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The impact of e-waste on environment and its treatment through the E-waste art

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ABSTRACT

Today in the era of technology, everyone is interested in buying a new and latest gadget to get updates with technology, but we never think of their threats and dangerous impact on the environments. Electronics gadgets when it becomes useless, it proves to be very hazardous for our health. It is shocking to note that more than 75% of heavy metals in the landfill destination are left in their source as electronic devices. The inevitability of time is to understand that e-waste how can be disposed-off naturally way without affecting the environment. Nowadays, Eco-artists across from the whole globe are established an excellent example to use e-waste naturally in their artworks as art materials. In most countries like the United States, Britain, Germany, Japan and other developed countries exports most e-waste to other developing countries thereby causes environmental damages and health concern for humans instead of being recycled. The aim of writing this paper is to understand and explore the crucial impact of E-waste on the environment in India and around the world.

1. INTRODUCTION

"E-Waste" is a well-liked, informal name for electronic manufactured goods that is close to the end of their "useful life". E-wastes consider dangerous, as certain components of electronic products contain materials which are dangerous, depending on their situation and density. The hazardous content of these materials create a threat to human's health and environment. Discarded computers, televisions, VCRs, stereos, copiers, fax machines, electric lamps, cell phones, audio equipment and batteries (see fig.1), if improperly disposed can pollute soil and groundwater. Many of these products can be refined or recycled through environmental friendly way so that they are less harmful to the ecosystem. With the above mentioned facts, it can be understood that the growing demand for consumer electronic equipment and the marketing of new features has caused rapid growth in the generation of unwanted electronics, known as E-waste. E-waste terms can include discarded computer equipment, TVs, printers, fax machines, telephones etc. apart from this, many electronics have very little life span because there is a need to constantly upgrade to keep up with the latest technology. This will quickly become a runaway problem if we don't concentrate to make better use of the e-waste as well as, develop better recycling techniques. A general survey of the United Nations University states that e-waste in the Asia-continent is growing at alarming levels. 'The study says that the amount of e-waste in Asia has grown by 63 percent in just by the past five years. For a long time, many Asian countries, especially China, have worked as a dumping ground for electronic waste from all over the world, but with the increase in e-waste along with these countries, the problem is very terrific. While there are electronics recycling services around Asia, the devices are not always properly disposed-off.'[1] To remove precious metals like gold and silver from the circuit board, the practice of burning of copper or acid for the bathing of acid produces dangerous conditions for the workers and produces toxic fumes creating threat to the entire environment and society. Illegal dumping of electronics leads to leaching of damaging materials in soil and water bodies.

***fig.1** Types of E-waste*

Since the starting of 21st century, technical boom is spreading worldwide and e-waste generated through it, in East and South-East Asia rose 63 per cent, according to a report from the United Nations University.[2] For the new report, researchers studied e-waste generation in 12 countries in East and South-East Asia – including China, which more than doubled its volume of e-waste over the five years. Lead author of the study **Ruediger Kuehr** says that *"More and more*

[1] E-waste is growing rapidly in Asia | TreeHugger, Retrieved March 10, 2019, from https://www.treehugger.com/gadgets/e-waste-increasing-quickly-asia.html

[2] Gadget boom sees e-waste in Asia spike 63 per cent in 5 years, Retrieved March 11, 2019, from https://www.newscientist.com/article/2117954-gadget-boom-sees-e-waste-in-asia-spike-63-per-cent-in-5-years/

gadgets and toys are coming with either a plug or a battery, and it's all substantially contributing to an increase in e-waste".[3]

The quick changes in technology and discarded electronics have become the fastest growing waste in the world. Every year, thousands of old computers and mobile phones are dumped in landfill or burned in smelter factories. Therefore, in countries like India, China and South Africa the mountains of dangerous developed countries based waste are increasing rapidly. Foreign exported e-waste is polluting rivers in cities of China and Ghana that their water is completely black, and they are some of the biggest dumps in the world. "The UN Environment Programme predicts that between 2007 and 2020, the amount of e-waste exported to India will have jumped by 500 percent and by 200 to 400 percent in South Africa and China."[4]

2. THE OBJECTIVE OF THE STUDY:

The aim of writing this paper is to explore and understand crucial dark side impact of environment of E-waste in India and world. The main purpose of this paper is to develop an understanding of environmental crisis and solutions through e-waste art. Nowadays, many artists from all over the world are trying to show the society a new one by e-waste art.

3. METHODOLOGY:

Today, Scholars, artists, teachers, and researchers from around the world are giving special attention to keeping the environment green and clean. And how can be the whole world overcome by e-waste problem. Based on my study & findings, I present the argument that a new concept has derived conception of beauty which can be created from such a terrible electronic waste. Present study based on secondary sources data and descriptive research methodology.

The work is involving collection of data through experiments, government agencies, newspaper, research paper and spatial analysis of compiled data.

My Research Questions:

- What are e-waste and its impact on environment?
- How to deal with e-waste problem in the world?
- What are the e-waste management techniques and procedures?
- What steps can be taken to solve this problem?

4. IMPACTS E-WASTE ON ENVIRONMENT AND HUMAN HEALTH:

The process of decontamination and disposal of electronic waste has given rise to many environmental impacts in developing countries. Dumping e-waste in landfill means that toxic substances in broken electronics can make their way into the waterways and soil area. Recycling facilities in the developing countries that use workers to decompose electronics do not provide adequate safety equipments. The health effects of certain constituents in e-wastes are very dangerous. If these electronic items are discarded with other household garbage, the toxics create a danger to both human health and critical components of the ecosystem. Like Africa, China, India is now faced with the considerable problem of e-waste - both locally generated and internationally imported and this collected E-waste is an attractive industry, but there is a danger to human health and the environment.

4.1. Rising E-Waste In India Threatening Environment:

According to the United Nations estimates, the world produces 50 million tons of e-waste annually. In developing countries, informal processing of e-waste can have adverse effects on human health and environmental. It can pollute water, land and air and lead to life threatening diseases like cancer,TB, etc and it also affect fertility in the workers exposed to this e-waste. Presently, in India, more than 85% of electronic scraps are recycled in the informal sector, where the use of unsafe practices is common. With no proper rules and its implementation from government electronic waste containing dangerous and toxic components such as mercury, cadmium , lead, arsenic etc causing serious environmental problems in India. E-waste includes computers, TVs, refrigerators, radios, mobile or any other electronic device that has been discarded, disposed of by users. This can be seen in Delhi's biggest markets dealing in the electronics business such as Nehru Place, Gaffar Market, Chadni Chowk Electronics Markets and Shopping Malls etc. Though the Supreme Court of India banned the import of hazardous waste in 1997, thousands tons of e-waste still enter the country in every year. it is one estimate that, the US alone exports a huge portion of its e-waste to China, India and Pakistan. Shockingly enough, India's pollution regulatory body, Central Pollution Control Board, continues to deny that e-waste is coming into India; but although, it is certain that legal loopholes are being exploited by importers, traders and recyclers to take advantage of this profitable business which has a high human and environmental impact.[5]

4.2. Resolution the E-waste problems:

The solution to e-waste problem starts with education, and changes in people's habits, most people are trained to recycle newspapers, clothes, cans and various types of bottles. It is important that any e-waste recycler should be certified and inspected regularly and make sure that they follow certified procedures for the safe disposal of electronic waste. There are many steps which people can taken, like sell unutilized stuff, take advantage of buyback offers, find certified e-waste recycler, donate them to relatives, local repair shop etc. that can be reduce e-waste and save environment. The policy of 3R-Reuse, Reduce, Recycle should be follow by people at large.

The circuit board is one of the challenging task to recycle. Circuit boards of electronic devices such as mobile and

[3] Gadget boom sees e-waste in Asia spike 63 per cent in 5 years, Retrieved March 11, 2019, from https://www.newscientist.com/article/2117954-gadget-boom-sees-e-waste-in-asia-spike-63-per-cent-in-5-years/

[4] Tracking New York City's Electronic Waste – InsideHook Retrieved March 11, 2019, from https://www.insidehook.com/article/tech/tracking-new-york-citys-electronic-waste/

[5] Addressing socio-enviro issues and concepts of sustainability, Retrieved March 11, 2019, from http://thegreenden.blogspot.com/2009/03/e-waste-in-india.html

computer are contain precious metals such as gold, silver, platinum etc. In order to separate these basic metals from e-waste, insecure methods like melting the circuit board, acid bath for copper wire and separating the metals in the open are mostly adopted today which has very negative consequences on environment. Health problems, greenhouse gas emissions can be reduced by adequately disposing or reusing electronics. Reuse and refurbishing offer are a more environmentally friendly and socially conscious alternative to down-cycling processes. One of the noble steps can be taken by Companies that, at the purchase of electronics product they should inform the consumers about the recycling of product after the usage. E-waste represent large amount of toxic substances. Irregular and inappropriate e-waste recycling has been linked largely to the death of fish and other ecological disasters. Recently WWF has shown a dead whale containing large quantity of plastic in the belly of whale. Awareness among the people, Resource Recovery, Sustainable Development etc can be the Strategies to tackle e-waste.

4.3. E-waste Art and their Artist:

The conceptual artists have understood that recycled art is not just benefiting to environments, rather it also breathes life into large discarded objects that would otherwise land up in dustbins and create environment problems. Below we have discussed some of the aspiring artists who have given trash (in various forms) a new lease of life and explore E-waste art (see fig.2) as new intervention in contemporary art.

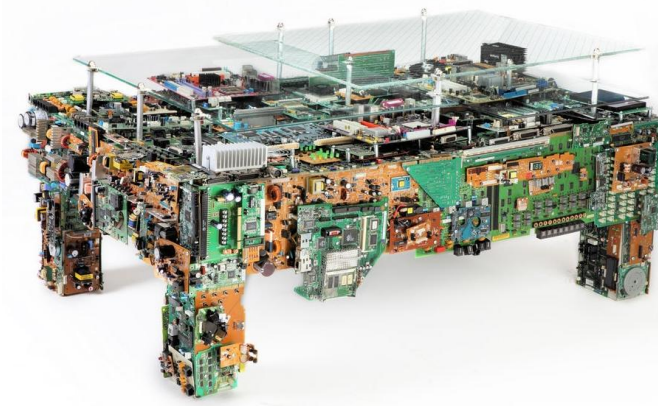

fig.2 *Coffee table made from e-waste.*

HA Schult is one person congratulate for his amazing trash arts which includes the largest display of recycled art. Put together by Schult, this awesome artwork comprises 1000 trash men made from computer parts, plastic leftovers and aluminium cans. Schult was able to put the entire thing together in about six months and has displayed this out of the world collection at various worldwide venues including the Egyptian Pyramids, *La Grande Arche* and the Great Wall of China to name a few.

Pen refills used to make miniature world landmarks: Indian hobbyist ***M R Sreenivas*** collected pen refills from anywhere possible. When he was in schools and colleges under the "Say No to Plastic" program conducted to raise awareness of global warming, that he was struck with the idea of building incredible miniature sculptures using these discarded pen refills. Sreenivas has created many famous landmark sculptures using the pen refills; these include the miniature sculpture of the Big Ben, Leaning Tower of Pisa and the Eiffel Tower (see fig.3). Sreenivas is featured in the India Book of Records for the amazing mini sculpture of the Taj Mahal he made using 700 trashed pen refills.

fig.3 Srinivass waste Pen Refill Waste Art work.

Italian artist, ***Franco Recchia*** has a special eye to recreate the bold shapes of man-made urban landscapes from components of trash computers. At a distance Recchia's art looks just like miniature cities, (see fig.4) but when you get closer you slowly recognize the electronic components that were used to create the illusion.

fig.4 *The sculpture pictured is called "Central Park," will set you back $4,600.*

An article about the city of Helsinki, made from the recycled motherboard, appeared in the news. It was a fantastic art, and when you saw a picture of the whole thing, then the shape of the city could be immediately recognised. The artist Susan Stockwell completed his map with the motherboard, but it did not stop with just one city or a country. Their motherboard construction is a large map of the whole world. She was commissioned to build the beauty of this recycled computer parts by the University of Bedfordshire, and it was displayed in the entrance hall of their new student building. They started working on this world map in 2010 (see figure 5), and the entire computer parts used to make Secure IT Recycling Company donated it. If you look closely, will clearly see the motherboard, electric wire, fan and all types of small computer parts. He has given this stuff a new life, and it is incredible and impressive a large installation, sculptures, paintings and collages. His art emphasises the issues of ecology, geopolitics, mapping, trade and global commerce.

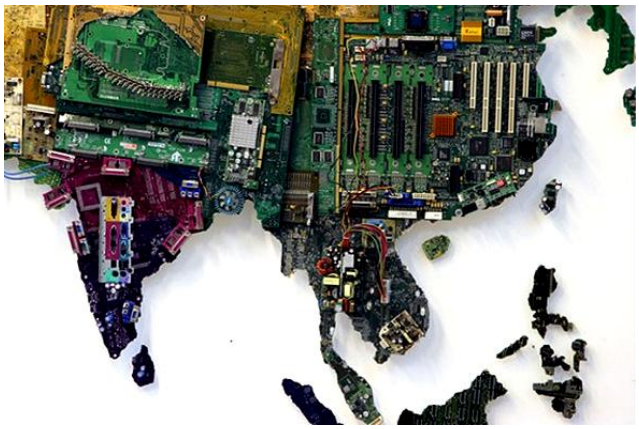

fig.5 *World Map, by* ***Susan Stockwell*** *Sources: https://freshome.com*

Gabriel Dishaw, a sculptor who loves his works mainly made from recycled computer & typewriter parts. Their passion for working with metal and mechanical objects has been essential in the evolution of his art. It provides to express itself in a way that brings new life into the components of typewriters, machines and old computer technology which will normally end up in a landfill. He has embark a mission is to create dialogue and help find creative, environmentally sound ways of re-purposing e-waste. If we will see Gabriel Dishaw's artworks which are made from E-waste. (see fig.6)

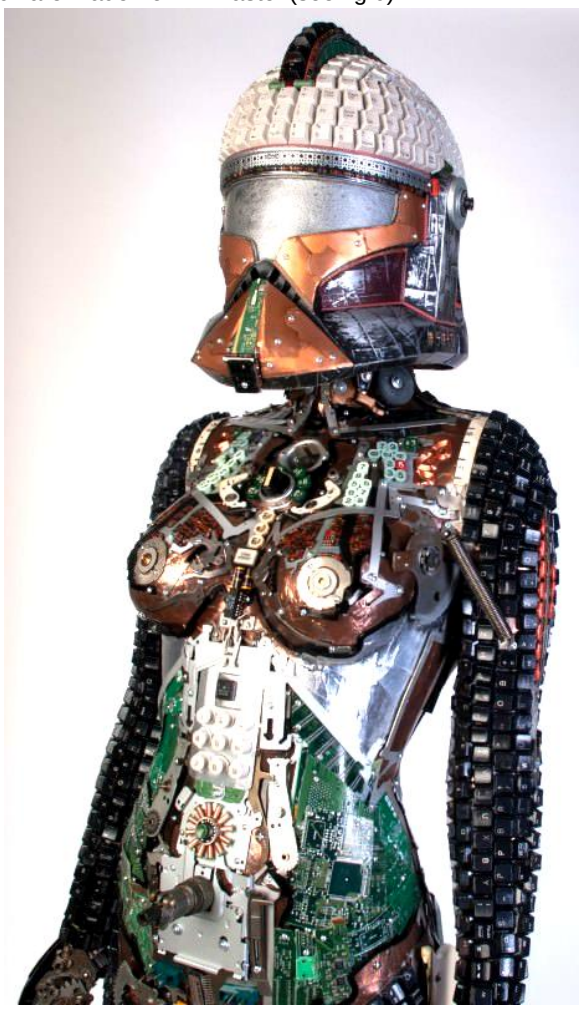

fig.6 *Fembot by* ***Gabriel Dishaw****, materials used: copper, adding machine parts, typewriter parts, computer mother boards, fuses, airplane parts, wire and meters.*

South African artist ***Maurice Mbikayi*** created these wonderful skull sculptures from the keys of computer keyboards. He calls them "Anti-social Networks." The Trojan horse is known since Greek mythology, where they are given to the Greeks who reached Troy City. This horse has now been recreated by designer ***Babis***, resin and buttons on computer keyboard through a unique sculpture called 'hedonism (y) trojaner' (see fig.7). Trojan viruses are all over the internet, and you should beware when we give personal information online that Hacking attacks can be a victim, it displays a very good symbol Trojan virus in a unique way by designer. Humans are stuck in the Internet as a medium in seeking of their happiness.

fig.7 *Torejan horse has now been recreated by* ***designer Babis.***

fig.8 *world's largest mosaic of Dr. APJ Abdul Kalam, by Chetan Natasha Raut*

In above figure (see fig.7) forever in awe, a couple takes in the world's largest mosaic of Dr. APJ Abdul Kalam, made using more than 87,000 computer keyboard buttons and 2,500 scrapped keyboards, on Monday. The 15ftx20ft mosaic was completed in six days by ***Chetan Natasha Raut*** at the Hiranandani Gardens. Prashant Waydande (*Source: the Hindu*)

5. Conclusion

The findings of the study revealed that Electronic waste is one of the rapidly growing environmental problems in the world. Electronics waste are polluting and destroying eco-systems around the world. It is time to solve the problem. If we have more idea about e-waste management then sure, it will set a unique example in the world. Today, scholars, artists, teachers, and researchers from around the world are paying particular attention to save the environment; and how can be the whole world overcome the problem of e-waste. Based on study & analysis, we present the argument that a new concept has derived conception of beauty which can be created from such a massive discarded electronic waste. And in the role of taking this concept many artists from around the world are emerging in front of us. These artworks could have been seen in many popular cultural art events, and they can connect the people's thinking to e-waste beauty as well as the sense of preserving the environment.

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