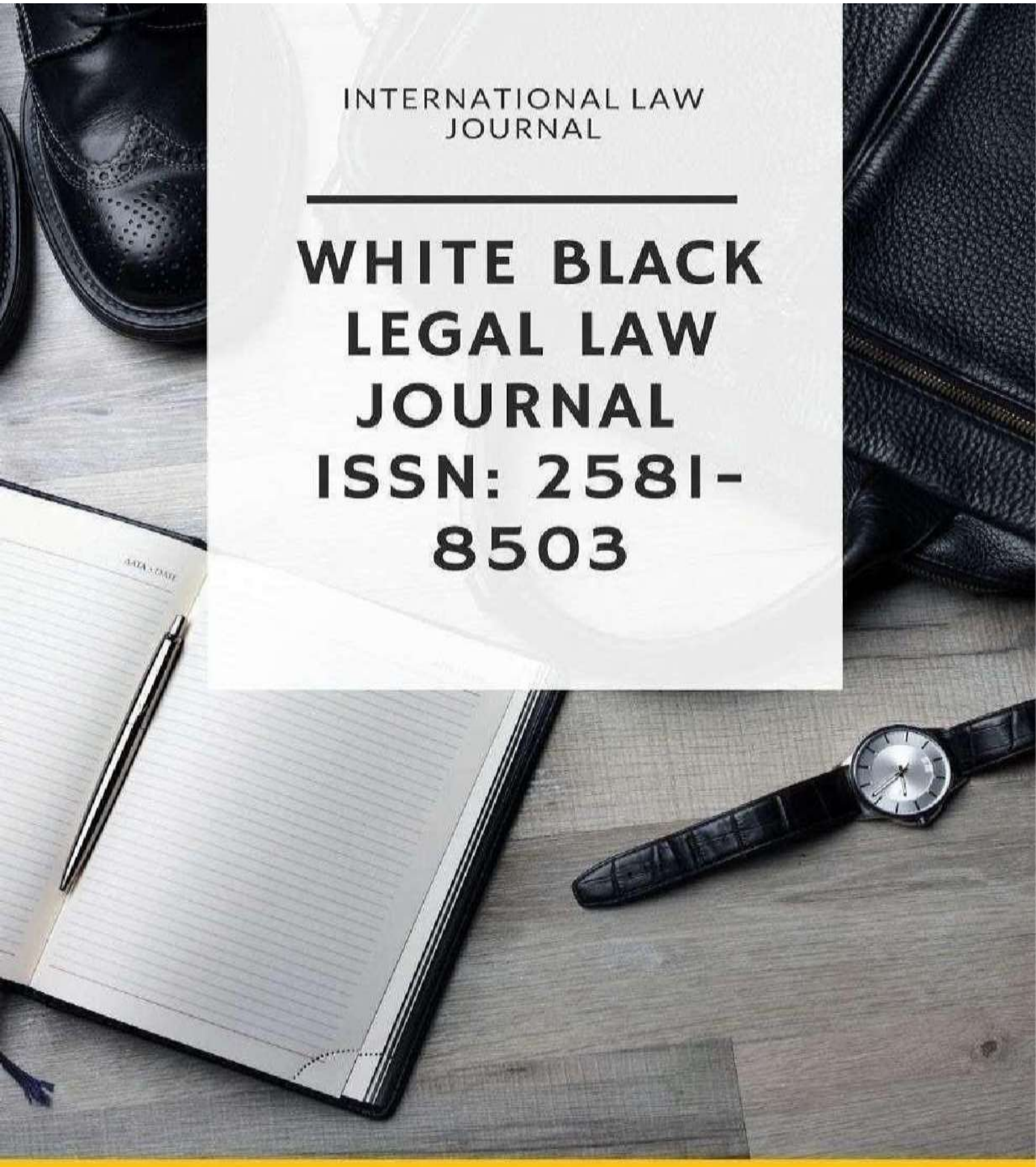

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WHITE BLACK LEGAL is an open access, peer-reviewed and refereed journal providededicated to express views on topical legal issues, thereby generating a cross current of ideas on emerging matters. This platform shall also ignite the initiative and desire of young law students to contribute in the field of law. The erudite response of legal luminaries shall be solicited to enable readers to explore challenges that lie before law makers, lawyers and the society at large, in the event of the ever changing social, economic and technological scenario.

With this thought, we hereby present to you

ENVIRONMENTAL IMPACTS OF E-WASTE MANAGEMENT AND EXTENDED PRODUCER RESPONSIBILITY

AUTHORED BY - MS. JAYA PRIYA S
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Abstract:

The growing issue of electronic trash, or "e-waste," is caused by a number of complex combinations. The improper treatment of e-waste is caused by a number of factors, including low public awareness, a lack of specialized infrastructure for processing, a lack of technical knowledge for correct handling, and a lack of funding for long-term solutions. This essay explores a number of tactics to counteract this emerging danger. Implementing appropriate recycling techniques is one important strategy. Hazardous substances like lead and mercury coexist with valuable elements like precious metals in e-waste. While reducing the hazards to the environment and human health associated with inappropriate disposal, responsible recycling procedures can recover these priceless materials for use in new products. It is crucial to set up explicit procedures and enforce current environmental laws. There are two sides to technology's impact on the environment. However, a lot of energy and resources are used in their production procedures. Furthermore, these devices contribute to the ever-expanding pile of electronic garbage when they become outdated and are carelessly thrown. Technology has an impact on the environment that goes beyond energy use and inappropriate disposal. Globalization is driving rapid technology advancement, which is a global contentious issue. Technology has a positive impact on the environment, but these benefits are indisputable. The following paper will go deeper into the complex discussion surrounding the responsible creation and application of emerging technology. It will look at possible remedies that support eco-friendly and sustainable behaviors at every stage of the technology life cycle, from usage and disposal to design and manufacture.

Keywords: E-Waste, Recycling, Disposal, Technical skills, Environment, eco-friendly

Introduction:

Since the beginning of human beings existence on this planet, we have always relied on technology to aid us with daily duties and enhance the quality of our lives. Numerous technological devices are used by billions of people. Thus, the production of a large amount of e-waste is inevitable. Developed nations discard over 30- 40 billion tons of e-waste annually[1]. The World Health Organization (WHO) has issued a warning that there is a sharp increase in e-waste worldwide. But technology has advanced more quickly than ever in the last 200 years alone. There is electronic garbage in our businesses and homes. Global e-waste production reached over 57.1 tons in 2021. Anything electronic, from a fridge to a cell phone, is considered E waste. Our health is impacted by depleting planet reserves as well. In India, just 11% of the millions of e-waste created are recycled. "Reuse, Recycle, and Restore" are the three ways we can manage our electronic waste. Refrain from making needless upgrades. Scanners and copiers, televisions, audio/video equipment, cell phones, monitors, laptops, personal electronic devices, mice, keyboards, and other electronic gadgets are some of the various sorts of e-waste found in technology. Since we now consider these peripheral pieces to be a necessary part of life, we usually replace them when they break, turning the old one into e-waste. Any electrical gadget has an average life of two years. It becomes customary to purchase a new device and discard the old one rather than maintaining or updating an outdated one. Old devices need to be recycled or resold. If this isn't done, the landfill will fill up. As per the study during the year of 2021 -2022, 5, 27,131.57 tons of E-waste [2]has been recycled.

E-waste Definitions:

E-waste is defined as waste generated from used electronic devices and household appliances which are not fit for their originally intended use and are destined for recovery, recycling and disposal. Generally, E-waste comprises of old, end-of-life electronic appliances such as computers, laptops, TVs, DVD players, refrigerators, freezers, mobile phones, MP3 players, etc., which have been disposed of by their original users.[3]

MoEF&CC (2011) defines E-waste as "waste electrical and electronic equipment, whole or in part or rejects from their manufacturing and repair process, which are expected to be discarded". Though Electrical and electronic equipment has been characterized as "equipment which is subject to electrical flows or electromagnetic fields to be completely useful".

According to European Union (EU) means equipment which is dependent on electrical currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such current and fields designed for use with a voltage rating not exceeding 1000

[1] Nele D' Haese et al., A Multidimensional Indication set to assess the benefits of WEEE Material recycling, J Clear Product., 305-316, (2014)

[2] https://pib.gov.in/PressReleasePage.aspx?PRID=1986201

[3] CPCB (Central Pollution Control Board, India) Guidelines, 2008

volts for alternating current and 1500 volts for direct current. Waste is any substance or object which the holder disposes of, or is required to dispose of pursuant, to the provision of National law in Force.[4]

Types of Electrical and Electronic Wastes

Household Appliances such as freezers, fans, exhaust ventilation, air conditioning, washing machines, Dishwashers, dryers, microwaves, and heating, ventilation, and air conditioning units, Vacuum cleaners, additional cleaners, toasters, fryers, pressing irons, grinders, hair care tools, clocks, watches and textile appliances for sewing, knitting and weaving etc.

Office Use Appliances such as Telephones, fax, telex equipment, photocopiers, typewriters, PCs desktop, notebooks, laptops, microcomputers, printers, mainframes.

Audio and Video Appliances such as: TVs and radios[5], Hi-Fi recorders, audio amplifiers, video cameras and decoders, and musical instruments.

Light and other Equipment such as fluorescent light fixtures, low pressure sodium lights, saws, drills, sewing machines, equipment for turning, milling, sanding, sawing, cutting, shearing, drilling, punching, folding, and bending, riveting, nailing, and screwing tools, welding and soldering tools, spraying, spreading, and dispersing tools.

Medical Equipment such as, Equipment for fertility testing, respirators, analyzers, freezers, radiation, cardiology, dialysis, and identifying, preventing, monitoring, treating, or lessening disease, damage, or handicap.

E- Waste Regulations:

The basic raw resources are available in India. All abiotic and non-renewable materials used in India make up 97% of the total materials that are removed domestically. The materials used in the production process determine how many resources are used. Reducing the amount of primary materials used and improving waste-reducing production processes are directly linked to increased resource efficiency. In this method, the environmental load would be reduced. The design phase is the most crucial to minimizing material use and waste production. While valuing the strategic substance of a product is crucial to enhancing resource recovery potentials from this stage itself, the National Design Policy (2007) does not focus on the need to improve resource efficiency and secondary resource management For a social effect analysis of e-waste management, four sub-sectors collection, refurbishment, material recovery primarily for reuse, recycling, and final disposal can be taken into account. Recyclable waste is evaluated as a

[4] Adediran Y.A. and Abdulkarim A. (2012) "Challenges of Electronic Waste Management in Nigeria" International Journal of Advances in Engineering and Technology, Vol.4, July 2012, PP.640-648

[5] Deepak Pant, E-waste projection using life-span and population statistics, 18 Int'l J. Life Cycle Assessment 1465 (2013).

resource and a potential source of revenue.[6] Reusing the precious resources found in e-waste to create new products would prevent the depletion of virgin materials from the environment and lessen the pollution produced during their production.

The 2011 E-Waste (Management & Handling) Rules were announced in 2011. However, in supersession of the E-Waste (Management and Handling) Rules, 2011, the Ministry of Environment, Forests, and Climate Change (MoEF&CC), Government of India, has informed the E-Waste (Management) Rules, 2016, which is being applied from 01-10-2016. This is done in order to improve the e-waste regulations and to clearly define the part of producers in EPR. The producers, consumers, bulk consumers, collection centers, dismantlers, and recyclers of e-waste engaged in the production, sale, procurement, and processing of electrical and electronic equipment or components listed in schedule I of these Rules (MoEF&CC 2016) are all subject to these regulations.

The E-Waste (Management) Rules, 2016 have been completely updated by the Ministry, and the E-Waste (Management) Rules, 2022 were notified in November 2022. As of April 1, 2023, the revised rules are in effect. With the strengthened Extended Producer Responsibility (EPR) regime for e-waste recycling, these new regulations aim to handle e-waste in an environmentally sound manner. All manufacturers, producers, refurbishers, and recyclers must register on the CPCB-developed portal. The proposed regulations would ensure that e-waste is recycled in an environmentally responsible manner and channel the informal sector into the formal sector for business purposes. Additionally, provisions for environmental compensation as well as verification and audit have been added. These regulations also support the Circular Economy by promoting the EPR regime and scientific e-waste recycling and disposal.[7]

Concerns for Health and the Environment:

The informal recyclers do not take the CPCB's guidelines seriously. (Central Pollution Control Board) and using risky methods to dispose of E-waste, such as acid leaching to recover copper and precious metals from PCBs (Printed Circuit Boards), mother boards, and open burning to recover targeted metals like copper, aluminum, iron, and steel from equipment peripherals; leaving all hazardous metals, such as Pb, Hg, and Cd, at the treatment sites in the open, causing an explosion of pollutants in the environment.[8] Excessive and extended exposure to these chemicals or pollutants released during the unregulated recycling of e-waste can result in harm

[6] Annual Report ,2018 , NITI AAYOG
[7] https://pib.gov.in/PressReleasePage.aspx?PRID=1986201
[8] Oladele Osibanjo, Evaluation of Pb and Cu Contents of Selected Component Parts of Waste Personal Computers, Journal of Applied Sciences and Environmental Management (Oct. 2015).

to the kidneys, brain development, blood systems, respiratory systems, skin conditions, lung cancer, bronchitis, heart, liver, and spleen. The toxic and dangerous materials found in discarded equipment caught the attention of the nation's waste management organizations since they pose a threat to public health and the environment anywhere they are present in unregulated settings. Lead and other heavy metals can be discovered in landfills. These contaminants cause soil acidification, air pollution, and contamination of ground water.

According to the UN, e-waste is any discarded object that has a battery or plug and contains dangerous and poisonous materials like mercury that can seriously endanger the health of people and the environment.[9] It's important to take into account how technological products affect climate change. Every gadget ever developed has a carbon footprint and adds to the warming of the planet caused by humans. A ton of laptops can produce up to 10 tons of CO2 emissions during manufacturing. When a device's lifetime carbon dioxide emissions are taken into account, the majority of them happen during production, prior to a product being purchased by a customer. Because of this, the manufacturing stage's lower carbon procedures and inputs (such using recycled raw materials) and the product lifetime become crucial factors in determining the overall environmental impact.

Extended Producers Responsibility (EPR)

Extended Producer Responsibility (EPR), manufacturers' responsibilities are extended throughout the course of their products' life cycles, but primarily to the post-consumer phase, which is when the products are discarded and turned into trash. Numerous nations consistently employ the Extended Producer Responsibility (EPR) principle to manage e-waste, and the outcomes of its application have been validated in EU member states. It is the producer's responsibility to provide information on the product or its components at various stages of its life cycle. The creation of a closed loop of responsibility that spans a product's whole life cycle is the most crucial aspect of EPR. Closed material loops can also benefit from EPR, as waste materials can be utilized as raw materials to produce new products. Producer responsibility (EPR) is extended to the post-consumer phase, so creating a significant connection between product design and end-of-life issues.

The CPCB's responsibility in India is to monitor Producers PAN India compliance of EPR. All manufacturers of electrical and electronic equipment (EEE) are held accountable under the Extended Producer Responsibility (EPR) framework. EPR authorization is mandatory for all producers, including importers, merchants, online sellers, eBay, and other entities that are covered by the E-Waste (Management) Rules, 2016 (MoEF&CC 2016).[10] There are numerous

[9] https://www.genevaenvironmentnetwork.org/resources/updates/the-growing-environmental-risks-of-e-waste/
[10] https://eprewastecpcb.in/#/

established methods for achieving their EPR targets, including setting up collection centers, take-back programs, or both, to direct e-waste and end-of-life products to authorized dismantlers and recyclers. As specified in their EPR Plan, producers must continue to be connected to licensed dismantlers and recyclers, either individually or collectively, through the Producer Responsibility Organization (PRO) or E waste Exchange system. Producers under Extended Producer. According to the revised e-waste rules of 2018, the phase-wise collection target for e-waste, which can be either in number or weight, is 10% of the amount of waste generated as indicated in the EPR Plan during the 2017–2018 year, followed by 20% during the 2018–2019 year, 30% during the 2019–2020 year, 40% during the 2020–2021 year, 50% during the 2021–2022 year, 60% during the 2022–2023 year, and 70% starting in the year 2023.

E waste and Sustainable Development goals:

Inadequate treatment resulting from inappropriate disposal poses major health risks. When burned or buried, the composition of hazardous e-waste contaminates land, water bodies, and breathing air, endangering public health. Unnecessary risks to society and the environment are posed by the inappropriate and unscientific dismantling operations, which include an unskilled labor force performing the task by hand in a suitable but unsafe facility in residential areas. Stakeholders' increased and adequate understanding would aid in addressing the SDGs,

Goal 6: Preserve clean water and sanitation by refraining from burning electronic waste outdoors. Ensuring appropriate channels for disposal will help accomplish Goal 11, which is focused on Sustainable Cities and Communities.

Goal 3: Optimal health and wellness and Goal 8: Decent Work and Economic Growth[11] is attainable if institutional recycling frameworks that promote scientific e-waste management practice and yield financial gains are established. The issues of economic growth, environmental preservation, and public health will also be addressed through responsible e-waste treatment and the creation of new jobs through entrepreneurial endeavors.

Extended Producer Responsibility (EPR) is especially pertinent in this context because SDG 12's focus on Responsible Consumption and Production greatly interacts with the management of electronic waste (e-waste). Because it contains dangerous elements like lead, mercury, and cadmium, e-waste a term used to describe discarded electronic items like TVs, laptops, and smartphones poses special risks to human health and the environment. E-waste poses a threat to human health and the environment when it is not managed properly, as it can contaminate land, water, and air.

[11] Sustainable Development Goals- https://www.undp.org/sustainable-development-goals

Conclusion:

Globalization, product design dynamism, and innovation have replaced electrical and electronic equipment quickly, leading to a rapid increase in waste production worldwide. Electronic goods and high-tech products like laptops, TVs, refrigerators, washing machines, and air conditioners are being bought by consumers in greater numbers. This implies that an increasing number of electrical and electronic appliances are being thrown away, which adds to the amount of electronic trash, or "E-waste." Electronic devices that have been broken, outdated, or carelessly disposed of are referred to as e-waste, or Waste Electrical and Electronic Equipment (WEEE).

Due to its harmful and toxic qualities, e-waste is flowing through the system at a very fast pace, endangering both human health and the environment. E-waste is created in the nation by a variety of sources, including the government, business, institutional, research and development, and home and manufacturing sectors. The aforementioned sectors are free to give the waste to whoever would place the highest offer; these might be professional or informal recyclers, or any local E-waste collectors. The majority of waste management techniques used today is mostly technical and concentrates on environmental issues, ignoring underlying societal issues and pertinent remedies. The problem in India is exacerbated by a lack of public awareness[12] on the proper disposal of electronic items and inadequate policies to address the challenges surrounding e-waste. Even while the government and business community agree that e-waste must be effectively handled from a social and environmental perspective, they still need to work together to reach a consensus by comprehending the practical and cultural realities of the situation. The very goal that the government and business sector are trying to accomplish will be automatically defeated if the informal sector is not formalized or forced to participate in a defined E-waste supply chain.

[12] Ambika Bhatia, A Study on Awareness of Consumers towards E-Waste Management in the City of Jaipur (2019).