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A Study on End-of-Life Electronics Waste Management with Special Reference to Ernakulam Urban Areas

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Abstract: *EOL or End-of-Life electronics or electronic waste or e-waste describes discarded electrical or electronic devices. Used electronics which are destined for reuse, resale, salvage, recycling, or disposal are also considered e-waste. Informal processing of e-waste in developing countries can lead to adverse human health effects and environmental pollution. Scrap components, such as CPUs, contain potentially harmful materials such as lead, cadmium, beryllium, or brominates flame retardants. Recycling and disposal of e-waste may involve significant risk to health of workers and communities in developed countries and great care must be taken to avoid unsafe exposure in recycling operations and leaking of materials such as heavy metals from landfills and incinerator ashes. This study helps to know the e-waste management with special reference to Cochin city in Ernakulum district which is known to be the commercial capital of Kerala state.*

Keywords: *EOL, End-of-Life electronics, E-Waste, E-Waste Management, Objectives, Scope, Research Methodology, Limitations, Analysis of Data, Findings, Suggestions and Conclusion.*

INTRODUCTION

Advances in the field of science and technology brought about industrial revolution in the 18th century which marked a new era in human civilization. These spectacular developments in modern times have undoubtedly enhanced the quality of our lives. At the same time, these have led to manifold problems including the problem of massive amount of hazardous waste and other wastes generated from electronic products.

Electronic waste or E-Waste in a common parlance can be defined as the disposal if all types of electronic products that includes all types of electronic materials that are bound to be reused, salvaged, recycled, resold, and disposed off. This may include items such as computers, servers, mainframes, monitors, CDs, printers, scanners, copiers, calculators, fax machines, battery cells, cellular phones, transceivers, TVs, medical apparatus, and electronic components besides white goods such as refrigerators and air conditioners. Experts opine that E-Waste amounting to 50million tons and above are being generated globally each year.

The Indian Information Technology (IT) is one of major contributors to the global economy. At the same time, it is responsible for the generation of the bulk of E-Waste and of waste electrical

and electronic equipment (WEEE) in India. These waste substances are in the long run hazardous in nature as they are intangible, corrosive, reactive, toxic, explosive, poisonous or infectious. Hence, they pose substantial or potential threat to public health or the environment.

E-Waste management is managing the E-Waste by reusing, recycling, refurbishing the electronic products in proper way without harming the natural and human environment. All these electronic products lay unattended in the offices, homes, warehouses etc. or are ultimately disposed off at land-filling areas or centers. This type of land-filling does more harm to the environment. Thus it becomes necessary to take steps in proper management of E-Waste. Both developed countries and the developing countries like India face the problem of E-Waste management. The rapid growth of technology, the upgradation of technical innovation and a high rate of obsolescence in the electronics industry has led to one of the fastest growing waste streams in the world.

E-WASTE

E-waste is any electrical or electronic equipment that's been discarded. This includes working and broken items that are thrown in the garbage or donated to a charity reseller like Goodwill. Often, if the item goes unsold in the store, it will be thrown away. E-waste is particularly dangerous due to toxic chemicals that naturally leach from the metals inside when buried.

OBJECTIVES OF THE STUDY

- To find out the ways in which E-Waste is managed in Ernakulam urban areas.
- To study how E-Waste can be effectively managed.
- To analyze the awareness of E-Waste management practices among people.
- To understand the financial assistance and subsidies provided by Government for E-Waste management

SCOPE OF THE STUDY

This study focuses on remedies regarding when and how to manage reuse and dispose hazardous harmful E-Waste by conducting study in Ernakulam urban areas and promote emerging sustainable technologies to eliminate negative environmental consequences and help to go green.

RESEARCH METHODOLOGY

- Type of research - The type of research used is descriptive.
- Source of information - Both the primary and secondary data have been collected for the purpose of study.
- Sampling techniques - The technique used is household survey and Sampling strategy.
- Tools used - The tools used are tables, graphs and diagrams.

This work is done mainly depending on both primary data and secondary data with a Field study conducted in Ernakulam urban areas and its environs. The primary data were collected using questionnaire. Secondary data were collected with the help of Internet, E-Waste magazines, newspapers etc. The faculty guide also supported in gathering relevant information.

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LIMITATIONS OF THE STUDY

- Respondent's bias cannot be eliminated.
- Small sample size is taken for analysis, so proper analysis cannot be drawn.
- Analysis and interpretation based on figures in report.
- Inadequacy of time is a major limitation.

ANALYSIS OF DATA

Table No.1 showing awareness of the respondents about e-waste management

PARTICULARS	NO OF RESPONDENTS	PERCENTAGE
YES	300	100
NO	0	0
TOTAL	**300**	**100**

Table No.2 showing duration of usage of equipment before discarding

PARTICULARS	NO OF RESPONDANTS	PERCENTAGE
1DAY-1WEEK	15	5
1WEEK-1MONTH	25	8
1MONTH-6MONTHS	50	17
6MONTHS-1YEAR	60	20
ABOVE 1 YEAR	150	50
TOTAL	**300**	**100**

Table No.3 showing the Reasons for discarding the equipment

PARTICULARS	NO OF RESPONDANTS	PERCENTAGE
RELIABILITY	25	8
BROKEN	50	17
NOT WORKING	35	12
UPGRADE	175	58
NO REASON	15	5
TOTAL	**300**	**100**

Table No.4 showing preferable action when the equipment is no longer useful

PARTICULARS	NO OF RESPONDENTS	PERCENTAGE
STORE IN OWN PREMISES	25	8
SELL AS SECOND HAND EQUIPMENT	35	12
THROW THEM AWAY WITH GENERAL WASTE	125	42
GIVE THEM TO RECYCLER	35	12
DISASSEMBLE TO REUSE SOME PARTS	15	5
RETURN TO SELLER ON BUY BACK AGREEMENT	25	8
DONATE TO FAMILY,SCHOOLS,EMPLOYEES ETC.	40	13
TOTAL	**300**	**100**

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Table No.5 showing the most preferred e-waste management practices by the respondents

PARTICULARS	NO OF RESPONDENTS	PERCENTAGE
REUSE	20	7
RECOVER	15	5
RECYCLE	155	52
REFUBISH	50	17
MINIMIZATION OF WASTE	25	8
LAND FILLING	10	3
INVENTORY MANAGEMENT	10	3
EXPORTING	15	5
INCINERATION	0	0
TOTAL	**300**	**100**

Table no.6 showing respondent's opinion about attending e-waste awareness programs

PARTICULARS	NO OF RESPONDENTS	PERCENTAGE
ALWAYS	10	3
SOMETIMES	15	5
NEVER	275	92
TOTAL	**300**	**100**

Table No.7 showing respondents opinion in regards to local government's attitude towards e- waste management

PARTICULARS	NO OF RESPONDENTS	PERCENTAGE
HIGHLY EFFECTIVE	0	0
EFFECTIVE	10	3
AVERAGE	25	8
INEFFECTIVE	90	30
HIGHLY INEFFECTIVE	175	59
TOTAL	**300**	**100**

Table No.8 showing awareness about financial assistance and subsidies provided by the government for e-waste management

PARTICULARS	NO OF RESPONDENTS	PERCENTAGE
YES	0	0
TO SOME EXTENT	15	5
NO	285	95
TOTAL	**300**	**100**

Table No.9 showing opinion about financial assistance and subsidies to state bodies for e-waste management provided by central government

PARTICULARS	NO OF RESPONDENTS	PERCENTAGE
GREATLY	165	55
TO SOME EXTENT	125	42
NO	10	3
TOTAL	**300**	**100**

Table no.10 showing respondents view about improvement of e-waste management if local authority is availed with more funds

PARTICULARS	NO OF RESPONDENTS	PERCENTAGE
YES	190	64
NO	85	28
TO SOME EXTENT	25	8
TOTAL	**300**	**100**

FINDINGS & SUGGESTIONS

FINDINGS

- It is observed from the study that all the respondents are aware about E-Waste management.
- It is found that most of the respondents use the equipments for more than a year before discarding.
- It is found that majority of respondents discarded the equipment for upgrading it to the latest version and some people discard it for no reason.
- It is evident that majority of the respondents prefer to recycle the equipment and use it again, thus reducing the amount of E-Waste produced. And none of the respondents are willing to incinerate the E-Waste.
- It is observed that majority of the respondents never attend any E-Waste awareness programs.
- It is evident from the study that many of the respondents are not aware about the local projects or activities pertaining to E-Waste management.
- Many respondents opined that the attitude of local government towards E-Waste management is highly inefficient.
- It is observed from the study that majority of the respondents are not aware of the financial assistance and subsidies provided by the government for E-Waste management.
- Respondents opined that central government should provide more assistance to state bodies for effective E-Waste management.
- It is evident that respondents think their locality can improve E-Waste management if local authority is availed with more funds.

SUGGESTIONS

- Proper E-Waste management practices should be adopted in every locality so that proper disposal of E-Waste is guaranteed which does not harmfully affect the society and the environment.
- Producer-Public-Government cooperation is the concept of developing partnerships with industry, the public sector and civil society for reducing hazardous wastes at sources and promoting their recycling and re-use.
- Product design by using safe and environmental friendly raw materials and most emerging technologies can reduce the volume if E-Waste.
- More awareness programs and activities should be conducted in the locality. The awareness among the consumers regarding hazardous constituents of E-Waste can be created through active propaganda in print and electronic media and strong extension programs. The awareness through media nay not be feasible by the producers individually. This task may have to be taken up by agencies like Municipal Bodies/State Pollution Control Board. Nevertheless, Government needs to undertake a massive awareness program to encourage E-Waste collection for safe disposal and recycling. A partnership among all stakeholders is vital for success of process.
- Local authority should assure people are available with the opportunity to make use of these awareness programs and activities.
- Producers need to supply with threshold limit for the use of certain hazardous or toxic substances in electronic equipment. While green design products and grant of incentives can be encouraged.
- Monitoring of compliance of rules. The State Pollution Control Boards or Committees responsible for grant of authorization, monitoring compliance of authorization and registration conditions can take action against violations of rules. On the other hand, the Central Pollution Control Board (CPCB) can monitor the compliance of conditions stipulated for granting registration.
- Need for stringent health safeguards and environmental protection laws in India to address the issue related to either domestic E-Waste or imports of hazardous E-Waste.
- Re-use and recycling of electronic equipment is a beneficial alternative than disposal. By giving incentives for setting up more units within ten same states, movement of material can be avoided and the disposal can be ensured in a environmentally sound process.
- Establishment of E-Waste collection, exchange and recycling centers should be encouraged so that people get the opportunity to recycle and re-use. All Central and State government departments, PSUs and other bulk consumers should channelize their E-Waste disposal so as to safeguard and protect the environment.

CONCLUSION

On the basis of the objectives of the study and from the analysis, we came to the conclusion that most of the respondents are aware about E-Waste management. On the other hand majority of them have no idea regarding safe disposal of E-Waste and most of them are not aware about the awareness programs.

Considering the future scenario, it is imperative that the safe management of waste is done in an organized manner with sufficient resources and sustainable recycling technologies on the one hand and effective legislations and monitoring mechanisms on the other. Effective E-Waste management practices should be adopted in localities that can drive to success for E-Waste management by developing eco-designed devices, to properly collect E-Waste, recover and recycle material by safe methods, dispose of E-Waste by suitable techniques, forbid the transfer of used electronic devices to developing countries, to raise awareness of the impact of E-Waste pollution of both users and manufacturers.

Indian people are still to realize the associations between the cause of generation of E-Waste and it's effects including detrimental health and environmental effects. Over and above all of these, no matter how well the policies are introduced and implemented benefits will only arise provided end users are prepared to accept introduced policies and adhere to them.

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