Electronic Waste Disposal in Saudi Arabia

[1]Ahmed Aleissa, [2]Salem Alturky, [3]Abdullah Hamam, [4]Rahsed Almujaljil

Abstract: **Electronic waste disposal becomes very important in implementing circular economy in many countries, such Saudi Arabia. The rapid change of technologies has shortened the life-cycle of many electronics which lead to having huge amount of electronic waste that need to be disposed in a safe way, have a process of electronics recycling, or refurbish them to be used somewhere else. Saudi Arabia as a grown market have invested in circular economy through establishing many companies specialized in recycling of electronic waste and other materials. In this paper, the electronic waste disposal effort and challenges of different Saudi organizations, such as government sectors, non-profit organizations, and profit organizations will be discussed.**

Keywords: **Electronics, Disposal, Recycling, Waste, Circular Economy.**

I. INTRODUCTION

Electronic waste disposal plays a major role in implementing circular economy as the accelerated rhythm in tech-invention has shorten the life-cycle of many electronics which causes its retention to be much less in the years to come. In Saudi Arabia as rapidly grown market, there is one accredited specialized company called "TADWEER" that helps users to get extra mileage out of used computers, monitors, and TV sets or at least make it possible for other consumers to do so. One can donate his/her old office equipment like those old electronics and tech gadgets rather than let them gather dust in a closet or add them to a landfill. Many individuals and organizations from international to local will greatly appreciate having these circulated/refurbished devices. Some specialize in recycling in certain fields, such as government sectors, non-profit organizations, and profit organizations.

II. GOVERNMENT SECTOR

Waste management is a significant priority for Saudi Arabia due to its rapid industrialization, high rate of population expansion, and rapid urbanization [9]. According to a 2018 study, Saudi Arabia's daily waste per person is 1.72 kg, of which 2-3% are thought to include electronic wastes [7]. It is anticipated that by 2035, more than 106 million tons of trash would have been processed [9]. The Regional E-waste Monitor for the Arab States 2021 confirms this. Saudi Arabia produces the most electronic trash, at 595 kilotons (kt) (13.2 kg/inh) [11].

Therefore, Saudi Arabia became one of the pioneers' countries in paying attention to the field of waste management. It has begun developing an integrated plan for managing all waste types. The approach includes minimizing the rates of created wastes and encouraging the private sector to invest in recycling, energy recovery, and metal reclamation enterprises in addition to laws, unique procedures, and standards for managing electronic wastes [12].

In July 2019, Saudi Arabia has established National Center for Waste Management aiming to regulate and supervise waste management activities, encouraging investment, as well as expanding their quality based on the principle of Circular Economy in waste management to achieve sustainable development goals [10].

A new waste management law was released in Saudi Arabia in 2021 to control the import, export, safe disposal of trash, and all other associated operations. To improve environmental and economic outcomes, all parties involved must recycle, recover resources, and ensure safe disposal [9].

Additionally, as part of Vision 2030, the National Center for Privatization and PPP (NCP) has identified waste management as one of the areas that should be privatized. The NCP website as well as other websites like Tadweer for managing e-waste are places where businesses can locate postings of procurement opportunities [9].

III.   NON-PROFIT ORGANIZATIONS

There are many nonprofit organizations in Saudi Arabia that would be grateful to receive old computers. Donating old computers, Laptops, iPad etc. to nonprofit organizations kingdom-wide is a great way to help those in need and to give back to the community. Computers are essential tools for many people, and by donating your old computer, you can help someone get the education, training, or employment he/she need to improve their life.

Below are some of the nonprofit organizations in Saudi Arabia that would be grateful to receive your old computer:

- King Salman Center for Disability Awareness

- Saudi Red Crescent Society

- Alwaleed Philanthropies

- Mohammed bin Rashid Al Maktoum Foundation

- Ertiqa Foundation

- Al-Amal Charity Society

- Islamic Relief Worldwide

In 2020, during the COVID-19 Pandemic, there was the time that schools in Saudi Arabia were totally closed and all classes were shifted to virtual platforms. Many poor people couldn't afford accommodating such change and avail the required devices to their children to continue their education remotely from home. Charities organizations and committees exerted all their effort to help and support those poor families by donating used computers received from the local community. Received used electronic devises, such as laptops, computers, printers, etc are refurbished by the charities organizations and then donated to the most needed families to let their children continue their education. In addition, other companies from private sectors, such as Saudi Aramco has launched the company's employee initiative to support the kingdom educational process remotely, under the title "Hardware Donation Campaign", in cooperation with the Charitable Association for the Rehabilitation of Computers "Irtiqaa". The campaign lasted for two weeks, from September 6-17, 2020 during which the company's employees donated used computers, including desktops, laptops, and tablets. In 2021, Saudi Aramco donated more than 100,000 computers to nonprofit organizations in Saudi Arabia in which laptops were the most common type of computer donated. [1] [5].

IV.   PROFIT ORGANIZATIONS

The electronic waste market is a promising sector in Saudi Arabia. As per Al Arabiya News website, the United Nations Conference on Trade and Development reported that "Saudi Arabia has the largest number of mobile phones users worldwide with 180 mobile phones for every 100 residents in Saudi." [6].

The Saudi Ministry of Investment, had issued a report that showed the scorecard of the investment opportunity in the electronic waste (e-waste) market. As per the report and according the General Authority for Statistics report revealed in 2018, the Saudi daily waste 1.72 kg per capita. Moreover, the report estimated that the value of disposable electronic devices in 2025 and 2030 that can be reused is more than 2 billion dollars. Considering that the Kingdom of Saudi Arabia is the largest regional market and its used devices is 60% higher in comparison with Gulf Cooperation Council (GCC) countries, the report highlighted that it can be a regional hub for companies to localize their manufactories and process all their operations. [7].

Many companies have invested in the e-waste market in Saudi Arabia, these companies provide electronic recycling and disposal services which includes all electronic devices and peripherals. Some of these companies are:

- Huloul e-waste recycling.

- EADA: Sorting and Recycling Co. For Environmental Services

- SAMA: Sama Environmental Services Co.

- Tadweeer.

The 2022 annual report for Tadweeer Storing and Recycling Company shows net profits of 18,159,645 SAR compared to profits of 11,347,830 SAR in 2021 and profits of 9,567,130 SAR in 2022. [8]
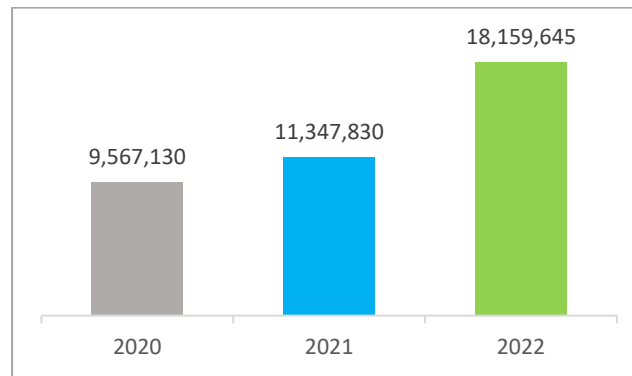
Figure 1: Tadweer Net Profit (SAR) [8]

Moreover, Tadweeer finalized an agreement with Saudi Electricity Company worth of 20 million Saudi Riyals in this regard, signed a contract with PrimeGate for Communications and IT to recycled replaced copper cables kingdom wide and signed a Memorandum of Understanding with the Ministry of Communications to recycle more than 1 million devices in the coming five years. [8]

V. INFORMATION SECURITY THREAT OF ELECTRONIC WASTE

Although, disposing the electronic waste is highly recommended and governed by law in some countries, computers and smartphones that usually disposed can hold a lot of sensitive information. Therefore, improper treatment of the information still present in electronic waste may pose a threat to information security. [4].

The majority of Saudi Arabian institutions resell or donate old, formatted personal computers to non-profit organizations without properly disposing of the hard drives and memory devices. [2]. However, this risk is not always adequately evaluated, and the amount of valuable information saved on discarded electronic devices receives little attention. [3][4].

In order to ensure that data on electronic waste is secure and won't be recovered by unauthorized users during the recycling or reuse process, there are a number of processes that clean data out of e-waste beyond recovery. Therefore, people must be aware of the privacy concerns and data security issues related to electronic waste, and they must follow the correct channels and protocols when getting rid of their electronic waste. [2].

VI. CONCLUSION

In conclusion, Saudi Arabia as one of the largest consumers of electronic devices will continue investing in circular economy by managing electronic waste through establishing more specialized recycling companies in the up-coming years which will lead to economic growth and provide safe environment for its people. Other Saudi government sectors and non-profit organizations will continue play major role in circular economy by helping the society through donating of old electronic devices, such as computers to the most needed families to ensure their children continue their education and have better life style.

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