa boleh dikenal pasti melalui pendidikan, sosial-ekonomi dan institusi. Rangka kerja konsep pengurusan sisa menyumbang kepada kerajaan faktor penting yang boleh menambah baik pelaksanaan pengurusan sisa dan meningkatkan kekayaan melalui faktor strategik. Analisis dokumen digunakan untuk mendapatkan maklumat daripada sumber yang berbeza untuk mempunyai banyak pengetahuan tentang isu yang sedang dipertimbangkan dan membantu dalam kontekstual penyelidikan dalam subjek dengan menyediakan pengetahuan latar belakang dan pelbagai fakta. Kertas kerja ini mendapati bahawa pengurusan sisa boleh membawa kepada penjanaan kekayaan jika pembangunan pelbagai inisiatif oleh kerajaan Malaysia ke arah pembangunan mampan dalam amalan pengurusan sisa.

Kata kunci: *Pembaziran kepada kekayaan, Faktor pendidikan, Pendapatan, Faktor institusi, Pembangunan Mampan.*

INTRODUCTION

In metropolitan areas all throughout the world, but particularly in the rapidly growing cities and towns of the developing world, solid waste management is still a major challenge. In truth, the absence of a sufficient and effective solid waste management system has negatively impacted the environment. Statistics from Malaysia Investment Development Authority (MIDA), with a population size of 32.7 M in 2021 (annual growth rate of 0.2%) and an average waste generation rate of 1.17 kg/ca/d is selected for the study. The national waste composition mix in Malaysia, where the highest portion comprises food waste (44.5%). The MSWs include the solid waste generated from households, industrial, commercial, and institutions (Yee et al., 2022). Malaysia produces roughly 38,000 metric tonnes of waste each day, but only recycles 24% of it, with the remaining 76% ending up in landfills. The landfills in Malaysia are running out of room, but rubbish still finds its way there. Some regions where the enormous quantities of debris have been dumped have trash mountains (Sarpong & Alarussi, 2022).

The issue with Malaysia is that it is located in a region with subpar waste management, and only a small amount of composting and incineration is done. Landfills and open dumps continue to be the most popular disposal options, but they come with a number of drawbacks. Open dumps are unhygienic, damaging to the environment, and dangerous to the health of those who live nearby (Sarpong & Alarussi, 2022). In Malaysia, the National Solid Trash Management Department (abbreviated as JPSPN in Malay), Solid Waste Management and Public Cleansing Corporation (SWCorp), local governments, and various private concessionaires are in charge of managing solid waste. The Malaysian government has implemented regulations and action plans to treat MSW in an environmentally friendly manner in response to the significant increase in MSW creation. These include the National Solid Waste Management Policy from 2006 (updated in 2016), the Action Plan for a Beautiful and Clean Malaysia from 1987, and the National Cleanliness Policy from 2020. In Malaysia's policy papers, a few targets are suggested, such as 40% recycling rate by 2025 under the 12th Malaysia Plan (12 MP) 2021-2025, 80% sanitary landfills (SL) by 2030 under the Green Technology Master Plan 2017-2030, and 95% integrated facilities under the 12th Malaysia Plan 2021-2025 (Yee et al., 2022).

Additionally, the Malaysian government implemented new legislation on solid waste management and created a Strategic Plan for Solid Waste Management in Peninsular Malaysia. The main techniques available for integrated waste management include waste minimization, reuse, material recycling, energy recovery, and landfilling, according to a top-down hierarchy. The policy states that

waste treatment facilities such transfer stations, thermal treatment plants, and waste to energy production facilities will be available as alternative treatment alternatives for solid waste management in the near future (WTE).

The Government of Malaysia, through the Ministry of Housing and Government (MHLG) launched national recycling in 1993. But the campaign was not successful due to lack of support and participation from the public. It re-launched its recycling campaign on 2nd December 2000. In Malaysia, although an extensive budget has been spent on MSWM, the most commonly used MSW handling practice is landfill (88.8%), followed by recycling (10.5%) and composting (0.7%). Out of 138 operational landfills, 117 are open landfills without proper landfill gas and leachate collection systems (Radhi, 2020, Keat et al., 2021). The Malaysian government has established a number of national goals to advance sustainability, including raising the rate of solid waste recycling to 40% by 2030, increasing the percentage of renewable energy in the electricity mix to 20% by 2025, and cutting the country's carbon emissions by 45% from 2005 levels by 2030 (Keat et al., 2021).

Only 70% of the daily 18, 000 tonnes of solid garbage produced in Malaysia gets collected and disposed of. The remaining 30% is recycled or illegally disposed of. However, it is thought that only 3-5% of waste is actually recycled, which means that at least 25% of the waste gets disposed of at unlicensed dumps. The overall lack of concern for effective waste management among Malaysians and the absence of a solid waste management programmed are to blame for this dreadful state of affairs. In reality, there is an urgent need to inform the public of the serious consequences resulting from improper solid waste disposal into the environment.

Table 1: Projection of recycling rate in Malaysia from 2001 until 2020 Year Total Waste generated (tonnes/ year) Recycling rate (%)

Year	Total Waste generated (tonnes/ year)	Recycling rate (%)
2001	160,600	3.0
2002	164,615	4.0
2003	168,730	5.0
2004	172,949	6.0
2005	177,272	7.0
2006	181,704	8.0
2007	186,247	9.0
2008	190,903	10.0
2009	195,676	11.0
2010	200,567	12.0
2011	205,582	13.0
2012	210,721	14.0
2013	215,989	15.0
2014	221,389	16.0
2015	226,924	17.0
2016	232,597	18.0
2017	238,412	19.0
2018	244,372	20.0
2019	250,481	21.0
2020	256,743	22.0

Source: Implementation of the semi-aerobic landfill system (Fukuoka Method) in developing countries: A Malaysia cost analysis by Chong et al., 2005).

Previous study from Chong et al (2005) provide an information shown in Table 1, the total wastes generated of at this landfill is estimated to be 4,102,472 tonnes. This projection are part of Master Plan for the Waste Disposal from Alam Flora show the increase of recycling rate from 2001 to 2020. The implementation of recycling method emphasized in decrease of quantity of disposed waste.

Such educational initiatives should aim to influence the views of locals. In considering the above data, this study will attempt to identify the ideal future attitudes of households toward recycling solid waste and will also evaluate the behaviors and levels of current recycling campaign intensity on Malaysia's northern and eastern coasts. The major objective is to gain understanding into the factors that

frequently lead to the failure of such initiatives and the factors that deter the general public from engaging in recycling activities.

The objective of this study is to assess the factors influencing the decision to manage their waste and help the government to improve waste management practices among Malaysian. It highlights the method than can be use in sustainability growth in waste management. More importantly, this paper can help in industrial growth and infrastructure development strategies to ensure environmental pollution and emission can be reduces and also playing important roles in creating an enabling field that favours solutions, products and business models that are more sustainable in pursuance of its sustainable development programme.

The article contributes to discussions on waste management, existing practises in general, and the framework for creating a sustainable business culture. It also contains information on how the advantages that can result from that in a developing nation like Malaysia, which is an important issue to emphasise. For this article, a variety of published official reports, institutional records, local Malaysian authorities, government agencies, and other secondary materials were consulted.

LITERATURE REVIEW

Waste to Wealth

A household is a social unit that consists of a head and people who live in the same house and pool their incomes for the administration of their residence. This revenue is combined for housing, food, and other social requirements as well as for household administration, which includes garbage disposal. Participation is defined in this study as engaging in tasks linked to recycling and disposing of household solid waste. The study uses households as its unit of analysis because they are a crucial level for managing domestic solid waste and are where participation in garbage disposal and recycling is examined (Fadhullah et al., 2022).

In the past, various terms have been used to define waste. Waste is pronounced differently in each country. It has variously been referred to as trash, rubbish, etc. Waste was first described using the French word "vastum," which means "empty or barren." (Singh & Sushil, 2017). Waste management became necessary for industrialization as a result of improper waste management during the production process (Singh & Sushil, 2017) Although there are many different kinds of trash produced by human activity, for the purposes of this study, home garbage will be the main emphasis. Domestic waste covers any trash generated by domestic operations, including human excreta, as well as regular refuse, garbage, swill, and rubbish. The focus of this study will be on residential solid waste, while domestic trash can also take the form of liquids.

Due to reduced startup, operating, and maintenance costs compared to other disposal methods, open dumping dominates solid waste management (SWM) in the majority of developing countries, including Malaysia. The lack of proper liners, gas collection, and leachate collection and treatment in this unhygienic and outengineered technique exposes the surrounding environment to several air, water, and soil contamination problems (Fadhullah et al., 2022). Solid wastes are waste generated through domestic, commercial, industrial, agricultural and other social activities including institutional wastes, street sweepings and construction (Nasir & Ibrahim, 2022). Solid waste is general waste that is not a liquid or a gas, originating from industrial, domestic, municipal or agricultural sources. Domestic waste covers any trash generated by domestic operations, including human excreta, as well as regular refuse, garbage, swill, and rubbish. The focus of this study will be on residential solid waste, while domestic trash can also take the form of liquids. The subject of this study is household solid waste, or garbage that originates from domestic sources. As a result, for the purposes of this study, "domestic solid waste" refers to waste generated by a household, including food packaging, kitchen waste, and other types of waste (Tariq et al., 2022). However, because waste management systems are so intricate, modeling uncertainty is inescapable. Consequently, it becomes crucial to manage these uncertainties.

In developed nations, protecting the environment is the primary goal of garbage management. When it comes to waste management, other factors like environmental protection, productivity growth, job creation, resource recovery, meeting the welfare needs of a large population, etc. are also crucial (Sarpong, 2022).

Educational Factors

The study postulates that there is a connection between educational attainment and environmental understanding, and hence, environmental education knowledge. This claim is supported by the fact that educated individuals are more likely to be reached by official public environmental education campaign tools like the media (TV, radios), newspapers, or radios because they can understand the language of the broadcast (English or Afrikaans). In this section, it will be evaluated if exposure to these different media actually affects people's attitudes about the environment as seen through participation in home trash management and disposal. Environmental knowledge would also influence pro- environmental behavior indirectly through environmental concern (Wu et al., 2022).

Environmental and action-oriented knowledge have been distinguished as two categories of environmental knowledge that appear to be crucial in predicting pro-environmental behavior. Understanding the ecological and social aspects of the environment as well as environmental challenges is referred to as having environmental-oriented knowledge (Wu et al., 2022). The ability to accept concepts and behavioral patterns connected to environmental sustainability is correlated with awareness about littering and proper waste management. Gaining knowledge in this area will improve attitudes and environmental awareness (Owojori et al., 2022). The influence of environmental information in influencing pro-environmental behavior has drawn criticism from academics for being significantly understated. Environmental information is generally accepted to provide a necessary cognitive foundation upon which pro-environmental conduct can be created, even though environmental knowledge per se is not a motive of pro-environmental activity.(Wu et al., 2022). Environmental education strives to orient young citizens and assist them in forming perceptions and constructive activities towards environmental conservation and protection at lower levels of education, among teenagers and the youth. At higher levels of education, the emphasis is on acquiring in-depth knowledge and gaining the skills needed to work toward managing and enhancing environmental quality.

The objective of professional environmental education is to train and create a critical mass of specialists capable of managing environmental resources while maintaining their ecological values and integrity. Environmental education is thus clearly a powerful instrument for climbing the corporate ladder. That is, the harmony between humankind and nature, as well as between the environment and growth. Environmental education success, in their perspective, also depends on a number of other factors at many levels, including individual, group, community, and societal. Success in waste management and disposal is directly tied to environmental education success.

Income (Social Economic Factors)

Participation in household waste recycling and disposal varies along with socioeconomic categories. The results of these categories demonstrate that 100% of affluent families recycle and dispose of their waste. The relationship between poorer households' low participation in garbage disposal programs, their refusal to pay for services, and their limited access to domestic waste management facilities must be carefully examined as a result of this significant observation.

While the disparity in waste management, fee payment, and sorting practices between the wealthy, middle class, and poor may be related to affordability, it may also be influenced by different access to the media, public environmental campaign programs, and other tools that raise awareness of the environment and, in turn, increase participation in waste management. The relationship between education, particularly environmental education, and household participation in domestic waste management is yet unknown, hence the following section examines how various educational categories participate in trash management and disposal.

Institutional Factors

Institutional issues include the low rates of household coverage by waste management facilities and the relatively low level of public understanding of the environmental implications of proper waste management. Coverage with waste management facilities is primarily an institutional issue when it comes to the delivery of public services or the provision of support to the private sector to take over the supply of waste management services. The cost of municipal solid waste management services has significantly increased during the last ten years.

In addition to other measures, local governments are working to lower the costs connected with SWM by promoting trash reduction and reorganizing waste services. Even though it is anticipated that households will make every attempt to participate in domestic trash disposal and recycling, this study advises a supply-driven approach, particularly in relatively poorer settlements where coverage is currently fairly low.

Another key element that has a negative impact on inadequate participation in recycling and rubbish disposal and is extremely relevant institutionally is the relative lack of environmental knowledge. Given all other factors being equal, it is acceptable to infer that the relatively low participation in waste management and recycling in such houses is a direct result of ignorance and a lack of awareness. If people are informed of the benefits such acts have for the environment, they are more likely to accept to help with waste sorting to promote recycling. SWM systems usually fail to function as intended because laws governing existing operations and the implementation of new projects are generally not successfully enforced.

According to Zeng et al., (2022), the number of children in the household may be a significant factor that influences waste separation. The intention of middle-aged adults towards behaving a more eco-friendly system was affected by critical social reference groups around them, such as the interaction with family or the motivation, especially children, and/or the consideration of the health situation of the whole family.

RESEARCH FRAMEWORK

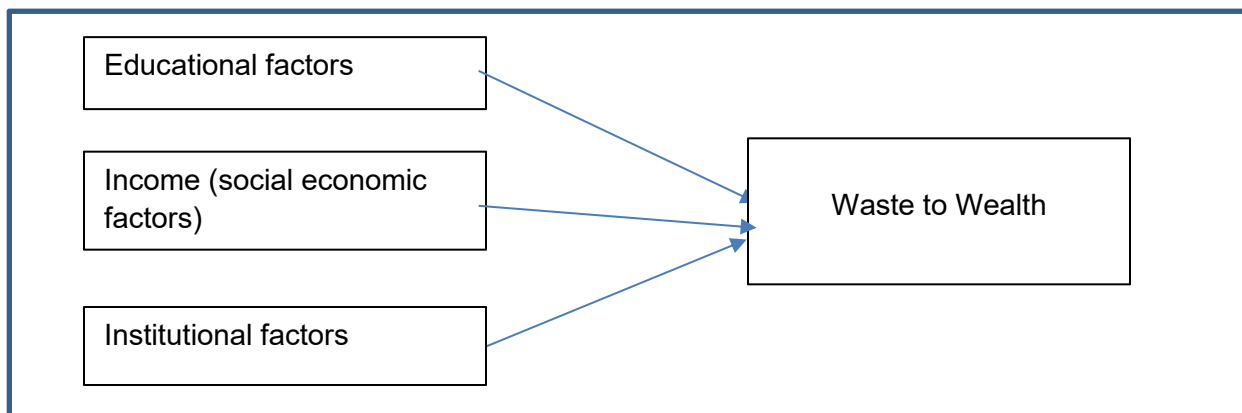


Figure 1 : Research Framework

METHODOLOGY

This article has focused a lot of attention on Malaysia's waste management challenges and how the circular economy may help. The government's aim to uphold its sustainability commitment served as the backdrop against which the paper sought to do that. As a result, the article used document analysis to ascertain the relevant government policies. In order to fully understand the issues at hand, we also gathered information from a variety of sources. The use of document analysis, which is a methodical process for assessing or evaluating papers, proved to be highly useful. Due to the numerous ways in

which such a technique can boost and support research, it is frequently used. Background knowledge and extensive coverage can be obtained by document analysis.

RECOMMENDATIONS AND CONCLUSIONS

In summary, the level of household awareness of environmental education and waste management issues translates into level of participation in domestic waste management, such as sorting, recycling and disposal of domestic waste. This level of participation is related to various factors, among which socio-economic (level of education and wealth or income) and institutional factors.

Due to its intricate connections to general education, environmental education has a direct impact on household participation in trash disposal and recycling. The degree of education and understanding of environmental education concerns are directly correlated, and as a result, there is a greater incentive to participate in household waste management. This complex relationship between household waste management and education is particularly intriguing because it highlights the importance of emphasizing environmental education as a way to improve household waste management. Receiving waste management services without comprehensive environmental education may not be sufficient to ensure widespread public engagement.

Additionally, it was shown that wealthier households participated more in domestic garbage sorting and disposal. This was both because of higher levels of education and hence higher knowledge in environmental education. However, the poorer was not actively involved in waste management because of the location of these households in rural areas well not served by waste management facilities.

The study's conclusions feature the following recommendations that are highly relevant to the design and implementation of waste management programs:

1. It is suggested that greater trash management services be offered, particularly to poorer suburbs and homes. People will be encouraged to take part in garbage management as a result of this. 37% of all respondents strongly agree with this advice and believe that the lack of trash cans and bags for waste separation prevents the general public from taking part in waste management.
2. It is suggested that informal outreach methods and programs be used to promote environmental education initiatives in community settlements as well as in schools, either by direct governmental involvement or indirectly through the activities of non-governmental organizations (NGOs).
3. It is suggested that access to environmental education be expanded in order to increase participation. Low waste management participation is a direct result of poor environmental education, as well as a general lack of awareness and information.
4. Environmental education should be used to raise people's awareness about the relationship between domestic waste management and the environment.

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