
Perception of Households on E-waste Management in Tamilnadu

Dr. A. Merlin Thanga Joy

Post Doctoral Fellow,
Institute of Management,
University of Kerala,
Thiruvananthapuram

Dr. K.S. Chandrasekar

Dean & Professor
Institute of Management,
University of Kerala,
Thiruvananthapuram

Abstract

This study aims to identify the perception of households in Tamil Nadu. Data were collected from a sample of 384 households in Tamil Nadu by means of a self-administered questionnaire survey. Snowball sampling which is part of the non-probability sampling was utilized in this research. The results show that the quantities of electrical and electronic equipment (EEE) in use and the rate of replacements of even functioning EEE are increasing, which in turn increase the generation of e-waste. This study also provides evidence that the level of households' awareness towards e-waste recycling is still low. Thus, the time has come for the introduction of a recycling programme for these potentially harmful waste materials. The findings of this study also lead to implications for the theory-deficient of e-waste recycling literature and several policy recommendations for policy makers to enhance household e-waste recycling response rate.

Key Words: E Waste – Electrical and Electronic Equipment – Land filling – E Waste Recycling

1.1 INTRODUCTION

The Electronics industry is the world's largest and fastest growing manufacturing industry. Recent policy changes in India have led to an influx of leading multinational companies to set up electronics manufacturing facilities and R&D centres for hardware and software. This has no doubt helped the Indian economy to grow faster and fueled increase in the consumption rate of electronics products. Along with the economic growth and availability of electronics goods in the market has increased temptation of consumers to replace their household electronics items with newer models for various reasons. The net effect is a higher rate of obsolescence, which is leading to growing piles of e-waste.

1.2 OBJECTIVES OF THE STUDY

1. To examine the perception and awareness level of house holds on the electronic waste disposed by them.
2. To identify the e – waste disposal system followed by households.
3. To evaluate the knowledge of households on the hazardous effect of the various e waste to the environment
4. To understand the various e- waste collection methods followed and preferred by the households.

1.3 METHODOLOGY

This study is based on a questionnaire survey that consists of quantitative approaches for data analyses. Descriptive research is used for the study. Multi stage Random sampling is used for the selections of sample from the municipal households.

1.4 ANALYSIS OF DATA

1. Demographic Profile of House Holds

Demographic details such as Gender, Age, Educational Qualification, Marital Status, Occupation and Monthly Income has been studied to know about the background of the house holds taken for the study.

Table No. 1.1
Demographic Profile of House Holds

Demographic Profile		No. of Respondents	Percentage
Gender	Male	135	35
	Female	249	65
Age (in Years)	Below 25	100	26
	25 - 40	119	31
	41 - 60	88	23
	61 -75	77	20
Education Level	Diploma/Higher Secondary	69	18
	Graduation	161	42
	Post Graduation	127	33
	Others	27	07
Marital Status	Single	150	39
	Married	232	60
	Divorced	02	01
Occupation	Agriculturist	42	12
	Self Employed	37	10
	Government Employee	60	15
	Business Man	6	02
	Home maker	56	14
	Student	166	43
	Others	17	04
House Hold Gross Monthly Income	Below Rs.20,000	87	23
	Rs. 20,000 –30,000	140	37
	Rs. 30,001 – 40,000	45	11
	Rs. 40,001 – 50, 000	48	12
	Above Rs. 50,000	64	17
Total		384	100

Source: Survey Data.

From the above table it is inferred that the respondents were predominantly female (65 Percentage) .The age group with the highest number of participants is the 31-40 age with 106 participants. For education levels, the percentage of graduate and non-graduate are 42 per cent and 18 per cent respectively. As far the respondents monthly income is concerned, most of the participants were paid between Rs. 30,000 toRs. 40,000. This Shows that the municipal households consists of people with different Age group, Educational level and Income without much difference in the overall proportion.

2. Years of usage of the Electronic Products by the households

An important factor is the duration of use of electronic products by the house holds is studied in detail to determine the replacement period taken for each electronic product.

Table No. 1.2
Years of usage of the Electronic products

Products	< 1 year		1 to 3 yrs.		4 to 5 yrs.		5 to 10 yrs.		>10 years	
	No.	%	No.	%	No.	%	No.	%	No.	%
Large House Hold Appliances	44	11.5	14	3.6	37	9.6	97	25.3	192	50.0
Small House Hold Appliances	21	5.5	33	8.6	50	13.0	68	17.7	212	55.2
IT and Telecommunication products	11	2.9	37	9.6	48	12.5	68	17.7	220	57.3
Consumer Equipment	23	6.0	58	15.1	36	9.4	62	16.1	205	53.4
Lighting Equipment	33	8.6	34	8.9	16	4.2	36	9.4	265	69.0
Others	66	17.2	40	10.4	44	11.5	68	17.7	166	43.2

Source: Primary data

The above table highlights the fact that 50 per cent of house holds use the large electronic appliances for more than 10 years, Lighting equipments were used by nearly 43 per cent house holds for more than 10 years. It is understood that the lighting equipments have more longevity and its replacement is not done frequently.

3. REASON FOR DISPOSAL OF ELECTRONIC ITEMS BY THE HOUSEHOLDS

There were various reasons for the municipal households to dispose their old house hold electronic items and buy new items. Due to industrial revolution there were new innovations and changes taking place in the environment every day. Advancement in science and technology also play a major role in this and leads to number of new products and new brands every day in the market ranging from low price to high price which varies according to the needs and preferences of the customers.

Table No. 1.3
Reason for Disposal of electronic items by the Municipal Households

Reason	Large House Hold Appliances		Small House Hold Appliances		IT and Telecommunication products		Consumer Equipment		Lighting Equipment		Others	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Availability of new cheap products	44	11.5	14	3.6	37	9.6	97	25.3	105	27	87	22
Repairing Cost High	21	5.5	33	8.6	50	13.0	68	17.7	115	29	97	25
Frequent Malfunctioning during use	11	2.9	37	9.6	48	12.5	68	17.7	172	45	48	12
Product Outdated	23	6.0	58	15.1	36	9.4	62	16.1	108	28	97	25
Life span Elapsed	33	8.6	34	8.9	16	4.2	36	9.4	182	47	83	21
Other Reasons	66	17.2	40	10.4	44	11.5	68	17.7	94	24	72	19

Source : Primary Data

From the above table it is inferred that, the main reason for disposal of Television is due to high repairing cost which amounts to 39 percentages. It is implied that the representative samples rarely send broken TVs for repair works as it is often easier and cheaper to buy new products than repairing old ones. For Mobile phones, about one third of the sample respondents claimed that 'outdated' is the dominant factor for its disposal. This scenario also reflects the increase in affordability of new products among the households.

4. Condition of the Electronic Products at the time of replacement

House holds intends to replace when the products get outdated and any frequent repairs happen and sometimes the cost of repair may be high. Some households replace to show their standard of living. An attempt is made here to know the condition of the electronic products at the time of replacement.

Table No. 1.4

Condition of the Electronic Products at the time of replacement

S. No.	Condition	No. of Households	Percentage
1.	Working	45	12
2.	Repair but fixable	143	37
3.	Repairing cost high or unrepairable	196	51
Total		384	100

Source:Primary data

From this table it is clear, that majority of 51 per cent of the households replace their existing electronic products when it is unrepairable or the repairing cost high. Companies should manufacture accessories with low cost replacable product accessories. It will reduce the disposal of electronic products as e waste.

5. Disposal Methods followed by the Households

There are different types of disposal practices followed by the households while replacing their house hold electronic items. Some may give to their relative or friends. Some may give for second hand sales. Some will give to the scrap collector. Some will keep idle without use.

Table No. 1.5

Disposal Methods followed by the Households

S. No.	Disposal Methods	Product Category					Total
		Large House Hold Appliances	Small House Hold Appliances	IT and Telecommunication Equipment	Consumer Equipment	Lighting Equipment	
1.	Gave to Friends or Relatives	85(22)	172(44.8)	62(16.1)	55(14.3)	10(2.6)	384(100)
2.	Second Hand sales	156(40.6)	114(29.7)	30(7.8)	84(21.8)	-	384(100)
3.	Donated for Charity	273(71.1)	79(20.6)	18(4.7)	14(3.6)	-	384(100)
4.	Stored it/ No longer in use	10(2.6)	80(20.8)	130(33.9)	49(12.8)	110(28.6)	384(100)
5.	Gave to Scrap Collector	62(16.1)	67(17.4)	77(20.1)	55(14.3)	123(32.0)	384(100)
6.	Throw Away	12(3.12)	80(20.8)	64(16.7)	58(15.1)	170(44.2)	384(100)

Source:Primary data

From this table it is clear, that majority of 44 per cent of the households give the small house hold appliances to the friends or relatives. It is found from the study that most of the house hold appliances are

disposed by throwing away or giving to the scrap collector especially the lighting equipment is concerned. Still the awareness has not created among the households related to the e waste generated through lighting equipments.

6. Gender and Disposal Method of E waste followed by households

There are different types of disposal practices followed by the households while replacing their house hold electronic items. Some may give to their relative or friends. Some may give for second hand sales. Some will give to the scrap collector. Some will keep idle without use. In order to find out the significant difference in attributes attracts to purchase the branded products among different gender group of households; ‘T’ test is attempted with the hypothesis

H_0 – There is no significant difference between the gender and the disposal methods followed among the households.

Table No. 1.6

T- Test for the Relationship between the Gender and the Disposal methods followed among the households.

S. No.	Disposal Methods	Gender (Mean Score)		T-Statistics
		Male	Female	
1	Gave to Friends or Relatives	4.3560	3.9526	1.956
2	Second Hand sales	4.0681	4.0216	0.807
3	Donated for Charity	4.3194	4.1053	2.016*
4	Stored it/ No longer in use	3.9634	4.1789	0.205
5	Gave to Scrap Collector	3.9372	3.9016	0.648
6	Throw Away	4.1832	4.1316	0.735

Source: Primary data

*-Significant at five per cent level

The table shows the mean score of attributes between the gender and the disposal methods followed among the households along with its respective ‘T’ statistics. Since the respective ‘T’ statistics are significant at 5 per cent level, the null hypothesis is rejected.

7. CHI – SQUARE TEST ON EDUCATIONAL QUALIFICATION AND DISPOSAL METHODS FOLLOWED BY THE MUNICIPAL HOUSEHOLDS

Chi Square test is used to know the association between the Educational Qualification of the municipal households and the Disposal method followed by the households while replacing the household electronic item taken for the study.

H_0 - There is no significant association between Educational Qualification and the Disposal Method followed by the Municipal Households.

Table No. 1.7
Educational Qualification Vs Disposal Methods followed by Municipal Households
Chi Square Test

Disposal Methods	Educational Qualification				Total
	Diploma/HSc.	Graduation	Post Graduation	Others	
Gave to Friends or Relatives	01	02	01	0	04
Second Hand sales	01	01	01	01	04
Donated for Charity	08	20	11	07	46
Stored it/ No longer in use	48	70	34	05	157
Gave to Scrap Collector	05	45	68	05	123
Throw Away	06	23	12	09	50
Total	69	161	127	27	384

Source :Primary Data

From the Chi Square analysis, the calculated value is 79.1428. The Table value at 0.05 confidence level and 15 degrees of freedom the Chi square value is 24.996. Hence it is found that the calculated value is higher than the table value. Therefore, null hypothesis, H_0 is rejected and the alternative hypothesis is accepted. It is proved that there is significant association between the Educational Qualification and the disposal methods followed by the households.

1.5 SUMMARY OF FINDINGS

1. The profile of the respondents through percentage analysis ascertains that it is inferred that the respondents were predominantly female (65 Percentage) .The age group with the highest number of participants is the 31-40 age with 106 participants. For education levels, the percentage of graduate and non-graduate are 42 per cent and 18 per cent respectively. As far the respondents monthly income is concerned, most of the participants were paid between Rs. 30,000 to Rs. 40,000. This Shows that the municipal households consists of people with different Age group, Educational level and Income without much difference in the overall proportion.

2. Electronic products are available new in the open market and second hand market. House holds prefer to buy the electronic products sometimes new from the super market, even sometimes from the second hand market for lesser price and sometimes they may buy it from their friends or relatives free of cost or for the low price. It is clear, that 76 per cent of the households purchase electronic products from the super market. Only 16 per cent buy from second hand market and 08 percent from their friends or relatives. It is understood that most of the households prefer to buy new products rather used products because of the availability of umpteen electronic appliances at cheap and affordable prices.

3. The duration of usage of electronic products by the house holds is studied in detail to determine the replacement period taken for each electronic product. It is understood that 50 per cent of households use the large electronic appliances for more than 10 years, Lighting equipments were used by nearly 43 per cent house holds for more than 10 years. It is understood that the lighting equipments have more longevity and its replacement is not done frequently.

4. There were various reasons for the municipal households to dispose their old house hold electronic items and buy new items. Due to industrial revolution there were new innovations and changes taking place in the environment every day. The main reason for disposal of Television is due to high repairing cost which amounts to 39 percentages. It is implied that the representative samples rarely send broken TVs for repair

works as it is often easier and cheaper to buy new products than repairing old ones. For Mobile phones, about one third of the sample respondents claimed that 'outdated' is the dominant factor for its disposal. Similarly, this implies that Mobile phones are often discarded although they work perfectly due to new products offer more advanced features or have more trendy designs. In other words, the households prefer to purchase new products rather than repairing old ones. This scenario also reflects the increase in affordability of new products among the households.

5. House holds intends to replace when the products get outdated and any frequent repairs happen and sometimes the cost of repair may be high. Some households replace to show their standard of living. Majority of 51 per cent of the households replace their existing electronic products when it is unrepairable or the repairing cost high. Companies should manufacture accessories with low cost replacable product accessories. It will reduce the disposal of electronic products as e waste.

6. There are different types of disposal practices followed by the households while replacing their house hold electronic items. Some may give to their relative or friends. Some may give for second hand sales. Some will give to the scrap collector. Some will keep idle without use. Majority of 44 per cent of the households give the small house hold appliances to the friends or relatives. It is found from the study that most of the house hold appliances are disposed by throwing away or giving to the scrap collector especially the lighting equipment is concerned. Still the awareness has not created among the households related to the e waste generated through lighting equipments.

1.6 PROPOSED SOLUTIONS TO THE PROBLEM OF E WASTE

- Domestic legal framework to address these gaps in import of E Waste
- Need to address safe disposal of domestic waste.
- Tie recycling with take-back product
- The Framework should address the issue of E waste imports for reuse and recycling.
- Attract investment in this sector
- Link up activities of informal sector with formal sector
- Provide for appropriate framework for processes
- Promote adequate ESM technologies for recycling
- Incorporate precautionary principles and polluter pays
- Insist on domestic processing
- Then make sure the company selected has capacity to handle either type of E-Scrap.
- Promote recycling units to ease process and to encourage generators to have proper e-waste disposal
- Impart training to generators on e-waste handling
- Awareness program on recycling
- Fix duties and responsibilities to recyclers
- Tax incentives for scrap dealers
- Reward and reprimand schemes for performance and non-compliance of e-waste management

1.7 CONCLUSION

In India, it is becoming more complicated by the invasion of e-waste, particularly cellphone waste and computer waste. There exists an urgent need for a detailed assessment of the current and future scenario including quantification, characteristics, existing disposal practices, environmental impacts etc. Institutional infrastructures, including e-waste collection, transportation, treatment, storage, recovery and disposal, need to be established, at national and/or regional levels for the environmentally sound management of e-wastes. Establishment of e-waste collection, exchange and recycling centres should be encouraged in partnership with private entrepreneurs and manufacturers. Model facilities employing environmentally sound technologies and methods for recycling and recovery are to be established. Criteria are to be developed for recovery and disposal of E Wastes. Policy level interventions should include development of e-waste regulation, control of import and export of e-wastes and facilitation in development of infrastructure. An effective take-back

program providing incentives for producers to design products that are less wasteful, contain fewer toxic components, and are easier to disassemble, reuse, and recycle may help in reducing the wastes.

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