



Understanding the global e-waste crisis

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ABSTRACT

Background: Electronic waste is a global issue affecting all mankind. This research aims to provide an understanding of electronic waste, including its problems, causes, and what humans can do to address it. **Methods:** This study employs a literature review to discuss the topic. **Finding:** The rapid advancement of technology has had a major impact on the amount of e-waste generated worldwide. The most effective way to reduce the amount of e-waste generated is to encourage people to reuse and recycle their electronic devices. The results of this study demonstrate the need for better management of e-waste. **Conclusion:** The e-waste crisis is a growing global problem that is having a significant impact on the environment and human health. 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. By implementing these solutions, we can reduce the amount of e-waste generated and help protect our environment and human health.

KEYWORDS: crisis; electronic waste; global issue.

1. Introduction

The global e-waste crisis is a growing environmental and public health concern. Electronic waste, or e-waste, is any discarded electrical or electronic device that has reached the end of its useful life. This includes computers, cell phones, televisions, and other consumer electronics. As technology advances and becomes more accessible to people around the world, the amount of e-waste generated is increasing exponentially. Unfortunately, much of this waste ends up in landfills or is illegally exported to developing countries where it can cause serious environmental and health problems. This paper will explore the causes and effects of the global e-waste crisis and discuss potential solutions for addressing this growing problem.

E-waste is defined as any item of electrical or electronic equipment (EEE) that has been discarded, donated, or otherwise disposed of by its owner. This includes items such as computers, laptops, tablets, mobile phones, televisions, printers, and other consumer electronics. E-waste also includes components and materials from these items such as circuit boards, batteries, plastics, and metals. Electronic waste, or e-waste, refers to all items electrical and electronic equipment (EEE) and others a part that has been disposed of by its owner as waste with no intention of reuse. E-waste is also known as WEEE (Waste Electrical and Electronic Equipment), electronics waste or e-scrap in various areas and

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below different circumstances in the world. It includes a wide range of products – almost any household or business items with electrical circuits or components with power supply or battery.

The global e-waste crisis is a growing environmental issue that is caused by the improper disposal of electronic waste (e-waste). E-waste includes any discarded electrical or electronic device, such as computers, cell phones, televisions, and other household appliances. As technology advances and becomes more accessible, the amount of e-waste produced has increased dramatically. This has created a global crisis as e-waste contains hazardous materials that can be harmful to both human health and the environment if not disposed of properly. In addition, many countries lack the infrastructure to properly manage and recycle e-waste. As a result, much of this waste ends up in landfills or is illegally exported to developing countries where it is often burned or dumped in rivers and oceans. This has led to an increase in air pollution, water contamination, and soil degradation. The global e-waste crisis is an urgent issue that needs to be addressed to protect human health and the environment.

One of the negative impacts of e-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

This research was conducted using the literature review method. The author gathered various literature related to electronic waste. The literature provided various theories or concepts that can be referenced to explain the issues being discussed.

3. Literature Review

3.1 Causes of the global e-waste crisis

Every year, millions of tons of e-waste are generated, and the majority of it is not recycled or disposed of properly, leading to devastating effects on human health and the environment. This crisis is fueled by a combination of factors, including a rapid technological advancement, global lack of awareness, and poor recycling infrastructure.

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. This following Figure 1 shows the mobile users in the world.

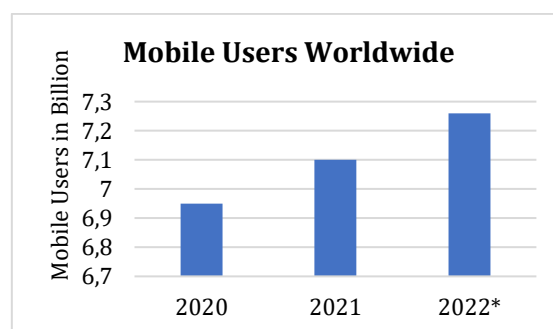


Fig. 1. Mobile users worldwide
(Statista)

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. 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 opportunity builds the economic climate along with technological advances. Many electronic product vendors are competing to claim that technology is their superior selling point in market competition. Some examples are camera pixels, processor speed, image clarity, and large memory sizes. The impact is that many consumers become very consumptive, because of the perception that is formed from the superiority of electronic products offered by manufacturers. However, the development of electronic products has had an impact in the form of an increase in electronic waste (e-waste) globally.

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.

3.2 Solutions to the global e-waste crisis

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 electro.

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 et al., 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 (Reynolds et al., 2019).

4. Results and Discussion

The rapid advancement of technology has had a major impact on the amount of e-waste generated worldwide. As technology continues to evolve, more and more electronic devices become obsolete and are discarded. This has created a growing environmental problem, as e-waste contains hazardous materials that can be damaging to the environment if not disposed of properly.

The most effective way to reduce the amount of e-waste generated is to encourage people to reuse and recycle their electronic devices. This can be done by providing incentives for people to donate their old devices to charities or organizations that can refurbish them and redistribute them to those in need. Additionally, governments can also create regulations that require manufacturers to take responsibility for the disposal of their products.

The results of this study demonstrate the need for better management of e-waste. The majority of e-waste is generated by households, which indicates that individuals need to be better educated about the proper disposal of their electronic devices. Additionally, businesses, government, and educational institutions need to take steps to ensure that their e-waste is handling properly instead of being sent to landfills or burn. Finally, more research needs to be done to determine the most effective methods for managing e-waste.

5. Conclusion

The e-waste crisis is a growing global problem that is having a significant impact on the environment and human health. The amount of electronic waste produced each year is increasing at an alarming rate, with estimates suggesting that up to 50 million metric tons of e-waste are generated annually. This waste contains a variety of hazardous materials, including heavy metals, flame retardants, and other toxic chemicals. The improper disposal of e-waste can lead to the release of these hazardous materials into the environment, where they can cause 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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References

- Astuti, W. (2013). Dampak Kandungan Logam Berat dalam Sampah Elektronik. *Majalah Ilmiah Universitas Pandanaran*, 11(25), 4-5. <https://jurnal.unpand.ac.id/index.php/dinsain/article/view/145>.
- Babaian, S. (1998). *The Most Benevolent Machine: A Historical Assessment of Cycles in Canada*. National Museum of Science and Technology.
- King, A.M., Burgess, S.C., Ijomah, W., & McMahon, C.A. (2006). Reducing Waste: Repair, Recondition, Remanufacture or Recycle. *Sustainable Development*, 14(4), 257-267. <https://doi.org/10.1002/sd.271>.
- Lund, R. T. (1984). *Remanufacturing: The experience of the United States and implications for developing countries*. [UNDP Project Management Report Number 2]. The World Bank.
- Reynolds, L. P., Borowicz, P. P., Caton, J. S., Crouse, M. S., Dahlen, C. R., & Ward, A. K. (2019). *Developmental Programming of Fetal Growth and Development. The Veterinary clinics of North America. Food animal practice*, 35(2), 229-247. <https://doi.org/10.1016/j.cvfa.2019.02.006>.

Wasista, I. P. (2020). Isu Keusangan Terencana dan Sampah Elektronik dalam Revolusi Industri 4.0. *Senada (Seminar Nasional Desain dan Arsitektur)*, 361-368. <https://eprosiding.idbbali.ac.id/index.php/senada/article/view/273>.

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