E-WASTE MANAGEMENT IN INDIA: A STUDY OF CURRENT SCENARIO

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ABSTRACT:

Whenever we think of waste, we think only in terms of garbage or solid/semi-solid waste and not anything else. In the last ten years, e-waste has become a global issue. India too generates a large quantity of electronic waste i.e. e-waste every year. Sadly e-waste is something which does not get much media coverage; hence people's awareness regarding e-waste is quite low.

E-waste recycling is a concept barely in existent in India. As a result, the electronic waste generated is often dumped in rivers or dump yards without proper recycling or treatment. This is hazardous on various levels; for both the environment and personal health.

The present paper highlights the scenario of e-waste in India and other parts of globe. It also exhibits the trends of e-waste in India through a comparison with other countries. The study reveals that Computer equipment and mobile telephones are identified as the principal e-waste generators in India. Computers contributed towards 70 per cent of the total e-waste generated in India, while telecommunication equipment accounted for 12 per cent. Among cities, Mumbai topped the list as it generated an estimated 1, 20,000 tonnes of e-waste annually. Delhi and Bengaluru ranked second and third, with 98,000 and 92,000 tonnes of e-waste generation respectively. State-wise Maharashtra is ranked first in generation of electronic waste, followed by Tamil Nadu and Uttar Pradesh. Approximately 70 per cent of heavy metals found in landfills are accounted for by E-waste. The paper, in the end also offers suggestions to deal with the Challenges and problems of e-waste.

KEY WORDS: E-Waste, E-waste Management, Recycles

I. INTRODUCTION:

E-WASTE:

E-waste contains various toxic substances such as mercury, lead or brominated flame-retardants to name but a few. Upon prolonged exposure during unsafe e-waste recycling activities, these substances lead to damage of almost all major body systems such as nervous systems, blood systems, brain development, skin disorders, lung cancer, heart, liver, and spleen damage. This is particularly relevant in the informal sector, as a considerable number of informal e-waste workers do not take any health preventive safeguard measures.

As per the The Associated Chambers of Commerce and Industry of India (ASSOCHAM) report, about 80% of e-waste workers in India suffer from respiratory ailments like breathing difficulties, irritation, coughing and choking due to improper safeguards. With bare hands and no protective facemasks, workers & children are usually among the most exposed to toxic fumes on a daily-basis. Tube lights, motherboards and toner cartridges are burnt on open flames, spewing lead, mercury and cadmium into the air.

Over 1, 60,000 Metric Tons (MT) of municipal solid waste is generated daily in the country. Per capita waste generation in cities varies from 0.2 kg to 0.6 kg per day depending upon the size of the population. This is estimated to increase at 1.33 per cent annually. The total waste quantity generated by 2047 is estimated to be about 260 million tons per year. It is estimated that if the waste is not disposed off in a more systematic & scientific manner, more than 1,400 km^2 of land, which is equivalent to the size of city of Delhi, would be required in the country by the year 2047 for its disposal.

The Indian industrial sector generates an estimated 100 million tons/year of non-hazardous solid wastes, with coal ash from thermal power stations alone accounts for more than 70 million tons/year. Over 8 million tons/year of hazardous waste is generated in India and about 60% of these wastes, i.e., 4.8 million tons/year is estimated to be recyclable and the remaining 3.2 million tons/ year is non-recyclable. In India, approximately 1.5 % of the total e-waste generated is recycled by formal recyclers or institutional processing and recycling, and another 8% of the e-waste generated is rendered useless and goes to landfills.

II. OBJECTIVES AND METHODOLOGY:

The objectives and the research methodology are as follows:

OBJECTIVES OF STUDY:

The study has been geared to achieve the following objectives;

1. To analyse the trends of Electronic Waste in India through a comparison with other parts of world
2. To study the current scenario of E-Waste management in India
3. To construct the suggestions dealing with the challenges and problems of e-waste

RESEARCH METHODOLOGY:

Type of Research: Quantitative and Analytical Research

Data: E-Waste data of India and other Countries & Continents

Data Collection Method: This study has been carried out with the help of secondary data only, all the data has been collected from the various sources such as websites & reports and compiled as said by the need of the study.

Sources of Data Collection: The study is based on the published data. For the purpose of present study, the data was extracted from the various issues ASSOCHAM's Newsletter, Report of ASSOCHAM-KPMG & ASSOCHAM-Sofies-Toxics Link joint study, various journals, newspapers and websites particularly from the Ministry of Electronics & Information Technology, Government of India & ASSOCHAM.

III. E-WASTE AND INDIA

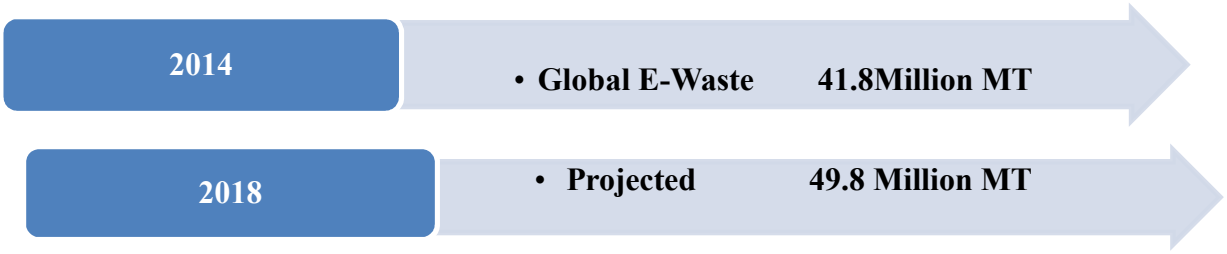
India discarded approximately 1.85 million tonnes of e-waste in 2016 which is about 12 percent to the global e-waste production. India has emerged as fifth largest Electronic waste producer in world. Computer devices account for nearly 70% of e-waste, with the contribution of telecom sector being 12%, medical equipment being 8%, and electric equipments being 7% of the annual

e-waste production. The Government, public sector companies, and private sector companies generate nearly 75% of e- waste; with the contribution of individual household being only 16%. City-wise, Mumbai tops the list in producing electronic waste, followed by New Delhi, Bangalore and Chennai.

INDIA RECYCLES LESS THAN 2% OF E-WASTE

Only 1.5% of electronic waste generated in India is recycled through an `institutional process', as per industry body ASSOCHAM's report. E-waste is growing 30% yearly and set to explode beyond the 1.8 million metric tonnes India generated in 2016, given the rapid penetration of mobiles, computers and other consumer devices. The global quantity of e-waste is expected to touch 49.8 Mt (million tonnes) by 2018 from the current level of 47.8 million tonnes, with an annual growth rate of 4 to 5 %, according to an ASSOCHAM-Sofies-Toxics Link joint study.

IV. GLOBAL E-WASTE IS GROWING:



ASIA	AMERICAS	EUROPE	AFRICA	OCEANIA
16	11.7	11.6	1.9	0.6
Per Capita 3.7 Kg (Per inhabitant)	12.2 Kg	15.6 Kg	1.7 Kg	15.2 Kg

The top three Asian countries with the highest e-waste generation in absolute quantities are China (6.1 Mt), Japan (2.2 Mt) and India (1.8 Mt), reveals the joint study on 'Rethinking Waste-Scaling Opportunity in India' released on 15 September 2017.

ASIAN COUNTRIES WITH HIGHEST E-WASTE GENERATION (million MT):

The biggest e-waste recycling market in India is in Delhi followed by Bengaluru and Chennai. While the informal sector's efficiency in collecting e-waste and its contribution towards resource recovery are laudable, various health and environmental issues are related to informal recycling activities.

Mobile Makes-Up the Chunk of E-Waste:

In 2014, global e-waste would have filled over one million heavy trucks forming a line 23,000 km long.

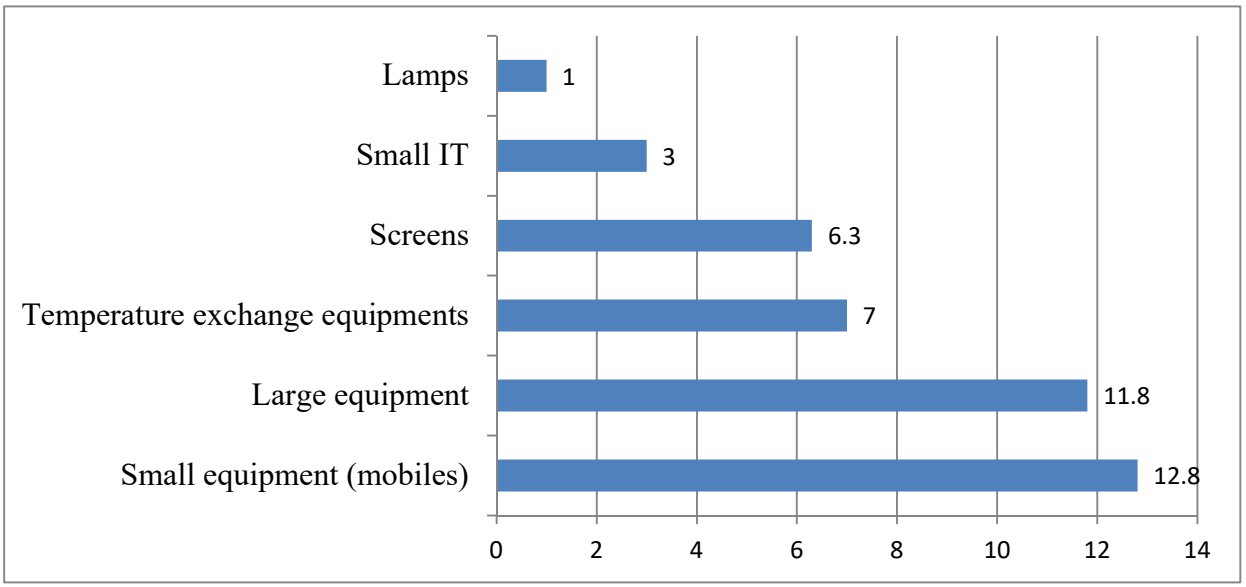


Figure 1: Global e-waste generation by type 2014 (in millions MT)

India Is Not Among 15 Top E-Waste Generators Per Capita:

India is not among 15 top e-waste generators per capita but India is fifth largest producers of e-waste.

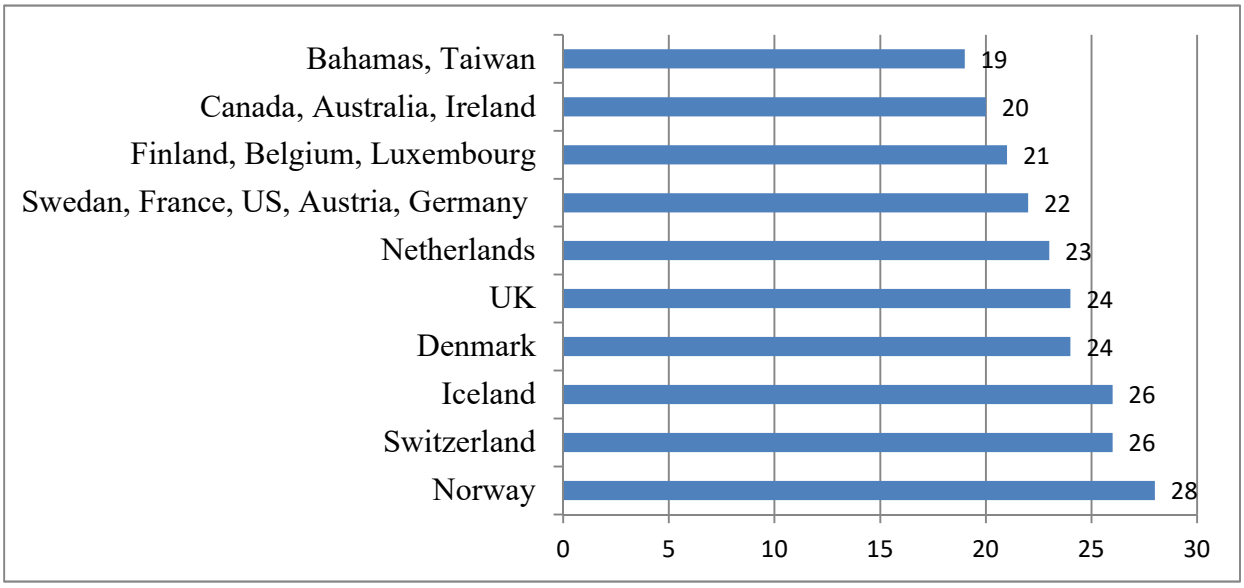


Figure 2: Top e-waste generators per capita (in Kg)

V. TOP 5 E-WASTE GENERATING COUNTRIES IN THE WORLD:

India was ranked as the 5th largest generator of electronic waste in the world. A study conducted The Associated Chambers of Commerce and Industry of India and KPMG in 2016, ranked India among one of the top 5 countries in the world in terms of e-waste generation, with an estimated 1.85 million tonnes generated annually. Globally, the number is an astounding 40-50 million tonnes annually. India accounts for roughly 4 per cent of e-waste generated annually. The United States ranked first in e-waste generation, generating 11.7 million tonnes of e-waste annually whereas China ranked second with 6.1 million tonnes of electronic waste every year.

USA	China	Japan	Germany	India
11.7 Million Tonnes	6.17 Million Tonnes	2.2 Million Tonnes	2.0 Million Tonnes	1.8 Million Tonnes

Figure 3: India is the fifth biggest producer of e-waste in the world

Source: ASSOCHAM-KPMG Report

VI. TOP 3 E-WASTE GENERATING CITIES OF INDIA:

The ASSOCHAM-KPMG study, titled "Electronic Waste Management in India'' identified computer equipment & mobile telephones as the principal e-waste generators in India. According to this study, computers contributed about 70 per cent of the total e-waste generated in India, while telecommunication equipment accounted for 12 per cent. Among the India cities, Mumbai topped the list as it generated an estimated 1, 20,000 tonnes of e-waste annually. Delhi and Bengaluru ranked second and third, with 98,000 and 92,000 tonnes of e-waste generation respectively. State-wise list Maharashtra ranks first in generation of electronic waste, followed Tamil Nadu and Uttar Pradesh.

India is among the top five e-waste generating countries in the world besides China, the US, Japan and Germany. Among states, Maharashtra contributes the largest e-waste of 19.8% but recycles only about 47,810 tonnes per annum (TPA), the report released by Assocham and NEC on ahead of the Environment Day on 5 June 2019.

Tamil Nadu with e-waste contribution of 13% recycled about 52,427 TPA; Uttar Pradesh (10.1%) recycles about 86,130 TPA; West Bengal (9.8%), Delhi (9.5%), Karnataka (8.9%), Gujarat (8.8%) and Madhya Pradesh 7.6%.

The global volume of e-waste is expected to reach 52.2 million tonnes (MT) or 6.8 kg per inhabitant by 2021 from 44.7 MT in 2016 at a compound annual growth rate of 20%.

VIII. INDIA'S E-WASTE FROM OLD MOBILES WILL JUMP 1800 % IN 2020:

By the year 2020 India's e-waste from old mobiles and computers will rise by about 1800 per cent and 500 per cent respectively as compared to the levels in the year 2007, according to an ASSOCHAM-KPMG joint study.

With more than 1.1 billion mobile phones in circulation, nearly 25 per cent end up in e-waste annually. India, which has emerged as the world's second largest mobile market after China, is also the fifth largest producer of e-waste. Telecom equipment alone accounts for 12 per cent of the e-waste, a study by Assocham said.

The country's burgeoning population on mobile phones has seen surprise growth in the last decade. From 310 million subscribers in 2001 to 1.1 billion in 2016, the number of mobile phone users in India is nearly 4 times that of USA today and it is second only to China in the world, which has 1.3 billion mobile subscribers.

China		India		USA	
2001	**2016**	**2001**	**2016**	**2001**	**2016**
150 Million	**1.3 Billion**	**310 Million**	**1.1 Billion**	**120 Million**	**320 Million**

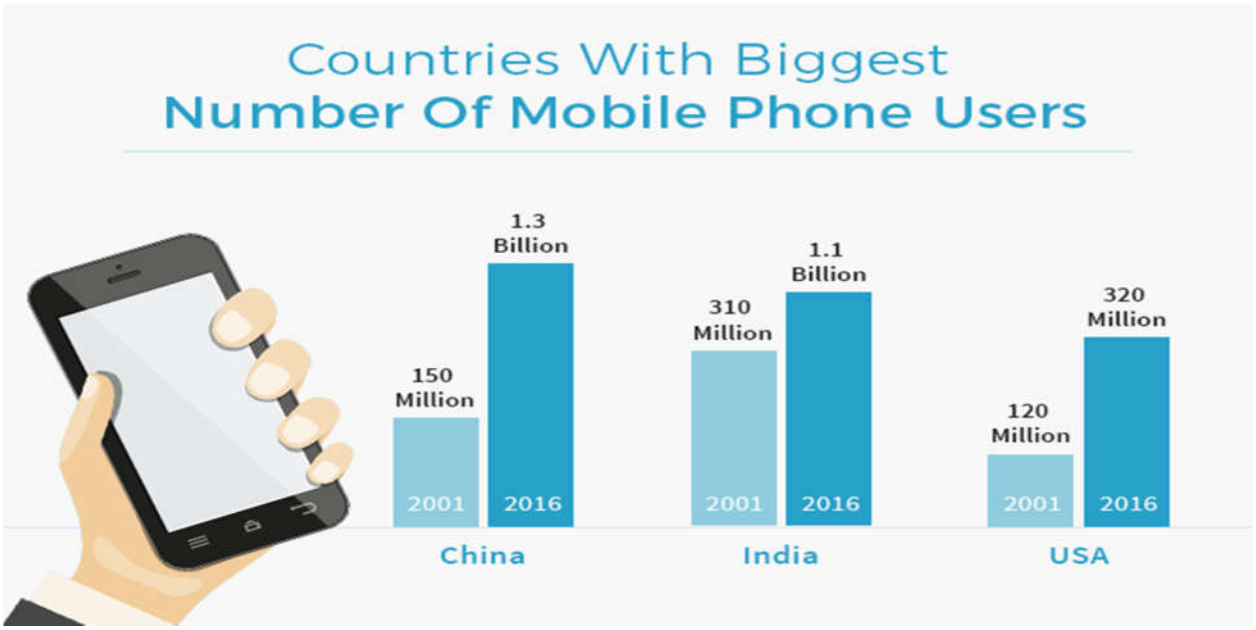


Figure 5: Countries with biggest No. of Mobile Phone Users

Source: ASSOCHAM-KPMG Report

IX. MAJOR CHALLENGES OF WASTE MANAGEMENT IN INDIA ARE:

Major Challenges of waste management in India are as follows;

● Urbanization directly contributes to waste generation, and unscientific waste handling causes health hazards and urban environment degradation

● Waste is scattered widely in every part of the country, making it difficult to collect it from every corner

● Lack of workforce needed for waste collection and processing

● Industries dump their waste in rivers for petty profits which get back into homes of people via water they use

● Financial constraints, institutional weaknesses, improper choice of technology and public apathy towards municipal solid waste

● No polluter pays principle invoked rather we give incentives to treat, NGT and judicial activism adds confusion to legislative and executive decisions

● Rag pickers not properly integrated in the waste management cycle. Rag pickers have to face occupational hazards while collecting, no social security for them

● Corruption leads to not proper installation of dustbins and e-waste collection mechanism

● No proper implementation of punishment provision for defaulters in India

Challenges to Policy makers are:

- Lack of resources at civic bodies, old equipment and technology and societal apathy
- Laws for waste management are very old which need to be aligned with present requirements
- No separate department for waste management in Urban Local Bodies
- To cultivate the feeling of cleanliness in children as well as in citizens through education and awareness programme

X. SUGGESTIONS:

Followings are the important suggestions to deal with the problems of e-waste:-

a. Separate department in urban local bodies:

It is suggested that the government should rework on laws for waste management and creation of separate department in urban local bodies to deal with the e-waste situation is the need of hour.

b. Collaborating with the industry:

Accompanied by the huge size of the population and rising electronics users in the country, managing an unorganised sector to achieve such high targets may not be feasible. Thus, the government may look at collaborating with the industry to draw out formal/standard operating procedures and a phased approach towards the agenda of reducing e-wastes to the lowest.

c. Targets are implemented in a phased manner:

It is suggested that electronic waste collection targets are implemented in a phased manner with the lower and practically achievable target limits. Further, detailed implementation procedures for collection of electronic waste from the market need to be followed.

d. Refer methods adopted by other countries:

Alternatively, the government may also refer methods adopted by other countries for efficient collection and recycling of e-wastes. For example, South Korea, one of the largest producers of electronics managed to recycle 21 per cent of the total 0.8 million tonnes of e-waste that it produced in 2015. Korea recycles all the e-waste that it produces. It has set up the Seoul Resource Centre (SRC) which receives 20 per cent of the Seoul's e-waste for extraction of valuable metals such as gold, copper, etc. The remaining 80 per cent of Seoul's e-waste is used entirely for land filling.

e. Strict vigilance of unorganised sector:

Most importantly the unorganised sector should also be brought under proper supervision and monitoring, so that majority of the e-waste generated could be recycled systematically.

f. Privatization of recycling:

The government may also evaluate privatization of recycling like in the United Kingdom (UK) wherein a private company, Concept governed by the public body, Electrical and Electronic Equipment (WEEE) Directive has been handed over the responsibility of collecting and recycling e-wastes in the UK.

g. Awareness campaign:

There is an urgent need to reach out to the workers of the informal sector, raise awareness about the consequence of improper electronic waste management, and include them as part of the solution to e-waste related issues.

CONCLUSION:

So what, as a consumer, should you do to dispose your e-waste?

Do a thorough search and research about your electronic waste recycler. Choose the one about whom you are sure will treat your e-waste systematically and scientifically. The Central Pollution Control Board (CPCB) has a list of e-waste recyclers operating in India on its website. Do go through it to find a registered agency to dispose your e-waste.

You can also explore the retail options. Many companies have an effective recycling program in all of their stores. Samsung India, for example, encourages its customers for e-waste recycling through its STAR (Samsung Take-back And Recycling) programme. Get in touch with your retailer to know about e-waste disposal.

Last, but not the least, encourage your neighbors to join you and spread the word about educated way of e-waste disposal. Remember, every time you buy an electronic device, it is your responsibility to dispose or recycle your old one properly.

Don’t be so greedy to buy more and more, if you cannot dispose the old one properly. Resolve to be a part of the solution rather than increasing the problem at hand. Help make the earth a better place to live because you owe it to your children.

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