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SMARTPHONES GENERATED ELECTRONIC WASTE MANAGEMENT IN BANGLADESH: POLICY ANALYSIS AND RECOMMENDATION FOR AN EFFECTIVE REGULATORY FRAMEWORK

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ABSTRACT

A new environmental threat has been imposed by smartphone-generated e-waste as almost 4 Billion people around the globe are using it randomly. People use and discard worthless smartphones with no regard for environmental damage or long-term sustainability. The large volume of electronic waste (e-waste) generated from Smartphones is becoming a major concern in Bangladesh also. The garbage from mobile phones is very harmful because it contains heavy metals that are detrimental to the environment and human health. The Medical Waste Management Rules of 2008 address waste management challenges in the medical sector, including smartphone-generated e-waste along with Bangladesh's National Environmental Policy of 1992 and Environment Conservation Act of 1995. These policies are not adequate to mitigate pollution and regulate the waste disposal and management system. The paper, after careful examination of the environmental impacts and existing policies, has recommended measures for an effective regulatory framework for the management and disposal of smartphones generated electronic waste.

KEY WORDS: Electronic waste, Smartphones e-waste, Electronic waste management, Waste regulation

INTRODUCTION

Electronic waste, sometimes known as e-waste, is one of the world's fastest-growing issues. Computers, mobile phones, digital music recorders/players, refrigerators, washing machines, televisions, and a variety of other household consumption devices are all examples of e-waste. A new threat has been imposed by smartphone-generated e-waste as almost 4 Billion people around the globe are using it randomly (Bankmycel, 2021). According to the Bangladesh Telecommunication Regulatory Commission, at the end of January 2021, the total number of mobile phone subscribers had

reached 171.854 million and almost two-third are smartphone users (BTRC, 2021). People use and discard worthless smartphones with no regard for environmental damage or long-term sustainability. According to the report "From e-waste to Resource," Bangladesh generates roughly 2.7 million metric tons of e-waste per year, whereas the global volume of e-waste generated each year is 20 million metric tons (Schluep *et al.*, 2009). According to National Board of Revenue data, almost 80,003,818 mobile phones have entered Bangladesh from 2015 to 2018. A mobile phone's lifespan is currently limited to 2.5 years, or even shorter in some situations. This means that in the following two to three years, these used

mobile phones, as well as undocumented informal imports, will end up in Bangladesh's trash stream (Rahman and Mahboob, 2015). Currently, the informal sector in Bangladesh is mostly responsible for the recycling of discarded smartphone-generated electrical products. In the informal sector located in Dhaka's urban slums, smartphone-generated electronic waste or E-waste is collected, sorted, deconstructed, and recycled (Ahmed, 2011). Processes like open burning and acid treatment are used in the manual disassembly and recycling stages. Around 1000 distinct compounds are found in smartphone e-waste, many of which include significant quantities of poisons and harmful substances. If smartphone e-waste is not recycled and disposed of appropriately, it can endanger human health and the environment. Bangladesh lacks a proper regulatory framework for the effective management and disposal of smartphone-generated electronic waste. The Medical Waste Management Rules of 2008 address waste management challenges in the medical sector, including smartphone-generated e-waste along with Bangladesh's National Environmental Policy of 1992 and Environment Conservation Act of 1995. Very soon all of these millions of cell phones and smartphones will be useless and converted into the trash and wind up in the country's trash stream if an effective regulatory framework is not implemented timely.

Impact on Environment

Smartphones generated E-waste is disposed of in large quantities in (sanitary) landfills. The TCLP (Toxicity Characteristic Leaching Procedure) was used to show that e-waste put at urban rubbish dumping sites does not cause leachates with heavy metal concentrations exceeding environmental limits (Spalvins, Dubey, and Townsend, 2008). The chemical cocktail that resulted from the TCLP test of various electrical devices as leachate was harmful to aquatic creatures (Dagan *et al.*, 2007). Because the usual technique of compressing e-waste before or during landfill burial may cause electronic circuit elements to be disrupted, it is proposed that e-waste be exposed to cement solidification, which raises pH and reduces the flow of aqueous solutions in the garbage discharged (Niu and Li, 2007). Heavy metals included in circuits covered by a plastic grid become more mobile when burned before being discarded at dump sites, and as a result, while not bioavailable after wash-out, they are released to the

atmosphere after burning. E-waste recycling, on the other hand, entails deconstructing and destroying individual components to recover a variety of materials. Sixty percent of a smartphone's usable elements can be recovered through recycling (Ladou and Lovegrove, 2008). To ensure a low impact on the environment, recycling methods should be blended with suitable technologies. While burning smartphone-generated e-waste without using appropriate technologies, developing countries emitted several pollutants into the air, which create high environmental impact and pollution. The final benefit-to-impact ratio is not always favorable to the environment (Aizawa *et al.*, 2008). Any environmental benefit from recycling is lost when the material to be recycled is carried over a long distance because of the negative environmental impact of the energy consumed to transport it (Gutierrez, Diaz and Hopp, 2008). Recycling, on the other hand, has a lower environmental impact than dumping and burning e-waste (Hischier *et al.*, 2008).

Existing Legal Provisions of Bangladesh

"Bangladesh's National Environmental Policy", enacted in 1992, controls all actions that impair or destroy the environment. The purpose of the "Environment Conservation Act of 1995" was to "regulate, conserve, and improve the quality of the environment", as well as to "control, avoid, and mitigate pollution". "The Medical Waste Management Rules", which took effect in 2008, address all aspects of medical waste management, including E-waste. The most current initiative is the "Electrical and Electronic Waste (Management and Handling) Rules, 2011", which incorporates the following features: These regulations apply to anybody involved in the "manufacture, sale, purchase, or processing of electrical and electronic equipment or components, including producers, dealers, collection centers, refurbishers, dismantlers, recyclers, auctioneers, consumers, and bulk consumers". It specifies who is responsible for what: the manufacturer, the dealer, the refurbisher, the collecting center, the customer or bulk consumer, the dismantler, the recycler, and the reprocessors. It outlines how authorizations are granted, as well as who has the right to suspend or revoke them. Procedures for registration, environmental clearance, and renewal E-waste storage procedures, E-waste transportation procedures Accident reporting and investigation Producers, collectors,

carriers, dismantlers, and recyclers of e-waste are all liable. Electronic trash is collected, stored, transported, sorted, reconditioned, deconstructed, recycled, and disposed of. Bangladesh lacks rules for dealing with e-waste, as well as its disposal and management. Bangladesh is a signatory to the "Basel Convention", which prohibits hazardous waste from being transported over international borders. Any type of garbage must be imported with the approval of the government. Although it is briefly listed as an action item in the country's ICT policy, there is no comprehensive electronic waste (e-waste) policy. Under the "Environment Pollution Control (EPC) Ordinance, 1977", the government formed the Department of Environment (DoE). The "Ministry of Environment and Forest" was founded as the top body in 1989, when pollution and the environment gained increasing attention. In 1992, the "National Environmental Policy" went into force, emphasizing the regulation of all activities that harm or degrade the environment. The "Environment Conservation Act (ECA) of 1995" gave the Department of the Environment the authority to take whatever action required to preserve and improve the quality of the environment, as well as to manage, avoid, and mitigate the pollution. Any new project must also be approved by the "Department of the Environment" on environmental grounds. The "Environment Conservation Rules of 1997", which followed the ECA, split businesses and projects into different groups based on pollution load and potential environmental damage. Within the industry sectors, there are some criteria and laws that must be followed to create a waste management system. The Act and its restrictions, on the other hand, do not apply to smartphone-generated e-waste. The government is currently developing a solid waste management strategy that may include smartphone-generated e-waste. At the same time, the "Medical Waste Management Rules of 2008" address waste management challenges in the medical sector, including smartphone-generated e-waste.

Challenges for the Government

According to e-waste development trends, Bangladesh's development of e-waste related policy, including waste reduction efforts such as "Extended Producer Responsibility" (EPR), is a crucial benefit. This law gives Bangladesh the regulatory framework it needs to address e-waste challenges formally, as well as accelerates the adoption of

lessons learned in e-waste regulation and management from industrialized countries. In addition, several developing nations are contemplating adopting technologies that have been successfully applied in developed countries with adequate infrastructure to manage smartphone e-waste. A number of these developing countries' economic, environmental, and social situations differ from those of developed countries, necessitating adaptation, putting in place, and scaling up appropriate technologies that are better suited to the situation of the local circumstances. This is in line with research into the implementation of EPR policies in Bangladesh, which has revealed some issues and limitations. If items are smuggled into the country or little shop-assembled products account for a substantial fraction of the market, governments' first challenge is to recover funds from manufacturers or importers. The procedures that incentivize collectors and recyclers to over-report the amount of e-waste they collect to get additional payments from the fund are the second problem. The third problem is the battle for e-waste between the legitimate and informal recycling sectors. The involvement of the informal e-waste recycling business in developing countries versus developed ones is one of the major issues to explore. This is because Bangladesh's informal sector participates in the e-waste recycling process. The valuable elements present in the e-waste stream, as well as its market worth, encourage these informal recyclers. Informal collectors obtain very high collection efficiency in countries like Bangladesh, India, and China, where considerable amounts of e-waste recycling take place. In nations like Bangladesh, prohibiting and imposing fines on informal recycling hasn't helped. This is because informal recycling is carried out by the poor, and as a result, the government is unable to enforce high fines because the poor cannot afford to pay them. The challenge is determining how to deal with e-waste recyclers who profit more from illegal informal recyclers than licensed recyclers. According to a study, e-waste disposers are generally wealthier than recyclers, allowing the government to charge them a high fee. In developing countries, waste management and recycling through informal sectors are the results of several complex phenomena like the expanding gaps between socio-economic reality and regulatory framework with the expectation that the informal sector will continue to be an important recycling force in the upcoming decades. The entire

“Informal recycling chain” must be thoroughly examined to decide which phases are ecologically friendly and should be preserved, as well as which steps of the material mass flow should be altered to improve downstream environmental and recycling performance.

Recommendation for an Effective Regulatory Framework

With the creation of the United Nations (UN) treaty known as the “Basel Convention” on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, the international community began to regulate the issue of hazardous waste. In 1992, the Basel Convention came into effect. It was created to decrease hazardous waste transit between countries. Another aim of the convention was to prevent hazardous waste transfer between developed and developing nations. The convention has been ratified by 183 countries. Bangladesh is a signatory to the Basel Convention, which it joined on April 1, 1993. According to Bangladesh’s Import Policy Order, the import of second-hand electronic goods is prohibited (IPO). However, because substantial amounts of smartphone e-waste already exist in the informal sector, it’s unknown how strictly the ban is enforced or whether the e-waste is created in the country or illegally imported. The integration of e-waste into the national development agenda via policy planning instruments such as “green economy assessments (GEA)” and “strategic environmental assessments (SEA)” is the first proposal for an effective regulatory framework. Stakeholder considerations, green economy credentials, and environmental sustainability are projected to be better integrated into e-waste policy creation using policy planning methods like GEA and SEA. The “Green Economy Act (GEA)” marks a transition from the current black economy, which is based on fossil fuels, to a green economy, which is based on renewable energy sources and sustainable production and consumption. Using GEA to design an e-waste policy would allow the e-waste industry to be integrated as part of a national green growth strategy, with the government as the main investor and consumer of green e-waste infrastructure and goods. Once the government becomes the market and driver to green the supply chain, this may give the essential economic incentive signals for a more environmentally responsible e-waste production industry. The second suggestion is to set up national e-waste database systems, as well as a decision-

making system, to collect, update, and disseminate e-waste data and information. The third option is to create a phased national informal sector e-waste register to officially recognize and track the informal sector. While many developing-country governments are becoming more conscious of the problem of electronic waste and striving to solve it, others have yet to adopt the appropriate Basel, Bamako, or Waigani agreements into their domestic legislation. Both the “Nairobi Declaration on Environmentally Sound Management of Electronic and Electrical Waste”, published in 2006, and the “Bamako Declaration on the Environment for Sustainable Development”, published in 2010, appear to indicate that Africa’s challenges are greater than what can be sacrificed on the altar of political expediency. Several developing countries have formulated policies on “electrical and electronic equipment”; Some are concentrating their attention on the age of imported “electrical and electronic equipment, such as Ghana, which is considering a ban on “electrical and electronic equipment” older than five years, and Uganda, which has banned the importation of second-hand electrical and electronic equipment. As it seems difficult to formulate a universal regulatory mechanism to address the e-waste problem, Bangladesh should focus on formulating a national legal framework on e-waste management and transboundary movements. The legislature could follow the guidelines of the “Administrative Measures on Control of Pollution Caused by Electronic Information Products (known as the China RoHS) of 2006” and the “Ordinance on the Administration of the Recovery and Disposal of Waste Electronic and Electrical Products (known as China WEEE) of 2009”. In terms of policy, some developed and developing countries are less likely to join the United Nations Development Programme (UNDP) and UNEP’s Poverty-Environment Initiative (PEI). Joining the initiative could help to get technical assistance and institutional capacity building. While legal frameworks and regulatory operations are critical components of effective solutions to the problem of electronic waste in developing countries like Bangladesh, strategic techniques involving all stakeholders are unavoidable. In the end, all participants in the product-disposal chain are responsible for the environmental consequences of the overall production system. To reduce their products’ life-cycle environmental impacts, manufacturers should

influence product design, manufacturing methods, material selections, product system support, product delivery, and product disposal procedures. To reduce their products' life-cycle environmental impacts, manufacturers should influence product design, material selections, manufacturing methods, product delivery, product system support, and product disposal procedures.

CONCLUSION

The invasion of smartphone-generated e-waste is complicating Bangladesh's solid trash management, which is already a major concern. A full assessment of the current and future scenario, including quantification, characteristics, existing disposal procedures, environmental implications, and so on, is urgently needed. Unquestionably, digitized Bangladesh represents a big potential for our country. However, we must be prepared for the ramifications of this modernization leap. To deal with the massive amounts of smartphone e-waste that will accumulate in the future, it is recommended that e-waste rules be enacted at the national level, that stakeholders be made aware of the issue, and that the country adopt a self-sustaining e-waste management model.

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