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ELECTRONIC WASTE: A GROWING CHALLENGE IN NIGERIA

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ABSTRACT

In this age, where information is power, one way to ensure advancement is to acquire Information and Communication Technology (ICT), which is a veritable vehicle for development. It is therefore not surprising that in Nigeria, a developing country that is, perhaps more than others, in a hurry to catch up with the developed world, there is massive importation of electronic ICT equipment. The electronics industry, however, is very innovative and has become one of the world's fastest growing manufacturing sectors. As a consequence, large numbers of electronic ICT products become obsolete each year, and constitute electronic waste. This paper discusses this growing problem of electronic waste from the Nigerian perspective, and highlights factors that can militate against the successful management of such waste in Nigeria. Ways of ensuring success are also highlighted, which include the e-waste "treasure hunt" scheme, in order to keep the problem under control and avert the consequences of environmental pollution and degradation.

KEYWORDS: Information Age, electronic equipment, electronic waste, recycling, environmental pollution, waste management.

INTRODUCTION

Electronic waste, or E-waste for short, is a popular, informal name for electronic products nearing the end of their "useful life". Computers, televisions, videocassette recorders, stereos, copiers, and fax machines are common electronic products. Unfortunately, electronic discards (i.e. discarded electronic items) constitute one of the fastest growing segments of any nation's waste stream. This is due to the fact that the electronics industry is very innovative, and has become one of the world's fastest growing manufacturing sectors. As a consequence, large numbers of electronic ICT products become obsolete each year, and constitute waste – electronic waste. E-waste is inevitable because electronic technology is ever advancing. Better and better products are released into the market at such a high rate that existing equipment becomes obsolete in a very short time. The term "e-waste" is, however, loosely applied to consumer and business electronic equipment that is near or at the end of its useful life. There is actually no clear definition, as yet, for e-waste; for instance, it has not been established whether or not items like microwave ovens and other similar "appliances" should be grouped into the category. The major concern about e-waste is that certain components of some electronic products contain materials that render them hazardous, depending on their condition and density. This is worrisome. Meanwhile, in their bid to become more developed, developing countries import these products massively, and end up inheriting the e-waste problem. Nigeria is not left out of this, and has to face up to reality.

The objective of this write-up is to draw attention more closely to the growing problem of electronic waste posed by the misdirected and uncontrolled importation into the country of electronic products that are close to the end of their useful lives. The paper also cites examples of e-waste problems elsewhere, and some of the methods that have been employed to tackle them there, with suggestions on measures to be taken here, which include a method that is considered to be uniquely Nigerian.

E-Waste Problem

The e-waste problem is not peculiar to Nigeria. As a matter of fact, Nigeria is relatively a new-comer to the problem. The developed countries have already been faced, and are still being faced, with the problem. A typical example is the United States of America (USA). According to a report by the Nebraska Department of Environmental Quality (Nebraska, 2001) most households in the USA have at least one television and a computer. Also, according to the same report, most businesses and other organizations use computers, and consider them to be essential to the conduct of business. However, it is obvious that even the latest and greatest television or computer will eventually break down or no longer serve the needs of the owner. It then becomes part of electronic waste, and has to be disposed of. According to the Environmental Protection Agency in the United States, computers are the nation's fastest-growing category of solid waste (http://www.maineenvironment.org). Estimates of the numbers of televisions and computers considered obsolete, unwanted, or unusable every year vary widely. In some cases they have been estimated to be as high as tens of millions. Another estimate (Hileman, 2006) has it that 100 million computers, monitors, and televisions become obsolete each year in the USA alone. The United States National Safety Council estimates that by the year 2007 some 500 million personal computers (PCs) will be rendered obsolete in the USA alone (http://www.maineenvironment.org). However, regardless of the actual numbers, there is no doubt that they are enormous, and this inevitably means an enormous problem.

At best e-waste is a nuisance. The situation, however, is made worse by the fact that some e-waste contains hazardous material, thereby making e-waste a threat to the environment. A major culprit in the hazardous waste arena is the cathode ray tube (CRT), which is present in most computer monitors and televisions. The cathode ray tube is known to contain some quantity of lead and barium. In addition, computers also contain silver, cadmium, mercury, selenium, and hexavalent chromium. Other substances are lead and tin in soldering lead, beryllium alloys in connectors, and bromide in brominated flame retardants used in plastics and circuit boards (Well, 2005), (Hileman, 2006). Computers destined to become obsolete within the next few years are estimated to contain more than 450 million kilograms of lead, over 860,000 kilograms of cadmium, over 540,000 kilograms of chromium, and nearly 182,000 kilograms of mercury (http://www.maineenvironment.org). These are substances that can easily contaminate the environment, especially soil, air, and water, thereby endangering human life.

E-Waste in Nigeria

E-waste in Nigeria arises primarily from the massive importation of ICT products into the country, in a bid to catch up with other countries that are more advanced. At the present

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state of technology infrastructure in the country, manufacturing of ICT products locally is minimal. Just a few companies, such as ABG Electronics in Kaduna, are into local manufacture. Thus the bulk of the products are imported. By October, 2005, it was reported that Lagos was receiving an average of 500 containers of computers a month (Hileman, 2005). The e-waste problem is therefore an acquired problem, and it is not even accompanied by technology transfer. There would be technology transfer if the products were at least being assembled locally, but they are not. They are largely imported as used products, because that way they are much cheaper. The practice of importing used items into the country is well known. Among other names, such goods are called "Belgium". We have "Belgium" televisions, "Belgium" clothing, "Belgium" cars, and virtually "Belgium" everything. A report on e-waste (Well, 2005) asserts that "much of the growth in the IT sector in developing countries has been fueled by the importation of used equipment from rich, developed countries, whose consumers are all too happy to find buyers for them". This assertion applies well to Nigeria, being a developing country. In the case of ICT products, the items are usually near the end of their useful lives. Thus they become waste very rapidly.

In the October 2005 report of the Basel Action Network (BAN), a non-profit group that involves a world-wide network of environmental activists focused on preventing trade in the form of toxic waste, there was a comment on the recycling of electronic waste in Lagos, Nigeria. BAN, which is based in Seattle in the United States, pointed out that exporters of such waste to Nigeria claimed that the shipments were repairable equipment that would help bridge the digital divide between Africa and the industrialized countries. Although Lagos has a workforce with the education and skills to repair electronic equipment, BAN found that three-quarters of the devices were so old or so badly broken that they could not be fixed (Hileman, 2005). The intention may have been good, but the result unfortunately was a dumping of e-waste in the country. Under the Basel Convention, which is part of the United Nations Environmental Programme, it is illegal in Europe to ship un-repairable electronic products to developing countries, but the authorities are not testing the products before export, to see if they can actually be refurbished. The Basel Convention is an international treaty that sets up controls, enforcement mechanisms, and requirements that signatories agree to follow, including preventing and monitoring illegal traffic in hazardous waste, promoting cleaner technologies and production, and focusing specifically on helping developing nations.

According to Elizabeth Grossman of Greenpeace, "Ostensibly sent for resale in Nigeria's rapidly growing market for high-tech electronics, as much as 75 percent of the incoming equipment is unusable. As a result, huge quantities are simply dumped. Photographs taken by BAN in Lagos show scrapped electronics lying in wetlands, along roadsides, being examined by curious children and burning in uncontained landfills. Seared, broken monitors and CPUs are nested in weeds, serving as perches for lizards, chickens and goats. One mound of computer junk towers at least 1.8 metres high" (Grossman, 2006). Certainly there are legitimate charities that send working machines to those who need them, as observed by Adam Lincoln of the Economist Intelligence Unit. He, however, added: "but there isn't a governmental check that computers still have life in them before they are loaded onto container ships. The impact of such oversight is felt in places like Lagos, where there is a vibrant market for repairing and refurbishing old computers, mobile phones, televisions, and other electronic goods. Local experts quoted in the BAN report said as much as 75% of the imports that arrive in Africa's largest port – some 400,000 computers and monitors each month – are not economically repairable and are being discarded and often burned. According to the report, 45% of the 'junk' that is shipped to Lagos is from the United States, 45% from Europe, and the other 10% from Japan and Israel. Yet all of these countries are signatories to the Basel Convention, which forbids countries from exporting hazardous waste, including electronics" (Lincoln, 2006).

It is obvious, therefore, that e-waste has the tendency to grow rapidly in Nigeria. Strategies to dispose of this waste do not, however, appear to be very obvious. They do not seem to match the severity of the problem. There are laws in the country concerning waste management, but do they specifically address e-waste? Even if they do, are they obeyed? It does not seem so. Evidence abounds to show that e-waste is not yet properly disposed of in Nigeria. A walk through the streets of any major town in Nigeria would reveal heaps of un-repairable electronic equipment by the sides of electronic repair workshops. The Basel Action Network in its report also pointed out that much of the equipment that is exported to Nigeria is simply strewn along rivers and roads or burned in large piles without any attempt to recover useful materials (http://www.ban.org). The same report has it that "in Nigeria, they would just routinely set ablaze the plastic carcasses of computers and televisions." These observations clearly do not suggest a proper management of the waste. Rather, they paint a gloomy picture of the magnitude of the e-waste problem in the country. Perhaps not enough awareness exists of the hazards that can be caused by improper disposal of these wastes.

Management of E-Waste

In the developed countries where the problem originated, strategies have been devised for the management of e-waste. Such strategies include:

(a) Computer equipment "take-back" programme, in which equipment manufacturers offer to take back obsolete equipments.

(b) Recycling, in which reusable resources such as gold, silver, platinum, copper, aluminium and shredded plastic are recovered. According to a report by the International Association of Electronics Recyclers, recycling in the USA produced about 400 million kilograms of usable materials out of 680 million kilograms of waste in 2003 (Hileman, 2005).

(c) Refurbishing, in which obsolete or unwanted electronic equipment is refurbished and put back to use.

Nigeria could follow the example of these countries and apply similar measures. We do not need to wait until the problem gets as bad as it is in the developed world before we start to tackle it with sufficient seriousness. We should actually learn from their mistakes and start early. The thing to do is not to stop importation of electronic products. Although that could end the e-waste problem totally, it would be decidedly counter-productive. Rather, measures should be taken to keep the problem under control. The following should help:

(1) Massive awareness campaign, to enlighten the populace on the dangers of improper management of waste in general, and toxic electronic waste in particular, should be embarked upon by the authorities. When it concerns electronic discards, the public should be encouraged to "Reduce, Reuse, and Recycle" – reduce the generation of e-waste through wise procurement and good maintenance, reuse still functioning electronic equipment by donating or selling to someone who can still use it, and recycle those components that cannot be repaired.

(2) Enforcement of legislation to control the disposal of electronic waste. It is not enough to simply make laws; they should be enforced. The watchdog on environmental issues in Nigeria is the Federal Environmental Protection Agency (FEPA) which is vested with all the legal instruments to tackle illegal shipment of toxic wastes, chemicals (pesticides), and contraband chlorofluorohydrocarbons.

(3) Take-back schemes should not only be encouraged but should be made attractive. Manufacturer take back programmes shift the responsibility for collection and recycling away from tax payers and

governments, and provide incentives for companies to develop products that are more durable, recyclable and less toxic. In Europe, for example, members of the European Union (EU) have started to implement a directive, enacted in 2002, and called the Waste Electrical and Electronic Equipment Directive, which requires retailers and manufacturers to take back electronic products at the end of their useful lives (http://www.pubs.acs.org).

(4) Just as in the case of the automobile industry, where limits are set on harmful gas emission, limits should be set on the levels of toxic materials allowed in electronic products. A similar action has already been taken by the European Union. In 2003, the European Union passed a law setting standards for toxic materials in new electronic equipment. The directive puts strict limits on lead, mercury, cadmium, hexavalent chromium, and polybrominated bipheryls used as flame retardants (http://www.pubs.acs.org).

Treasure Hunt

The above measures have been applied elsewhere, and can also work here in Nigeria. However, the extent of their success if applied here is somehow doubtful. This is because of the peculiar situation in Nigeria where even the best of schemes gets manipulated and undermined, and nothing ever seems to work. An approach that is adaptable to the Nigerian situation is therefore called for. We could call this the "E-Waste Treasure Hunt". In this approach the large numbers of unemployed persons in the country are encouraged to collect (treasure hunt) discarded electronic equipment and submit them at collection centres. They are induced with handsome payments for each item turned in at the collection centre. From the collection centre the items are transported to points designated by the Federal Environmental Protection Agency for that purpose. Each town in the country should have at least one such point, which we may call FEPA Depot. Waste processing experts then collect the items from the FEPA depot and take them to the waste processing plant. The steps in this scheme can be outlined as follows:

(i) "Treasure hunters" collect discarded electronic equipment from the streets, homes, offices, etc., submit them at a collection centre, and get paid appropriately on the spot

(ii) The electronic discards are transported to FEPA "depots" in batches from the collection centres.

(iii) Accumulated electronic discards are moved from FEPA depots and are submitted to waste processing plants for expert handling and processing.

(iv) Treated waste at the plant is then disposed of properly and professionally.

The organization of the scheme is illustrated in Fig. 1.

The e-waste treasure hunt approach can work because everybody would like to make some money. If the pay is right, discarded electronic items would turn up at the collection centres at a steady rate. Key to the success of the scheme is the cash reward the "treasure hunters" receive on submitting an item to the collection centre. If properly handled the scheme is capable of reducing general unemployment and, in particular, ridding the environment of discarded electronic equipment. The environment would be, to that extent, cleaner and healthier.

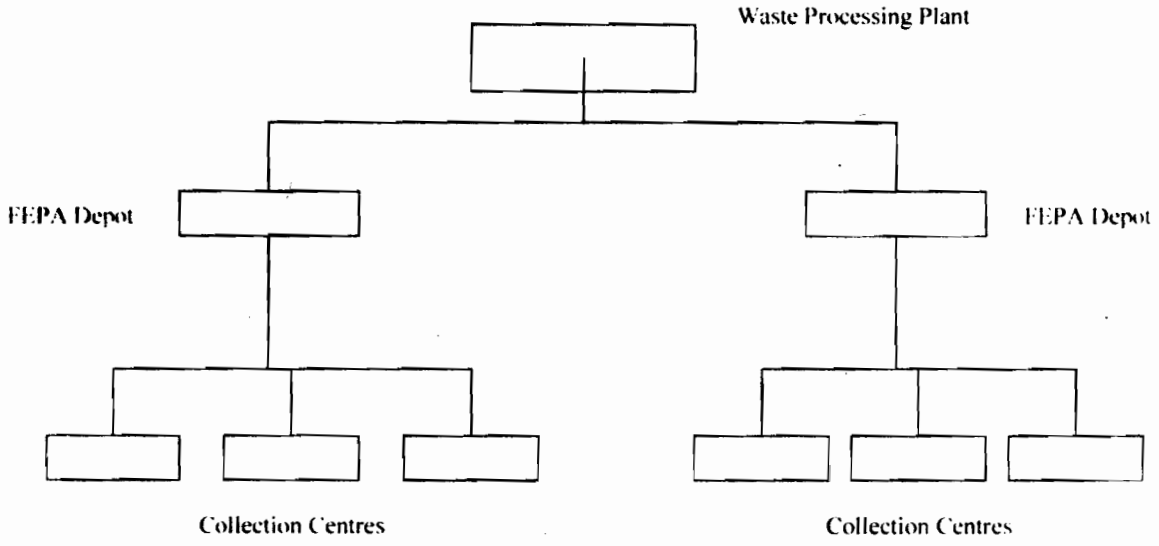

Fig. 1: The E-Waste "Treasure Hunt" Scheme

CONCLUSION

The electronic waste problem is real in Nigeria, and has the tendency to become worse in a relatively short time, given the rate of electronic products importation and the condition of the imported products. There is at the moment insufficient public awareness of the problem, so little or nothing is being done to contain it. This trend should not be allowed to continue. The problem is not only an environmental one, it is also an engineering problem. Engineers should therefore take up the challenge, and join hands with other stakeholders to bring the situation under control. The e-waste "treasure hunt" approach can bring about the desired change.

RECOMMENDATION

The Nigerian Society of Engineers (NSE), the Nigeria Computer Society (NCS), and Faculties of Engineering, among other stakeholders, should get together with the Federal Environmental Protection Agency (FEPA) to get a grip on the e-waste situation, so that it does not get out of hand. The e-waste treasure hunt approach is recommended.

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