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Allocate: Smart Waste Management Trash Can

Nadhirul Atiq Ruzali, Mifzal Salihin, Fadhlin Jeslina Ismail, Khairina Atiqah Khairil Hizar*

Centre of Foundation Studies in Science, University of Malaya, 50603 Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur, Malaysia

*E-mail: khairinahizar@gmail.com

ABSTRACT

The overflow of solid waste in Malaysia has become an issue at an alarming rate. According to Solid Waste Management and Public Cleansing Corporation (SWCorp) deputy chief executive officer (technical) Dr Mohd Pauze Mohamad Taha, said that the recycling rate in Malaysia last year is only 17.5% despite introducing the waste segregation programme, which highlights how serious food wastage is in the country [2]. Most waste is sent to landfills and incinerators without properly managed and processed, contributing towards environmental issues factors. This becomes our problem statement. In solving this issue, we proposed a solution where consumers can turn the waste produced daily harms our planet into something useful and in turn reuse and reduce the resources consumed. We have developed a smart recycling can consisting of a multipurpose function to aid waste separation such as glass crusher and paper shredder integrated into the can to make recycling fun and effortless for users. Instead of a regular recycling bin which sophisticates waste separation, our innovation which focuses on easy use for consumers, would encourage and teach people from all walks of life to adopt recycling as their daily habit. We have set a few objectives as a guideline for our innovation. These objectives include reduce and decrease the amount of solid waste produced by the nation, to eliminate the need for landfills and incinerators, promote and engage the community to practise sustainable living through a practical and easy method of waste disposal, to establish an efficient waste management and disposal system at any location, and to implement and promote the "net zero" movement to the society. Civilians' groups are the main target of our commercial potentials using this product. These groups can drop their waste easily where the trashcan is readily available publically. In conclusion, this project will further be improved to be adapted for household use to increase efficiency of solid waste management.

Keywords: Solid waste; management; separation; trashcan

1. INTRODUCTION

The overflow of generated solid waste has resulted in most world issues such as climate change and pollution of different aspects. Economically, governments have to allocate a specific budget in managing these wastes such as providing waste disposal facilities to the public and support landfill operations. The increasing amount of waste produced has also contributed to poverty, proportional the reduction of resources available. It is clear how the ignorance of waste management that may have been looked at lightly by the community in the past has left a massive impact in the now. In tackling this issue, an

effective way is to curb from where it all started, which is when and how the waste was disposed of initially. The suggested solution would be separating waste according to selected categories, generally recyclables and organic waste, to ease the process waste management and thus reducing the cost and energy invested in this process. However, people have a lackadaisical attitude when it comes to waste management and recycling due to complications namely insufficient time, inaccessible or inconvenient facilities provided and lack of knowledge and awareness regarding waste management. Combating this requires applying a practical solution where it engages the community to separate waste in an easy way. The objectives are:

i. To reduce and decrease the amount of solid waste produced by the nation.
ii. To combat environmental issues such as climate change and pollution.
iii. To eliminate the need for landfills and incinerators that contribute to environmental and economic issues.
iv. To promote and engage the community to practise sustainable living through a practical and easy method of waste disposal.
v. To establish an efficient and dynamic waste management and disposal system at any location namely housing areas, academic institutes, public districts and industrial regions.
vi. To implement the "net zero movement to the society, where the total resources or energy used is roughly equal to the amount of renewable resources or energy that can be created, at any household [1]."

SWCorp deputy chief executive officer (technical) Dr Mohd Pauze Mohamad Taha revealed these figures at a forum on waste management at the Academy of Sciences Malaysia here yesterday. He said in 2018, Malaysians generated a whopping 38, 142 tonnes of waste per day, an increase from 19, 000 tonnes of waste a day in 2005. "If you compare 2005 and 2018, the amount of waste generated has increased tremendously," he said, attributing it to a population boom and the inclusion of commercial waste in the 2018 survey. According to Dr Mohd Pauze, 44.5% of the waste collected was food waste, followed by plastic waste (13.2%) and diapers (12.1%). However, he said the composition of waste was changing, with the latest statistics showing plastic making up 20% of waste. Dr Mohd Pauze said this data for municipal solid waste did not include construction and manufacturing waste. "More than half of the waste generated is sent to sanitary landfills," Dr Mohd Pauze said, adding that approximately 40% of waste was recyclable. "Malaysians have a lackadaisical attitude when it comes to recycling and waste management." He said the recycling rate was low, at a mere 28%, but SWCorp hoped to increase it to 30% by 2020. He said that while the country prepares to introduce a circular economy framework by 2021, Malaysians could greatly reduce the rubbish they generate by segregating their waste [3]."

Our team was inspired by how the environment is society's responsibility to take care of, nonetheless how big or small the action done by each individual might be. Throwing trash away has been something common and everyday practise, but how it's done can affect the environment. If we can persuade the community to dispose of solid waste properly, environmental problems would be reduced significantly to help build a better nation.

2. INNOVATION DEVELOPMENT

The main function of this innovation is to make waste separation more efficient and practical to every household, to prepare waste according to its respective categories for further processing such as recycling and composting, as well as to transform useless waste to produce new forms of resources and energy. To make this innovation adaptable at any situation or locations, various models of this smart trash can will be introduced and customised according to its purposes given with specialized, different set of features for each model. However, each model will work and operate on the same basics.

Initially, the prototype comes with 3 compartments: one for glass bin, plastic and aluminium bin and waste bin each on top of the lid of the innovations are equipped with machines to suit their function such as a glass shredder on the glass bin and paper shredder on the paper bin. However, consumers can choose to purchase each bin individually where it is much more convenient to work around on space and placed anywhere in the house. The smart trash can will be It functions to dispose waste in an orderly fashion and to maximise space for further storage. In addition, it separates the types of solid waste that exists on every household. After solid waste has been organised according to its respective categories, it will go through some processes following up the customised built-in features of each trash bin model. Since we emphasize good waste management practice in every household, we have created and produced this smart trash can which is family friendly.

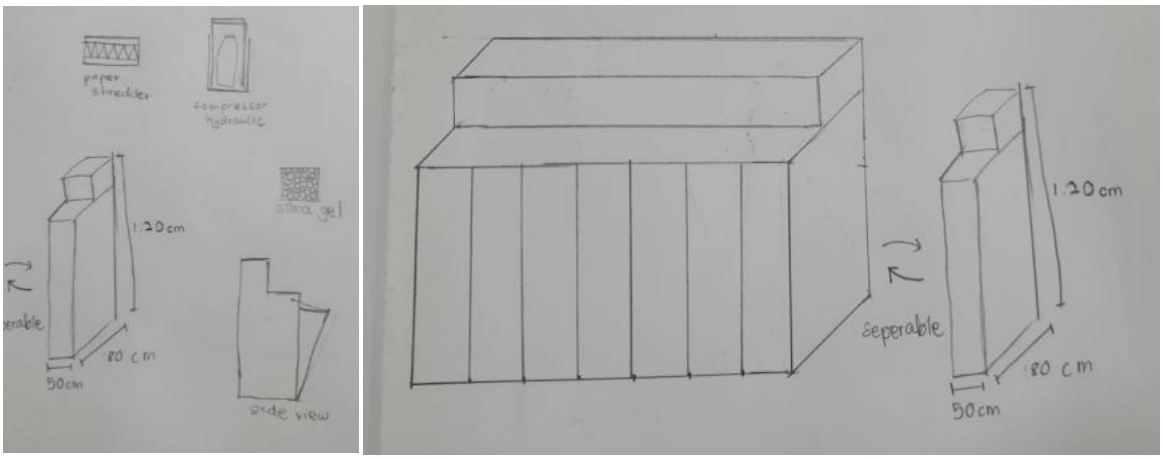

Figure 1: The front view and side view of the smart trash can

3. COMMERCIAL POTENTIAL

It is an urgent need for a smart trash can that provides an efficient solid waste management system both household and industrial. Solving the issue of solid waste overflow in this country from an early stage can eliminate the need for the already established solid waste management systems introduced by the government such as incineration sites and landfills, resulting in a highly cost budget to support and operate the systems. In addition to that, these solid waste management systems contribute to environmental issues such as groundwater pollution, biodiversity change, and air pollution due to the

release of greenhouse gases. The community's health will also be affected as the chances of contracting diseases increase with an unhealthy environment. More money and funds must be allocated to combat these problems. With the implementation of Allocate nationwide, the government can cut costs as producing these innovations are small-scaled and efficient in comparison to other waste management systems available as of now.

This innovation can also produce income for both the household community. Solid waste has no value once it is mixed up without being separated into their respective categories and types. It will take time and energy to seperate them once they are mixed. For recyclables, consumers can send the already separated waste to recycling stations and receive payment according to the weight of waste.

Our multipurpose trash can that is cheap and efficient provides a greater alternative than the regular recycling can. This is because our trash can which is relatively 'smarter' than the regular recycling dustbin can help improve waste management and educate students at a large scale. Furthermore, it can reduce the amount of labour put in separating waste and at the same time generate electricity which can be used by everyone.With the addition of glass and paper shredder on the trash can, the waste can be cut up into pieces which provides ample space for storage making the trash can space friendly and viable.The product is also marketable as climate change and waste disposal is getting more attention and concern from the public and the government.

Besides, our innovation can also help to overcome improper waste management in the country which can lead to many dangerous diseases if left the way it is right now. What we aim from our product is to explore and discover new ways to help reduce the amount of waste product while maintaining a substantially low price of production.

4. CONCLUSION

The potential of Allocate is beyond our imagination, as humans evolve towards a better future, they have a lack of interest in this small yet important part of life. Each waste is precious as it can give life to other resources but will hold no value without proper management. By initiating the project "Allocate", it can enhance waste management efficiency and eliminate the factors that contribute towards environmental issues. In the long term, energy, time and cost invested into waste management can be reduced significantly and can be directed to solving other world issues. With this machine perhaps everyone can actually make a change just like in the old days people always say that "in for a penny, in for a pound", we start small and we will sure end big. If people actually use the machine perhaps we can live in a better world not only for us but for the future generation. Towards a better future!

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