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MORALITY BEFORE KNOWLEDGE

Understanding the global e-waste crisis

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ABSTRACT

Background: The escalation of the global e-waste crisis presents profound environmental and public health concerns stemming from the inadequate management of discarded electrical and electronic devices. **Methods:** This paper provides an in-depth examination of the causative factors, ramifications, and potential remedial measures associated with this burgeoning issue. **Findings:** It delineates the impacts of rapid technological advancements, planned obsolescence strategies, and the dearth of public awareness on the exponential growth of e-waste. Furthermore, the paper elucidates solutions such as heightened public awareness campaigns, the implementation of remanufacturing protocols, and the enactment of regulatory frameworks mandating responsible disposal practices. **Conclusiom:** Emphasizing the imperative for enhanced e-waste management strategies, the paper advocates for concerted efforts across governmental, corporate, and societal domains to mitigate the adverse repercussions on both environmental sustainability and human well-being. Through rigorous interdisciplinary collaboration and proactive intervention, effective strategies can be formulated to alleviate the e-waste crisis and fortify global environmental resilience.

KEYWORDS: environmental sustainability; e-waste management; technological obsolescence.

1. Introduction

The increasing global e-waste crisis poses significant concerns for both the environment and public health. E-waste encompasses discarded electrical and electronic devices such as computers, cell phones, and televisions, which have reached the end of their useful lifespan. With the proliferation of technology worldwide, there has been an exponential rise in e-waste generation. Regrettably, a considerable portion of this waste is improperly disposed of in landfills or illegally exported to developing nations, resulting in severe environmental and health implications. This paper aims to examine the factors contributing to the global e-waste crisis, its consequential effects, and propose potential solutions to mitigate this pressing issue.

E-waste encompasses a broad spectrum of electrical and electronic equipment (EEE) that has been discarded, donated, or disposed of by its owner, with no intention of reuse. This category includes devices such as computers, laptops, tablets, mobile phones, televisions, and printers, along with their accompanying components and materials like circuit boards, batteries, plastics, and metals. Referred to as WEEE (Waste Electrical and Electronic Equipment) or e-scrap in various contexts, e-waste encompasses virtually any household or business item containing electrical circuits or components powered by a battery or power supply.

The escalating global e-waste crisis represents a significant environmental concern primarily stemming from the inadequate disposal of electronic waste (e-waste). E-waste comprises any abandoned electrical or electronic device, ranging from computers and cell phones to televisions and other household appliances.

The rapid advancement and increasing accessibility of technology have resulted in a substantial surge in e-waste production. This surge has precipitated a global crisis due to the presence of hazardous materials within e-waste, posing risks to both human health and the environment if not appropriately managed. Compounding the issue, many countries lack the necessary infrastructure to effectively handle and recycle e-waste. Consequently, a significant portion of e-waste finds its way into landfills or is illicitly exported to developing nations, where it often undergoes harmful disposal practices such as burning or dumping into water bodies. These practices have led to heightened levels of air pollution, water contamination, and soil degradation. Urgent action is imperative to address the global e-waste crisis and safeguard human health and environmental integrity.

One of the negative impacts of electronic waste is that cell phone waste produces environmental pollution when large amounts of cell phone open burning are carried out, as has happened in developed countries (Astuti, 2013).

2. Methods

2.1 Causes of the global e-waste crisis

Annually, millions of tons of e-waste are produced, with the majority failing to undergo proper recycling or disposal procedures, resulting in severe repercussions for human health and the environment. This crisis is compounded by several contributing factors, notably rapid technological advancements, a global deficiency in awareness, and inadequate recycling infrastructure.

2.1.1 Rapid Technological Advancement

The rapid advancement of technology has seen many consumers and businesses replacing their devices with newer, more advanced models. This has left millions of outdated electronics accumulating in the environment.
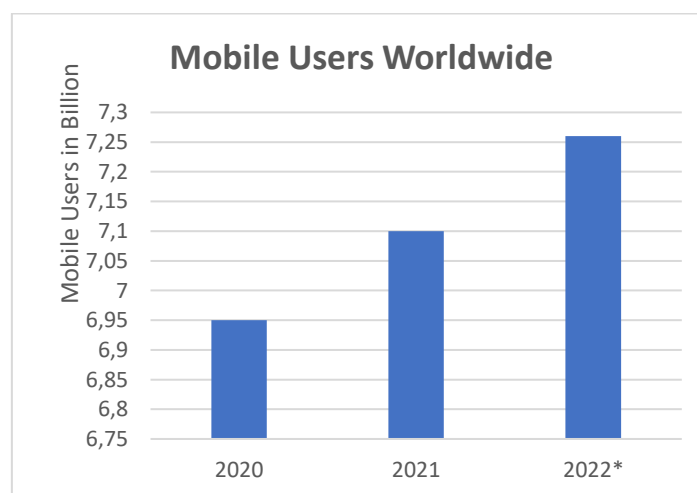

Fig 1. The number of mobile users worldwide
(Taylor, 2023)

It can be seen from the chart above that every year mobile phone users are increasing globally. The increased use of mobile devices has led to an increase in e-waste. As mobile

devices become more advanced and new features are added, consumers frequently upgrade their devices, leading to an increase in discarded devices.

2.1.2 Planned Obsolescence

Planned obsolescence is a type of obsolescence in which a product or technology becomes outdated due to rapid changes in its field. Planned obsolescence occurs when technology advances so quickly that products become outdated after a short period of use, or when new products or services offer features or capabilities that make older versions obsolete.

Planned obsolescence was originally used by the CEO of General Motors, namely Alfred P. Sloan Jr. in 1924 (Babaian, 1998).

Can be exemplified as technological advances in smart phones. Via smart phone. This technology is an application of the principles of revolution 4.0, such as cyber physical systems, internet of service and internet of things. This principle forms the integration of humans and the internet in facilitating all lines of life.

This dynamic fosters economic growth alongside technological progress. Numerous electronic product manufacturers vie for market dominance by promoting technological superiority, such as higher camera pixels, faster processors, sharper image quality, and greater memory capacities. Consequently, consumers are incentivized to adopt a more consumptive behavior, driven by the perception of enhanced product features touted by manufacturers. However, the proliferation of electronic products has led to a surge in global e-waste, underscoring the unintended consequences of technological advancement.

2.1.3. Lack of Public Awareness

According to (Wasista, 2020)public awareness and active participation in a society are important for the success E-waste management. Some society may not understanding how the awareness level effects the disposal behavior and sustainable management of E-waste in particular country or community.

As an example in a household, many household chores unknowingly generate e-waste, such as washing clothes using a washing machine, using a refrigerator or just watching television. This is done almost every day in every house. The amount of e-waste that is generated is not balanced with proper e-waste management so that e-waste will continue to be generated without recycling or further management.

2.2. Solutions to the Global E-Waste Crisis

2.2.1 Increase public awareness

Raising public awareness about the dangers of e-waste, its impact on the environment, and ways to responsibly dispose of it is an essential way of combating the global e-waste crisis. This can be done through creating educational programs and campaigns that inform people about the dangers of e-waste and promote responsible disposal habits. Additionally, governments and businesses can partner to create collection and recycling programs that make it easier for people to responsibly dispose of their electronic waste.

2.2.2 Remanufacturing

Remanufacturing is the process of rebuilding an existing product to its original quality and performance standards. The process typically involves disassembly, cleaning, inspection, replacement of worn or damaged parts, and testing (Lund, 1984). The advantage of implementing the remanufacturing process is increasing the efficiency of material use and energy consumption, thus directly contributing to efforts to save energy

and reduce waste (King, 2006). Environmental and economic advantages make remanufacturing an important strategy.

Remanufacturing is different from recycling, especially in terms of managing products that have become waste. The remanufacturing process is also classified as a product recovery strategy, while recycling is a strategy for material recovery. therefore a remanufacturing strategy bridges the gap between environmental benefits and effective use of assets.

Remanufacturing e-waste involves taking used electronic devices and components, disassembling them, testing and repairing the components, and then reassembling them into refurbished products that are either as good as new or better than before. This process helps to reduce electronic waste by extending the life of the product and helping to reduce the need for new products. It also helps to reduce the cost of ownership for consumers by providing them with a cheaper alternative to buying new products.

3. Results and Discussion

The swift progression of technology has significantly influenced the quantity of e-waste produced globally. With each technological advancement, an increasing number of electronic devices become obsolete and are subsequently discarded. Consequently, this trend has contributed to a burgeoning environmental dilemma, given that e-waste often harbors hazardous materials detrimental to the environment if not disposed of in a proper manner.

The most efficient approach to mitigate the generation of e-waste is to promote the reuse and recycling of electronic devices among individuals. Encouraging people to donate their old devices to charities or organizations that refurbish and redistribute them to those in need can be incentivized. Moreover, governments can enact regulations mandating manufacturers to assume responsibility for the disposal of their products, further bolstering efforts to reduce e-waste accumulation.

The findings of this study underscore the necessity for enhanced management of e-waste. Given that a significant proportion of e-waste originates from households, it is evident that individuals require better education regarding the appropriate disposal of their electronic devices. Furthermore, businesses, governmental bodies, and educational institutions must implement measures to ensure the proper handling of their e-waste, thereby preventing its disposal in landfills or through incineration. Lastly, further research is imperative to identify the most effective methodologies for managing e-waste comprehensively.

4. Conclusions

The escalating e-waste crisis represents a burgeoning global issue with substantial implications for both environment and human health. The annual production of electronic waste is on a distressing upswing, with estimates indicating that as much as 50 million metric tons are generated each year. This waste is laden with an array of hazardous materials, encompassing heavy metals, flame retardants, and other toxic chemicals. Inadequate disposal practices of e-waste pose a significant risk, as they can result in the release of these harmful substances into the environment, contributing to air, water, and soil pollution.

Fortunately, there are a variety of potential solutions to the e-waste crisis. Governments can create regulations that require manufacturers to take responsibility for the disposal of their products. Consumers can also play an important role by recycling their old electronics and purchasing products with longer lifespans. Additionally, businesses can adopt green practices, such as extending product warranties and offering take-back programs. Finally, technology can be used to create innovative solutions, such as the development of new materials that are easier to recycle. By implementing these

solutions, we can reduce the amount of e-waste generated and help protect our environment and human health.

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