Responsiveness of E-Waste in the Society

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Abstract. Information technology bring has brought enormous change the way we organize our life, economies, industries and institutions but simultaneously, these have led to manifold problems including the problem of hazardous e-waste. Indian is developing country with huge population of 130 core population. Electrical & Electronics Equipments (EEE) users are increasing with rapid speed hence E-waste is also increasing. We don't have strong management to deal with e waste. Responsiveness is missing at consumer's end which is creating e waste hazardous. This paper discusses about responsiveness among EEE user's regarding systematic disposal of e-waste keeping in view the harmful effect of hazardous components on human health. Delhi is High tech city and Delhiites always excites to use latest EEE. This paper discusses about harmful practices adopts by users while dealing with e waste. This paper reunion the gap between EEE user's and harmful practices adopted by them while handling e-waste; and also creating responsive towards e waste.

Keywords: E waste, Electrical & Electronics Equipments (EEE), Waste Electrical & Electronics Equipments (WEEE), Information Technology (IT),

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I. Introduction

Information Security is described as "the processes and methodologies which are outlined and carried through to protect either by print, electronic or whatever variety of confidential, private and sensitive information from unauthorized access, use, disruption, destruction or alteration" (SANS, 2019).

Production of Electrical and electronic equipment (EEE) is one of the fastest growing global manufacturing activities. The resultant is that the production and use of EEE creates a huge E-WASTE. Huge pace of development of technology and affordable cost of EEE renders quick obsolescence of EE equipments and gadgets creating problem of e-waste management.

The quantification of e-waste is very difficult in India and there is also no proper policy to check the flow of e-waste and recycling of e-waste. According to a joint survey by ASSOCHAM-

KPMG, “India recorded an approximate 18 lakh metric tons of e-waste in 2016. India currently recycles less than 2% of the total e-waste it produces annually.”

As per Down To Earth report “the government, public and private sectors act as the primary source of e-waste, accounting for 70 per cent. Individual households contribute only 15 per cent. The balance 15 per cent is produced by manufacturers”.

“Due to continuously increasing consumer demand and rapid obsolescence rate, the outdated EEE finds their way to the informal recycling center including municipal solid waste dumping sites” (Dasgupta *et al.*, 2017).

The Electrical and Electronic Equipment contains toxic chemicals like lead, mercury, cadmium, barium, manganese, cobalt etc., if not properly processed prior to disposal, it can have an adverse impact on both human and environment. For example, cathode ray tubes (CRTs) of computer monitors contain heavy metals such as lead, barium and cadmium, which can be very harmful to health if they enter the water system. E waste damage human health effecting nervous and respiration system which cause many other diseases cause to death.

In India, various government agencies like Ministry of Environment and Forest (MoEF), Central Pollution Control Board (CPCB) and State Pollution Control Board (SPCB), the National Association of Software and Services Companies (NASSCOM) and Manufacturers’ Association for Information Technology (MAIT) tries to manage the e-waste by framing rule & regulation and conducts responsiveness progress.

II. What is E-waste?

“E-waste or electronic waste refers to any discarded electrical or electronic products or appliances” (Wikipedia, 2018). “E-waste is defined as anything with a plug, electric cord or battery (including electrical and electronic equipment) from toasters to toothbrushes, smartphones, fridges, laptops and LED televisions that has reached the end of its life, as well as the components that make up these end-of-life products” (Chemycal, 2019). E-waste is described as waste of electrical or electronic equipment abbreviated as WEEE.

According to Ministry of Environment, Forest and Climate Change, Government of India 'e-waste' means “electrical and electronic equipment, whole or in part discarded as waste by the consumer or bulk consumer as well as rejects from manufacturing, refurbishment and repair processes”.

Hence, it refers to all types of electrical and electronic equipment (EEE) and its parts that have been discarded by the owner as waste without the intention of re-use. It comprises of items such as refrigerators, washing machines, computers and printers, televisions, mobiles, i-pods, etc., many of which contain toxic materials.

III. Review of Literature

Manufacturing industry has demonstrated one of the highest degree of innovation in the current times. "Almost every day new electronic products are flourishing in the market influencing consumption pattern. However, short life span of the products, upgradation of technology, availability of choices, rapid urbanization, and affordability of the consumers has placed the electronic industry at the top of the world business. It is often cheaper for the user's to purchase new items than to repair or upgrade the used, old and broken ones. This has resulted in an increased amount of e-waste" (Yasmin, 2018). Hence, better recycling is one of the priorities of the government as well as to the public and numerous systems which are engaged in the segregation of e-waste. (Islam, Dias & Huda, 2018).

India is among the top five countries after China, USA, Japan & Germany generating 2 million tonnes of e-waste per annum. However, as per the reports only 5 percent of this waste is being recycled by the formal sector. Further, compared to the global recycling rate of 20 percent only 5 percent of the e-waste being recycled in India.

"Despite being highly effective in collecting WEEE, techniques employed by informal sector yield low extraction rates and result in large-scale environmental pollution which negatively affects the physical well-being of thousands of people" (GIZ, 2017).

Sivathanu, (2016) believes that consumer responsiveness and consumer behavior towards the e-waste really plays an important role in e-waste management.

"Public responsiveness of the e-waste problem is only the beginning; the public has to be willing to support companies that help to properly dispose of e-waste, even if the cost of their products become slightly higher as a result. Consumers hold the power, but need to be educated about the facts and the fact is that recycling starts Public responsiveness of the e-waste problem is only the beginning; the public has to be willing to support companies that help to properly dispose of e-waste, even if the cost of their products become slightly higher as a result. Consumers hold the

power, but need to be educated about the facts and the fact is that recycling starts" according to Saritha, Sunil & Srikanth (2015).

"Environmental effects of hazardous waste arise due to primary, secondary and tertiary emissions of hazardous waste. Primary emissions include hazardous waste present in e-waste including heavy metals like lead, arsenic, mercury and PCB whereas secondary emissions are generally due to incomplete treatment of e-waste which leads to generation of dioxins and furans. Tertiary emissions occur due to harmful chemicals used for recycling of hazardous waste. Often electronic goods can be classified into three main categories, white goods that consist of household appliances, brown goods including televisions, and cameras and grey goods include computers, printers and scanners". Author suggested that "grey goods are more hazardous than white and brown goods" (Ganguly, 2016). Therefore, there is a need to study how society responds to the e-waste and thereafter steps can be suggested for better management of e-waste.

IV. Objectives and Methodology

The study endeavors to study the Electrical & Electronics Equipments (EEE) users e-waste responsiveness level. In order to assess the responsiveness level of Electrical and Electronic Equipment among the end user's of the product, survey method has been employed. Structured questionnaire was given to the sample of targeted population. Survey was conducted in the year 2019.

Primary survey of the targeted respondent was conducted in the South East region of New Delhi. As the area was too large to cover therefore survey was conducted within 5 km radius from Jamia Millia Islamia University.

Cochran's sample size formula has been applied for estimating sample size (n). Krejcie & Morgan, 1970 suggested that for categorical data, 5% margin of error is acceptable. Alpha (α) is kept at 5% or .05 and probability of happening sample proportion (P) is 0.5 and probability of not occurring (q) is (1-P) i.e O.5. The size of population (N) is assumed to be 100,000. It is calculated in equation (1)

$$\text{Sample Size} = \frac{(Z)\text{^}2\,.P.Q.N}{(N-1).e\text{^}2+(Z)\text{^}2.P.Q} = \frac{(1.96)^2X0.5X0.5X100{,}000}{(100{,}000-1)X(0.05)^2+(1.96)^2X0.5X0.5} = 104\ldots\ldots(1)$$

Judgmental Sampling technique was used as population elements are purposely selected based on judgment. Statistical measures such as ANOVA and Chi Square test were used to interpret the obtained data.

V. RESULTS & INFERENCES

In the study, there are total respondent of 104 out of which 70 percent are males and 30 percent are females. For assessment of responsiveness level of e-waste among EEE user's, a summated rating scale was constructed from questions 09 to 21 and it was labeled as "Taware" which is refer as total responsiveness. The data fulfills all the assumptions to use analysis of variance (ANOVA). They assumptions are as follows – (a) Response variable is normally distributed and (b) Variances of the population are equal.

Mismanagement while dealing with e-waste is due to end user responsiveness level. Sample of 104 respondents shows that the mean score of total responsiveness obtained by the salaried class is 5.87 which is high as compared to self-employed and students. Ch-square statistics reveal that salaried class in more responsive comparison to other self-employed and students. In addition to the relationship between education and responsiveness was examined it was realized that responsiveness toward e-waste is directly proportional to the level of education. The ratio of mean score of responsiveness toward disposal of e-waste among matriculate and above post graduate is in the ratio of 3:8. Results of ANOVA indicate that youth Post graduate and graduate respondents are more aware about environment and health related issues as compared to the intermediate and matriculate but still they unable to do much in formal disposal due to lack of infrastructure and recycling centers in Delhi and NCR. Result concluded that these parameters including education, income and profession people are more concerned towards disposal of e-waste.

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