

Solid Waste Management- A Study on Residents Attitude and its Influence on Behavioural Intention

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Abstract:

Occupants of Chennai city need mindfulness in overseeing waste. It is additionally seen that there is an expansion and increase of disposal sites which poses wellbeing risks to the inhabitants of the area. The developing urbanization has changed the living hood of numerous individuals from individual homes to gated communities. These gated communities become one of the variables to be considered by the nearby civil overseeing bodies while anticipating the Solid Waste Management (SWM). This requires an examination on the frame of mind and social aim among the gated community inhabitants in Chennai. Descriptive research design has been employed for the study and the questionnaire instrument has been administered to collect the appropriate data. Statistical Package for Social Science is used to analyse the relationship of attitude and behavioural intention among the gated community residents.

Keywords: waste management, attitude, gated communities, behavioural intention, *e-waste, willingness to pay.*

I. INTRODUCTION

India is in the phase of rapid urbanization and increase in the growth rate of population has been a major contributor to the increase in the solid waste generation. Even though there has been a significant improvement in social and economic areas, solid waste management systems remain the same. Waste should be considered as resources and resource extraction would be a viable solution for effective waste management. The resources that has been extracted could be any materials, nutrients or energy which would help in providing livelihood for many. Also, there is a need for infrastructure development in India with respect to manging solid waste. India has an effective recycling traditional system and still now we could see effective recycling practices among the people. The informal sector comprising of waste pickers and rag pickers are unorganised and it becomes necessary to integrate the informal and formal sector for effective waste management. Waste generation in India would be 0.7 kg per person per day in 2025, but in Chennai it has already reached 0.71 kg per person per day of waste generation and by 2024 it is predicted to be 161 million tonnes of waste generation. So, India needs much better waste management systems. Waste segregation and waste processing facilities has a major role in solid waste management. India's waste management system needs more experienced environment professionals and engineers to plan resource extraction such as energy generation from landfill. Non-availability of land, financial constraints, lack of appropriate technology are hindering the proper waste management system in the city. The major categories of waste that are generally found in India are bio-degradable waste such as food, kitchen waste, green waste and recyclable materials such as paper, bottles, cans, glass, plastics etc, Inert waste matter such as dirt and debris, composite waste such as waste clothing, tetra packs and some domestic



Hazardous waste such as waste medicine, paints, chemicals, spray cans, e-waste and batteries. MoEF introduced waste management and handling rules in India, but compliance is limited. Today we are living in a world where there is a huge accumulation of waste due to increase in the production of increasing amounts of waste and increased landfills. Also, the municipal waste contaminates the soil, ground water and surface water which in turn poses a threat to the human health for present and future generations. Even the food waste that is generated also has anegative impact on the environment and thus contributing to the global warming as well.



Tamilnadu state government (2018) has stated that the urban local bodies would start to collect a fee from every household and different rate may be prescribed to different kinds of waste and on the quantity of generated waste. Also, planning to levy Solid waste management tax. The municipal corporation should insist on zero waste generation and instruct in situ solid waste management in gated community. The Urban local bodies must promote the 4Rs-Reduce, Recover, Reuse, and Recycle).

Chennai is the fifth largest city and ranks 36th in the world's urban areas. In Chennai City, the garbage collected from wards in 15 zones, which covers 95% of households are transported in dump yards that is situated in 15 km away from the city. There are around 8 transfer centres where the garbage is unloaded before taken to landfills. Chennai corporation has two dump yards- Perungudi in south Chennai and Kodungaiyur in the north. These land fills have been used more than 30 years and it is nearing its maximum capacity. Out of 15 zones 3 (6,8,10) zones have been privatized and the corporation oversees the other 12 zones. The zones 6,8,10 are contracted with ONYX which handles the solid waste management.



Source: Upgradation of Municipal Solid Waste Dump Sites of Corporation of Chennai, National Productivity Council, New Delhi.

Participation of the community in solid waste management is more important. So, mobilizing the community and educating the citizens on handling waste and segregating waste before disposal must be done. Citizens believe that keeping the city clean is the responsibility of the ULBs. This mindset should be thoroughly eliminated from the society. In the midst of this, there is a hope on better co-operation from the citizens seeing the residents in place like Manali in North Chennai. The streets are very clean since the past four years and it is due to the efficient source segregation at home. The number of bins and the volume of garbage generated has gone down. The residents participated enthusiastically by investing on containers which shows there is some support from the public, the integration of this support and drive from the administration can transform the solid waste management system more efficiently. They have vermi -composting unit through which they sell the manure and there is also a facility that generates bio-gas and used for cooking mid-day meals at schools. The integration between the corporation and the public has proved to be a successful story. The kind of new norms and their way of behaviour on how gated communities are working on sustainable



solid waste management has not yet been explored in-depth.This study is done to clearly understand the influence of attitude on behavioural intention with respect to following new solid waste management practices, and the resident's willingness in paying for managing solid waste, the method of disposal of e-waste.

II. REVIEW OF LITERATURE

Bamgbose (2000), defines solid waste as garbage refuse, waste materials from industries, toys, furniture, tyres and also sludge from the treatment plant. Afton, Bassey et.al (2006) states that materials used for packing, clothing, bottle. newspaper, batteries, food waste can be considered as solidwaste. The rate of solid waste generated in a city is due to the functions of the population, and other commercial activities (Daude and Osita 2003). Refsgaard k, Magnussen K(2009) in his study stated that people who have organic waste recycling in their municipalities are more informed than those people in other municipalities which do not possess such facility. The municipalities considered environmental friendliness, price, easy solutions and information. The people's recycling behaviour depends on technical, organisational aspects and also on institutions. The municipalities system in Norway affects the people's attitude.Rahardyan B, et.al (2004) found that health effect and pollution had been rated higher followed by "cost" and "damage to nature" were considered as the limitationsof SWM facility in Japan due to limited space constraint.

Studies on recycling were done over years to encourage and expose knowledge to recycle. Porter et.al (1995) designed antecedent strategies to increase recycling by prompting through written or verbal communication, flyers, newspaper ads. Burn (1991) has illustrated a prompting strategy that was very effective by involving face to face, resident to resident verbal prompting. Hopper and Nielson (1991) asked the residents to act as leaders and convey the neighbours about the recycling program at the curbside, which produced a greater effect. Recycling became a normative behaviour for the residents of the neighbourhood. Burn and Oskamp (1986) proved that commitment strategies were very effective in the participation of the recycling program. The effectiveness increased by the written commitment than verbal prompting. Environmental alterations by adding special and separate containers have also influenced the recycling behaviour positively. Layben et. al, (1979) has proved that recycling practice among college students have increased by the environmental alterations. Hamad et al (1981) in his study found that goal setting on recycling lead to positive effect and once the goal was discontinued the positive effect also declined.

Consequent strategies such as feedback, rewards, penalties have also been used to increase recycling. Katzev and Mishina (1992) has proved that the feedback strategy was successful in increasing paper recycling. Layben and Bailey (1979) has proved that offering prizes increases newspaper recycling. As per Wath et.al (2010), E-waste also called aswaste electrical and electronic equipment orend of life returns of the appliances such as computers, mobile phones, laptops etc. that have been disposed by the users after they are felt to be unwanted.

It is estimated by Chaturvedi (2010) that around 3.3 hundred thousand tonnes of E-waste are generated in India annually. 1-2% of total solid waste generation constitutes of e-waste and is expected to grow to 2% by 2010(UNEP, Report 2007) Bhat et.al 2012 explains that high value can be recovered from E-waste. E-waste also contains toxic non-renewable materials. The WEEE when burned release toxins in to the environment. Moreover, when it is recycled in an improper manner, it would lead to social and economic problems as well. Grant et. al, 2013 suggests that disposal of E-waste leads to the deterioration of human as well as other eco systems. Also, innovative techniques and approaches are necessary to develop awareness among the common public in Chennai S. Preetha et al (2018)

III. METHODS AND MATERIALS

A descriptive research design has beenadopted



which deals with attitude, behavior and other characteristics of agroup. The data collection involves interaction with the secretaries of the gated amongresidents communities. survev and observation of the waste management practices in the gated community. The questionnaireconsists of demographic, attitude, behavioural related questions which provided information for data analysis and interpretation. Convenient sampling technique was used, and the respondents were selected from nine gated communities spread across the Chennai region. A pilot study was done which indicated Cronbach alpha 0.704, which is considered to be reliable. SPSS 21 was used to perform logistic regression to analyse whether attitude has any effect on the behavioural intention.

H10: Attitude has a significant effect on the Behavioural intention with respect to following of new practices that improves SWM.

Table 1	
Omnibus Tests of Model Coefficients	

		Chi-squar	DF	Sig
		e	DI	515.
	Step	42.283	22	.006
Step 1	Block	42.283	22	.006
	Model	42.283	22	.006

Table 2

Model Summary-Attitude and behavioural intention (New practices)

Step	-2 Log likelihood	Cox & Snell R Square	Nagelker ke R Square		
1	194.353 ^a	.101	.225		
a. Estimation terminated at iteration number 20					
becau	se maximum ite	erations has be	en reached.		

Final solution cannot be found.

Hosmer and Lemeshow Tes	st
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Table 3: Hosmer and Lemeshow Test				
Step	Chi-squar e	DF	Sig.	
1	.000	7	1.000	

The logistic regression was performed to test the effect of attitude on behavioural intention with respect to following new practices that improves SWM. Results of omnibus test indicates that the model is valid as p<0.05. The Nagelkerke R2 indicated that the model accounted for 22.5% of the total variance. The Hosmer and Lemshow test revealed that p>0.05 which means that the independent variable attitude predicts the behavioural intention with respect to following of new practices that improves SWM.

H20: Attitude has a significant effect on the Behavioural intention with respect to willingness to pay for SWM.

Omnibus Tests of Model Coefficients					
		Chi-squar e	DF	Sig.	
	Step	33.701	22	.043	
Step 1	Block	33.701	22	.043	
	Model	33.701	22	.043	

Table 4 Omnibus Tests of Model Coefficients

Table 5

Model Summary

	10100	ier semmary			
Stop	-2 Log	Cox & Snell	Nagelkerke R		
Step	likelihood	R Square	Square		
1	436.145 ^a	.082	.117		
a. Estimation terminated at iteration number 20					
because maximum iterations has been reached.					
Final	Final solution cannot be found.				

Table 3



Table 6: Hosmer and Lemeshow Test				
Step	Chi-square	DF	Sig.	
1	.000	8	1.000	

The logistic regression was performed to test the effect of attitude on behavioural intention with respect to following new practices that improves SWM. Results of omnibus test indicated that the model is valid as p<0.05. The Nagelkerke R2 indicated that the model accounted for 11.7% of the total variance. The Hosmer and Lemeshowtest indicates that p>0.05 which means that the independent variable attitude predicts the behavioural intention with respect to willingness to pay for SWM. Segregation of e-waste before disposal

> Table 7 ewaste-storage

Is dispos	sal of e-waste done separately	Frequency	Percent	Valid Percent	Cumulative Percent
	never	195	49.2	49.2	49.2
	rarely	90	22.7	22.7	72.0
Valid	often	65	16.4	16.4	88.4
	always	46	11.6	11.6	100.0
	Total	396	100.0	100.0	

From the above graph we can observe than about 50% of population does not segregate and store e-waste separately before disposal. This clearly indicates that residents are not aware of the consequences of disposal of e-waste together with other bio or non-bio degradable waste. Moreover, there is no proper e-waste collection system in place where the residents can dispose e-waste.

Willingness to pay for SWM

Table 8

w IP ranges per monu	WTP	ranges	per	month
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Willingness to pay(in Rs)	Frequency	Percent	Valid Percent	Cumulative Percent
notwilling	109	27.5	27.5	27.5
Below 25	37	9.3	9.3	36.9
25-50	50	12.6	12.6	49.5
50-100	83	21.0	21.0	70.5
100-150	42	10.6	10.6	81.1
150-200	25	6.3	6.3	87.4
200-250	20	5.1	5.1	92.4
250 and above	30	7.6	7.6	100.0
Total	396	100.0	100.0	

From the above graph it can be stated that more than 70% of residents are willing to pay for SWM which indicates that residents have more concern on

January - February 2020 ISSN: 0193-4120 Page No. 3278 - 3284

keeping their environment clean and tidy.From Table 9, it is clearly shown that more than 21% of people are willing to pay for SWM in the range of rupees 50 to 100 and only 7.6% are willing to more than rupees 250 per month for SWM.

Yielding money through recycling

Table 10: giving away waste to recyclers yield money

		Frequency of recycling	Percent	Valid Percent	Cumulative Percent
Valid	yes	340	85.9	85.9	85.9
	no	56	14.1	14.1	100.0
	Total	396	100.0	100.0	

The above results indicate that the residents are willing to give away recyclable waste to association as it might yield some money to the association. This can be well used for the betterment of the association and its environment.

IV. CONCLUSION

The result shows attitude was having a positive effect on the Behavioural intention of the individual. Attitude has some influence on the following of new solid waste management practices among the residents and also on the willingness to pay for SWM. There is less awareness on therecycling centre available in the city among the residents.Residents agree highly on the concept of "Do it yourself" and other new practices related to SWM.Most of the residents also agree to pay a considerable amount of money that might increase the effectiveness of SWM practices prevailing in the city. This highlights that residents are concerned on the cleanliness of the environment. Also, they feel that giving away recyclable wastes separately can yield moneyto the community association thereby encouraging the segregation waste process. Theresearch has concentrated on attitude of residents of gated communities and explored its influence towards behavioural intention **SolidWaste** towards Management.

V. RECOMMENDATIONS

There is an urgent need for a proper formal system that is eco-friendly for managing waste. Consumers



awareness is the biggest challenge in managing the e-waste. Lack of basic civic sense among residents poses a big threat. People are not aware of the consequences of improper waste management. Residents awareness on harmful effects of improper disposal of e-waste should be addressed by the government and by other welfare associations as well. E-waste should be routed proper e-waste transit system, through authorized collection centre and recyclers who are authorized for safe disposal of e-waste. Chennai community must be made aware of the current crisis and risks with respect to the garbage. Chennai Residents welfare Associations must unite together, put in their efforts for sustainable solid waste management and be a role model for other business and non-business organizations.

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