"Developing an E-Waste Management System at the Ateneo de Manila University"

Grand Sustainability Solutions

Presented to
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Introduction

In 2019, the World Economic Forum published, "A New Circular Vision for Electronics: Time for a Global Reboot." In this explainer, a zero-e-waste circular economy for electronics and electrical goods production and consumption was proposed.

In a circular economy for e-waste, government leadership, producer responsibility, and consumer education and awareness are seen as enablers of market mechanisms that drive higher resource productivity, innovation, and economic growth (Ali and Shirazi, 2023). Circular economy in zero e-waste management emphasizes using few raw materials, going beyond traditional recycling practices, designing products for reuse, durability, and safe recycling, efficient production and distribution of electronic and electrical goods, improving collection and recycling infrastructures, and studying consumer behavior (World Economic Forum, 2019). In short, it prioritizes "working towards higher-value material loops and waste prevention" (Ali and Shirazi, 2023).

A policy report, "Development of E-waste Management Policy at the Local Level: A case Study of Cebu City, Philippines," examined how Cebu, the Philippines' second-fastest-growing city after Manila, developed an e-waste management system with its Japanese partners in Kitakyushi City. After observing the deficiencies in the existing policies and regulations in the city and waste management practices (from e-waste generation to its final treatment), Premakumara (2016) recommended the following to improve the e-waste management situation of Cebu: establishment of a multi-stakeholder dialogue, having an inventory of the current e-waste situation, development of an e-waste management strategy including regulations, establishment of e-waste management business models, establishment of effective monitoring and certification systems, and development of awareness programmes. In the said policy report, specific methods that are in accordance with the zero-e-waste circular economy were established.

Overall, the integration of the circular vision, the case study mentioned above, and other related research and development projects can be a guide in further developing an e-waste management system at the university level—specifically, at the Ateneo de Manila University (ADMU).

Sustainability issues

Economic Sustainability: *Competition between the informal and formal sectors*

Corporate consumers include commercial, industrial, and government entities. Some Cebu City offices and commercial customers have prior arrangements with formal recyclers and second-hand stores for waste disposal. collecting obsolete and abandoned e-waste such as personal computers. Industrial users in the city either send their e-waste to recyclers in the

industrial processing zones or ship it to recyclers in other regions of the country, including Manila.

In the city, competition between the informal and formal sectors is fierce, particularly in the personal computer and cellular industries. Markets for mobile phones (Carisma, 2009) informal recyclers have several ways for repurposing abandoned EEE prior to ultimate treatment. The collected machines are frequently refurbished and then outfitted with counterfeit software and computer add-ons and peripherals. Furthermore, mobile phones are frequently mended, refurbished, and replaced. No-name, pirated, and copycat electronics (e.g. iPod) are imported from Taiwan, Thailand, and China. Because of these various revenue prospects, the informal and second-hand markets might pay higher rates for worn or broken mobile phones. Phones for a lower price (one phone for 15-20 Pesos) than formal recyclers (2-10 Pesos per unit).

Another potential impediment to promoting the city's e-waste recycling company is a scarcity of domestic e-waste (Carisma, 2009). Maritrans Recyclers, Incorporated (MRI) is one of the largest and oldest e-waste recycling, the city's official e-waste recycler, the factory receives roughly 2-5 tons of e-waste every week. The majority of it is bulky garbage generated by business and institutional users. Due to competition from the informal sector, the company cannot obtain enough domestic e-waste to support its operations.

Social Sustainability: *Poor waste management accessibility*

Due to a lack of skills, technology, and financial capacity to manage e-waste recycling facilities that match international standards, both formal and informal e-waste recycling firms in the city confront enormous obstacles. Inadequate treatment due to a lack of technology and competence may result in health issues as well as air and soil contamination in the barangays.

There have been very few initiatives to promote material recovery and take-back mechanisms, such as the activities organized by SM Malls. However, the success of these operations is limited due to user annoyance and a lack of incentives. It was discovered that recyclers who participate in the monthly recycling market buy e-waste at the same or lower price than junk dealers who visit residences to buy e-waste.Furthermore, people must deliver their e-waste to the landfill.

Recycling markets can be seen in mall parking lots. People, particularly those without their own transportation, found it inconvenient to move large e-waste using public transportation. Many people were turned off by these difficulties. Residents are barred from participating in e-waste recycling events, despite their desire to do so.

Environmental Sustainability: *Low environmental consciousness*

Household devices that are no longer functional frequently find up in the hands of scavengers (waste pickers). Scavengers sell discarded electronics to junk businesses, who then

sell them to a formal recycler for dismantle, recovery of valuable metals, and further processing.Even while city officials need to know the volume of e-waste generated by families in order to make realistic policy decisions, e-waste management and recycling system decisions.

A lack of environmental consciousness and knowledge of environmental legislation is also a problem in Cebu City's e-waste management. According to A2D (2012) approximately 42% of city families are unaware of the classification of e-waste and hazardous garbage, as well as the proper disposal techniques for these waste items. Some of the factors for low environmental consciousness include a lack of education, limited information exchange, and a lack of effective promotion and instructional programs to enhance environmental awareness are all issues that must be addressed.

Despite the fact that the Philippine national government has approved essential laws and legal frameworks to ensure a proper e-waste management system, the implementation of this national legislation and legal frameworks has been slow at the local level and is insufficient. Most localities lack by-laws and policies that identify e-waste types, separate collecting, or ensure ecologically sound e-waste treatment and disposal.

The future of e-waste management in developing cities is dependent not only on national and international initiatives, but also on the effective practices of local government authorities working with waste producers (citizens) and recycling service operators (both formal and informal sectors). Building local government capacity is therefore critical for developing an e-waste management system that handles e-waste in an environmentally sound manner through the formation of public and private partnerships. International partners can play an important role in offering technical know-how and capacity building opportunities, facilitating research and best practices, and giving development support to strengthen the city's e-waste management system through city-to-city cooperation.

Development Projects

The projects listed below tackle the sustainability challenges that are aggravated by improper e-waste disposal and management practices. This is considering the fact that e-waste is a rapidly growing global health concern that affects the lives of almost every inhabitant in the world. These initiatives include projects from foreign countries, and as well as a variety of programs from the Philippines that seek to alleviate the potential harm that can be brought in by e-waste.

Envirocycle

Envirocycle stands out as the sole full-service environmental processor of electronic waste in the Philippines, equipped to manage a wide array of electronic waste streams, being dedicated to minimizing waste pollution, contamination, and the consumption of natural

resources. Through advanced methods and technology, they actively promote the concept of "gradual zero disposal to landfill.". The company holds accreditation from the Department of Environment (DENR) as a Treatment, Storage, and Disposal (TSD) Facility, capable not only of handling e-waste but also various other hazardous materials such as CRTs, damaged fluorescent lamps (BFLs), used lead-acid batteries (ULABs), ink toners and cartridges, used oil, contaminated containers, solder dross, solder paste, and more. Personnel and vehicles engaged in transporting hazardous waste undergo DENR-approved training and hold the appropriate accreditation.

E-waste Zero

The Globe Telecom Team proposed E-waste Zero as a tool for solving the e-waste problem (Tillekeratne, 2020). Globe's comprehensive sustainability framework covers four main thematic areas: Care for People, Positive Social Impact, Digital Nation and Care for the Environment. It was launched in 2014 under the name of Project 1 Phone, and has been one of the strongest e-waste collection efforts in the Philippines today. The project is detailed on the responsible disposal and recycling of e-waste. The E-waste Zero tool targets the total kilograms of e-waste collected per year or total percent of waste diverted from landfills or the total number of partners for the program. The total proceeds are given to Habitat for Humanity, a charitable institution that develops low-cost housing and schools for the disadvantaged communities.

EWIT

Meanwhile in Africa, another project aiming to solve the e-waste problem is EWIT, or the E-Waste Implementation Toolkit (2015). The initiative aims to create an e-waste toolkit for African metropolitan areas to boost recycling and recover secondary raw materials from E-waste, addressing challenges posed by urbanization. The fast growth of use of technology is making a rise in e-waste stream, having limited recycling capacity. Improvements are in a way urgently needed to combat related health issues, alleviate poverty and develop the local recycling sector. EWIT project's aim is to address these challenges, assisting African municipalities in the implementation of effective e-waste management systems for their communities. EWIT will resolve the conditions and actions necessary to implement effective waste recycling systems in metropolitan areas.

UNIDO Project

The United Nations Industrial Development Organization (UNIDO) and the DENR in the Philippines have led projects supporting safe e-waste recycling in Manila's low-income districts (UNIDO, 2020). Funded by the e Global Environmental Facility (GEF), it upgraded a municipal facility to treat e-waste, offering safety training, especially for women recyclers. The project

aims to prevent pollution, ensure proper handling of hazardous substances, and formalize employment. It incorporates gender-responsive measures, documenting roles and risks, providing training for women, and promoting their leadership. The Bagong Silang Treatment, Storage, and Disposal (TSD) facility, opened in 2020, is the country's first community-run e-waste recycling center, recognized by GEF as a good practice for sustainable and inclusive programming.

Pragmatic Implications

Despite the multifaceted aspects and various spaces affected by electronics, whether beneficial to humankind equipping nations towards achieving the 2030 sustainable development goals or to economies with its "huge" opportunities in material value, these products are ironically being discarded at a fast rate and in vast amounts resulting in "wasted resources." In the face of this, there stands an opportunity to build a circular electronics system where electronic products are not merely used and discarded, but collected and integrated into a system where their values remain intact and eventually re-used. As part of the Platform for Accelerating the Circular Economy (PACE), The E-waste Coalition's New Circular Vision for Electronics report (World Economic Forum, 2019) identifies the contemporary age as a time for a "global reboot" to address and arrest the global challenge posed by the growing problem on electronic and electrical wastes worldwide. To push for a zero e-waste circular economy, the following are identified to pursue such a cause:

1. **Vision** wherein the society collectively rethink the "rules of the game" creating a vision for which the government, consumers, and industry are existing alongside each other;
2. **Awareness** wherein the public is enlightened regarding the growing global challenge of e-waste along its opportunities;
3. **Collaboration** where nations, small and medium-sized enterprises (SMEs), entrepreneurs, associations, academies, trade unions, public and private institutions, and civil society play an important role in being involved in processes towards change in the landscape of electronics; inciting
4. **Action** in coordinated and inclusive ways "across national borders."

Part of this movement is the establishing of a legislative basis at the national level geared towards regulating the management system of e-wastes (Premakumara, 2016). The gap and major challenge this imposes, however, lie on the practical implementation of these policies at local levels. In the Philippines, DENR Administrative Order No. 2013-22 (DAO 2013-22) recognizes e-waste as a "new class" of waste and revised the procedures and standards for the management of hazardous wastes (Malaya, 2013) including generating, transport and storage,

and treatment and disposal (TSD) facilities. This also asserted the role of the local governments for appropriate implementation of the order.

In the case of Cebu City reviewing the state of e-waste management practices—generation, collection, recycling, treatment, and policies, the main barriers to effective implementation of the order lie in how the public responds and various points of view. Moreover, the study identified the important relationship between the practices coming from the local governments while working with the waste producers (consumers) and operators of recycling and repurposing services. Along with establishing mechanisms towards a circular economy in electronics, partnerships between the public and private sectors and institutions are crucial, especially in bridging the waste producers and re-users.

Inching toward contextualizing solutions for the growing problem of e-waste, the report from Cebu City's e-waste management system crafted several points for recommendations intended for local decision makers in other cities in the country. One of which is the "inventory of the current e-waste situation" where a need for e-waste assessment is emphasized. In doing so, the proponents suggested cities to work with academics and practitioners in inventory and monitoring of e-waste generation. This is where the suggested solution of the group comes in- encourage collection and identification of e-wastes from users: employees and students. This ideation springs from the fact that despite awareness about the issue on e-waste, individuals seem out of touch with facilities on where and how to properly discard electronic products from batteries to bigger machineries.

Such effort to integrate collection of e-waste at the school level encourages participation and collaboration from stakeholders- consumers, partner institutions in processing and repurposing these e-wastes, and the government in response to the Administrative Order 2013-22. The implementation of this in the university calls for leadership and administration response in relation to adapting policies in pursuit of the goal- to take part in the zero e-waste circular economy model loop, specifically in bridging consumers and facilities through collection and proper inventory.

The cost of implementing this solution will not be that big. The potential costs seen are those for the additional deposit bins for e-waste but then again, the university can partner with institutions such as Globe (with their existing e-waste zero bins) in order to fully take advantage of systems that are already in place within the country. It must also be stated that within an increasingly emerging online world, the status of technology and gadgets are at an all-time high. Students, teachers, and other such stakeholders must be given the entitlement of having the right to repair, to sustain, and as well as to properly dispose of the ever-increasing amount of e-waste that piles up given the status of consumption within these products.

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