

## A SURVEY OF CONSUMER BEHAVIOUR TOWARDS E- WASTE MANAGEMENT IN THE CITY OF MUMBAI

USHA P OOMMAN

Assistant Professor, Smt CHM College, Ulhasnagar, Maharashtra, India

### ABSTRACT

Humans are fast paced creatures always wanting and needing what they desire as quickly and efficiently as possible. This attitude that our society possesses has created the desire for the human race to always have the latest technologies irrespective of its consequences on the environment. Over the past two decades, the global market of electrical and electronic equipment (EEE) continues to grow exponentially, while the lifespan of those products becomes shorter and shorter. Therefore, business and waste management officials are facing a new challenge, and e-Waste or waste electrical and electronic equipment (WEEE) is receiving considerable amount of attention from policy makers.

This paper titled “*A Survey of Consumer Behaviour towards E- Waste Management in the City of Mumbai*” is an attempt to study consumer attitudes towards e- Waste disposal, e- Waste recycling and e- waste management.

**KEYWORDS:** Electronic Waste (E- Waste), Waste Electronic and Electrical Equipment (WEEE), Solid Waste Management, Willingness to Pay (WTP), Wheelie Bin

### INTRODUCTION

The electronic industry is the world’s largest and fastest growing manufacturing industry. During the last decade, it has assumed that role of providing a forceful leverage of the socio-economic and technological growth of a developing society. The consequence of its consumer oriented growth combined with rapid product obsolescence and technological advances are a new environmental challenge - the growing menace of “Electronics Waste” or “E- Waste” that consists of obsolete electronic devices. It is an emerging problem as well as a business opportunity of increasing significance, given the volumes of e-waste being generated and the content of both toxic and valuable materials in them.

The fraction including iron, copper, aluminium, gold and other metals in e-waste is over 60%, while plastic account for about 30% and the hazardous pollutants comprise only about 2.70%. Solid waste management, which is already a mammoth task in India, is becoming more complicated by the invasion of e-waste, particularly computer waste. E-waste from developed countries find an easy way into developing countries in the name of free trade (Toxics Link, 2004) is further complicating the problems associated with waste management.

### Definition of E- Waste

As a popular and informal term, electronic waste (e-Waste) is loosely referred to any white goods, consumer and business electronics, and information technology hardware that is in the end of its useful life. Specifically, Puckett defines e-waste as “a broad and growing range of electronic devices ranging from large household devices such as refrigerators, air conditions, cell phones, personal stereos, and consumer electronics to computers which have been discarded by their

users". According to Sinha-Khetriwal, "e-Waste can be classified as any electrical powered appliance that has reached its end-of-life". Meanwhile, a list of prevalent definitions has been provided by Widmer.

### **Research Methodology**

The present research is a theoretical research based on primary data collected from a sample of 200 people randomly selected by the author within the city limits of the city of Mumbai. The sample group consisted of persons in the age group of 18yrs to 50 yrs. The study was conducted with regard to computers and mobile phones considered as a single component of e- Waste. The scope of the present research is to identify different reasons responsible for production of e-waste and suggest different e-waste management policies.

### **E-Waste in India**

As there is no separate collection of e-waste in India, there is no clear data on the quantity Generated and disposed of each year and the resulting extent of environmental risk. The preferred practice to get rid of obsolete electronic items in India is to get them in exchange from retailers when purchasing a new item. The business sector is estimated to account for 78% of all installed computers in India (Toxics Link, 2003). Obsolete computers from the business sector are sold by auctions. Sometimes educational institutes or charitable institutions receive old computers for reuse. It is estimated that the total number of obsolete personal computers emanating each year from business and individual households in India will be around 1.38 million. According to a report of Confederation of Indian Industries (CII), the total waste generated by obsolete or broken down electronic and electrical equipment in India has been estimated to be 1,46,000 tons per year (CII, 2006). Although the per-capita waste production in India is still relatively small, the total absolute volume of wastes generated will be huge. Further, it is growing at a faster rate. The growth rate of the mobile phones (80%) is very high compared to that of PC (20%) and TV (18%).

## **FINDINGS OF THE STUDY**

### **Socio-Economic Findings of the Study**

- The majority of the respondents are in age group of 21-30 years representing 34 per cent of the sample surveyed. The respondents in the age group of 31-40 years made up 29.5 per cent of the sample followed by respondents above 40 years making 20.5 per cent and those in the age group of 18- 21 years comprise 16 per cent of the sample.
- All the 200 respondents had acquired educational qualification. It included those with higher secondary education, diploma holders, graduates and those with professional qualifications.
- It is found that 65.3 per cent respondents are married, 11.7 per cent of the surveyed are single, 9.5 per cent are divorced and 13.5 per cent of the sample respondents have lost their spouse.
- It is identified that the type of family that exists among respondents is categorized as Uni- member, Nuclear and Joint family system. 7 per cent belong to a uni-member family, 78.7 per cent come from a nuclear family and 14.3 per cent are from a joint family, reflecting the fact that more and more families are preferring to be independent and nuclear.

- It is found that 55.5 per cent have own accommodation and the rest 44.5 per cent respondents live in rented houses. The information revealed that there is equal representation of people living in own and rented accommodation.
- The respondents are categorized as Government employees, business /self employed, private employees and private professionals to show the source of income and the possession of EEE gadgets.
- It is found that monthly income of 200 respondents is distributed as, 25.5 per cent belong to the category of employees with income less than Rs. 20,000, 30.8 per cent of the respondents have a monthly income of Rs. 20,001 – 30,000 and 24.2 per cent of them receive a monthly income of Rs 30,001- 50,000 and the remaining 19.5 per cent have a monthly income of more than Rs 50,000.

### **Findings of the Purchase Patterns and Disposal Behaviour towards EEE Gadgets**

The two EEE gadgets namely Personal Computer (including laptops) and Mobile phone undertaken for the study reveals the following findings:

- It is identified in the study that the major factors that influence the purchase of the EEE gadgets are necessity, new features, status symbol, higher incomes and advertisements. Personal computers and mobiles are considered as an essential requirement of every household.
- The study reveals that of the 200 respondents 89 per cent own both Computer and Mobile phone. This can be attributed to the fall in the prices of electronic gadgets through the years and both the gadgets have become indispensable. The price of electronic gadgets has reduced rapidly due to rapid technological changes and the introduction of advanced features.
- It is found that increase in income has led to an increase in possession of more EEE gadgets.
- It is found that the participation of the women force in purchasing and owning electronic gadgets is less in comparison to men.
- It is noted that the respondents have spent a minimum of less than Rs. 5,000 to a maximum of more than Rs. 35,000 in purchasing the electronic gadgets.
- The level of disposable income is a major factor in determining the decision to own an electronic gadget. Thus, it is observed from the study that as the income levels increases, the amount of money spent on the purchase of gadgets also increases.
- It is noted that the two gadgets which were purchased are invariably new gadgets. The most preferred mode to obtain EEE gadgets is to buy new items.
- The study reveals that only the mobile phones are replaced on a regular basis and the other gadget was purchased for the first time.
- The frequency of replacement of EEE gadgets suggests that frequency of replacement is maximum for mobile phones due to frequent introduction of new models with advanced features and lower prices. The period of replacement ranged from less than a year to more than 2 years.

- The study reveals the condition of the gadgets were either beyond repair or in working condition and broken at the time of disposal.
- The major options adopted in disposing the two gadgets are donating to others, exchanging the old gadget at retail outlets for new and giving it to scrap dealer in return for a monetary sum.
- The monetary benefit in disposing the gadget ranged from nil benefit to more than Rs.1000 (in case of high end mobile phones or smart phones) indicating that gadgets in good condition fetch more monetary return. The amount of money spent on repairing these two gadgets ranges from less than Rs. 1000 to more than Rs. 5,000.
- Apart from the two gadgets studied, small WEEE gadgets are disposed along with household waste. The most common WEEE disposed are mobile batteries, TV remotes, Electronic toys, CDs, floppy discs and cartridges.

#### **Findings of Consumer Awareness towards WEEE**

- In the disposal of WEEE gadgets, of the total 200 respondents, it was found that 30.5 per cent respondents are aware of the effects of discarding gadgets while 69.5 per cent of the respondents are unaware of the effects of discarding gadgets.
- The study reveals that 88.5 per cent of the respondents are unaware of any e –waste recycling initiatives and only 11.5 per cent are aware of the recycling initiatives introduced by mobile manufacturer, Nokia.
- Though educational levels bring about positive effect on environmental issues, the level of awareness on the impact of electronic based is low which suggest that there is an urgent need to educate the masses on the issue of WEEE.
- It is noted that among the sample respondents 23.8 per cent are aware of the harmful chemicals present in EEE gadgets while 76.2 per cent are unaware of the chemicals present in EEE gadgets.
- The study reveals that the respondents are unaware of the crossed out wheelie/wheeled bin symbol present in EEE gadgets. 63.5 per cent of the respondents are unaware of the symbol while 36.5 per cent respondents are aware of the symbol and recalled as having seen it on mobile batteries.
- It is noted that the major sources of knowledge in discarding gadgets are newspapers, user manuals, Television, radio and internet. 69.9 per cent of the respondents gather information on electronic gadgets from the user manuals 3. 4 per cent gather information from newspapers, 6.8 per cent from television and 19.9 per cent gather information from the internet.
- It is found the awareness levels of the respondents towards the E-waste policy of the Government of India has been low with a majority of 91.5 per cent respondents unaware and a meager 8.5 per cent respondents aware of the government legislations regarding WEEE.
- It is found that the WTP for a green EEE product among the sample respondents is 46.5 per cent and 53.5 per cent are unwilling to pay for a green EEE gadget.

- It has been recognized in the study that the general notion that prevails among the sample respondents is that EEE green gadgets are priced higher than non-green gadgets.
- The study reveals that the amount of money willing to be paid for a green EEE gadget ranges from less than 5 per cent to above 20 per cent of the price of the product.

## SUGGESTIONS

The following suggestions are made on the basis of the study undertaken;

- There is a need to develop baseline data which would benefit policy makers in initiating suitable legislations.
- Impetus need to be given for effective national e-waste management policy.
- There is a need to gradually eliminate or phase out harmful substances used in the manufacture of EEE gadgets.
- Manufacturing process that result in waste minimization and the judicious use of resources need to be encouraged.
- Prolonging the life of the product through product repair need to be considered as an alternative to disposal.
- Restriction on the use of Hazardous Substances (RoHS) compliance has to be made mandatory for all gadgets.
- Labelling of the crossed out wheelie/wheeled bin symbol needs to be more prominently displayed on gadgets.
- A system needs to be developed that makes producers responsible for end of life gadgets.
- Green initiatives by manufacturers need to be encouraged by suitable policies framed by the Government.
- Viability and implementation of Extended Producer Responsibility (EPR) and Advance Recycling Fee (ARF) need to be probed.
- Awareness needs to be created through the use of mass media. Environmental consciousness among people should be developed through organizing rallies, awareness campaigns and workshops to highlight the need to manage e-waste.
- Users of EEE gadgets need to be encouraged to pass on old gadgets to others which would extend the life of the gadget. This would prevent them from entering landfills.
- Collection drives need to be organized to encourage people to dispose their WEEE provision of adequate drop-off points.
- Special bins with crossed out wheelie/wheeled symbol need to be placed at prominent public locations which are accessed by the public in the city such as shopping malls and parks to encourage voluntary disposal of WEEE gadgets.
- The 3Rs namely Reduce, Reuse and Recycle should be stressed among users of EEE gadgets which would minimize e- waste generation

## CONCLUSIONS

Solid waste management in India is becoming more complicated with the addition of e-waste, particularly computer and 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-waste. Establishment of e-waste collection, exchange and recycling centers should be encouraged in partnership with private entrepreneurs and manufacturers.

Users can play a major role in solving the WEEE problem through the purchase of green gadgets and adopting proper disposal of EEE gadgets. Economics of natural resources and environment has emerged as a key issue in the past few decades. Focus on concepts such as “*cradle to cradle*” approach would reduce the impact on the environment, rather than the traditional approach of “*cradle to grave*”. Sustainable consumption on the part of the users of EEE gadgets would lessen the impact on the environment. It is inferred that people are willing to make a contribution to protect the environment. Communication and educational campaigns on WEEE are important to encourage consumers to make positive choices for the environment. When environmental issues are explicitly addressed among people, it would bring about change in their perceptions towards the environment.

## REFERENCES

1. **Ackerman, Frank** “Why do we recycle? Markets, value and Public Policy”. Island Press Washington U.S.A, 1997.
2. **Arora, Rachna; Killguss,Ulrike; Chaturvedi, Asish and Rochat, David** “Whither e-waste in India: The Indo-German–Swiss initiative” in the book E-waste: Implication, regulation and management in India and current global practices (ed) Rakesh Johri, pp 69-87, 2008.
3. **Asnani, P.U** “Solid waste management in India” in India Infrastructure Report 2006; Urban Infrastructure (ed) Anupam Rastogi, Oxford University Press, New Delhi, 2006.
4. **Boyes, Rogers and Kiley, Sam** “Ships shuttle from port to port in search of dumping ground for poison waste. Third World awakes to toxic trade perils” in Toxic Terror Dumping of hazardous waste in the Third World. Third World Network, Malaysia, 1988
5. **Clapp, Jennifer** “Toxic Exports: The transfer of hazardous waste from Rich to Poor countries” Cornell University Press, 2001.
6. **Daily, G.C** “Nature’s services: Societal dependence on natural ecosystem”, Island Press, Washington, 1997.
7. **Dimitrakakis, Emmanouil and Gidarakos, Evangelos** “Extended Producer Responsibility: a key tool for International rules and regulation on e-waste” in Electronic waste (ed) Rakesh Johri, pp189-199, 2009.
8. **Kuehr, Ruediger and Williams, Eric** “Computers and the Environment: Understanding and managing their impacts” Kluwer Academic Publishers and United Nations University, London 2004.
9. **Sinha, Satish** “Dark shadows of digitization of the Indian Horizon” in E-waste: Implications, regulations and management in India and current global best practices (ed) Rakesh Johri, TERI Press, New Delhi.2008.

10. **Tammemagi, Hans** “The waste crisis Landfills, incinerators and the search for a sustainable future” Oxford University Press, 1999.
11. **Dr. B. J. Mohite**, “Issues and Strategies in Managing E-Waste in India” Indian Journal of Research in Management, Business and Social Sciences (IJRMBSS) ISSN No. : 2319-6998, Vol. 1, Issue 1, Mar. 2013, pp 46- 51.
12. **Kurian Joseph**, “Electronic Waste Management In India–Issues And Strategies” published in the proceedings Sardinia 2007, Eleventh International Waste Management and Landfill Symposium S. Margherita di Pula, Cagliari, Italy; 1 - 5 October 2007.
13. **Toxics Link (2003)** “Scrapping the hi tech myth-computer waste in India”
14. **Toxics Link (2004)** Fact Sheet Number 20/March 2004.
15. **Toxics Link (2009)** which appeared in the article “Disposal of e-waste a staggering problem” by Ajai Sreevatsan and Sruthi Krishnan, in The Hindu Chennai edition dated July 27<sup>th</sup> 2009
16. **Toxics Link report (2010)** “E-waste flooding the city of joy”.
17. [www.cseindia.org](http://www.cseindia.org)
18. [www.ewasteguide.info](http://www.ewasteguide.info)
19. [www.greenpeace.org](http://www.greenpeace.org)
20. [www.greenpeace.org/international/en/campaigns/toxics/electronics/Guide-to-Greener-Electronics/](http://www.greenpeace.org/international/en/campaigns/toxics/electronics/Guide-to-Greener-Electronics/)

## APPENDICES

### Annexure: Survey Form

*Note: Information gathered from the respondent would be used purely for educational purpose. The author of the paper ensures secrecy of the information provided by the respondents.*

1. Name : \_\_\_\_\_
2. Age: \_\_\_\_\_
3. Residential Address: \_\_\_\_\_
4. Number of Family Members:    Adults       Children
5. Marital Status:                      Married               Single
6. Educational standard:
  1. Upto Higher Secondary
  2. Diploma and others
  3. Graduate and above
  4. Professional Degree

7. Type of family
1. Uni-member  2. Nuclear  3. Joint
8. Nature of Accommodation:
1. Own  2. Rented
9. Type of Employment:
1. Government Employee
2. Business / Self employed
3. Private employee
4. Private Professional (Doctor, Engineer, etc)
5. Others \_\_\_\_\_
10. Monthly Income of the respondent Rs. \_\_\_\_\_
11. Electronic products in the household
1. Personal Computer
2. Laptop
3. Mobile Phone
4. Television
5. Washing Machine
6. Air Conditioner
12. Purchase of the gadget(computer and mobile phone) is influenced by:
1. Necessity/ Convenience
2. New/ Advanced features
3. Status symbol
4. Increase in Income
5. Advertisement
6. Others
13. Total amount of money spent on electronic products in the last year: Rs. \_\_\_\_\_
14. Purchase of gadgets made by: Male  Female
15. Purchased product:
- For the first time  As replacement

16. Purchased good: New  Second hand

17. How many years later did you replace the gadget:

**Table 1**

Type of Equipment	Before 1 Year	1-2 Years	2- 3 Years	3-5 Years	5 Years and Above
Personal Computers					
Laptop					
Mobile phones					

18. Reasons for replacement

**Table 2**

Gadgets	Beyond Repair	Outdated	New Features
Personal computers			
Laptops			
Mobile phone			

19. How much money and time you spent in repairing the gadget

**Table 3**

Type of Equipment	Money Spent	Number of Times Gadget Repaired
Personal Computers		
Laptops		
Mobile phones		

20. Condition of the equipments while discarding:

**Table 4**

Type of Equipment	Broken	Working Condition	Beyond Repair	Others Specify
Personal Computers				
Laptops				
Mobile phones				

21. Options adopted in disposing the gadget

**Table 5**

Type of Equipment	Store it in the House	Throw it in Dustbin along with Other Waste	Donate to Friends , Relatives, Schools, Charitable Institutions	Return to the Seller in Exchange for a New Product	Give it to Scrap Dealer	Others Specify
Personal Computers						
Laptop						
Mobile phones						

22. Other WEEE that you dispose along with household waste:

A. Batteries Yes  No

B. Cartridges Yes  No

- C. Floppy Discs Yes  No
- D. CDs Yes  No
- E. Television Remote Yes  No
- F. Electronic Toys Yes  No

23. Awareness levels

- 1. Are you aware of the effect of discarding the equipment: Yes  No
- 2. Are you aware of the chemicals present in electronics products: Yes  No
- 3. If yes name the chemicals \_\_\_\_\_
- 4. Do you know what does this symbol represent?



Yes  No

- 5. What is your source of information to discard / dispose the gadget

- 1. Newspapers
- 2. User manuals of the product
- 3. Television
- 4. Radio
- 5. Internet

- 6. Are you aware of any company that collects discarded e-waste for re-cycling

Yes  No

- 7. Are you aware of the e-waste guidelines of the Government of India?

Yes  No

- 8. Are you willing to pay for a green product (which will not affect the health of the consumers and the environment)?

Yes  No

- 9. If yes, how much would you like to pay (as a percentage of the value of the product):

Up to 5 %  6 - 10 %  11 - 20 %  > 20 %