Demand based keys for e waste management

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Abstract

The radical revolutions accomplished in societies throughout the globe due to the utilization of electronics are far more profound and pervasive than the consequences of industrial revolution. The extensive use of electrical and electronic items has boosted business activities, created employment opportunities and thus it made communication easier. However, along with various advantages, it has brought many challenges, for example the rising problem of e-waste that have to be dealt with by society. The current age of electronics has made immense impact on human society and spectacularly enriched our connectivity across the world. This proposed research work presents the preliminary findings to identify the numerous prevalent means of managing e-waste in especially in India and reasons for exercising those approaches. It efforts to provide a concise vision into this relatively new conception of e-waste, its generation in our country India and the environmental and health affairs concerned to it. This also looks into the universal trade in e-waste and the international experience in this context. Taking into consideration of the future picture, it is essential that the reliable dealing of waste is done in an organized manner with sufficient resources and sustainable recycling technologies on the one hand and operative legislations and supervising procedures on the other. The electronic waste accumulation in the country if not disposed-off properly may become a serious challenge for the environmentalists and technologists in the coming future.

Keywords

PDAs, CD players, fax machines, electronic waste, e-waste, TVs, monitors, cell phones, environment, health concerns, education, valuable materials, hazardous materials, computers, electrical and electronic toys, household appliances, laptops, mobile phones, printers.

Introduction

Almost all waste having nature of electronic type contains some form of recyclable material. This includes plastic, glass and metals. We are trained to recycle a newspaper, cans and bottles. Almost anything electronic in nature can be recycled properly with effort. It is important that any e-waste processor is fully certified in safe destruction and follow certified documented procedures to safely dispose of electronic waste. In addition to its damaging effect on the environment and its illegal smuggling into developing countries, researchers have now linked e-waste to adverse effects on human health, such as inflammation and oxidative stress -- precursors to cardiovascular disease, DNA damage and possibly cancer.

Laptops and computers were also a major source of e-waste due to obsolescence. The constant release of new and upgraded software was a force for replacing computer equipment. New operating systems and programs required an increasing amount of resources in memory, processing power, and storage space. Corporations, desiring to use the latest operating system to take advantage of greater computing efficiencies, found themselves with the need to replace numerous older computers. Older systems which ran legacy applications successfully for several years now were obsolete and entered the waste stream.

Indian Scenario

The recycling of E-waste is a major concern in India. The workers in the recycling sector are dominated by the urban poor with very low literacy levels and hence they have very little awareness regarding the potential hazards of E-waste. Among the urban poor, there are a substantial number of women and children engaged in various recycling activities which further exaggerate the problem of E-waste as they are more vulnerable to the hazards from this kind of waste.

While considering the problems related to E-waste in India, there are five major components which should be focused upon. These are Main Sources of E-waste in India, Magnitude of the Problem with respect to the Indian scenario, Health and Environmental Implications of e-waste, Current Management practices of E-waste in India and Policy level initiatives in the country.

In addition it is known that cadmium and mercury are emitted in diffuse form or via the landfill gas combustion plant. Although the risks cannot be quantified and traced back to E-waste, landfilling does not appear to be an environmentally sound treatment method for substances, which are volatile and not biologically degradable (Cd, Hg, CFC), persistent (PCB) or with unknown behaviour in a landfill site (brominated flame retardants). As a consequence of the complex material mixture in E-waste, it is not possible to exclude environmental (long-term) risks even in secured landfilling

Issues related with negative impact on health

The physiological and health impacts on humans and animals of many of the toxic substances contained in e-Waste are

- **Skin**: contact dermatitis; skin lesions; carcinogenic, including and lung cancer; anaemia; CBD (a Currently-Incurable, Debilitating Disease that can Sometimes be Fatal); and mortality.
- **DNA**: damage in lymphocytes, fatal and developmental toxicity; growth retardation; abnormal brain development, which can result in intellectual impairment; and possible long-term impacts on memory, learning and behaviour.
- **Organs**: damage to the brain, including swelling; liver, including liver necrosis; kidney, including renal toxicity; thyroid; pancreas; lymph nodes; spleen; and bone, including bone toxicity.
- **Nervous system**: damage to the central nervous system (CNS) and blood system, including CNS depression and neurotoxicity; immune system suppression, including inhibition of a key blood cell enzyme.
- **Hormonal system**: Disruption to endocrine systems including the oestrogen, androgen, thyroid hormone, retinoid and corticosteroid systems; inhibition of human and organ hormone reception; and ability to mimic natural oestrogen hormones, leading to altered sexual development in some organisms.
- **Reproduction**: damage to both male and female reproductive systems, including interfering with development of the testes; reduction in semen production and quality; abnormal morphology of Source of e-wastes Constituent Health effects rates.
- **Other**: hypertension (high blood pressure); cardiovascular and heart disease; respiratory tract irritation, including irritation of the nose, mouth and eye

Management of E-waste

The composition of E-waste consists of diverse items many of which contain hazardous elements. Therefore, the major approach to treat E-waste is to reduce the concentration of these hazardous chemicals and elements through recycle and recovery. In the process of recycling or recovery, certain E-waste fractions act as secondary raw material for recovery of valuable items. In Indian context, primarily recycling, reuse and recovery are done as measures to treat E-waste. The recycle and recovery includes the unit operations like dismantling, segregation of ferrous metal, non-ferrous metal and plastic by shredder process, refurbishment and reuse, recycling / recovery of valuable materials and treatment/disposal of dangerous materials and waste. Dismantling includes removal of parts of the electrical and electronic equipment containing perilous substances (CFCs, Hg switches, PCB); removal of easily accessible parts containing valuable substances (cable containing copper, steel, iron, precious metal containing parts etc.). Refurbishment and reuse of E-waste has potential for those used electrical and electronic equipment which can be easily renovate to put

to its original use. Recycling / recovery of valuable materials includes recycling and recovery of valuable materials from the E-waste stream like non-ferrous metals in smelting plants, precious metals in separating works.

Problem can be solved or decreased

The solution for this problem may be a systematic approach in dealing with e-waste recycling. Banning all electronic waste exports will go far in eliminating the impact of electronic waste on third-world nations' environment and the health of their population. Strict government regulations should be enacted which govern the proper handling of e-waste on a national scale instead of leaving it up to individual states. Increasing recycling efforts through governmental support with tax credits and loans to provide an incentive to build environmentally friendly recycling facilities, could work.

Primarily two types of disposal alternatives based on the composition are in practice. These are Landfilling and Incineration. However, the environmental risks from landfilling of E-waste cannot be neglected because the conditions in a landfill site are different from a native soil, particularly concerning the leaching behaviour of metals.

Conclusion

This work discusses the need to increase e-waste recycling; however, further studies in related areas could assist in the overall goal of reducing electronic waste. More research in the area of electronic waste is needed. Delving further into how e-waste is processed could provide valuable information. Research needs to look closely at how items are disassembled, processed, and individual components reclaimed. This research could assist in increasing the amount of e-waste recycled versus exporting or discarding in a landfill.

This work confers that the evaluations of the scenario of e-waste, if accomplished perfectly, results in the expression of proper views; thus the system based on the any systematic model could generate an overall improvement to the environment. The awareness that please don't throw away your computer or old monitor in the junk, it may be illegal should be spread. Environment friendly methods to dispose of and recycle IT and electronic equipment must be promoted and provided is the best solution for the problem of e-waste is the extract of this paper. Solving the e-waste problem starts with education. Such good habit changes as a result of knowledge. Almost all of us are trained to recycle a newspaper, bottles, and cans. Almost anything electronic in nature can be recycled properly with effort. It is important that any e-waste processor is fully certified in safe destruction and follow certified documented procedures to safely dispose of electronic waste. Ask questions before you recycle. Environment friendly methods to dispose of and recycle IT and electronic equipment must be promoted and provided is the best solution for the problem of e-waste is the extract of this paper.

Future scope

The objective of further research will be investigating certain questions, which are results of this work. Subsequent from this initial work, a number of research questions arise. For a more complex environment, how much illustration would be required to train the system to a satisfactory level? To what degree should outlier decisions be identified and included in the system? The perfect system to deal this wastage in such a way that instead of negative effect, it should be positive impact on the society and environment.

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